Final

Source Water Assessment

for the

Town of Grantsville Water System

Garrett County, Maryland

Prepared for:

Maryland Department of the Environment
Water Management Administration
Water Supply Program
1800 Washington Boulevard, Suite 625
Baltimore, Maryland 21230-1719

Prepared by:

EA Engineering, Science, Technology, Inc.
15 Loveton Circle
Sparks, Maryland 21152
(410) 771-4950

February 2004

Final

Source Water Assessment

for the

Town of Grantsville Water System

Garrett County, Maryland

Prepared for:

Maryland Department of the Environment
Water Management Administration
Water Supply Program
1800 Washington Boulevard, Suite 625
Baltimore, Maryland 21230-1719

Prepared by:

EA Engineering, Science, Technology, Inc.
15 Loveton Circle
Sparks, Maryland 21152
(410) 771-4950

Mike Hertz, P.G.
Task Manager

Kevin Sharpe, P.G.
Project Manager

February 2004

TABLE OF CONTENTS

Page

LIST OF FIGURES iii

LIST OF TABLES iii

LIST OF ACRONYMS AND ABBREVIATIONS iv

EXECUTIVE SUMMARY ES-1

1. INTRODUCTION 1-1

 1.1 Ground-Water Supply System Information 1-1
 1.2 Hydrogeology 1-1

2. DELINEATION OF THE AREA CONTRIBUTING WATER TO SOURCE 2-1

3. INVENTORY OF POTENTIAL CONTAMINANTS WITHIN THE DELINEATED ZONE 3-1

 3.1 Point Sources 3-1
 3.2 Non-Point Sources 3-1

4. REVIEW OF WATER QUALITY DATA 4-1

 4.1 General Water Quality Parameters 4-1
 4.2 Volatile Organic Compounds 4-1
 4.3 Synthetic Organic Compounds 4-1
 4.4 Inorganic Compounds 4-2
 4.5 Microbiological Contaminants 4-2

  4.5.1 Ground Water Under the Direct Influence (GWUDI) 4-2

 4.6 Radionuclides 4-3

5. SUSCEPTIBILITY ANALYSIS 5-1

 5.1 Volatile Organic Compounds 5-1
 5.2 Synthetic Organic Compounds 5-2
 5.3 Inorganic Compounds 5-2
 5.4 Radionuclides 5-3
 5.5 Microbiological Contaminants 5-3

CONTENTS (continued)

Page

6. RECOMMENDATIONS FOR PROTECTING THE WATER SUPPLY 6-1

    6.1 Protection Team 6-1
    6.2 Public Awareness and Outreach 6-1
    6.3 Planning/New Development 6-1
    6.4 Monitoring 6-1
    6.5 Contingency Plan 6-2
    6.6 Changes in Uses 6-2
    6.7 Contaminant Source Inventory Updates/Inspections 6-2
    6.8 Purchase Conservation Easements or Property 6-3
    6.9 Spring Upgrades 6-3
    6.10 Cooperative Efforts With Other Agencies 6-3

7. REFERENCES 7-1

APPENDIX A: RESULTS OF GROUND-WATER SAMPLE ANALYSIS

LIST OF FIGURES

Number	Title
1	Town of Grantsville location map of supply wells and springs.
2	Town of Grantsville source water protection area map with potential source of contamination.
3	Town of Grantsville land use map of the source water protection area.
4	Town of Grantsville sewer service map of the source water protection area.

LIST OF TABLES

Number	Title
1	Well information.
2	Spring information.

LIST OF ACRONYMS AND ABBREVIATIONS

BMP	Best Management Practice
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Act Information System
CHS	Controlled Hazardous Substances
COMAR	Code of Maryland Regulations
CREP	Conservation Reserve Program
DWEL	Drinking Water Equivalent Level
ft	Foot/Feet
gpd	Gallon(s) Per Day
gpm	Gallon(s) Per Minute
GPS	Global Positioning System
GWUDI	Ground Water Under the Direct Influence
in.	Inch(es)
IOC	Inorganic Compound
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
mg/L	Milligram(s) Per Liter
mL	Milliliter(s)
MGS	Maryland Geological Survey
NPL	National Priorities List
PCBs	Polychlorinated Biphenyls
pCi/L	Picocurie(s) Per Liter
PVC	Polyvinyl Chloride
PWSID	Public Water System Identification
SDWA	Safe Drinking Water Act
SDWR	Secondary Drinking Water Regulations
SOC	Synthetic Organic Compound
SWAP	Source Water Assessment Plan
SWPA	Source Water Protection Area
SWPP	Source Water Protection Plan

LIST OF ACRONYMNS AND ABBREVIATIONS (continued)

µg/L	Microgram(s) Per Liter
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WHPA	Well Head Protection Area

EXECUTIVE SUMMARY

EA Engineering, Science, and Technology was tasked to perform a Source Water Assessment for the Town of Grantsville water system in Garrett County, Maryland. The Maryland Department of the Environment (MDE) identifies this water system as Public Water System Identification (PWSID) 0110005. EA has performed this study under Purchase Order No. U00P9200205, as authorized by the MDE.

The required components of this report, as described in the Maryland Source Water Assessment Plan (SWAP), are:

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

The source of the Town of Grantsville water supply is the Pottsville-Allegheny Formation and the Purslane Sandstone, which are unconfined sandstone and shale and sandstone aquifers. The Source Water Protection Areas (SWPAs) for the four ground-water supply wells and the supply springs was delineated using the watershed delineation method. The SWPAs are based on land topography, nearby streams, and a calculation of the total ground-water contributing area during a drought. There are a total of four separate SWPAs that total approximately 694 acres.

Potential point and non-point sources of contamination within the assessment area were identified based on site visits, a review of MDE's databases, and a review of sewer service area and land use maps. The only point source of pollutants observed within the SWPA was a pole-mounted electrical transformer adjacent to the Shade Hollow Well (Well 5). Pastures and forests were observed within the SWPA. Pastures account for 17 percent of the SWPA and can be considered a non-point source of contaminants such as nitrates and microbiological contaminants. Well information and water quality data were also reviewed.

The susceptibility analysis for the Town of Grantsville water supply is based on a review of the water quality data, potential sources of contamination, aquifer characteristics, and well integrity. It was determined that the Town of Grantsville water supply is moderately susceptible to nitrates and microbiological contaminants, and has a low susceptibility to volatile organic compounds, synthetic organic compounds, other inorganic compounds, and radionuclides.

Recommendations to protect the ground-water supply include creating a SWPA team, resident awareness, and communication with County officials about future planning and land use.

1. INTRODUCTION

EA Engineering, Science, and Technology was tasked to perform a Source Water Assessment for the Town of Grantsville water system in Garrett County, Maryland. EA has performed this study under Purchase Order No. U00P3200205, as authorized by the Maryland Department of the Environment (MDE).

The Town of Grantsville water system serves the residents within the Town of Grantsville in northern Garrett County. The water treatment plant, supply wells, and springs for the system are located adjacent to National Pike (Route 40) and on the property of Arthur Green. The Town of Grantsville system serves a population of 600 with 210 connections. Four wells and four springs supply the water for this system (Figure 1).

1.1 GROUND-WATER SUPPLY SYSTEM INFORMATION

Based on a review of the well data and sanitary surveys of the water supply system ,Well 2 (Source 01) was drilled on 24 October 1991 and Well 5 (Source 05) was drilled on 19 July 1993. Well 6 (Source 07) was drilled on 10 August 1999. All wells were drilled in accordance with the State's current well construction standards, which were implemented in 1973. Wells 2,5 and the four springs have an average appropriation amount of 111,000 gallons per day (gpd). Well 2 has a pumping rate of 70 gallons per minute (gpm). The average ground-water appropriation amount for wells 6 and 7 is 112,000 gpd.

The wellheads were observed to be in good repair with secure caps, while the springs lacked a pump house or protective structure. The springheads were identified by white PVC pipe markers. The pumping rates for the four springs is unknown. A summary of the well construction data is shown in Table 1. A summary of available data on the four springs that supply this system is shown in Table 2.

TABLE 1. WELL INFORMATION

Source ID	Source Name	Permit No.	Total Depth (ft)	Casing Depth (ft)	Aquifer
01	Well 2	GA880815	300	43	Pottsville-Allegheny Formation
05	Well 5 – Shade Hollow	GA881351	232	99	Pottsville-Allegheny Formation
07	Well 6 – Arthur Green	GA941222	463	107	Purslane Sandstone
08	Well 7 – Arthur Green	GA942351	503	165	Purslane Sandstone

TABLE 2. SPRING INFORMATION

Source ID	Source Name	Aquifer
02	Grantsville Springs 2	Pottsville-Allegheny Formation
03	Grantsville Springs 3	Pottsville-Allegheny Formation
04	Grantsville Springs 4	Pottsville-Allegheny Formation
06	Grantsville Springs 6	Pottsville-Allegheny Formation

Three additional, unused, wells were identified in the site visit. According to Grantsville township employees, these wells are collapsed and not connected to the system or abandoned.

According to MDE, the contact responsible for this system is Bill Hetrick (OT-3), the Chief System Operator.

Water treatment processes include disinfection by gaseous chlorine, a PH adjustment by treatment with lime, and pressure sand filtration for iron removal.

1.2 HYDROGEOLOGY

Garrett County lies entirely within the Appalachian Plateau physiographic province, and is the westernmost county in Maryland. Pleistocene terraces and recent flood plains found along the larger streams and consolidated sedimentary rocks of the mid-Paleozoic (Devonian, Mississippian, and Pennsylvanian age) dominate the surface and subsurface geology. The Mid-Paleozoic units are folded into broad anticlines and synclines that trend northeast-southwest. The anticlinal structures are underlain by Devonian rocks and contain three distinct gas fields. The synclinal structures form the coal basins of the region and are underlain by Pennsylvanian rocks.

The ground water and spring water used by the Town of Grantsville is derived from the Pottsville-Allegheny Formation (Lower Pennsylvanian age) and the Purslane Sandstone of the Pocono Group (Lowe Mississippian age).

The rocks of the Pennsylvanian age consist of thin units of a repeating and variable sequence of sandstone, siltstone, and shale with subordinate amounts of coal, clay, and argillaceous limestone. The Pottsville and lower Allegheny Formation contain a somewhat higher percentage of sandy beds than the other Pennsylvanian units. The Pottsville and lower Allegheny Formation is described as "sandstone (locally conglomeritic, sandy shale and siltstone with clay beds and thin coal seams." Typically, this formation is an important aquifer in the coal basins and moderately important along the flanks of the basins [Maryland Geological Survey (MGS) 1980].

The Purslane Sandstone is composed of "coarse-grained sandstone (locally conglomeritic), shale and sandy shale." This is an important aquifer in the Deer Park and Accident anticlines. Many wells and springs in the Pocono Formation are fairly high-yielding water sources (MGS 1980).

The source of ground water in Garrett County is from precipitation in the form of rainfall or snowmelt that infiltrates into the subsurface. The availability of ground water in the predominantly sedimentary bedrock depends on the lithology of the rock, the permeability of the substrate, and the presence or absence of secondary openings from fracturing and weathering. The average well yield of 127 wells in the Pottsville-Allegheny Formation is 13.1 gpm (MGS 1980). Well yield from the Pocono Formation, from 132 wells, is 13.1 gpm with a range of 0.8 to 130 gpm (MGS 1980).

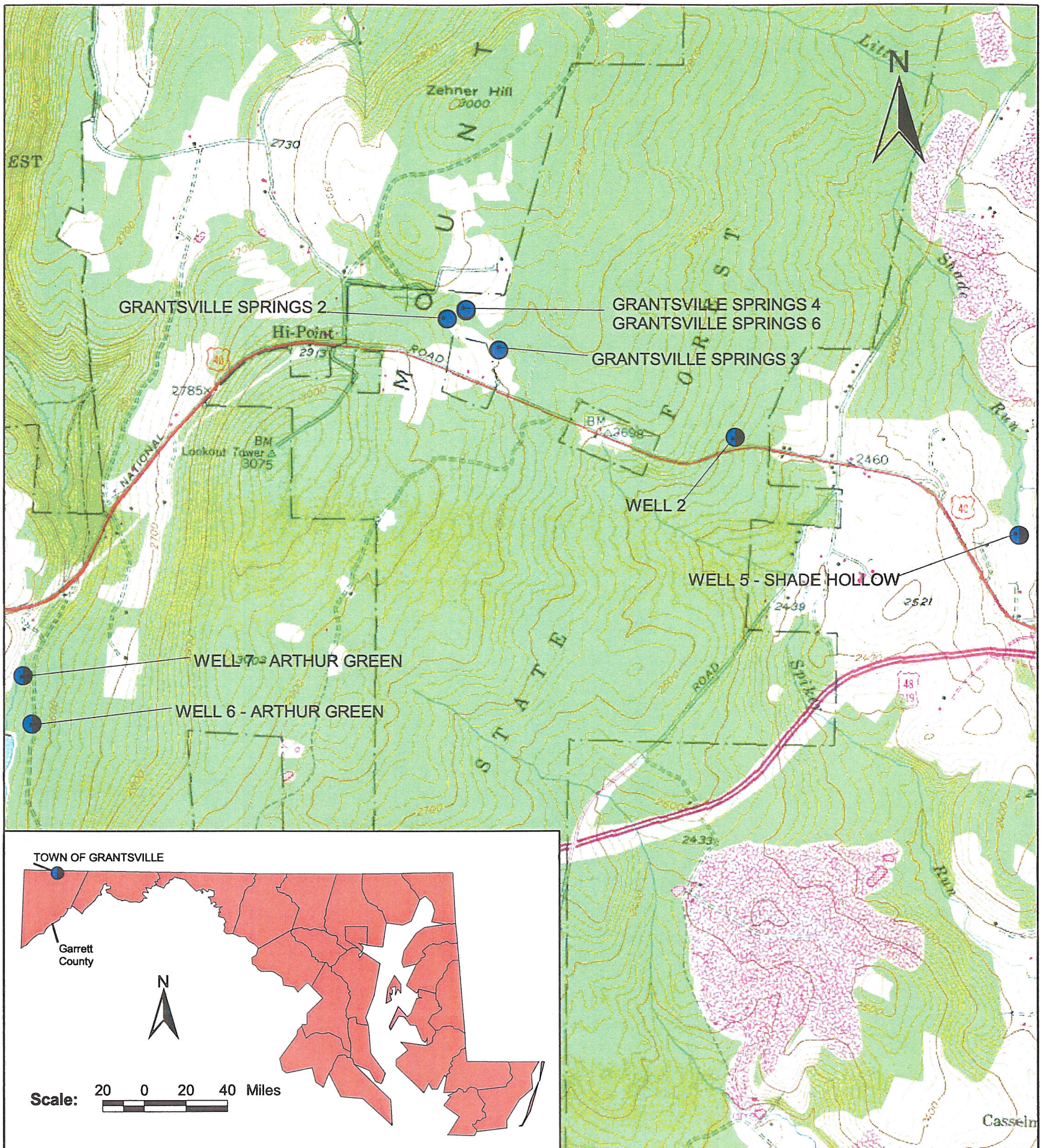


Figure 1. Town of Grantsville
Location Map of Supply Wells and Springs

Source Water Assessment Program
2003

Legend:

- Supply Well
- Supply Spring

Source: United States Geologic Survey. 1994. *7.5-minute Series Topographic Map for Grantsville, Maryland-Pennsylvania.*

Scale:

1000 0 1000 2000 Feet

2. DELINEATION OF THE AREA CONTRIBUTING WATER TO SOURCE

For ground-water systems, a wellhead protection area (WHPA) is considered to be the source water protection area (SWPA) for the system. Consistent with the recommended delineation method in the Maryland Source Water Assessment Plan (SWAP) (MDE 1999), the watershed drainage area that contributes ground water to the supply wells and springs was assessed.

This original delineation shape was modified by accounting for surface water bodies, topography, significant land features, and by using a conservative calculation of total ground-water recharge during a drought. For conservative purposes, a drought condition recharge value of 400 gpd per acre (or approximately 5.4 in. per year) was used to estimate the total ground-water contribution area required to supply the well.

The current Water Appropriation Permit for the Town of Grantsville issued by the MDE Water Rights Division is for a total withdrawal of 223,000 gpd with 111,000 gpd for the two Pottsville-Allegheny Formation wells and four springs and 112,000 gpd for the Purslane Sandstone wells. To determine the total ground-water contribution area during a drought, the following equation was used:

Recharge Area (acre) = Average Use (gpd)/Drought Condition Recharge (gpd/acre)

From the equation above, the total ground-water contributing area during a drought is approximately 558 acres. The total delineated SWPA is approximately 694 acres (Figure 2), and is therefore adequate to meet the average daily ground-water usage during a drought. Wells 5, 6, and 7 are adjacent to streams that bound their SWPA. Due to the distance between supply sources (wells and springs) and the geography of the area, the SWPA was divided into four separate areas. Individual recharge areas were calculated for each zone and summed for a total acreage of the entire system.

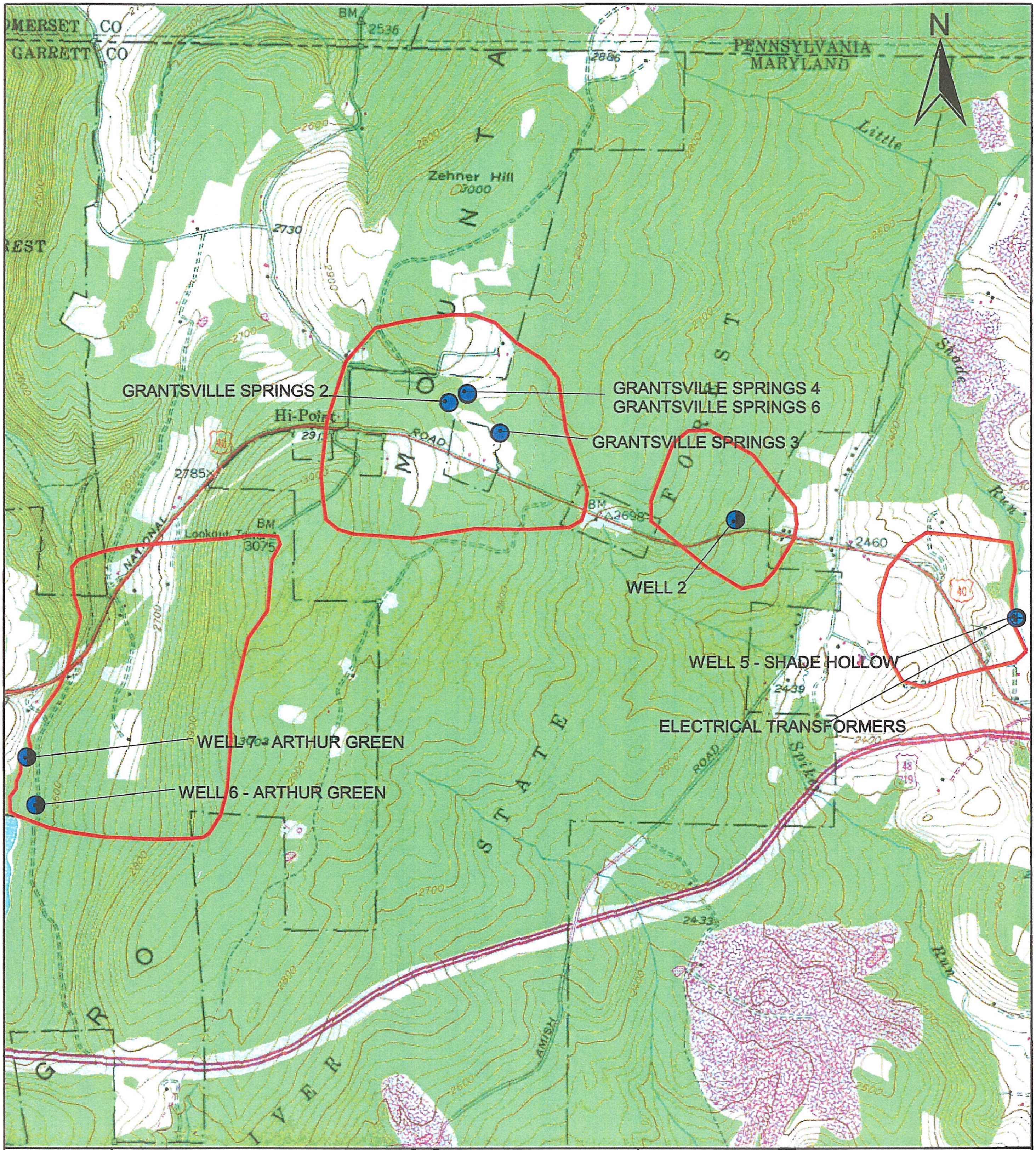


Figure 2. Town of Granstville Source Water Protection Area Map with Potential Sources of Contamination

Source Water Assessment Program
2003

Legend:
- Supply Well
- Supply Spring
- SWPA Boundary
- Miscellaneous

Source: United States Geologic Survey. 1994. *7.5-minute Series Topographic Map for Grantsville, Maryland-Pennsylvania.*

Scale: 1000 0 1000 2000 Feet

3. INVENTORY OF POTENTIAL CONTAMINANTS WITHIN THE DELINEATED AREA

A field survey was performed on 16 December 2002 to confirm potential sources of contamination identified in MDE databases around the ground-water wells and springs. These databases include the Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS), which includes National Priorities List (Superfund) sites, Maryland Registered Underground Storage Tank (UST) sites, Maryland Leaking Underground Storage Tank (LUST) sites, landfills, pesticide dealers, ground-water discharge permits, and Controlled Hazardous Substances (CHS) generator sites.

During the field survey, other potential sources of contamination not in the MDE databases were noted and the location was surveyed using a global positioning system (GPS) receiver for mapping purposes (Figure 2).

3.1 POINT SOURCES

Immediately adjacent to Well 5 (Shade Hollow) is a pole-mounted electrical transformer. Prior to 1977, many transformers contained polychlorinated biphenyls (PCB) as an insulator. It is possible that this transformer may contain PCB. If the transformer leaks, the PCB oil could eventually leach through the soil overburden and into the ground-water aquifer.

A septic system and drain field was observed on the property of Arthur Green, adjacent to Well 7. This septic system can be a pathway for nitrates to enter the ground water. Improper disposal of solvents or fuels through the septic system can also introduce volatile organic compounds (VOCs) to the aquifer.

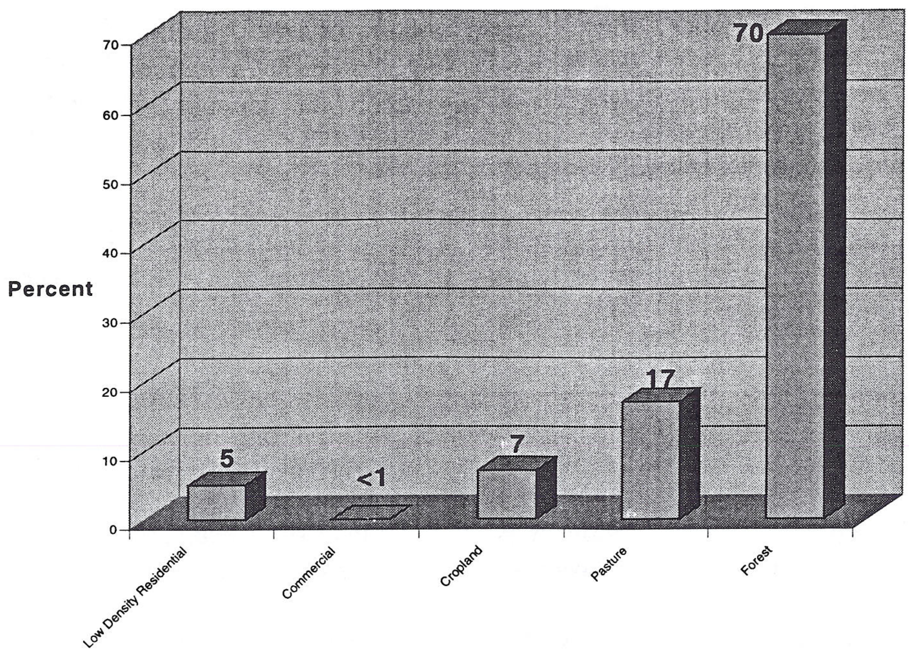
3.2 NON-POINT SOURCES

Using the Maryland Office of Planning 2000 Land Use/Land Cover map for Garrett County, potential non-point sources within the SWPA were also evaluated by land use designation (Figure 3). A summary of the percent and acreage of each type of land use is presented in the graphs on the following page.

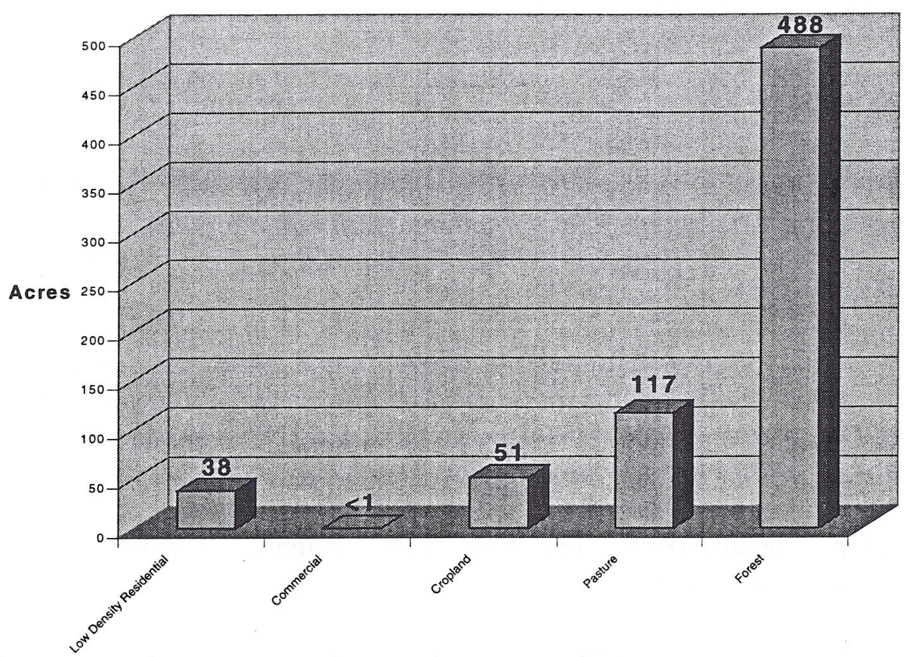
From an interpretation of the graphs, forest (488 acres) account for the majority of the SWPA (694 acres). There are no non-point sources of pollution associated with forested areas. However pastures (117 acres), cropland (51 acres), and residential areas (38 acres) account for a significant portion of the SWPAs. Nitrate and microbiological contamination from manure in pastures and septic systems in residential areas is possible. Over-application of herbicides and pesticides on croplands can also occur. Therefore, there is potential for the migration of contaminants into the ground water.

Using the 1993 Maryland Office of Planning's Garrett County sewerage coverage, potential non-point sources from other septic system users in the SWPA were assessed (Figure 4). By overlaying the SWPA on the sewerage coverage layer in ArcView GIS, it was determined that the entire SWPA does not have public sewer service and is not planned for service for at least 10 years.

PERCENTAGE OF EACH LAND USE TYPE



ACREAGE OF EACH LAND USE TYPE



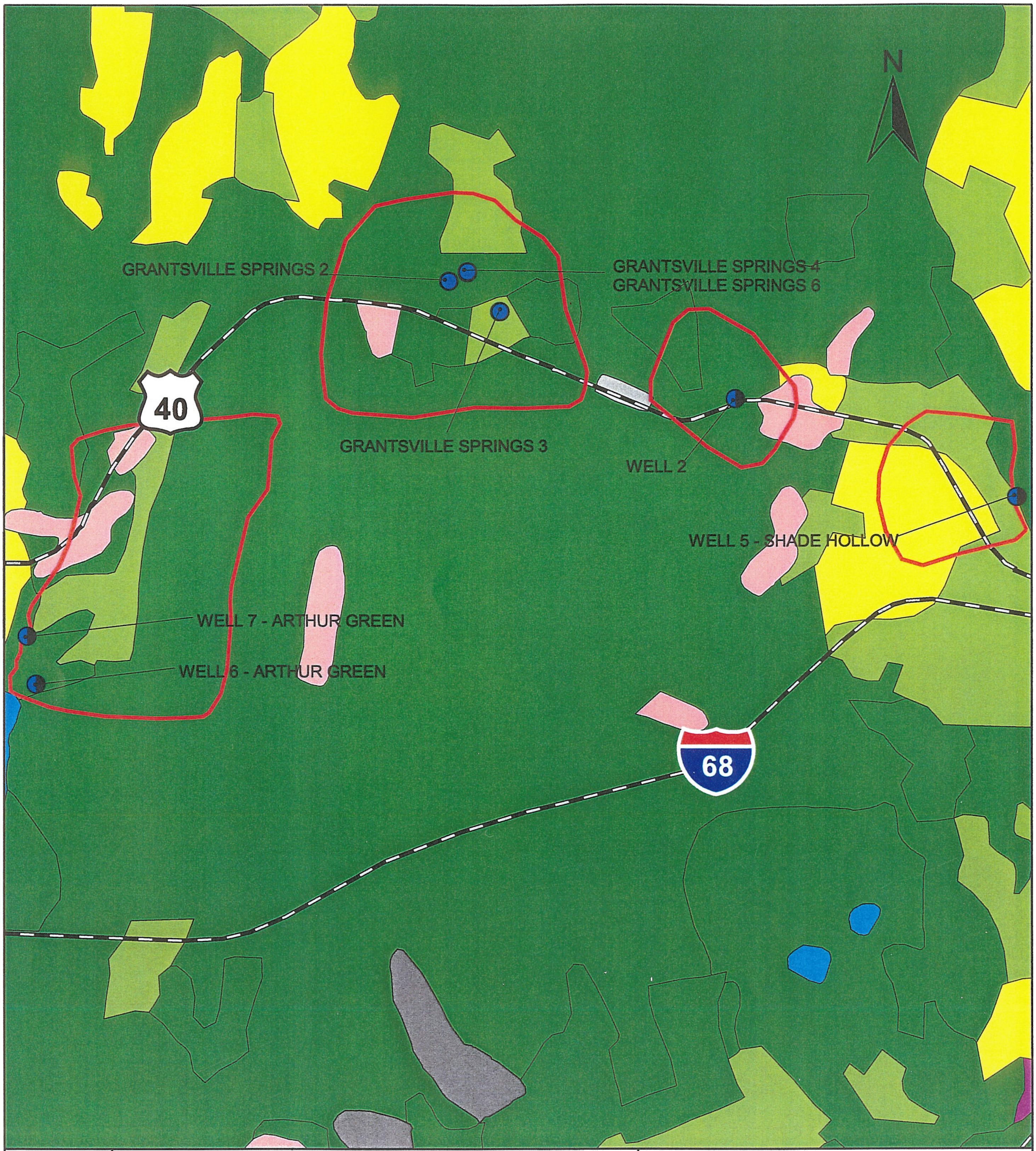


Figure 3. Town of Grantsville Land Use Map of the Source Water Protection Area

Source Water Assessment Program
2003

Scale: 2000 0 2000 Feet

Legend:

- Supply Well
- Supply Spring
- Major Roads
- SWPA Boundary

Land Use

- Low Density Residential
- Extractive
- Cropland
- Pasture
- Forest
- Water
- Feeding Operations
- Commercial

Source: Maryland Office of Planning, 2000.

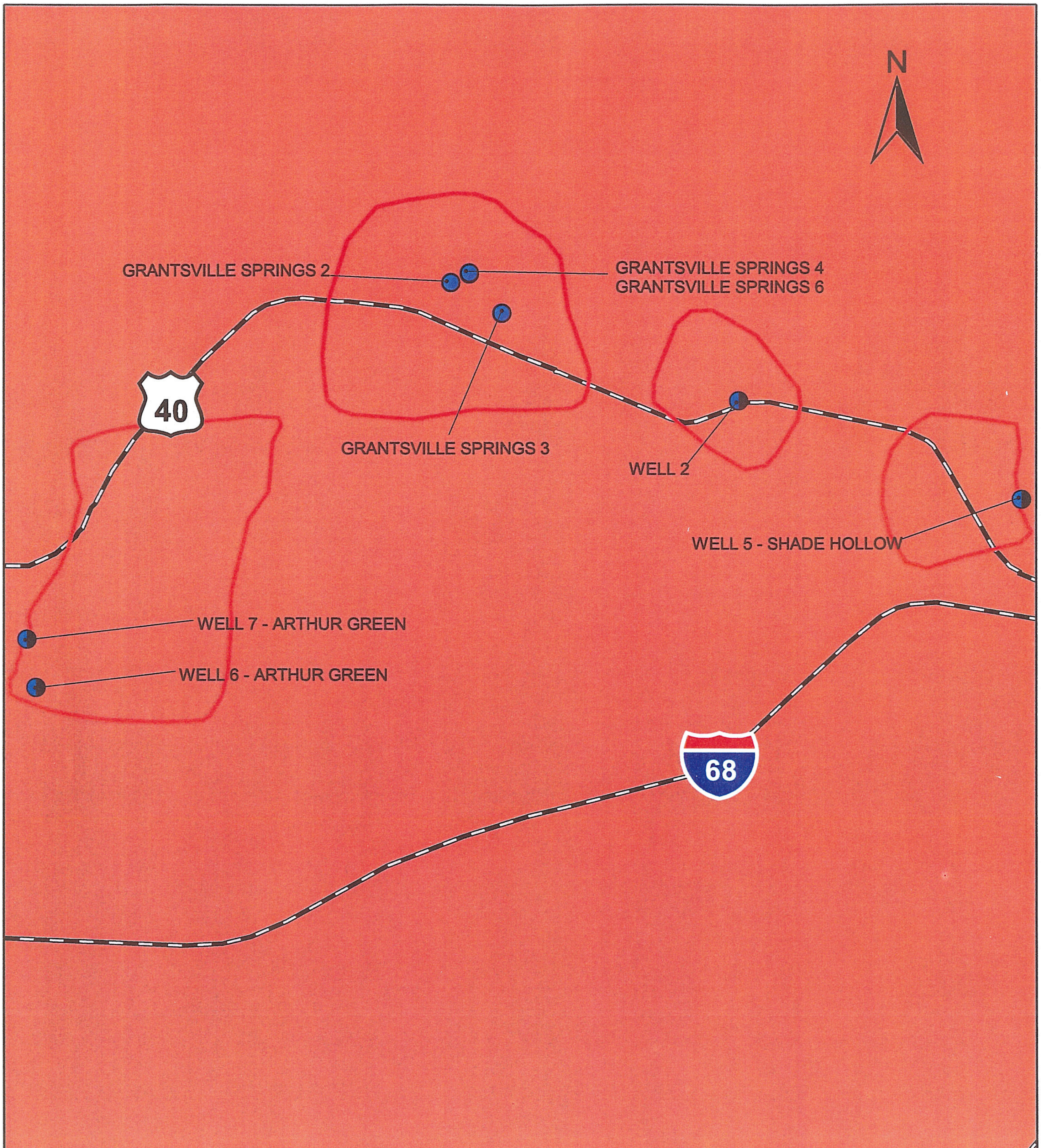


Figure 4. Town of Grantsville Sewer Service Map of the Source Water Protection Area

Source Water Assessment Program
2003

Legend:

Supply Well
Supply Spring
SWPA Boundary
Major Roads

Sewer
No planned service area

Scale: 1000 0 1000 2000 Feet

Source: Maryland Office of Planning, 1993.

4. REVIEW OF WATER QUALITY DATA

Water quality data were obtained from the MDE Water Supply Program database of Safe Drinking Water Act (SDWA) contaminants. The results reported are for finished (treated) ground water (not raw water unless noted).

A review of the water quality data from 1990-2002 has been performed for the Town of Grantsville's finished water samples. The results of the ground-water sample analysis are shown in Appendix A.

Ground-water analytical results were compared to 50 percent of the U.S. Environmental Protection Agency (USEPA) Maximum Contaminant Levels (MCLs) or the USEPA Secondary Drinking Water Regulations (SDWR). If no MCL of SDWR was available, the Drinking Water Equivalent Level (DWEL) was substituted as recommended by the USEPA Office of Water.

4.1 GENERAL WATER QUALITY PARAMETERS

No general water quality parameters were reported in the ground-water samples at concentrations greater than 50 percent of the comparison criteria.

One ground-water sample collected on 20 May 1996 was reported with a pH value of 7.2, which is within the normal SDWR range of 6.5 to 8.5.

4.2 VOLATILE ORGANIC COMPOUNDS

No VOCs were reported in the ground-water samples at concentrations greater than 50 percent of the comparison criteria.

A low level concentration (1 µg/L) of methylene chloride was reported in a ground-water sample collected on 14 February 1991. Methylene chloride has a USEPA MCL of 5 µg/L.

The disinfection by-products bromodichloromethane, chloroform, and dibromochloromethane (along with bromoform are commonly known as trihalomethanes) were also reported in water samples taken between 14 February 1991 and 24 March 1999, and ranged in concentration from 0.6 to 9.0 µg/L. The total concentration of trihalomethanes is below the current MCL for all trihalomethanes of 100 µg/L and the future MCL of 80 µg/L, which will be effective in January 2004.

Chloroethane (0.9 µg/L) was detected in a ground-water sample taken on 24 March 1999. Currently, chloroethane has no MCL, DWEL, or SDWR.

4.3 SYNTHETIC ORGANIC COMPOUNDS

No synthetic organic compounds (SOCs) were reported in the ground-water samples at concentrations greater than 50 percent of the comparison criteria.

A low-level concentration of dalapon (0.16 μg/L) was detected in a ground-water sample collected on 24 March 1999, which is less than the MCL of 200 μg/L.

4.4 INORGANIC COMPOUNDS

No inorganic compounds (IOC) were reported in the ground-water samples at concentrations greater than 50 percent of the comparison criteria.

Low-level concentrations of nitrate were reported in ground-water samples collected between 17 March 1993 and 9 January 2002, ranging from 0.21 to 1.0 mg/L. A low-level concentration of nitrite (0.003 mg/L) was reported in a ground-water sample collected on 20 May 1996. The reported nitrate and nitrite concentrations are below the MCLs of 10 and 1 mg/L, respectively.

Also, low-levels of sulfate were detected in ground-water samples collected on 13 December 1995 (12 mg/L), 20 May 1996 (14.3 mg/L), and 24 March 1999 (12.5 mg/L), and are less than the SDWR for sulfate of 250 mg/L.

Sodium (42.8 mg/L) was detected in a ground-water sample collected on 24 March 1999 and is within the USEPA drinking water advisory range of 30-60 mg/L.

4.5 MICROBIOLOGICAL CONTAMINANTS

No total or fecal coliform has been detected in samples of the finished water from January 1997 to August 2002.

4.5.1 Ground Water Under the Direct Influence (GWUDI)

Surface water that directly recharges the aquifer through major fractures in rock does not pass through the soil overburden that both filters and contains beneficial microorganisms that break down contaminants. If significant variances in the ground-water results from dry and storm conditions are observed, it is possible that the ground water is under the direct influence of surface water.

To assess the potential of Ground Water Under the Direct Influence (GWUDI) of surface water, ground-water sampling records (during dry and storm conditions) in MDE databases were assessed and information from Public Water Reports was reviewed.

Samples collected from Plant 3 from 24 May 1995 through 27 May 1995 had detectable levels of total coliforms on 25 May (23 organisms/100 mL) and 26 May (17 org/100 mL). A sample collected on 25 May had a fecal coliform concentration of 2 organisms/100 mL.

Samples collected from Plant 3 on 29 June 1995 and 30 June 1995 had total coliform concentrations of 50 and 240 organisms/100 mL, respectively. No fecal coliforms were detected.

Total coliform bacteria were detected in samples collected on 1 and 2 July 1995 (80 and 30 organisms/100 mL, respectively). No fecal coliforms were detected.

Also, a sample collected on 20 October 1995 from Plant 3 reported concentrations of total coliforms of 50 organisms/100 mL. No fecal coliforms were detected.

Samples from 22 November 1995 to 25 November 1995 were collected from Plant 3 and had detectable concentrations of total coliforms. The reported results were 30, 23, and 4 organisms/100 mL. All samples were non-detect for fecal coliforms.

No total or fecal coliforms have been detected in any GWUDI samples since 1995.

4.6 RADIONUCLIDES

No radionuclides were detected in ground-water samples at concentrations greater than 50 percent of the comparison criteria.

Gross beta was detected in the ground-water samples collected on 6 October 1993, 2 October 1995, and 24 March 1999. The reported gross beta concentrations were less than the MCL of 50 picocuries per liter (pCi/L). Concentrations were 1, 2, and 2.1 pCi/L, respectively.

Radon-222 (50 pCi/L) was reported in ground-water samples collected on 23 June 1999 at less than the conservative proposed MCL of 300 pCi/L. This MCL is a proposed MCL established by USEPA since there is no current MCL for this contaminant (USEPA 1999). However, if a state has a program to address the more significant risk from radon in indoor air, then 4,000 pCi/L can be used as an alternate MCL. For the purpose of this investigation, the more conservative number was utilized.

5. SUSCEPTIBILITY ANALYSIS

To evaluate the integrity of the ground-water sources, the following criteria were used to conduct the susceptibility analysis:

1. Available water quality data
2. Presence of potential contaminant sources in the SWPA
3. Aquifer characteristics
4. Well and spring integrity
5. Likelihood of change to the natural conditions

The aquifers that supplies the Town of Grantsville's drinking water are unconfined.

For the susceptibility analysis in this report, rankings of "high," "moderate," and "low" susceptibility to contamination were utilized after a review of current information. However, other SWAP reports for the State of Maryland also utilized rankings of "is," "may be," and "is not" susceptible to contamination. For consistency between the ranking systems, the following details their equivalence. The ranking of "highly susceptible" is equivalent to "is susceptible," "moderately susceptible" is equivalent to "may be susceptible," and "low susceptibility" is equivalent to "is not susceptible."

5.1 VOLATILE ORGANIC COMPOUNDS

No VOCs were reported greater than 50 percent of the MCL.

The trihalomethanes reported in the water samples are likely by-products of the chlorination process to eliminate waterborne bacteria. The reported concentrations were less than the MCL of 100 µg/L and the future MCL of 80 µg/L.

Methylene chloride (also known as dichloromethane) was detected (1 µg/L) in a water sample from 14 February 1991 at less than the MCL of 5 µg/L and is the only reported detection. Methylene chloride is a common laboratory cross-contaminant and is not likely present in the ground water.

Chloroethane (0.9 µg/L) was detected in a single ground-water sample collected on 24 March 1999. This compound has no comparison criteria at this time. Chloroethane is a common constituent of solvents and could be present as a result of a local release.

The four springs in this system are vulnerable to VOC contamination from surface runoff; however, no sources were observed within the SWPA.

Based on the water quality reviewed, the land use in the area, and the absence of point sources, the water supply for the Town of Grantsville has a low susceptibility to VOC contamination.

5.2 SYNTHETIC ORGANIC COMPOUNDS

No SOC concentrations were reported greater than 50 percent of the MCL.

The commercial herbicide dalapon was detected at a low concentration in a single sample collected on 24 March 1999 and was less than the MCL. Dalapon is a herbicide used to control grasses in a wide variety of crops, and is also registered for use in a number of non-crop applications such as lawns. The detections of dalapon could be the result of the application to weeds and grass within the SWPA.

No other SOC contaminants were detected in the water samples. SOCs are not readily dissolved in water and have a high affinity to sorb to soil particles. From well construction data for the Town of Grantsville, there is approximately 40 to 160 ft of overburden that will buffer the aquifer from SOC contamination.

The four springs within the SWPA have a low susceptibility to SOC contamination based on the lack of point sources. Also, the surface springs are only vulnerable to SOC contamination from a local release adjacent to the spring.

Based on the water quality reviewed, the thickness of overburden, and the absence of point sources for SOCs, the Town of Grantsville waters supply has a low susceptibility to SOCs.

5.3 INORGANIC COMPOUNDS

No IOCs were reported greater than 50 percent of the comparison criteria.

All of the SWPA is not served by public sanitary sewer systems. Septic systems were observed within the SWPA and are a possible source of nitrate in ground water. However, no concentrations of nitrate have been reported greater than 1.0 mg/L. No trends in the reported nitrate concentrations in the water samples have been observed over time. Elevated levels could occur due to an influx of agricultural animal waste, agricultural chemicals or fertilizers, and/or septic system effluent into the drinking water.

Sodium and sulfate were both detected in samples, but are within the background range for Garrett County (MGS 1980). The concentrations were less than their respective SDWR.

The springs for Grantsville are in property adjacent to pastures. Active grazing pastures can be a non-point source of nitrates from manure that can impact the water quality of the springs.

Based on the water quality reviewed, the presence of a large acreage of pastures upgradient of the springs that could impact the ground water with nitrates, and the presence of springs that can be easily impacted by surface runoff, the water supply for the Town of Grantsville is moderately susceptible to nitrates and has a low susceptibility to other IOCs.

5.4 RADIONUCLIDES

No radionuclides were detected in water samples at concentrations greater than 50 percent of the MCL.

Radon-222 and gross beta were detected in low concentrations and were less than the more conservative proposed MCL for each compound.

Based on the water quality reviewed and lack of point sources for radionuclides, the water supply for the Town of Grantsville has a low susceptibility to radionuclides.

5.5 MICROBIOLOGICAL CONTAMINANTS

No total or fecal coliforms were detected in the finished water samples from this system.

GWUDI samples have returned positive results for fecal and total coliforms in water samples taken during and after rain events. However, no GWUDI samples have been reported with coliform since 1995. MDE has determined that the springs and wells are not under the direct influence of surface water.

Fecal coliforms are a subset of total coliforms and are a good indicator of surface water contamination, and of the potential presence of waterborne pathogens associated with fecal contamination (USEPA 2001).

From documentation reviewed, the production wells were constructed after 1973, the year that proper well construction techniques were required to prevent surface water infiltration. All the wellheads were observed to be in good repair and were secure. However, the springs were not protected from surface water runoff.

The two unused collapsed wells are not properly abandoned and sealed. Surface contaminants can travel down the casing and impact the bedrock aquifer.

Based on the water quality reviewed, the nearby pastures, the presence of surface springs without surface water runoff protection, the GWUDI determinations, and the review of the construction records, the water supply for the Town of Grantsville is moderately susceptible to microbiological contamination.

6. RECOMMENDATIONS FOR PROTECTING THE WATER SUPPLY

With the information contained in this report, the Town of Grantsville has a basis for better understanding of the risks to its drinking water supply. Being aware of the SWPA, knowing potential contaminant sources, evaluating current and 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.

Recommendations for the protection of the ground-water supply are intended for the water supplier and its residents. Specific management recommendations for consideration are listed below.

6.1 PROTECTION TEAM

The team should represent all the interests in the community, such as water suppliers, community associations officers, the County Health Department, local planning agencies, local businesses, developers, property owners, and residents within and near the SWPAs. The team should work to reach a consensus on how to protect the water supply.

6.2 PUBLIC AWARENESS AND OUTREACH

The water supplier should consider discussing with property owners and businesses located within the SWPA the activities that could have impacts to the ground water and its quality.

The water supplier should also consider sending pamphlets, flyers, or bill stuffers to its residents to educate them about the SWPA. An example pamphlet, "Gardening in a Wellhead Protection Area," is available from MDE. The residents should also be encouraged to notify the Town of Grantsville management of any significant spills from gasoline or any other potentially hazardous substances.

Placing signs at the SWPA boundaries is an effective way to make the public aware of protecting their source of water supply, and to help in the event of spill notification and response.

The Executive Summary of this report should be listed in the Consumer Confidence Report for the water system, and should also indicate that the report is available to the general public by contacting the water supplier, the local library, or MDE.

6.3 PLANNING/NEW DEVELOPMENT

The water supplier should also inform the Garrett County Health and Planning Departments of any concerns about future development or zoning changes for properties that are within the SWPA.

6.4 MONITORING

The water supplier should continue to monitor the ground water for all SWDA contaminants as required by MDE.

Annual raw water sampling at the springs and the wells for microbiological contaminants is a good way to check the integrity of each source type.

The newly installed well, Arthur Green 2, has not had GWUDI testing performed to date. GWUDI samples should be collected and submitted for laboratory analysis as soon as possible.

6.5 CONTINGENCY PLAN

As required by the Code of Maryland Regulations (COMAR) 26.04.01.22, all water system owners are required to prepare and submit a plan to provide safe drinking water under emergency conditions for approval by MDE.

The water supplier should develop a Spill Contingency Plan. Quick and effective spill response in the event of accidental spills or leaks is an important element in the water supplier's SWPP. This plan should identify the procedures and resources to be used to mitigate any discharge of oil or hazardous substances in the SWPA. It should also establish responsibilities, duties, procedures, and resource containment, mitigation, and cleanup of accidental discharges of oil and hazardous substances that may occur within the SWPA. In all cases when spills may present a significant risk of contamination to ground water within the SWPA the local fire department should be notified of the incident.

6.6 CHANGES IN USES

The water supplier is required to inform the Water Supply Program at MDE of any changes to pumping rates and when a change in the number of wells or springs used is anticipated. Any changes to the pumping rate and/or the number of supply wells or springs will affect the size and shape of the SWPA.

6.7 CONTAMINANT SOURCE INVENTORY UPDATES/INSPECTIONS

The water supplier should conduct its own survey of the SWPA to ensure that there are no additional potential sources of contamination.

A regular inspection and maintenance program of the supply wells should be considered to prevent a failure in the well's integrity, which could provide a pathway for contaminants to the aquifer.

6.8 PURCHASE CONSERVATION EASEMENTS OR PROPERTY

Loans are available for the purchase of property or for the purchase of easements for protection of the water supply. Eligible property must lie within the designated SWPA. Loans are currently offered at zero percent interest and zero points. Please contact the Water Supply Program of the MDE for more information.

6.9 SPRING UPGRADES

The water supplier should consider implementing protective encasements around the springs to prevent surface water runoff from impacting water quality.

Springs can become contaminated when barnyards, sewers, septic tanks, and other sources of pollution are located on higher adjacent land. In addition, fecal bacteria (in addition to soil bacteria) have been found in the water from springs located near the headwaters of mountain streams, where the watersheds are generally heavily forested and uninhabited by man (EPA 1982).

The basic features of a spring encasement structure are as follows:

- An open-bottom, watertight basin intercepting the source, which extends to bedrock or a system of collection pipes and a storage tank
- A cover that prevents the entrance of surface drainage or debris into the storage tank
- Provision for the cleanout and emptying of the tank contents
- Provision for overflow
- A connection to the distribution system or auxiliary supply

At a minimum, the spring area around Spring 3 should be fenced to keep out livestock, especially in the upgradient direction, to help avoid possible pollution. In addition, a diversion ditch upgradient of the spring could be constructed to prevent surface water flow into the spring encasement.

6.10 COOPERATIVE EFFORTS WITH OTHER AGENCIES

The water supplier may request the assistance of the University of Maryland Agricultural Extension Service, Soil Conservation Service to work with the nearby farmers to adopt Best Management Practices (BMPs) for cropland located within the SWPA. The nearby farmers can also participate in the New Conservation Reserve Program (CREP) applicable to the cropland located within the SWPA. 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 relative environmental benefits of each acre offered for participation.

7. REFERENCES

The following sources of information were consulted as a part of this investigation:

1. Maryland Geological Survey (MGS). 1980. *Garrett County Water-Well Records, Chemical-Quality Data, Ground-Water Use, Coal Test-Hole Data and Surface-Water Data.* 102 pp.

2. Maryland Department of the Environment (MDE), Water Supply Program. 1999. *Maryland's Source Water Assessment Plan.* 36 pp.

3. United States Environmental Protection Agency (USEPA). 1999. *Proposed Radon in Drinking Water Rule.* EPA 815-F-99-006. USEPA Office of Water.

4. United States Environmental Protection Agency (USEPA). 2001. *A Small Systems Guide to the Total Coliform Rule.* EPA 816-R-01-017A. USEPA Office of Water. June.

5. United States Environmental Protection Agency (USEPA). 1982. *Manual of Individual Water Supply Systems.* EPA 5700982004. USEPA Office of Water. October.

SOURCES OF DATA

Water Appropriation and Use Database
Public Water Supply Inspection Reports
Monitoring Reports
MDE Water Supply Program Oracle Database
MDE Waste Management Sites Database
Maryland Office of Planning 2000 Garrett County Land Use Map
Maryland Office of Planning 1993 Garrett County Sewer Service Map
USGS Topographic 7.5-minute Quadrangle Map – 1994 Grantsville, Maryland Quad

Appendix A

Results of Ground-Water Sample Analysis

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	2/14/1991	1,1,1,2-TETRACHLOROETHANE	--	
01	9/26/1995	1,1,1,2-TETRACHLOROETHANE	--	
01	5/20/1996	1,1,1,2-TETRACHLOROETHANE	--	
01	1/31/1997	1,1,1,2-TETRACHLOROETHANE	--	
01	1/29/1998	1,1,1,2-TETRACHLOROETHANE	--	
01	3/24/1999	1,1,1,2-TETRACHLOROETHANE	--	
01	4/24/1990	1,1,1-TRICHLOROETHANE	--	
01	10/18/1990	1,1,1-TRICHLOROETHANE	--	
01	2/14/1991	1,1,1-TRICHLOROETHANE	--	
01	9/26/1995	1,1,1-TRICHLOROETHANE	--	
01	5/20/1996	1,1,1-TRICHLOROETHANE	--	
01	1/31/1997	1,1,1-TRICHLOROETHANE	--	
01	1/29/1998	1,1,1-TRICHLOROETHANE	--	
01	3/24/1999	1,1,1-TRICHLOROETHANE	--	
01	2/14/1991	1,1,2,2-TETRACHLOROETHANE	--	
01	9/26/1995	1,1,2,2-TETRACHLOROETHANE	--	
01	5/20/1996	1,1,2,2-TETRACHLOROETHANE	--	
01	1/31/1997	1,1,2,2-TETRACHLOROETHANE	--	
01	1/29/1998	1,1,2,2-TETRACHLOROETHANE	--	
01	3/24/1999	1,1,2,2-TETRACHLOROETHANE	--	
01	2/14/1991	1,1,2-TRICHLOROETHANE	--	
01	9/26/1995	1,1,2-TRICHLOROETHANE	--	
01	5/20/1996	1,1,2-TRICHLOROETHANE	--	
01	1/31/1997	1,1,2-TRICHLOROETHANE	--	
01	1/29/1998	1,1,2-TRICHLOROETHANE	--	
01	3/24/1999	1,1,2-TRICHLOROETHANE	--	
01	2/14/1991	1,1-DICHLOROETHANE	--	
01	9/26/1995	1,1-DICHLOROETHANE	--	
01	5/20/1996	1,1-DICHLOROETHANE	--	
01	1/31/1997	1,1-DICHLOROETHANE	--	
01	1/29/1998	1,1-DICHLOROETHANE	--	
01	3/24/1999	1,1-DICHLOROETHANE	--	
01	4/24/1990	1,1-DICHLOROETHYLENE	--	
01	10/18/1990	1,1-DICHLOROETHYLENE	--	
01	2/14/1991	1,1-DICHLOROETHYLENE	--	
01	9/26/1995	1,1-DICHLOROETHYLENE	--	
01	5/20/1996	1,1-DICHLOROETHYLENE	--	
01	1/31/1997	1,1-DICHLOROETHYLENE	--	
01	1/29/1998	1,1-DICHLOROETHYLENE	--	
01	3/24/1999	1,1-DICHLOROETHYLENE	--	
01	2/14/1991	1,1-DICHLOROPROPENE	--	
01	9/26/1995	1,1-DICHLOROPROPENE	--	
01	5/20/1996	1,1-DICHLOROPROPENE	--	
01	1/31/1997	1,1-DICHLOROPROPENE	--	
01	1/29/1998	1,1-DICHLOROPROPENE	--	
01	3/24/1999	1,1-DICHLOROPROPENE	--	
01	2/14/1991	1,2,3-TRICHLOROBENZENE	--	

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	9/26/1995	1,2,3-TRICHLOROBENZENE	--	
01	5/20/1996	1,2,3-TRICHLOROBENZENE	--	
01	1/31/1997	1,2,3-TRICHLOROBENZENE	--	
01	1/29/1998	1,2,3-TRICHLOROBENZENE	--	
01	3/24/1999	1,2,3-TRICHLOROBENZENE	--	
01	2/14/1991	1,2,3-TRICHLOROPROPANE	--	
01	9/26/1995	1,2,3-TRICHLOROPROPANE	--	
01	5/20/1996	1,2,3-TRICHLOROPROPANE	--	
01	1/31/1997	1,2,3-TRICHLOROPROPANE	--	
01	1/29/1998	1,2,3-TRICHLOROPROPANE	--	
01	3/24/1999	1,2,3-TRICHLOROPROPANE	--	
01	2/14/1991	1,2,4-TRICHLOROBENZENE	--	
01	9/26/1995	1,2,4-TRICHLOROBENZENE	--	
01	5/20/1996	1,2,4-TRICHLOROBENZENE	--	
01	1/31/1997	1,2,4-TRICHLOROBENZENE	--	
01	1/29/1998	1,2,4-TRICHLOROBENZENE	--	
01	3/24/1999	1,2,4-TRICHLOROBENZENE	--	
01	2/14/1991	1,2,4-TRIMETHYLBENZENE	--	
01	9/26/1995	1,2,4-TRIMETHYLBENZENE	--	
01	5/20/1996	1,2,4-TRIMETHYLBENZENE	--	
01	1/31/1997	1,2,4-TRIMETHYLBENZENE	--	
01	1/29/1998	1,2,4-TRIMETHYLBENZENE	--	
01	3/24/1999	1,2,4-TRIMETHYLBENZENE	--	
01	4/24/1990	1,2-DICHLOROETHANE	--	
01	10/18/1990	1,2-DICHLOROETHANE	--	
01	2/14/1991	1,2-DICHLOROETHANE	--	
01	9/26/1995	1,2-DICHLOROETHANE	--	
01	5/20/1996	1,2-DICHLOROETHANE	--	
01	1/31/1997	1,2-DICHLOROETHANE	--	
01	1/29/1998	1,2-DICHLOROETHANE	--	
01	3/24/1999	1,2-DICHLOROETHANE	--	
01	4/24/1990	1,2-DICHLOROPROPANE	--	
01	10/18/1990	1,2-DICHLOROPROPANE	--	
01	2/14/1991	1,2-DICHLOROPROPANE	--	
01	9/26/1995	1,2-DICHLOROPROPANE	--	
01	5/20/1996	1,2-DICHLOROPROPANE	--	
01	1/31/1997	1,2-DICHLOROPROPANE	--	
01	1/29/1998	1,2-DICHLOROPROPANE	--	
01	3/24/1999	1,2-DICHLOROPROPANE	--	
01	2/14/1991	1,3,5-TRIMETHYLBENZENE	--	
01	9/26/1995	1,3,5-TRIMETHYLBENZENE	--	
01	5/20/1996	1,3,5-TRIMETHYLBENZENE	--	
01	1/31/1997	1,3,5-TRIMETHYLBENZENE	--	
01	1/29/1998	1,3,5-TRIMETHYLBENZENE	--	
01	3/24/1999	1,3,5-TRIMETHYLBENZENE	--	
01	2/14/1991	1,3-DICHLOROPROPANE	--	
01	9/26/1995	1,3-DICHLOROPROPANE	--	

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	5/20/1996	1,3-DICHLOROPROPANE	--	
01	1/31/1997	1,3-DICHLOROPROPANE	--	
01	1/29/1998	1,3-DICHLOROPROPANE	--	
01	3/24/1999	1,3-DICHLOROPROPANE	--	
01	2/14/1991	1,3-DICHLOROPROPENE	--	
01	9/26/1995	1,3-DICHLOROPROPENE	--	
01	5/20/1996	1,3-DICHLOROPROPENE	--	
01	1/31/1997	1,3-DICHLOROPROPENE	--	
01	1/29/1998	1,3-DICHLOROPROPENE	--	
01	3/24/1999	1,3-DICHLOROPROPENE	--	
01	2/14/1991	2,2-DICHLOROPROPANE	--	
01	9/26/1995	2,2-DICHLOROPROPANE	--	
01	5/20/1996	2,2-DICHLOROPROPANE	--	
01	1/31/1997	2,2-DICHLOROPROPANE	--	
01	1/29/1998	2,2-DICHLOROPROPANE	--	
01	3/24/1999	2,2-DICHLOROPROPANE	--	
01	4/24/1990	BENZENE	--	
01	10/18/1990	BENZENE	--	
01	2/14/1991	BENZENE	--	
01	9/26/1995	BENZENE	--	
01	5/20/1996	BENZENE	--	
01	1/31/1997	BENZENE	--	
01	1/29/1998	BENZENE	--	
01	3/24/1999	BENZENE	--	
01	2/14/1991	BROMOBENZENE	--	
01	9/26/1995	BROMOBENZENE	--	
01	5/20/1996	BROMOBENZENE	--	
01	1/31/1997	BROMOBENZENE	--	
01	1/29/1998	BROMOBENZENE	--	
01	3/24/1999	BROMOBENZENE	--	
01	2/14/1991	BROMOCHLOROMETHANE	--	
01	9/26/1995	BROMOCHLOROMETHANE	--	
01	5/20/1996	BROMOCHLOROMETHANE	--	
01	1/31/1997	BROMOCHLOROMETHANE	--	
01	1/29/1998	BROMOCHLOROMETHANE	--	
01	3/24/1999	BROMOCHLOROMETHANE	--	
01	2/14/1991	BROMODICHLOROMETHANE	--	
01	9/26/1995	BROMODICHLOROMETHANE	--	
01	5/20/1996	BROMODICHLOROMETHANE	2	100 #
01	1/31/1997	BROMODICHLOROMETHANE	1.3	100 #
01	1/29/1998	BROMODICHLOROMETHANE	2.2	100 #
01	3/24/1999	BROMODICHLOROMETHANE	2	100 #
01	2/14/1991	BROMOFORM	--	
01	9/26/1995	BROMOFORM	--	
01	5/20/1996	BROMOFORM	--	
01	1/31/1997	BROMOFORM	--	
01	1/29/1998	BROMOFORM	--	

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	3/24/1999	BROMOFORM	--	
01	2/14/1991	BROMOMETHANE	--	
01	9/26/1995	BROMOMETHANE	--	
01	5/20/1996	BROMOMETHANE	--	
01	1/31/1997	BROMOMETHANE	--	
01	1/29/1998	BROMOMETHANE	--	
01	3/24/1999	BROMOMETHANE	--	
01	4/24/1990	CARBON TETRACHLORIDE	--	
01	10/18/1990	CARBON TETRACHLORIDE	--	
01	2/14/1991	CARBON TETRACHLORIDE	--	
01	9/26/1995	CARBON TETRACHLORIDE	--	
01	5/20/1996	CARBON TETRACHLORIDE	--	
01	1/31/1997	CARBON TETRACHLORIDE	--	
01	1/29/1998	CARBON TETRACHLORIDE	--	
01	3/24/1999	CARBON TETRACHLORIDE	--	
01	2/14/1991	CHLOROETHANE	--	
01	9/26/1995	CHLOROETHANE	--	
01	5/20/1996	CHLOROETHANE	--	
01	1/31/1997	CHLOROETHANE	--	
01	1/29/1998	CHLOROETHANE	--	
01	3/24/1999	CHLOROETHANE	0.9	NA
01	2/14/1991	CHLOROFORM	2	400 ^
01	9/26/1995	CHLOROFORM	--	
01	5/20/1996	CHLOROFORM	9	100 #
01	1/31/1997	CHLOROFORM	2.3	100 #
01	1/29/1998	CHLOROFORM	4.5	100 #
01	3/24/1999	CHLOROFORM	4	100 #
01	2/14/1991	CHLOROMETHANE	--	
01	9/26/1995	CHLOROMETHANE	--	
01	5/20/1996	CHLOROMETHANE	--	
01	1/31/1997	CHLOROMETHANE	--	
01	1/29/1998	CHLOROMETHANE	--	
01	3/24/1999	CHLOROMETHANE	--	
01	4/24/1990	cis-1,2-DICHLOROETHYLENE	--	
01	10/18/1990	cis-1,2-DICHLOROETHYLENE	--	
01	2/14/1991	cis-1,2-DICHLOROETHYLENE	--	
01	9/26/1995	cis-1,2-DICHLOROETHYLENE	--	
01	5/20/1996	cis-1,2-DICHLOROETHYLENE	--	
01	1/31/1997	cis-1,2-DICHLOROETHYLENE	--	
01	1/29/1998	cis-1,2-DICHLOROETHYLENE	--	
01	3/24/1999	cis-1,2-DICHLOROETHYLENE	--	
01	2/14/1991	DIBROMOCHLOROMETHANE	--	
01	9/26/1995	DIBROMOCHLOROMETHANE	--	
01	5/20/1996	DIBROMOCHLOROMETHANE	--	
01	1/31/1997	DIBROMOCHLOROMETHANE	--	
01	1/29/1998	DIBROMOCHLOROMETHANE	1.3	100 #
01	3/24/1999	DIBROMOCHLOROMETHANE	0.6	100 #

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	2/14/1991	DIBROMOMETHANE	--	
01	9/26/1995	DIBROMOMETHANE	--	
01	5/20/1996	DIBROMOMETHANE	--	
01	1/31/1997	DIBROMOMETHANE	--	
01	1/29/1998	DIBROMOMETHANE	--	
01	3/24/1999	DIBROMOMETHANE	--	
01	2/14/1991	DICHLORODIFLUOROMETHANE	--	
01	9/26/1995	DICHLORODIFLUOROMETHANE	--	
01	5/20/1996	DICHLORODIFLUOROMETHANE	--	
01	1/31/1997	DICHLORODIFLUOROMETHANE	--	
01	1/29/1998	DICHLORODIFLUOROMETHANE	--	
01	3/24/1999	DICHLORODIFLUOROMETHANE	--	
01	4/24/1990	ETHYLBENZENE	--	
01	10/18/1990	ETHYLBENZENE	--	
01	2/14/1991	ETHYLBENZENE	--	
01	9/26/1995	ETHYLBENZENE	--	
01	5/20/1996	ETHYLBENZENE	--	
01	1/31/1997	ETHYLBENZENE	--	
01	1/29/1998	ETHYLBENZENE	--	
01	3/24/1999	ETHYLBENZENE	--	
01	2/14/1991	HEXACHLOROBUTADIENE	--	
01	9/26/1995	HEXACHLOROBUTADIENE	--	
01	5/20/1996	HEXACHLOROBUTADIENE	--	
01	1/31/1997	HEXACHLOROBUTADIENE	--	
01	1/29/1998	HEXACHLOROBUTADIENE	--	
01	3/24/1999	HEXACHLOROBUTADIENE	--	
01	2/14/1991	ISOPROPYLBENZENE	--	
01	9/26/1995	ISOPROPYLBENZENE	--	
01	5/20/1996	ISOPROPYLBENZENE	--	
01	1/31/1997	ISOPROPYLBENZENE	--	
01	1/29/1998	ISOPROPYLBENZENE	--	
01	3/24/1999	ISOPROPYLBENZENE	--	
01	2/14/1991	m-DICHLOROBENZENE	--	
01	9/26/1995	m-DICHLOROBENZENE	--	
01	5/20/1996	m-DICHLOROBENZENE	--	
01	1/31/1997	m-DICHLOROBENZENE	--	
01	1/29/1998	m-DICHLOROBENZENE	--	
01	3/24/1999	m-DICHLOROBENZENE	--	
01	2/14/1991	METHYLENE CHLORIDE	1	5
01	9/26/1995	METHYLENE CHLORIDE	--	
01	5/20/1996	METHYLENE CHLORIDE	--	
01	1/31/1997	METHYLENE CHLORIDE	--	
01	1/29/1998	METHYLENE CHLORIDE	--	
01	3/24/1999	METHYLENE CHLORIDE	--	
01	9/26/1995	METHYL-TERT-BUTYL-ETHER	--	
01	9/26/1995	METHYL-TERT-BUTYL-ETHER	--	
01	5/20/1996	METHYL-TERT-BUTYL-ETHER	--	

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	5/20/1996	METHYL-TERT-BUTYL-ETHER	--	
01	1/31/1997	METHYL-TERT-BUTYL-ETHER	--	
01	1/31/1997	METHYL-TERT-BUTYL-ETHER	--	
01	1/29/1998	METHYL-TERT-BUTYL-ETHER	--	
01	1/29/1998	METHYL-TERT-BUTYL-ETHER	--	
01	3/24/1999	METHYL-TERT-BUTYL-ETHER	--	
01	3/24/1999	METHYL-TERT-BUTYL-ETHER	--	
01	4/24/1990	MONOCHLOROBENZENE	--	
01	10/18/1990	MONOCHLOROBENZENE	--	
01	2/14/1991	MONOCHLOROBENZENE	--	
01	9/26/1995	MONOCHLOROBENZENE	--	
01	5/20/1996	MONOCHLOROBENZENE	--	
01	1/31/1997	MONOCHLOROBENZENE	--	
01	1/29/1998	MONOCHLOROBENZENE	--	
01	3/24/1999	MONOCHLOROBENZENE	--	
01	2/14/1991	m-XYLENE	--	
01	9/26/1995	m-XYLENE	--	
01	5/20/1996	m-XYLENE	--	
01	1/31/1997	m-XYLENE	--	
01	3/24/1999	m-XYLENE	--	
01	2/14/1991	NAPHTHALENE	--	
01	9/26/1995	NAPHTHALENE	--	
01	5/20/1996	NAPHTHALENE	--	
01	1/31/1997	NAPHTHALENE	--	
01	1/29/1998	NAPHTHALENE	--	
01	3/24/1999	NAPHTHALENE	--	
01	2/14/1991	N-BUTYLBENZENE	--	
01	9/26/1995	N-BUTYLBENZENE	--	
01	5/20/1996	N-BUTYLBENZENE	--	
01	1/31/1997	N-BUTYLBENZENE	--	
01	1/29/1998	N-BUTYLBENZENE	--	
01	3/24/1999	N-BUTYLBENZENE	--	
01	2/14/1991	n-PROPYLBENZENE	--	
01	9/26/1995	n-PROPYLBENZENE	--	
01	5/20/1996	n-PROPYLBENZENE	--	
01	1/31/1997	n-PROPYLBENZENE	--	
01	1/29/1998	n-PROPYLBENZENE	--	
01	3/24/1999	n-PROPYLBENZENE	--	
01	2/14/1991	o-CHLOROTOLUENE	--	
01	9/26/1995	o-CHLOROTOLUENE	--	
01	5/20/1996	o-CHLOROTOLUENE	--	
01	1/31/1997	o-CHLOROTOLUENE	--	
01	1/29/1998	o-CHLOROTOLUENE	--	
01	3/24/1999	o-CHLOROTOLUENE	--	
01	4/24/1990	o-DICHLOROBENZENE	--	
01	10/18/1990	o-DICHLOROBENZENE	--	
01	2/14/1991	o-DICHLOROBENZENE	--	

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	9/26/1995	o-DICHLOROBENZENE	--	
01	5/20/1996	o-DICHLOROBENZENE	--	
01	1/31/1997	o-DICHLOROBENZENE	--	
01	1/29/1998	o-DICHLOROBENZENE	--	
01	3/24/1999	o-DICHLOROBENZENE	--	
01	2/14/1991	o-XYLENE	--	
01	9/26/1995	o-XYLENE	--	
01	5/20/1996	o-XYLENE	--	
01	1/31/1997	o-XYLENE	--	
01	3/24/1999	o-XYLENE	--	
01	2/14/1991	p-CHLOROTOLUENE	--	
01	9/26/1995	p-CHLOROTOLUENE	--	
01	5/20/1996	p-CHLOROTOLUENE	--	
01	1/31/1997	p-CHLOROTOLUENE	--	
01	1/29/1998	p-CHLOROTOLUENE	--	
01	3/24/1999	p-CHLOROTOLUENE	--	
01	4/24/1990	p-DICHLOROBENZENE	--	
01	10/18/1990	p-DICHLOROBENZENE	--	
01	2/14/1991	p-DICHLOROBENZENE	--	
01	9/26/1995	p-DICHLOROBENZENE	--	
01	5/20/1996	p-DICHLOROBENZENE	--	
01	1/31/1997	p-DICHLOROBENZENE	--	
01	1/29/1998	p-DICHLOROBENZENE	--	
01	3/24/1999	p-DICHLOROBENZENE	--	
01	2/14/1991	P-ISOPROPYLTOLUENE	--	
01	9/26/1995	P-ISOPROPYLTOLUENE	--	
01	5/20/1996	P-ISOPROPYLTOLUENE	--	
01	1/31/1997	P-ISOPROPYLTOLUENE	--	
01	1/29/1998	P-ISOPROPYLTOLUENE	--	
01	3/24/1999	P-ISOPROPYLTOLUENE	--	
01	2/14/1991	p-XYLENE	--	
01	9/26/1995	p-XYLENE	--	
01	5/20/1996	p-XYLENE	--	
01	1/31/1997	p-XYLENE	--	
01	3/24/1999	p-XYLENE	--	
01	2/14/1991	SEC-BUTYLBENZENE	--	
01	9/26/1995	SEC-BUTYLBENZENE	--	
01	5/20/1996	SEC-BUTYLBENZENE	--	
01	1/31/1997	SEC-BUTYLBENZENE	--	
01	1/29/1998	SEC-BUTYLBENZENE	--	
01	3/24/1999	SEC-BUTYLBENZENE	--	
01	4/24/1990	STYRENE	--	
01	10/18/1990	STYRENE	--	
01	2/14/1991	STYRENE	--	
01	9/26/1995	STYRENE	--	
01	5/20/1996	STYRENE	--	
01	1/31/1997	STYRENE	--	

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	1/29/1998	STYRENE	--	
01	3/24/1999	STYRENE	--	
01	2/14/1991	TERT-BUTYLBENZENE	--	
01	9/26/1995	TERT-BUTYLBENZENE	--	
01	5/20/1996	TERT-BUTYLBENZENE	--	
01	1/31/1997	TERT-BUTYLBENZENE	--	
01	1/29/1998	TERT-BUTYLBENZENE	--	
01	3/24/1999	TERT-BUTYLBENZENE	--	
01	4/24/1990	TETRACHLOROETHYLENE	--	
01	10/18/1990	TETRACHLOROETHYLENE	--	
01	2/14/1991	TETRACHLOROETHYLENE	--	
01	9/26/1995	TETRACHLOROETHYLENE	--	
01	5/20/1996	TETRACHLOROETHYLENE	--	
01	1/31/1997	TETRACHLOROETHYLENE	--	
01	1/29/1998	TETRACHLOROETHYLENE	--	
01	3/24/1999	TETRACHLOROETHYLENE	--	
01	4/24/1990	TOLUENE	--	
01	10/18/1990	TOLUENE	--	
01	2/14/1991	TOLUENE	--	
01	9/26/1995	TOLUENE	--	
01	5/20/1996	TOLUENE	--	
01	1/31/1997	TOLUENE	--	
01	1/29/1998	TOLUENE	--	
01	3/24/1999	TOLUENE	--	
01	4/24/1990	trans-1,2-DICHLOROETHYLENE	--	
01	10/18/1990	trans-1,2-DICHLOROETHYLENE	--	
01	2/14/1991	trans-1,2-DICHLOROETHYLENE	--	
01	9/26/1995	trans-1,2-DICHLOROETHYLENE	--	
01	5/20/1996	trans-1,2-DICHLOROETHYLENE	--	
01	1/31/1997	trans-1,2-DICHLOROETHYLENE	--	
01	1/29/1998	trans-1,2-DICHLOROETHYLENE	--	
01	3/24/1999	trans-1,2-DICHLOROETHYLENE	--	
01	4/24/1990	TRICHLOROETHYLENE	--	
01	10/18/1990	TRICHLOROETHYLENE	--	
01	2/14/1991	TRICHLOROETHYLENE	--	
01	9/26/1995	TRICHLOROETHYLENE	--	
01	5/20/1996	TRICHLOROETHYLENE	--	
01	1/31/1997	TRICHLOROETHYLENE	--	
01	1/29/1998	TRICHLOROETHYLENE	--	
01	3/24/1999	TRICHLOROETHYLENE	--	
01	2/14/1991	TRICHLOROFLUOROMETHANE	--	
01	9/26/1995	TRICHLOROFLUOROMETHANE	--	
01	5/20/1996	TRICHLOROFLUOROMETHANE	--	
01	1/31/1997	TRICHLOROFLUOROMETHANE	--	
01	1/29/1998	TRICHLOROFLUOROMETHANE	--	
01	3/24/1999	TRICHLOROFLUOROMETHANE	--	
01	4/24/1990	VINYL CHLORIDE	--	

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	10/18/1990	VINYL CHLORIDE	--	
01	2/14/1991	VINYL CHLORIDE	--	
01	9/26/1995	VINYL CHLORIDE	--	
01	5/20/1996	VINYL CHLORIDE	--	
01	1/31/1997	VINYL CHLORIDE	--	
01	1/29/1998	VINYL CHLORIDE	--	
01	3/24/1999	VINYL CHLORIDE	--	
01	4/24/1990	XYLENES, TOTAL	--	
01	10/18/1990	XYLENES, TOTAL	--	
01	2/14/1991	XYLENES, TOTAL	--	
01	9/26/1995	XYLENES, TOTAL	--	
01	5/20/1996	XYLENES, TOTAL	--	
01	1/31/1997	XYLENES, TOTAL	--	
01	1/29/1998	XYLENES, TOTAL	--	
01	3/24/1999	XYLENES, TOTAL	--	
Synthetic Organic Compounds			µg/L	µg/L
01	2/14/1991	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	9/26/1995	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	5/20/1996	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	1/31/1997	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	1/29/1998	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	3/24/1999	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	5/20/1996	2,4,5-T	--	
01	3/24/1999	2,4,5-T	--	
01	5/20/1996	2,4,5-TP (SILVEX)	--	
01	3/24/1999	2,4,5-TP (SILVEX)	--	
01	5/20/1996	2,4-D	--	
01	3/24/1999	2,4-D	--	
01	3/24/1999	3-HYDROXYCARBOFURAN	--	
01	5/20/1996	ALACHLOR (LASSO)	--	
01	3/24/1999	ALACHLOR (LASSO)	--	
01	3/24/1999	ALDICARB	--	
01	3/24/1999	ALDICARB SULFONE	--	
01	3/24/1999	ALDICARB SULFOXIDE	--	
01	5/20/1996	ALDRIN	--	
01	3/24/1999	ALDRIN	--	
01	5/20/1996	ATRAZINE	--	
01	3/24/1999	ATRAZINE	--	
01	5/20/1996	BENZO(a)PYRENE	--	
01	3/24/1999	BENZO(a)PYRENE	--	
01	5/20/1996	BHC-GAMMA(LINDANE)	--	
01	3/24/1999	BHC-GAMMA(LINDANE)	--	
01	5/20/1996	BUTACHLOR (MACHETE)	--	
01	3/24/1999	BUTACHLOR (MACHETE)	--	
01	3/24/1999	CARBARYL	--	
01	3/24/1999	CARBOFURAN	--	
01	5/20/1996	CHLORDANE	--	

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Synthetic Organic Compounds			µg/L	µg/L
01	3/24/1999	CHLORDANE	--	
01	5/20/1996	DALAPON	--	
01	3/24/1999	DALAPON	0.16	200
01	5/20/1996	DECACHLOROBIPHENYL	--	
01	5/20/1996	DI(2-ETHYLHEXYL) ADIPATE	--	
01	3/24/1999	DI(2-ETHYLHEXYL) ADIPATE	--	
01	5/20/1996	DI(2-ETHYLHEXYL) PHTHALATE	--	
01	3/24/1999	DI(2-ETHYLHEXYL) PHTHALATE	--	
01	5/20/1996	DIAZINON (SPECTRACIDE)	--	
01	5/20/1996	DICAMBA	--	
01	3/24/1999	DICAMBA	--	
01	5/20/1996	DIELDRIN	--	
01	3/24/1999	DIELDRIN	--	
01	5/20/1996	DINOSEB	--	
01	3/24/1999	DINOSEB	--	
01	5/20/1996	DURSBAN	--	
01	5/20/1996	ENDRIN	--	
01	3/24/1999	ENDRIN	--	
01	9/26/1995	ETHYLENE DIBROMIDE (EDB)	--	
01	5/20/1996	ETHYLENE DIBROMIDE (EDB)	--	
01	1/31/1997	ETHYLENE DIBROMIDE (EDB)	--	
01	1/29/1998	ETHYLENE DIBROMIDE (EDB)	--	
01	3/24/1999	ETHYLENE DIBROMIDE (EDB)	--	
01	5/20/1996	HEPTACHLOR	--	
01	3/24/1999	HEPTACHLOR	--	
01	5/20/1996	HEPTACHLOR EPOXIDE	--	
01	3/24/1999	HEPTACHLOR EPOXIDE	--	
01	5/20/1996	HEXACHLOROBENZENE (HCB)	--	
01	3/24/1999	HEXACHLOROBENZENE (HCB)	--	
01	5/20/1996	HEXACHLOROCYCLOPENTADIENE	--	
01	3/24/1999	HEXACHLOROCYCLOPENTADIENE	--	
01	3/24/1999	METHOMYL	--	
01	5/20/1996	METHOXYCHLOR	--	
01	3/24/1999	METHOXYCHLOR	--	
01	5/20/1996	METOLACHLOR	--	
01	3/24/1999	METOLACHLOR	--	
01	5/20/1996	METRIBUZIN (SENCOR)	--	
01	3/24/1999	METRIBUZIN (SENCOR)	--	
01	3/24/1999	OXAMYL (VYDATE)	--	
01	5/20/1996	PENTACHLOROPHENOL	--	
01	3/24/1999	PENTACHLOROPHENOL	--	
01	5/20/1996	PICLORAM	--	
01	3/24/1999	PICLORAM	--	
01	5/20/1996	PROPACHLOR (RAMROD)	--	
01	3/24/1999	PROPACHLOR (RAMROD)	--	
01	5/20/1996	SIMAZINE	--	
01	3/24/1999	SIMAZINE	--	

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Synthetic Organic Compounds			µg/L	µg/L
01	5/20/1996	TOXAPHENE	--	
Radionuclides			pCi/L	pCi/L
00	10/6/1993	GROSS ALPHA	--	
00	10/2/1995	GROSS ALPHA	--	
01	3/24/1999	GROSS ALPHA	--	
01	3/24/1999	GROSS ALPHA (SHORT TERM)	--	
00	10/6/1993	GROSS BETA	2	50
00	10/2/1995	GROSS BETA	2.1	50
01	3/24/1999	GROSS BETA	1	50
01	3/24/1999	GROSS BETA (SHORT TERM)	--	
01	6/23/1999	RADON-222	50	300
Inorganic Compounds			mg/L	mg/L
01	12/13/1995	ANTIMONY	--	
01	5/20/1996	ANTIMONY	--	
01	3/24/1999	ANTIMONY	--	
01	12/8/1993	ARSENIC	--	
01	12/13/1995	ARSENIC	--	
01	5/20/1996	ARSENIC	--	
01	3/24/1999	ARSENIC	--	
01	12/13/1995	BARIUM	--	
01	5/20/1996	BARIUM	--	
01	3/24/1999	BARIUM	--	
01	12/13/1995	BERYLLIUM	--	
01	5/20/1996	BERYLLIUM	--	
01	3/24/1999	BERYLLIUM	--	
01	12/13/1995	CADMIUM	--	
01	5/20/1996	CADMIUM	--	
01	3/24/1999	CADMIUM	--	
01	12/13/1995	CHROMIUM	--	
01	5/20/1996	CHROMIUM	--	
01	3/24/1999	CHROMIUM	--	
01	12/13/1995	FLUORIDE	--	
01	5/20/1996	FLUORIDE	--	
01	3/24/1999	FLUORIDE	--	
01	12/13/1995	MERCURY	--	
01	5/20/1996	MERCURY	--	
01	3/24/1999	MERCURY	--	
01	12/13/1995	NICKEL	--	
01	5/20/1996	NICKEL	--	
01	3/24/1999	NICKEL	--	
01	2/8/1993	NITRATE	--	
01	3/17/1993	NITRATE	1	10
01	12/13/1995	NITRATE	0.72	10
01	4/4/1996	NITRATE	0.54	10
01	5/20/1996	NITRATE	0.5	10
01	4/3/1997	NITRATE	0.53	10
01	8/10/1998	NITRATE	0.21	10

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF GRANTSVILLE WATER SAMPLE ANALYSIS

Plant ID	Sample Date	Contaminant Name	Result	MCL
Inorganic Compounds			mg/L	mg/L
01	3/24/1999	NITRATE	0.7	10
01	7/12/1999	NITRATE	--	
01	1/26/2000	NITRATE	0.8	10
01	12/14/2001	NITRATE	0.7	10
01	12/18/2001	NITRATE	0.7	10
01	1/9/2002	NITRATE	0.7	10
01	2/8/1993	NITRITE	--	
01	12/13/1995	NITRITE	--	
01	5/20/1996	NITRITE	0.003	1
01	12/13/1995	SELENIUM	--	
01	5/20/1996	SELENIUM	--	
01	3/24/1999	SELENIUM	--	
01	3/24/1999	SODIUM	42.8	60 +
01	12/13/1995	SULFATE	12	250 *
01	5/20/1996	SULFATE	14.3	250*
01	3/24/1999	SULFATE	12.5	250 *
01	12/13/1995	THALLIUM	--	
01	5/20/1996	THALLIUM	--	
01	3/24/1999	THALLIUM	--	
General Water Quality Parameters				
01	5/20/1996	pH	7.2	6.5-8.5 *

*=SDWR
^=DWEL
+=Drinking Water Advisory Level
#=Total Trihalomethane

- -=Not Detected
NA=No Criteria

SUMMARY OF MICROBIOLOGICAL CONTAMINANT ANALYSIS FOR GRANTSVILLE WATER SAMPLES

Sample Date	Samples Taken	Total Coliform	Total Fecal	Total Indeterminate	Sample Repeats	Repeat Coliforms	Repeat Fecal	Repeat Indeterminate
1/1/1997	1	0	0	0	--	--	--	--
2/1/1997	1	0	0	0	--	--	--	--
3/1/1997	1	0	0	0	--	--	--	--
4/1/1997	1	0	0	0	--	--	--	--
5/1/1997	1	0	0	0	--	--	--	--
6/1/1997	1	0	0	0	--	--	--	--
7/1/1997	1	0	0	0	--	--	--	--
8/1/1997	1	0	0	0	--	--	--	--
9/1/1997	1	0	0	0	--	--	--	--
10/1/1997	1	0	0	0	--	--	--	--
11/1/1997	1	0	0	0	--	--	--	--
12/1/1997	1	0	0	0	--	--	--	--
1/1/1998	1	0	0	0	--	--	--	--
2/1/1998	1	0	0	0	--	--	--	--
3/1/1998	1	0	0	0	--	--	--	--
4/1/1998	1	0	0	0	--	--	--	--
5/1/1998	1	0	0	0	--	--	--	--
6/1/1998	1	0	0	0	--	--	--	--
7/1/1998	1	0	0	0	--	--	--	--
8/1/1998	1	0	0	0	--	--	--	--
9/1/1998	1	0	0	0	--	--	--	--
10/1/1998	1	0	0	0	--	--	--	--
11/1/1998	1	0	0	0	--	--	--	--
12/1/1998	1	0	0	0	--	--	--	--
1/1/1999	1	0	0	0	--	--	--	--
2/1/1999	1	0	0	0	--	--	--	--
3/1/1999	1	0	0	0	--	--	--	--
4/1/1999	1	0	0	0	--	--	--	--
5/1/1999	1	0	0	0	--	--	--	--
6/1/1999	1	0	0	0	--	--	--	--
7/1/1999	1	0	0	0	--	--	--	--
8/1/1999	1	0	0	0	--	--	--	--
9/1/1999	1	0	0	0	--	--	--	--
10/1/1999	1	0	0	0	--	--	--	--
11/1/1999	1	0	0	0	--	--	--	--
12/1/1999	1	0	0	0	--	--	--	--
1/1/2000	1	0	0	0	--	--	--	--
2/1/2000	1	0	0	0	--	--	--	--
3/1/2000	1	0	0	0	--	--	--	--
4/1/2000	1	0	0	0	--	--	--	--
5/1/2000	1	0	0	0	--	--	--	--
7/1/2000	1	0	0	0	--	--	--	--
8/1/2000	1	0	0	0	--	--	--	--
9/1/2000	1	0	0	0	--	--	--	--

-- = not applicable   0 = not detected

SUMMARY OF MICROBIOLOGICAL CONTAMINANT ANALYSIS FOR GRANTSVILLE WATER SAMPLES

Sample Date	Samples Taken	Total Coliform	Total Fecal	Total Indeterminate	Sample Repeats	Repeat Coliforms	Repeat Fecal	Repeat Indeterminate
10/1/2000	1	0	0	0	--	--	--	--
11/1/2000	1	0	0	0	--	--	--	--
12/1/2000	1	0	0	0	--	--	--	--
1/1/2001	1	0	0	0	--	--	--	--
2/1/2001	1	0	0	0	--	--	--	--
3/1/2001	1	0	0	0	--	--	--	--
4/1/2001	1	0	0	0	--	--	--	--
5/1/2001	1	0	0	0	--	--	--	--
6/1/2001	1	0	0	0	--	--	--	--
7/1/2001	1	0	0	0	--	--	--	--
8/1/2001	1	0	0	0	--	--	--	--
9/1/2001	1	0	0	0	--	--	--	--
10/1/2001	1	0	0	0	--	--	--	--
11/1/2001	1	0	0	0	--	--	--	--
12/1/2001	1	0	0	0	--	--	--	--
1/1/2002	1	0	0	0	--	--	--	--
2/1/2002	1	0	0	0	--	--	--	--
3/1/2002	1	0	0	0	--	--	--	--
4/1/2002	1	0	0	0	--	--	--	--
5/1/2002	1	0	0	0	--	--	--	--
6/1/2002	1	0	0	0	--	--	--	--
7/1/2002	1	0	0	0	--	--	--	--
8/1/2002	1	0	0	0	--	--	--	--

-- = not applicable 0 = not detected

GROUND WATER UNDER DIRECT INFLUENCE (GWUDI) OF SURFACE WATER ANALYSIS FOR GRANTSVILLE WATER SAMPLES

Plant ID	Sample Date	Temp (C)	pH	Turbidity (NTU)	Total Coliform (org/100 mL)	Total Fecal (org/100 mL)
03	5/24/1995	--	6.5	3	--	--
03	5/25/1995	--	--	--	23	2
03	5/26/1995	--	--	--	17	--
03	5/27/1995	--	--	--	--	--
03	6/29/1995	--	5.5	2	50	--
03	6/30/1995	--	--	--	240	--
03	7/1/1995	--	--	--	80	--
03	7/2/1995	--	--	--	30	--
03	10/20/1995	--	6.9	--	50	--
03	11/22/1995	--	6.8	--	30	--
03	11/23/1995	--	--	--	23	--
03	11/24/1995	--	--	--	4	--
03	11/25/1995	--	--	--	--	--
03	4/20/1998	8.7	5.2	--	--	--
03	4/21/1998	8.6	5.3	--	--	--
03	4/22/1998	8.6	5.3	--	--	--
03	4/23/1998	9.5	5.3	--	--	--
03	4/24/1998	8.2	5.3	--	--	--
03	4/25/1998	9.3	5.3	--	--	--
03	4/27/1998	8.4	5.2	--	--	--
01	2/10/2000	11.2	6.6	0	--	--
05	2/11/2000	7.5	6.6	0	--	--
99	2/16/2000	10.1	6.4	72	--	--
02	2/17/2000	11.1	6.1	67	--	--

-- = Non Detect