WELLHEAD AREA SURVEY
CUMBERLAND VALLEY PACKING, INC.
ACHD SITE NO. 49
Cumberland, 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 Wellhead Survey Area for Cumberland Valley Packing, Inc., located west of Valley Road, on the west side of Dry Run in central Allegany County, Maryland. Cumberland Valley is a processing facility for deer meat. This site, designated No. 49 by ACHD, is served by two production wells completed in the local bedrock aquifer.

The draft Maryland Department of the Environment (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." Cumberland Valley is a small family-run operation with no constant clientele; therefore, this site is a transient non-community system (TNC).

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 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 supplies both transient and non-transient in nature. ACHD, in cooperation with MDE, established this program to bring existing non-community supplies into compliance with the coming regulations.

1.2 SCOPE

ALWI prepared this Wellhead Survey Area following ACHD requirements, which followed MDE guidelines for transient system operation and wellhead protection.

1. **Site Reconnaissance and Interview** – ALWI observed the on-site wellhead, storage, treatment, and distribution infrastructure to the degree exposed without excavation or exposure to personal

hazards. The owner of the Inn described its history, water use, and other issues potentially germane to wellhead protection.

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 A).

3. **Contamination Hazard Assessment** – ALWI identified existing and potential contaminant hazards within the delineated area 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 groundwater contamination.

2.0 HYDROGEOLOGIC FRAMEWORK

ALWI used published information from the United States Geological Survey and the Maryland Geological Survey to identify and describe the characteristics of the local hydrogeologic setting.

2.1 BEDROCK GEOLOGY

The site is located within the Appalachian Valley and Ridge physiographic province and is underlain by shales and sandstone bedrock of Silurian age, locally mapped as the Wills Creek and Bloomsburg formations. These rocks have been gently folded, resulting in broad synclines (concave-upward folds) and anticlines (convex-upward folds).

In three dimensions, the rock formations of such folds dip at right angles to the direction of plunge of the entire fold system. In general, dip directions may help govern groundwater (and contaminant) movement directions in the bedrock but plunge directions have little, if any relation. At this location, the bedding planes dip gently to the east-southeast. Deep groundwater flow directions likely follow.

Reported local well yields are sparse but range from 16 to 133 gpm. Wells completed within sandstone generally have a higher yield because the greater competence of the rock allows the development of longer and wider fractures both along and across bedding planes.

2.2 Saprolite and Soil Mantle

Natural chemical weathering of the shallow portion of the bedrock, due to percolating water, has chemically altered many of the original rock-forming minerals to clays and other secondary minerals. This has resulted in the development of shallow saprolite (weathered bedrock) and the overlying soil mantle. The thickness of the soil and saprolite is generally 2 to 10 feet, but it varies considerably over short distances. In highly fractured zones, enhanced groundwater storage and movement has accelerated the breakdown of the rock-forming minerals and has caused formation of a thicker saprolitic deposit.

2.3 Aquifer Recharge

Precipitation infiltrating through the soil on site and/or in up-gradient areas is the primary source of aquifer recharge to the on-site supply well. Generally, overlying soil horizons act to absorb and then slowly release infiltrating precipitation. However, in areas where fracture zones have formed, percolating groundwater can reach the water table quickly. A portion of the precipitation percolates downward through the soil mantle and then migrates through narrow, interconnected joints, fractures, faults, and cleavage planes in the bedrock.

2.4 Geology-Controlled Groundwater Flow

Generally, bedding plane partings and cross-bedding fracture zones (where present) function as both downward and lateral water conduits. Consequently, such zones receive and transmit water at a rate higher than would otherwise be achievable and, accordingly, are preferential conduits for groundwater flow and contaminant transport.

Despite the bedrock's overall hardness and resistance to erosion, hydraulic permeabilities in bedding planes and fracture zones may be several times greater than in surrounding less-fractured rock. This intrinsic characteristic portends the possibility for the existence of specific zones with higher-than-normal well yields, higher-than-normal groundwater flow velocities and higher-than-normal susceptibility to groundwater contamination.

3.0 WATER QUALITY ASSESSMENT

Slaughter and Darling (1962) reported the groundwater quality as locally variable (iron concentrations range from 0.05 to 0.08 micrograms per liter (mg/l); hardness averages 444 mg/l; and pH ranges from 7.0 to 7.9). ALWI interpreted that the slight reddish colors of the local rock exposures as likely attributable to the trace presence of iron.

At this location, ALWI collected baseline groundwater samples on December 28, 1998, in accordance with the MDE sampling procedures specified in COMAR 26.08.05. 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 with respect to the analyses performed. The supply appears not to be at risk for surface water influence as defined in the MDE guidance document.

4.0 DELINEATION

ALWI delineated an area of potential concern surrounding this site's well 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 well. From this radial area, ALWI then excluded downgradient areas more than 100 feet from the wellhead as well as areas unlikely to contribute recharge to the well based on intervening and/or drainage divides. ALWI excluded steeply-sloping cross-gradient areas.

The resultant delineation is shown on the "Water Plant Information" survey form (Appendix B) and encompasses approximately 67% of the circle (originally 72 acres in size) or 48 acres. Within an assumed 600 gallons per day per acre (gpd/ac) of annualized groundwater recharge (Slaughter and Darling, 1962, Table 37), over 28,000 gallons per day exists within the aquifer beneath this surveyed area. In actuality, the modest demand on this well (doubtlessly less than 500 gpd) is nearly one full order of magnitude smaller than the surveyed area, lending a high degree of conservatism to this analysis.

Negligible nitrate-nitrogen concentrations were detected in the sample ALWI collected. This obviated the need for a nitrate balance assessment.

5.0 CONTAMINANT THREATS ASSESSMENT

ALWI performed a site reconnaissance on December 28, 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. No interview information was available to corroborate these limited observations.

5.1 POTENTIAL HAZARDS AT THE WELLHEAD

Design, construction and present condition are important factors in determining a well's susceptibility to contamination. ALWI could only access one of the wells and no well tag was visible. Accordingly, ALWI could not assess the initial design nor present condition of the casing or grout seal.

5.2 OTHER LOCAL CONTAMINATION RISKS

No discharge to groundwater has been confirmed by any of the facilities or practices ALWI observed. ALWI identified the following potential sources of contamination within the surveyed area: equipment storage, the outdoor storage of deer processing by-products, downhill but within 100 feet of the well and at-grade pipes (as applied to a pitless connection). ALWI performed a site reconnaissance and conducted limited personal interviews to identify and describe these potential contaminant hazards.

6.0 CONCLUSION AND RECOMMENDATIONS

ALWI found that the supply is potable relative to the analyses performed. No discharge to groundwater has been confirmed by any of the facilities or practices ALWI observed. Nevertheless, ALWI provides recommendations to assess and mitigate the risk from the following hazards:

1. **Equipment and Bi-Product Storage –** ALWI observed equipment as well as processing by-products on-site. Although they were located downhill from the well, the possibility exists for infiltration during rainstorms. Stormwater could mobilize any materials leaking from the equipment or microbial contaminants from the by-products and carry them to the groundwater. ALWI also recommends that the second well, reportedly located in pasture near the top of the mountain west of the main building, be similarly evaluated.

2. **Subsurface Well Completion –** The wells should be retrofitted with a pitless adapter and the pipes should be installed below ground. The pipes current location above ground allows for the possibility of bacteriologic contamination arising from freezing.

7.0 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: Cumberland Valley Packing, Inc.

2. WAS: 49

3. System Information:

Address: Rt. 3, Box 508, Valley Road
Cumberland, Maryland

Phone No.: (301) 722-2385

4. ADC Map/Grid: N/A

5. Tax Map/Plat: N/A

6. Population:

Transient ______
Regular ______
Total unknown

7. Property Information:

Owner's Name William & Mary Greise

Address: Rt. 3, Box 508, Valley Road
Cumberland, Maryland

Phone No. (301) 722-2385

8. No. Service Connections:

9. Type of Facility:

Food Service ______
Church ______
Campground ______
Daycare ______
Other (specify) meat processing facility

10. Contact Person:

Name: William Greise

Phone No. (301) 722-2385

11. Operator:

Name: ______

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:
Mark W. Eisner

15. Date inspected:
12/29/98

16. System Vulnerability

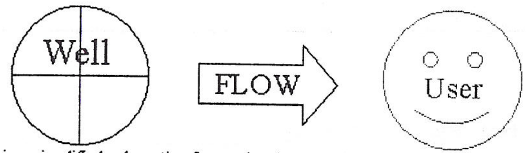
Protected ______ Vulnerable Yes (see report)

WATER PLANT INFORMATION

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

Disinfection	
Gas Chlorine:	______
Sodium Hypochlorite	______
Ultraviolet Radiation	______
Iron Removal	______
Nitrate Removal	______
PH Neutralizer	______
Other	______
Unknown	x

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 _x___ No _____

WELL INFORMATION

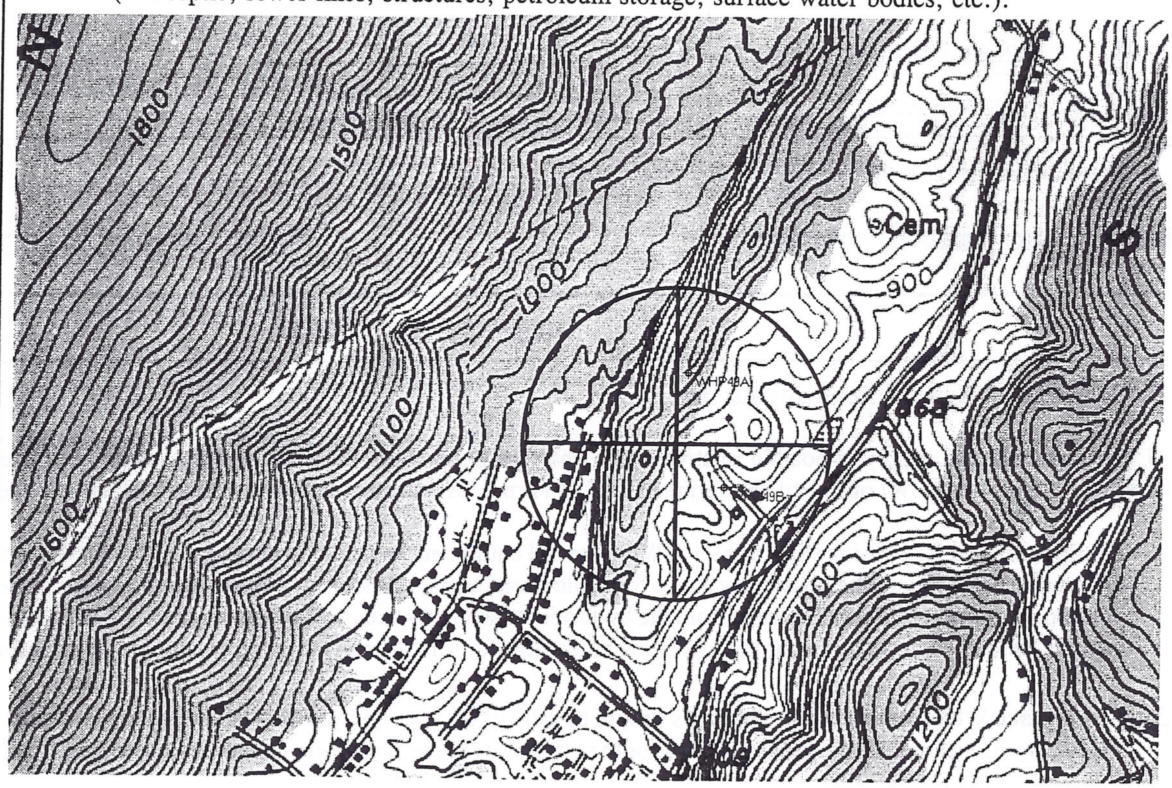
22. Well Information:

Tag Number:	not visible
Year Drilled:	______
Casing Depth:	______
Well Depth:	______
Well Yield:	______
Casing Height:	______
Grout Depth:	______
Pitless Adapter?	No
Wiring OK?	unknown
Pump OK?	unknown

23. Well Type:

Drilled	x
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:
Name: Wills Creek Bloomsburg
GAP #: ______________

Confined	______
Unconfined	x
Semi-confined	______

26. Quantity Used:

Daily Avg (gpd)	500
Pumping Rate (gpm)	unknown
Hours run per day	unknown

27. Well Cap:

Type?	N/a
Seal Tight?	O.K.
Vented?	O.K.
Screened?	No
Conduit OK?	O.K.

28. Casing Diameter:

2"	______
4"	______
6"	x
Other	______

29. Casing Type:

PVC	______
Metal	x
Concrete	______