Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for Lucky Buck Barge Public Drinking Water System, Neets Bay, Alaska PWSID # 121476.001

DRINKING WATER PROTECTION REPORT 1606

Alaska Department of Environmental Conservation

February, 2009

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The Drinking Water Protection (DWP) section of the Drinking Water Program is producing Source Water Assessments in compliance with the Safe Drinking Water Act Amendments of 1996. Each assessment includes a delineation of the source water area, an inventory of potential and existing contaminant sources that may impact the water, a risk ranking for each of these contaminants, and an evaluation of the potential vulnerability of these drinking water sources.

These assessments are intended to provide public water systems owners/operators, communities, and local governments with the best available information that may be used to protect the quality of their drinking water. The assessments combine information obtained from various sources, including the U.S. Environmental Protection Agency, Alaska Department of Environmental Conservation (DEC), public water system owners/operators, and other public information sources. The results of this assessment are subject to change if additional data becomes available. It is anticipated this assessment will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of public drinking water source. If you have any additional information that may affect the results of this assessment, please contact the DWP staff at the following number: 1-866-956-7656.

February, 2009

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Drinking Water Protection
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EXECUTIVE SUMMARY

The public water system for Lucky Buck Barge is a Class B (transient/non-community) water system that obtains water from a stream in Neets Bay, Alaska. The Lucky Buck Barge protection area received an overall susceptibility rating of **Very High**. *A rating of high to very high is typical for all systems with surface water intakes*. Potential and existing sources of the following contaminants were evaluated for the Source Water Assessment: bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals. No potential sources of contaminants were identified for this drinking water source. This evaluation included all available water sampling data submitted to DEC by the system operator. The samples may have been collected from either raw water or post-treated water. Combining the susceptibility of the surface water source with the contaminant risks, this water system has received a vulnerability rating of **Medium** for each of the three contaminant categories. This assessment can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of the Lucky Buck Barge to protect public health.

DRINKING WATER SYSTEM AND AREA OVERVIEW

The public water system for Lucky Buck Barge is a Class B (transient/non-community) water system that obtains water from an unnamed stream in Rockfish Cove in Neets Bay, Alaska (see Map A in Appendix A). Neets Bay lies in Southeast Alaska, on Revillagigedo Island, and it flows into Behm Canal. The nearest community is Ketchikan (population 7,732), 27 miles to the south. Temperatures in the area range from 51 to 65 degrees Fahrenheit in the summer, and from 29 to 39 degrees in the winter. The area receives an average of 162 inches of precipitation annually, including 32 inches of snowfall (ADCCED, 2008).

The most recent sanitary survey for this system (09/30/1999) indicates that the water intake is screened and maintained. The survey also states that the average daily production of the system (when active) is approximately 4000 gallons per day.

The Lucky Buck Barge public water system operates from June to October and obtains water from an unnamed stream, via a waterline out to the barge. The intake is located near to the shore and gravity feeds water to the barge's holding tanks.

LUCKY BUCK BARGE DRINKING WATER PROTECTION AREA

Identifying the pathways most likely for surface contamination to reach water intake areas is the first step in determining the water system's risk. These are initially determined by looking at the drainage area contributing overland water flow to a surface water source intake. The entire drainage area is also known as the "drinking water protection area".

The protection area established for surface water sources by the DEC is usually separated into three zones, limited by the watershed boundary. These zones correspond to the overland-flow distance that water travels to get to the source. The DEC Drinking Water Protection Technical Advisory Committee developed guidelines for derivation of these zones in 1998. The following is a summary of the three protection area zones:

Table 1. Definition of Zones

Zone	Definition
A	Areas within 1000-ft of lakes or streams
B	Areas within 1-mile of lakes or streams
C	The watershed boundary

Due to the small size of the watershed, the protection area for the Lucky Buck Barge water intake includes only Zone A (see Map A of Appendix A).

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

DWP has completed an inventory of potential and existing sources of contamination within Lucky Buck Barge protection area. This inventory was completed through a search of agency records and other publicly available information. There is a wide array of potential contamination sources to surface water. These contaminants are found within agricultural, residential, commercial, and industrial areas, but *can also occur within areas that have little or no development.*

For Class B public water system assessments, three categories of drinking water contaminants were inventoried. They include:

- Bacteria and viruses;
- Nitrates and/or nitrites; and
- Volatile organic chemicals.

No potential or existing sources of contaminants were identified at the time the inventory was taken.

RANKING OF CONTAMINANT RISKS

Once potential and existing sources of contamination are identified, they are assigned a ranking according to what category and level of risk they represent. Ranking of contaminant risks for "potential" or "existing" sources of contamination is a function of the toxicity and the volume of specific contaminants associated with that source. Rankings include:

- Low;
- Medium;
- High; and
- Very High.

The time-of-travel for contaminants within the water is dependent on the physical and chemical characteristics of each contaminant. Bacteria and Viruses are only inventoried in Zone A because of their short life span. Only "Very High" and "High" rankings are inventoried within Zones B and C due to the probability of contaminant dilution by the time the contaminants reach the water intake.

There were no known contaminant sources identified within the protection area for this system at the time the inventory was taken, therefore no rankings were assigned.

VULNERABILITY OF THE DRINKING WATER SYSTEM

Vulnerability of a drinking water source to contamination is a combination of two factors:

- Surface Water Susceptibility; and
- Contaminant risks.

The Surface Water Susceptibility of the source is reached by considering the properties of the water intake and the surrounding area.

Susceptibility of the Surface Water Source – always considered as "high".

+

Adequate Construction of the Intake

+

Runoff Potential Within Zone B

+

Dilution Capacity of the Surface Water

=

Overall Susceptibility

The surface water intake is not buffered from potential and existing contamination and is therefore always considered highly susceptible to contamination.

Table 2. Susceptibility of the Water Source

Category	Score	Rating
Overall Susceptibility	45	Very High

For contaminants, risks to a drinking water source depend on the type, number or density, and distribution of the contaminant sources. The Contaminant Risk score has been derived from an examination of existing, and historical contamination sources that have been detected in the protection area through routine sampling. It also evaluates potential sources of contamination. Flow charts are used to assign a point score, and ratings are assigned in the same way as the susceptibility:

Table 3 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 3. Lucky Buck Barge Contaminant Risks

Category	Score	Rating
Bacteria and Viruses	10	Low
Nitrates and/or Nitrites	3	Low
Volatile Organic Chemicals	0	Low

Finally, an overall vulnerability assigned for each contaminant type by combining each of the contaminant risk with the overall susceptibility:

Susceptibility of the Surface Water Source

+

Contaminant Risks

=

Vulnerability of the
Drinking Water Source to Contamination

Table 4 contains the overall vulnerability scores and ratings for each of the three categories of drinking water contaminants. Note: scores are rounded off to the nearest five.

Table 4. Lucky Buck Barge Overall Vulnerability

Category	Score	Rating
Bacteria and Viruses	55	Medium
Nitrates and Nitrites	50	Medium
Volatile Organic Chemicals	45	Medium

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **Low** with minimal potential sources of contaminants and no existing sources of contaminants contributing to the risk to the drinking water source.

Coliforms (a type of bacteria) are found naturally in the environment and although they aren't necessarily a health threat, they are an indicator of other potentially harmful bacteria in the water, more specifically, fecal coliforms and *E. coli* which only come from human and animal fecal waste. Harmful bacteria can cause diarrhea, cramps, nausea, headaches, or other symptoms (EPA, 2008).

Typically, coliform detection in raw water samples collected from surface water sources is normal. Positive samples increase the overall vulnerability of the drinking water source, indicating that the source is susceptible to bacteria and virus contamination. Bacteria and viruses have not been detected during the last five years of sampling at the Lucky Buck Barge (data reviewed in April, 2008).

After combining the contaminant risk for bacteria and viruses with the natural susceptibility of the source, the overall vulnerability of the source to bacteria and virus contamination is considered **Medium**.

Nitrates and Nitrites

The contaminant risk for nitrates and nitrites is **Low** with minimal risk resulting from positive sampling results for nitrates. No other sources of contaminants contribute to the risk to the drinking water source.

The Maximum Contaminant Level (MCL) for nitrates is 10 milligrams per liter (mg/L). The MCL is the maximum level of contaminant that is allowed to exist in drinking water and still be consumed by humans without harmful health effects (EPA, 2008). The sampling history for the water source indicates that nitrates have been detected within the last 5 years. A positive result of 0.510 mg/L was detected on 12/10/2004 (data reviewed in April, 2008).

After combining the contaminant risk for nitrates and nitrites with the natural susceptibility of the source, the overall vulnerability of the source to contamination is **Medium**.

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **Low** with no sources of contaminants contributing to the risk to the drinking water source.

The surface water source at the Lucky Buck Barge has not recently been sampled for volatile organic chemicals (data reviewed in April, 2008).

After combining the contaminant risk for heavy metals with the natural susceptibility of the source, the overall vulnerability of the well to contamination is **Medium**.

Using the Source Water Assessment

This assessment of contaminant risks can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of Lucky Buck Barge to protect public health. It is anticipated that Source Water Assessments will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of the drinking water source.

REFERENCES

Alaska Department of Commerce, Community and Economic Development (ADCCED), Accessed 2009 [WWW document]. URL: http://www.commerce.state.ak.us/dca/commdb/CF_COMDB.htm

United States Environmental Protection Agency (EPA), Accessed 2008 [WWW document]. URL: http://www.epa.gov/safewater/contaminants/index.html.

APPENDIX A

Lucky Buck Barge
Drinking Water Protection Area Location Map
(Map A)

Public Water Well System for PWS #121476.001 Lucky Buck Barge

Legend

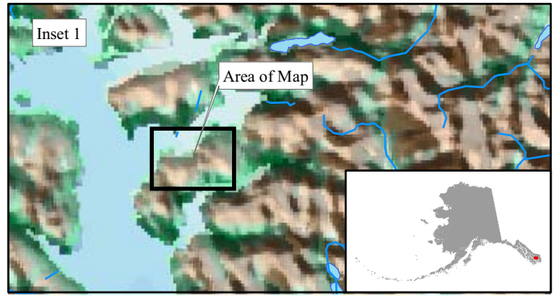
- Class B Public Water System Well
- Zone A Protection Area - Up to 1,000 Feet from Surface Water Body

Data Sources:
Contaminant Sources, Public Water System Wells, Alaska Department of Environmental Conservation (ADEC)

All other data:
Alaska Statewide Digital Mapping Initiative (SDMI)

Drinking Water Protection Areas based on "Alaska Drinking Water Protection Program - Guidance Manual for Class B Public Water Systems" published by ADEC

URS Corporation does not guarantee the accuracy or validity of the data provided.



N
W E
S

0 0.25 0.5 1 Miles

Lucky Buck Barge
PWS 121476.001

Appendix A Map A