SPRING SOURCE AREA SURVEY
DISTRICT 16 VOLUNTEER FIRE DEPARTMENT
ACHD SITE NO. 58
Spring Gap, Allegany County, Maryland

ALWI Project No. AL7N001

1.0 INTRODUCTION

Advanced Land and Water, Inc. (ALWI) was retained by the Allegany County Health Department (ACHD) to prepare a spring source protection plan for the District 16 Volunteer Fire Department (the VFD), located on the west side of Oldtown Road (MD Route 51) in southern Allegany County, Maryland. This site, designated No. 58 by ACHD, is served by a spring that issues from a sloping, grassy lawn on the west side of Irons Mountain, 150 feet east of MD Route 51 and approximately 800 feet east of the VFD facility.

The draft MDE "Transient Water Systems Operations Guidance" manual (herein termed the "Guidance Manual") defines a Non-Transient Non-Community (NTNC) Water System as one that "...serves at least 25 regular consumers over 6 months per year." An informal interview with the bartender suggested that the regular clientele (75 weekly), the year-round operations, and the lack of nearby tourist attractions drawing transient customers all combine to suggest that this water system is indeed a non-transient non-community system (NTNC) despite the lack of daily operations.

1.1 PURPOSE

The Safe Drinking Water Act (SDWA) of 1974 required the U.S. Environmental Protection Agency (EPA) to develop enforceable drinking water quality standards to protect the public health. In 1986, amendments made to the SDWA strengthened provisions for the protection of underground sources of drinking water. These amendments included provisions for establishing Wellhead Protection Programs by individual states under "umbrella" EPA oversight. The EPA approved a statewide Wellhead Protection Program developed by MDE in June 1991.

The MDE program originally applied to community well water supplies, only. A newly proposed broadening of the Federal Clean Water Act will have the result of expanding the MDE Wellhead Protection Program to encompass non-community well water supplies both transient and non-transient in nature. ACHD, in cooperation with MDE, established this program to bring existing non-community well water supplies into compliance with the coming regulations. At the direction of ACHD, ALWI applied appropriate provisions of the MDE Wellhead Protection Program to this spring source assessment.

1.2 SCOPE

ALWI prepared this spring source protection plan following ACHD requirements, which followed MDE guidelines for transient system operation and wellhead protection.

1. **Site Reconnaissance, Photographic Documentation and Interviews** – ALWI observed the on-site spring source, storage, treatment, and distribution infrastructure to the degree exposed without excavation or exposure to personal hazards. ALWI used an ACHD-owned digital camera to photograph conditions surrounding the spring at the time of the field reconnaissance. Said photographs are stored on ACHD's computer system. ALWI interviewed an employee to document information on the use patterns, history, and problems associated with the supply.

2. **Baseline Water Quality Assessment** - ALWI purged the water system and collected samples for analysis in the ACHD laboratory that is affiliated with the Maryland Department of Health and Mental Hygiene (DHMH). ALWI performed this fieldwork in accordance with MDE potable water sampling criteria including in-field measurements of turbidity, chlorine, and pH. ACHD selected the analyte list based on countywide experience with potability concerns and the capabilities of the aforementioned laboratory. The analytes included total and fecal coliform bacteria, nitrates, nitrites, iron, sulfur and manganese (Appendix B).

3. **Contamination Hazard Assessment** – ALWI identified existing and potential contaminant hazards within the delineated WHPA based on visual observations and the techniques enumerated above. ALWI ranked these hazards in term of relative risk and provided concrete suggestions for their appropriate address. More generally, herein ALWI provides specific recommendations for source reduction measures, contingency plans, and other methods that may help better protect against occurrences of water contamination.

2.0 WATER QUALITY ASSESSMENT

Slaughter and Darling (1962) reported the water quality from the Hamilton Group, the local bedrock geology as locally variable (iron concentrations range from 0.79 to as much as 8.2 micrograms per liter (mg/l); hardness ranges from 213 to 227 mg/l; and pH ranges from 7.1 to 7.7). ALWI interpreted that the slight reddish colors of the local rock exposures as likely attributable to the trace presence of iron.

ALWI collected baseline water samples at the VFD building on December 2, 1998, in accordance with the MDE sampling procedures specified in COMAR 26.08.05. ALWI was unable to collect raw water samples for bacteria analysis because there was no direct access to the spring itself. ACHD's laboratory analyzed the samples for those constituents of countywide concern. These included total coliform bacteria as specified in COMAR 26.04.01.11A-C, alkalinity, color, conductance, hardness, iron, manganese, nitrate-nitrite nitrogen (COMAR 26.04.01.14(4)(a)), nitrite nitrogen (COMAR 26.04.01.14(4)(b)), pH, and total dissolved solids. The results are included as Appendix A, and suggest potability relative to the samples collected.

3.0 DELINEATION OF SOURCE PROTECTION AREA

ALWI delineated a protection area surrounding this site's spring using generalized criteria developed by MDE for non-community supplies, as modified by ALWI (with ACHD consent) based on the specific topographic setting of the site. ALWI began by using a fixed radius of 1,000 feet around the spring. From this radial area, ALWI then excluded downgradient areas from this gravity-fed spring. ALWI also excluded steeply-sloping cross-gradient areas.

The resultant delineation is shown on the "Water Plant Information" survey form (Appendix B) and encompasses approximately 50% of the circle (originally 72 acres in size) or 36 acres. Within an assumed 600 gallons per day per acre (gpd/ac) of annualized groundwater recharge (Slaughter and Darling, 1962, Table 37), slightly more than 20,000 gallons per day exists within the aquifer upgradient of the spring. In actuality, the modest demand of this spring is considerably smaller than the total available in the WHPA, lending a high degree of conservatism to this analysis.

An interview with an employee suggested little if any seasonal peaking in demand, and ALWI used this to interpret little, if any, seasonal fluctuation of the boundary of the delineated area. Negligible nitrate-nitrogen concentrations were detected in the sample ALWI collected. This obviated the need for a nitrate balance assessment.

4.0 CONTAMINANT THREATS ASSESSMENT

ALWI performed a site reconnaissance on December 2, 1998. During the reconnaissance, local land use conditions were observed with emphasis on the potential use, storage and disposal practices of hazardous materials and petroleum products. Such conditions may have included visual evidence for present or former spills, stained or discolored ground surfaces, stressed vegetation, unusual odors, or visible underground storage tank (UST) facilities. Adjacent and nearby properties were also visually scanned for such evidence from the property and nearby public right-of-ways. Off-site properties were not entered. ALWI relied upon the accuracy of historical interview information provided by the owner and his employees to provide context for some of its observations.

4.1 POTENTIAL HAZARDS AT THE WELLHEAD

Spring sources are at high risk for surface water influence as defined in the MDE guidance document. This risk would be better quantified with better information on the construction of the catchment potential for variance in surface water indicator parameters (raw water bacteria; temperature and turbidity) with differing precipitation regimes. Ultimate decisions regarding possible filtration retrofits and/or bottled water conversions are appropriately driven by economic considerations.

The spring box itself also serves as a potential source of contamination. Appropriate sanitation of this structure is important to prevent possible contamination of the water supply with bacteria or other constituents of surface water runoff. ALWI observed that the spring catchment inside the spring box is concealed beneath a metal lid situated within the grassy lawn of a third-party residential property owner. Potential potability risks may arise from domestic lawn fertilization, animal feces, herbicide and pesticide use, fuel handling and storage, and leakage or drippings from vehicles and lawn maintenance equipment. Because the source is on property apparently not in ownership or control of the VFD, continued potability is contingent on (among other things) the reasonable, appropriate and benevolent actions of the property owner.

4.2 OTHER LOCAL CONTAMINATION RISKS

ALWI observed other potential contamination sources in the delineated captured zone; ASTs located out the aforementioned residence, and the proximity of the spring to Uhl Highway at an elevation below road grade. ALWI performed a site reconnaissance and conducted limited personal interviews to identify and describe these potential contaminant hazards.

5.0 CONCLUSION AND RECOMMENDATIONS

ALWI found that the supply appears potable relative to the analyses performed. No discharge to groundwater has been confirmed by any of the facilities or practices ALWI observed. ALWI has ranked its observation in decreasing order of overall relative risk. ALWI provides specific recommendations at the conclusion of each respective observation or interpretation.

1. **Surface Water Influence** – Depending on the results of the analyses indicated above, VFD interests should evaluate the cost and feasibility of retrofitting the existing water supply system with appropriate filtration measures to better protect from human health pathogens typically found in surface water (e.g., *Giardia* and *Cryptosporidium*). ALWI believes that conversion to bottled sources will prove more cost-effective. If no action is taken to investigate and mitigate this risk, all water should be boiled for ten minutes before potable use and appropriate placarding should be provided to warn against use of an untested source for potable purposes.

2. **Above Ground Storage Tanks** - ALWI observed that the fuel oil for the facility is currently stored in above ground storage tanks (ASTs). Some of these tanks had dribbled small amounts of oil on to the surface. ALWI recommends regular maintenance of this fuel storage and delivery system, including development of specific protocols to be employed in case of a leak or overfill.

3. **Subsurface Disposal Facilities** – Various homes and businesses in the area doubtlessly have septic systems varying in age and condition. Though the low nitrate concentrations detected in the water sample collected indicate no present release, property ownership interests should embark on a regularly scheduled program of pump-outs. When the septic

system needs replacement, the tank should be replaced with a seamless model and no facilities should be relocated uphill or within 100 feet of the source.

4. **Highway and Parking Area Deicing** – Highway and parking area deicing practices may increase a seasonal risk of sodium and chloride contamination. The State Highway Administration (SHA) is unlikely to curtail or otherwise change deicing practices on Oldtown Road (Route 51). However, consideration should be given to using non-chemical abrasives on the parking lot for deicing to the degree possible. Baseline and bi-annual sampling for sodium and chlorides should be considered.

6.0 SELECTED REFERENCES

Cleaves, Emery T., Jonathan Edwards Jr. and John D. Glaser, 1968. Geologic Map of Maryland: Maryland Geologic Survey, 1:250,000.

MDE Public Drinking Water Program, 1998, Transient Water System Operations Guidance; Guidance For Counties With Delegated Responsibilities (Draft), 45p.

Slaughter, Turbit H. and John M. Darling, 1963, The Water Resources of Allegany and Washington Counties: Maryland Department of Geology, Mines, and Water Resources, Bulletin 24, p. 408.

NONCOMMUNITY WATER SUPPLY SANITARY SURVEY

1. System Name: District 16 Vol. Fire Department & Ladies Auxiliary

2. WAS: 58

3. System Information:

Address: 12100 N. Branch Road, SE

Cumberland, Maryland

Phone No.: (301) 722-4444

4. ADC Map/Grid: N/A

5. Tax Map/Plat: N/A

6. Population:

Transient _____
Regular 75
Total 75 +/-

7. Property Information:

Owner's Name V.F.D. 16

Address: 12100 N. Branch Road, SE

Cumberland, Maryland

Phone No. (301) 722-4444 (301) 724-3493

8. No. Service Connections:

9. Type of Facility:

Food Service _____
Church _____
Campground _____
Daycare _____
Other (specify) Fire Dept.

10. Contact Person:

Name: unknown

Phone No. _____

11. Operator:

Name: unknown

Cert. No. _____

12. Sample History (Has the system had any violations?):

Bacteria: None apparent or reported

Nitrate: None apparent or reported

SURVEY RESULTS

13. Comments on System, Recommendations:

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14. Inspected by:	15. Date inspected:	16. System Vulnerability
Mark W. Eisner	12/03/98	Protected _____ Vulnerable yes (see report)

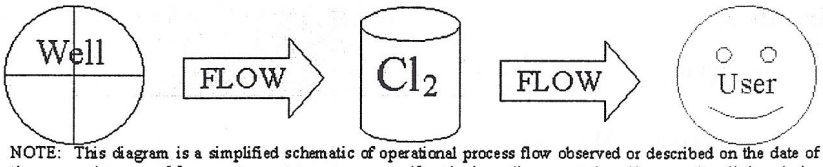
WATER PLANT INFORMATION

17. Type of Treatment:
(Check all that apply)

Disinfection
- Gas Chlorine: _____
- Sodium Hypochlorite: x
- Ultraviolet Radiation: _____

Iron Removal: _____
Nitrate Removal: _____
PH Neutralizer: _____
Other: _____
Unknown: _____

18. System Schematic (Process Flow):



NOTE: This diagram is a simplified schematic of operational process flow observed or described on the date of the reconnaissance. Many water systems possess malfunctioning, disconnected and/or occasionally/regularly-bypassed equipment. Actual treatment processes may differ, therefore, from those shown herein.

19. System Storage:

Ground Storage: _____
Elevated Storage: _____
Hydropneumatic Tank: x
Other: _____

20. Storage Capacity:

Typical Domestic

21. Untreated water sampling tap?

Yes _____ No x

WELL INFORMATION

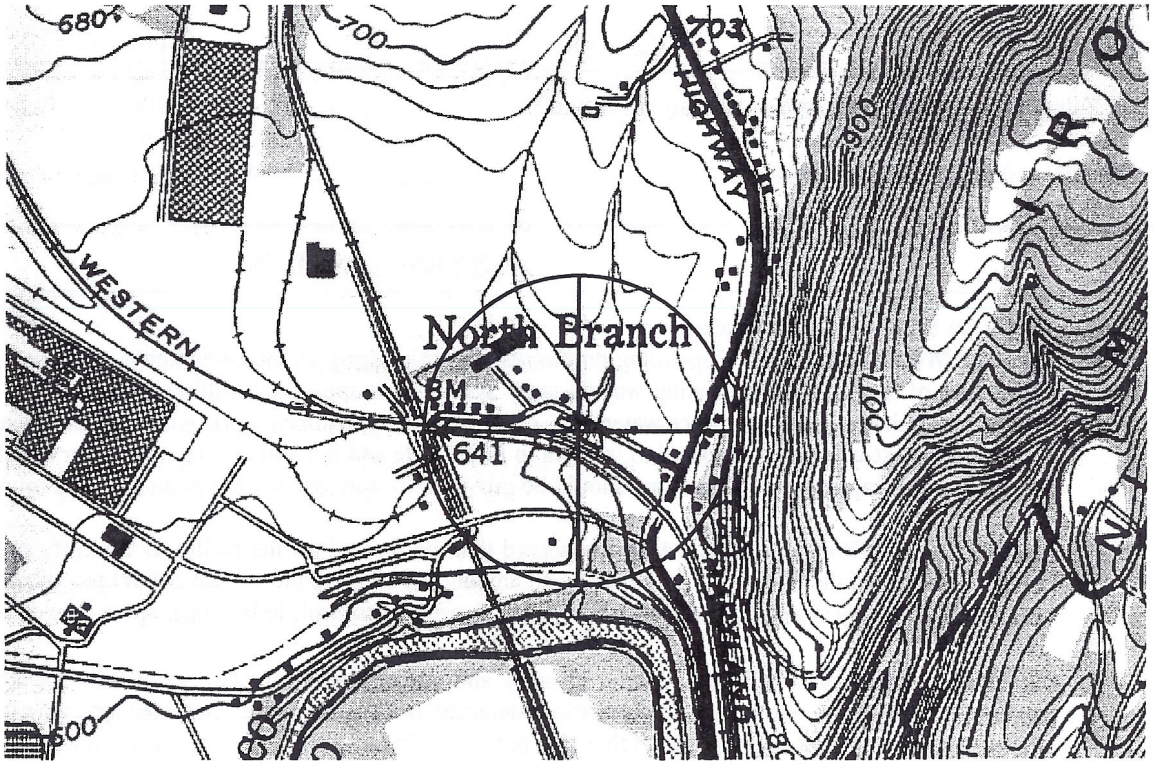
22. Well Information:

Tag Number: uses spring
Year Drilled: _____
Casing Depth: _____
Well Depth: _____
Well Yield: _____
Casing Height: _____
Grout Depth: _____
Pitless Adapter? _____
Wiring OK? unknown
Pump OK? unknown

23. Well Type: N/A

Drilled: _____
Driven: _____
Dug: _____

24. Well Location Diagram (1 in. = 1250 ft.) with Approximate Distances from Potential Contaminant Sources (i.e. septic, sewer lines, structures, petroleum storage, surface water bodies, etc.):



25. Aquifer: N/A

Name: _____
GAP #: _____
Confined: _____
Unconfined: _____
Semi-confined: _____

26. Quantity Used:

Daily Avg (gpd): 600
Pumping Rate (gpm): _____
Hours run per day: _____

27. Well Cap: N/A

Type? _____
Seal Tight? _____
Vented? _____
Screened? _____
Conduit OK? _____

28. Casing Diameter: N/A

2" _____
4" _____
6" _____
Other _____

29. Casing Type: N/A

PVC _____
Metal _____
Concrete _____