



Source Water Assessment

A Hydrogeologic Susceptibility and
Vulnerability Assessment for
YKHC Subregional Health Clinic
Public Drinking Water System,
Aniak, Alaska

PWSID # 271928.001

DRINKING WATER PROTECTION REPORT 1762

Alaska Department of Environmental Conservation

January, 2009

Source Water Assessment for YKHC Subregional Health Clinic Public Drinking Water System Aniak, Alaska PWSID# 271928.001

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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.

January, 2009

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Source Water Assessment for YKHC Subregional Health Clinic Source of Public Drinking Water, Aniak, Alaska

Drinking Water Protection Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The public water system for YKHC Subregional Health Clinic is a Class B (transient/non-community) water system consisting of one well located in Aniak, Alaska. The wellhead received a susceptibility rating of **Medium** and the aquifer received a susceptibility rating of **Very High**. Combining these two ratings produces a **High** rating for the natural susceptibility of the well. Identified potential and current sources of contaminants for YKHC Subregional Health Clinic public drinking water source include: septic systems, roads, medical facilities, motor vehicle repair shops, and heating oil tanks. These identified potential and existing sources of contamination are considered as sources of bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals. Overall, the public water sources for YKHC Subregional Health Clinic received a vulnerability rating of **High** for bacteria and viruses, **High** for nitrates and nitrites, and **Very High** for volatile organic chemicals. 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 YKHC Subregional Health Clinic to protect public health.

YKHC SUBREGIONAL HEALTH CLINIC PUBLIC DRINKING WATER SYSTEM

YKHC Subregional Health Clinic public water system is a Class B (transient/non-community) water system. The system consists of one well in Aniak, Alaska, located on the south side of town just off Morgan Road. Aniak is located in southwestern Alaska, approximately 92 miles northeast of Bethel. Temperatures range from -55 to 87 degrees Fahrenheit. Annual average precipitation is 19 inches, and average annual snowfall is 60 inches (ADCCED, 2008).

A majority of the households are plumbed and have individual wells, and only a few households haul water from a centrally located well. A central piped sewage system serves most homes, treating the waste in a lagoon. The remaining homes use individual septic tanks or pit privies. Electricity is provided by Aniak Light & Power Company (ADCCED, 2008).

Three major types of Quaternary sediment deposits cover most of the bedrock in the Aniak area: overbank

flood deposits, slack water deposits, and accretion deposits. The area also has two primary and six other soil groups, which mostly consist of silty loams (Dorava, 1994).

Surface water drains into the Kuskokwim River, which flows southwest. Groundwater flows in the area, therefore, are typically toward the southwest as well (Dorava 1994).

According to the well log (09/13/93), the well is approximately 36 feet deep, and the static water level is 18 feet below the ground surface. The well is completed in an unconfined aquifer consisting of gravel and sand. The most recent sanitary survey for this system (03/27/2003) indicates that the well is capped with a sanitary seal and the land surface is appropriately sloped away from the well. The well log shows that the well is grouted according to DEC regulations.

This system operates year-round and serves thirteen workers and one hundred and fifty non-residents through five service connections.

YKHC SUBREGIONAL HEALTH CLINIC DRINKING WATER PROTECTION AREA

In order to evaluate whether a drinking water source is at risk, we must first evaluate what are the most likely pathways for surface contamination to reach the groundwater. These areas are determined by looking at the characteristics of the soil, groundwater, aquifer, and well.

The most probable area for contamination to reach the drinking water well is the drinking water protection area. The drinking water protection area is the area circling the well (the area influenced by pumping) and also the area upgradient of the well, usually forming a parabola shape. Because releases of contaminants within the protection area are most likely to impact the well, this area will serve as the focus for voluntary protection efforts.

There are many different methods for calculating the size of protection areas. Drinking Water Protection (DWP) uses a combination of two simple groundwater flow equations, the Thiem and uniform flow equations for all groundwater wells screened in unconsolidated material. The orientation of the protection zone is then drawn using a water table elevation map (if available)

or a land surface elevation map of the area. The protection zone calculated by the DWP is an estimate using the available information and resources, and may differ slightly from the actual capture zone. Because of uncertainties and changing site conditions, a factor of safety is added to the protection zone to form the drinking water protection area for the well.

The parameters used to calculate the shape of this protection zone are general for the whole alluvial plain and were obtained from various United States Geological Survey (USGS) reports, area well logs, and the Groundwater textbook by Freeze and Cherry (Freeze and Cherry, 1979).

The protection areas established for wells by the DEC are usually separated into two zones, limited by the watershed. These zones correspond to differences in the time-of-travel (TOT) of the water moving through the aquifer to the well. An analytical calculation was used to determine the size and shape of the protection area.

The time-of-travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant. The following is a summary of the two protection area zones for wells and the calculated time-of-travel for each:

Table 1. Definition of Zones

Zone	Definition
A	Several months time-of-travel
B	Less than the 2 year time-of-travel

The drinking water protection area for YKHC Subregional Health Clinic was determined using an analytical calculation and includes Zones A and B (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 the YKHC Subregional Health Clinic drinking water protection area. This inventory was completed through a search of agency records and other publicly available information. Potential sources of contamination to the drinking water aquifer include a wide range of categories and types. Potential drinking water contaminants are found within agricultural, residential, commercial, and industrial areas, but can also occur within areas that have little or no development.

For the basis of all Class B public water system assessments, the following three categories of drinking water contaminants were inventoried:

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

The sources are displayed on Map C of Appendix C and summarized in Table 1 of Appendix B.

RANKING OF CONTAMINANT RISKS

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

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

Tables 2 through 4 in Appendix B contain the ranking of potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals.

VULNERABILITY OF YKHC SUBREGIONAL HEALTH CLINIC DRINKING WATER SYSTEM

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

- Natural Susceptibility; and
- Contaminant Risks.

A score for the Natural Susceptibility of the well is reached by considering the properties of the well and the aquifer.

Susceptibility of the Wellhead (0-25 Points)

+

Susceptibility of the Aquifer (0-25 Points)

=

Natural Susceptibility of the Well (0-50 Points)

A ranking is assigned for the Natural Susceptibility according to the point score:

Natural Susceptibility Ratings	
40-50 pts	Very High
30 to < 40 pts	High
20 to < 30 pts	Medium
< 20 pts	Low

Factors contributing to the susceptibility of the wellhead are: whether the sanitary seal is in place,

protection from flooding, and if the well casing is properly grouted.

The wellhead for the YKHC Subregional Health Clinic received a **Medium** susceptibility rating. The sanitary survey indicates that the well is capped with a sanitary seal and that the land surface is appropriately sloped away from the well. The well log shows that the well is grouted according to DEC regulations. Sanitary seals prevent potential contaminants from entering the well, while sloping of the land surface away from the wellhead provides adequate surface water drainage, and concrete or grouting around the wellhead helps to prevent potential contaminants from traveling down the outside of the well casing. The wellhead lies within a suspected floodplain.

Factors contributing to the susceptibility of the aquifer are: whether the aquifer is confined or unconfined, whether the well is completed in unconsolidated or fractured bedrock, whether wells and bore holes are penetrating the aquifer and, if applicable, the confining layer.

The YKHC Subregional Health Clinic system draws water from an unconfined aquifer which consists of sand and gravel. The aquifer received a **Very High** susceptibility rating because of its unconfined nature and the presence of multiple wells within the vadose zone of the protection area. Because an unconfined aquifer is recharged by surface water and precipitation that migrates downward from the surface, it is susceptible to contamination from outside sources. Furthermore, the presence of other wells penetrating the vadose zone of the protection area can allow contaminants to travel into the shared aquifer with precipitation and runoff.

Table 2 summarizes the Susceptibility scores and ratings for the YKHC Subregional Health Clinic system.

Table 2. Susceptibility

	Score	Rating
Susceptibility of the Wellhead	10	Medium
Susceptibility of the Aquifer	25	Very High
Natural Susceptibility	35	High

Contaminant risks are derived from an evaluation of the routine sampling results of the water system and the presence of potential sources of contamination. Contaminant risks to a drinking water source depend on the type and distribution of contaminant sources. Flow charts are used to assign a point score, and ratings are

assigned in the same way as for the natural susceptibility:

Contaminant Risk Ratings	
40-50 pts	Very High
30 to < 40 pts	High
20 to < 30 pts	Medium
< 20 pts	Low

Table 3 summarizes the Contaminant Risks for each category of drinking water contaminants for the YKHC Subregional Health Clinic system.

Table 3. Contaminant Risks

Category	Score	Rating
Bacteria and Viruses	35	High
Nitrates and/or Nitrites	33	High
Volatile Organic Chemicals	45	Very High

Finally, an overall vulnerability score is assigned for each water system by combining each of the contaminant risk scores with the natural susceptibility score:

$$\begin{array}{r}
 \text{Natural Susceptibility (0-50 Points)} \\
 + \\
 \text{Contaminant Risks (0-50 Points)} \\
 = \\
 \text{Vulnerability of the Drinking Water Source to} \\
 \text{Contamination (0-100 Points)}
 \end{array}$$

Again, rankings are assigned according to a point score:

Overall Vulnerability Ratings	
80-100 pts	Very High
60 to < 80 pts	High
40 to < 60 pts	Medium
< 40 pts	Low

Table 4 contains the overall vulnerability scores (0-100) and ratings for each of the three categories of drinking water contaminants for the YKHC Subregional Health Clinic system. Note: scores are rounded off to the nearest five.

Table 4. Overall Vulnerability

Category	Score	Rating
Bacteria and Viruses	70	High
Nitrates and/or Nitrites	70	High
Volatile Organic Chemicals	80	Very High

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **High** with septic systems, roads, and a medical facility contributing to the risk to the drinking water well.

Coliforms (a 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).

Only a small amount of bacteria and viruses are required to endanger public health. 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 had a positive result during recent sampling at YKHC Subregional Health Clinic (data reviewed in April, 2008).

After combining the contaminant risk for bacteria and viruses with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Nitrates and Nitrites

The contaminant risk for nitrates and nitrites is **High** primarily as a result of high concentrations of nitrates detected during sampling. Septic systems, roads, and a medical facility contribute further to the risk to the drinking water well.

The Maximum Contaminant Level (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 MCL for nitrates is 10 milligrams per liter (mg/L). The sampling history for the YKHC Subregional Health Clinic well indicates that nitrates have been detected in the water at levels reaching 42% of the MCL, with the highest concentration of 4.170 mg/l detected on 09/30/2003 (data reviewed in April, 2008).

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

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **Very High** with motor vehicle repair shops, heating oil tanks, septic systems, roads, an airport, and a medical facility contributing to the risk to the drinking water well.

The drinking water at YKHC Subregional Health Clinic has not been recently sampled for volatile organic chemicals (data reviewed in April, 2008).

After combining the contaminant risk for volatile organic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Very High**.

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 YKHC Subregional Health Clinic 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 YKHC Subregional Health Clinic drinking water source.

REFERENCES

Alaska Department of Commerce, Community and Economic Development (ADCCED), Accessed 2008 [WWW document]. URL: http://www.commerce.state.ak.us/dca/commdb/CF_COMDB.htm

Dorava, Joseph M., 1994. Environmental Overview and Hydrogeologic Conditions at Aniak, Alaska

Freeze, R.A. and Cherry, J.A., 1979. Groundwater. Prentice-Hall, Englewood Cliffs, NJ.

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

APPENDIX A

YKHC Subregional Health Clinic Drinking Water Protection Area Location Map (Map A)

Public Water Well System for PWS #271928.001 YKHC-Subregional Helath Clinic



YKHC-Subregional Helath Clinic
PWSID:271928.001

Zone A

Zone B

Legend

● Class B Public Water System

Groundwater Protection Zones

□ Zone A Protection Area - Several Months Travel Time

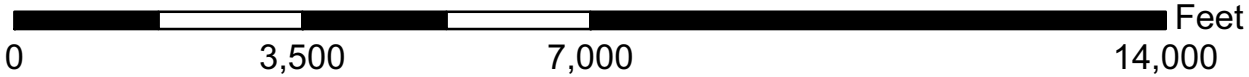
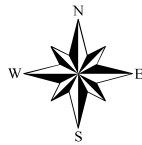
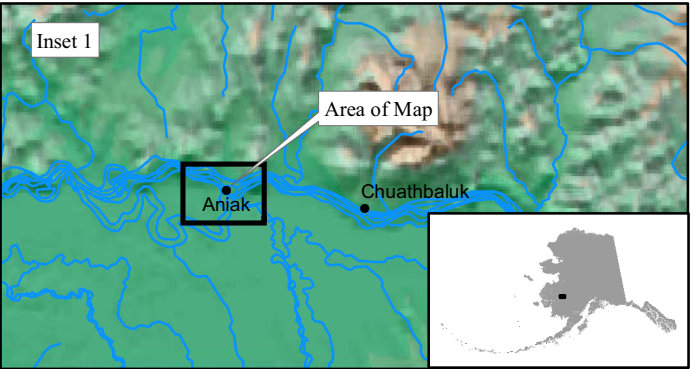
□ Zone B Protection Area - 2 Years Travel Time

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.**



APPENDIX B

Contaminant Source Inventory and Risk Ranking for YKHC Subregional Health Clinic (Tables 1-4)

Table 1

**Contaminant Source Inventory for
YKHC-Subregional Helath Clinic**

PWSID 271928.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Map Number	Comments
Motor /motor vehicle repair shops	C31	C31-01	A	C	
Motor /motor vehicle repair shops	C31	C31-02	A	C	
Motor /motor vehicle repair shops	C31	C31-03	A	C	
Septic systems (serves one single-family home)	R02	R02	A	C	5 assumed
Tanks, heating oil, residential (above ground)	R08	R08	A	C	5 assumed
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	C	
Highways and roads, paved (cement or asphalt)	X20	X20	A	C	2 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	C	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-02	A	C	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-03	A	C	
Septic systems (serves one single-family home)	R02	R02	B	C	8 assumed
Tanks, heating oil, residential (above ground)	R08	R08	B	C	16 assumed
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	B	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	B	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	B	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	B	C	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	B	C	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	B	C	

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Map Number</i>	<i>Comments</i>
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-03	B	C	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-04	B	C	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-05	B	C	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-06	B	C	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-07	B	C	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-08	B	C	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-09	B	C	
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	B	C	
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-02	B	C	
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-03	B	C	
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-04	B	C	
Airports	X14	X14	B	C	
Highways and roads, paved (cement or asphalt)	X20	X20	B	C	2 roads

Table 2

*Contaminant Source Inventory and Risk Ranking for
YKHC-Subregional Helath Clinic
Sources of Bacteria and Viruses*

PWSID 271928.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R02	A	Low	C	5 assumed
Highways and roads, paved (cement or asphalt)	X20	X20	A	Low	C	2 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	Medium	C	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-02	A	Medium	C	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-03	A	Medium	C	
Septic systems (serves one single-family home)	R02	R02	B	Low	C	8 assumed
Highways and roads, paved (cement or asphalt)	X20	X20	B	Low	C	2 roads

Table 3

*Contaminant Source Inventory and Risk Ranking for
YKHC-Subregional Helath Clinic
Sources of Nitrates/Nitrites*

PWSID 271928.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R02	A	Low	C	5 assumed
Highways and roads, paved (cement or asphalt)	X20	X20	A	Low	C	2 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	Low	C	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-02	A	Low	C	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-03	A	Low	C	
Septic systems (serves one single-family home)	R02	R02	B	Low	C	8 assumed
Airports	X14	X14	B	Low	C	
Highways and roads, paved (cement or asphalt)	X20	X20	B	Low	C	2 roads

Table 4

*Contaminant Source Inventory and Risk Ranking for
YKHC-Subregional Helath Clinic
Sources of Volatile Organic Chemicals*

PWSID 271928.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Map Number</i>	<i>Comments</i>
Motor /motor vehicle repair shops	C31	C31-01	A	Medium	C	
Motor /motor vehicle repair shops	C31	C31-02	A	Medium	C	
Motor /motor vehicle repair shops	C31	C31-03	A	Medium	C	
Septic systems (serves one single-family home)	R02	R02	A	Low	C	5 assumed
Tanks, heating oil, residential (above ground)	R08	R08	A	Medium	C	5 assumed
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	Low	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	Low	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	Low	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	Low	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	Low	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	Low	C	
Highways and roads, paved (cement or asphalt)	X20	X20	A	Low	C	2 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	Low	C	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-02	A	Low	C	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-03	A	Low	C	
Septic systems (serves one single-family home)	R02	R02	B	Low	C	8 assumed
Tanks, heating oil, residential (above ground)	R08	R08	B	Medium	C	16 assumed
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	B	Low	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	B	Low	C	

Table 4 (continued)

*Contaminant Source Inventory and Risk Ranking for
YKHC-Subregional Health Clinic
Sources of Volatile Organic Chemicals*

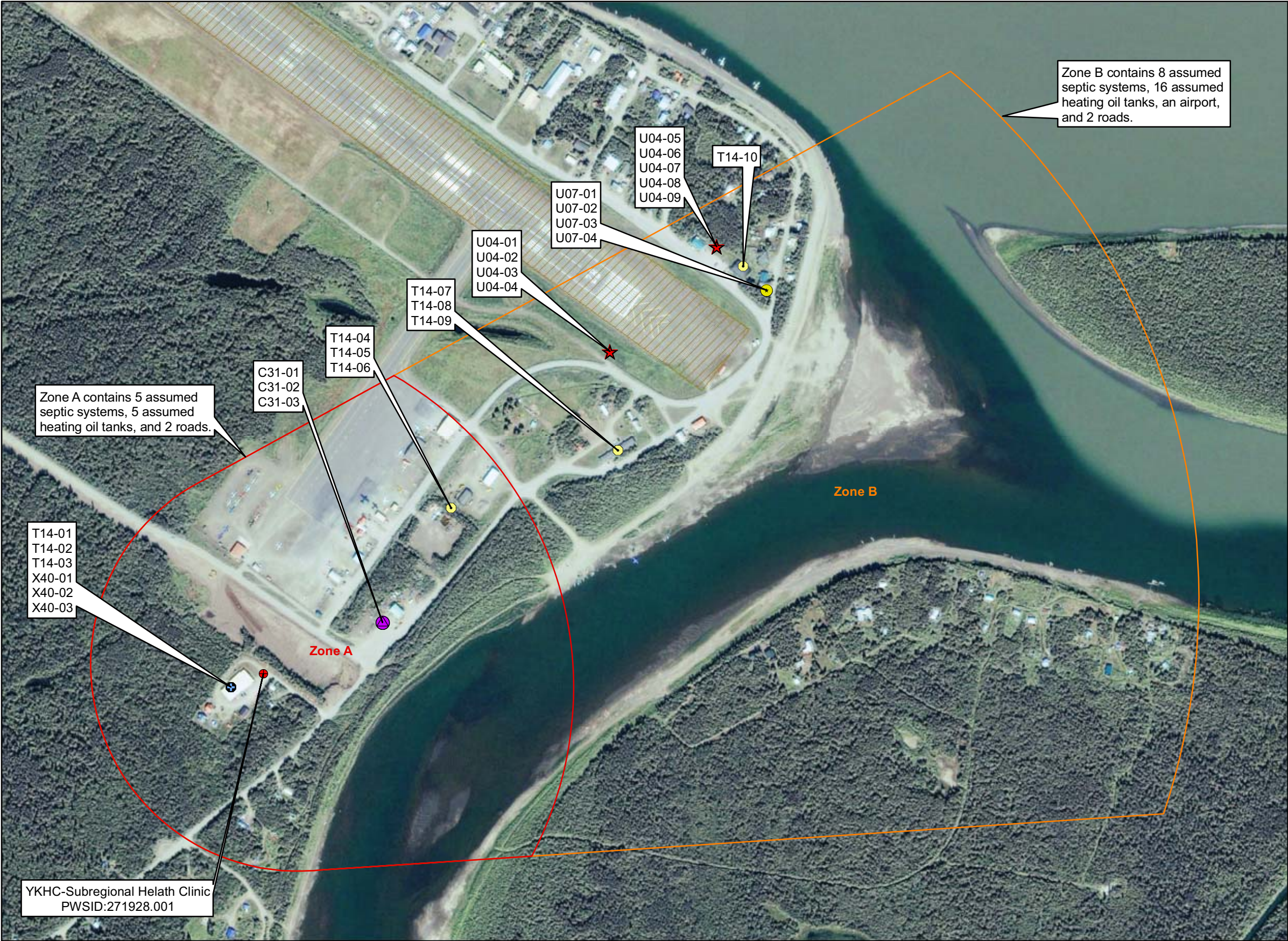
PWSID 271928.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Map Number</i>	<i>Comments</i>
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	B	Low	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	B	Low	C	
Airports	X14	X14	B	High	C	
Highways and roads, paved (cement or asphalt)	X20	X20	B	Low	C	2 roads

APPENDIX C

YKHC Subregional Health Clinic Drinking Water Protection Area and Potential and Existing Contaminant Sources (Map C)

Public Water Well System for PWS #271928.001 YKHC-Subregional Helath Clinic
Showing Potential and Existing Sources of Contamination



Legend

● Class B Public Water System Well

Groundwater Protection Zones

Zone A Protection Area - Several Months Travel Time

Zone B Protection Area - 2 Years Travel Time

Existing or Potential Contaminant Sources

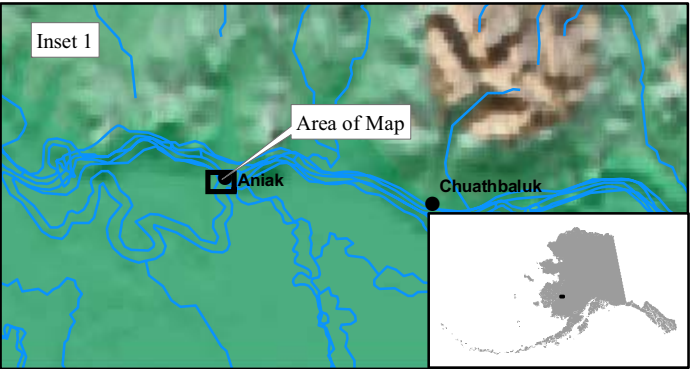
- Motor /motor vehicle repair shops (C31)
- Tanks, heating oil, nonresidential (aboveground) (T14)
- ★ Contaminated sites, DEC recognized, non-Superfund, non-RCRA (U04)
- Open Leaking Underground Fuel Storage Tank (LUST) Sites (U07)
- Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes) (X40)
- ▨ Airports/Airstrips (X14)

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

Apparent misalignment between geographic features and
aerial imagery may be present due to differences in source
data. URS Corporation does not guarantee the accuracy or
validity of the data provided.



0 1,500 3,000 Feet