



Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for the Kobuk Village Drinking Water System, Kobuk, Alaska

PWSID # 340565.001

June 2004

DRINKING WATER PROTECTION PROGRAM REPORT 1332 Alaska Department of Environmental Conservation

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The Drinking Water Protection Program (DWPP) 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 (ADEC), 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 Program Coordinator of DWPP, (907) 269-7521.

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Source Water Assessment for Kobuk Village Public Water System Source of Public Drinking Water, Kobuk, Alaska

Drinking Water Protection Program Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Kobuk Village Public Water System (PWS) has two wells. The well (PWS No. 340565.001) has been used as a drinking water source since it was drilled in October of 1978. This report is exclusively limited to PWS # 340565.001.

The well is a Class A (community and non-transient non-community) water system located on the north bank of the Kobuk River in Kobuk, Alaska. Available records indicate that the system has a 100,000 gallon storage tank and that the drinking water source is treated with calcium hypohypchlorite. This system operates year round and serves approximately 93 residents through 38 service connections. The wellhead received a susceptibility rating of **Very High** and the aquifer received a susceptibility rating of **Very High**. Combining these two ratings produce a **Very High** rating for the natural susceptibility of the well.

Identified potential and current sources of contaminants for the public drinking water source include: fuel tanks, bulk fuel facilities, pipelines, a landfill, and water treatment facility. A detailed inventory can be found in Table 1 of Appendix B. These identified potential and existing sources of contamination are considered sources of bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals, and other organic chemicals contaminant categories.

Overall, the well received a vulnerability rating of **Very High** for bacteria and viruses, nitrates and nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals, and other organic chemicals.

PUBLIC DRINKING WATER SYSTEM

The Kobuk Village PWS well is a Class A (community/non-transient/non-community) public water system. The system is located on the north bank of the Kobuk River, in Kobuk, Alaska (Sec. 03, T017N, R009W, Fairbanks Meridian, see Map A of

Appendix A). The community of Kobuk is located about 7 miles northeast of Shungnak and 128 air miles northeast of Kotzebue. The community has a population of 125 (ADCED, 2003). Total annual precipitation in Kobuk is 17 inches, including approximately 56 inches of snowfall. Temperatures can be as extreme as -68 to 90°F.

The community of Kobuk obtains most of their water supply from a piped water system. Outhouses and honeybuckets are used for sewage disposal (ADCED, 2003). Kobuk residents rely on the Kobuk Valley Electric Co-op for electricity, which is purchased from AVEC over the Kobuk-Shungnak intertie. Residents dispose of refuse at the community landfill.

According to information supplied by ADEC for the Kobuk Village PWS, the depth of the well is 30 feet below the ground surface. Based on available well construction details, it is assumed that the well is screened in an unconfined aquifer. The well is located within a floodplain.

Information acquired from a October 2000 sanitary survey for the PWS indicated that the land surface was sloped away from the well. Generally, land surfaces that slope away from the wellhead promote surface water drainage, which reduces the potential of contaminant migration down the well casing annulus. The sanitary survey indicates that the well is not grouted according to ADEC regulations. Proper grouting provides added protection against contaminants traveling along the well casing annulus and into source waters.

The thickness of seasonally thawed ground is much less where tundra vegetation has not been disturbed. Thawed sandy gravel is found at the base of the bluff along the Kobuk River. Soil in and around the Kiana area consist primarily of sandy silt and generally well-sorted floodplain, terrace, and alluvial fan deposits associated with streams and rivers. The soil contains few masses of ice (Indian Health Services, 1986).

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 area that contributes water to the well, the groundwater recharge area. This area is designated as the drinking water protection area (DWPA). Because releases of contaminants within the protection area are most likely to impact the drinking water well, this area will serve as the focus for voluntary protection efforts. An analytical calculation was used to determine the size and shape of the DWPA for the Kobuk Village PWS. The input parameters describing the attributes of the aquifer in this calculation were adopted from Groundwater (Freeze and Cherry, 1979). Available geology and groundwater contours were also considered to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at a meaningful protection area.

The protection areas established for wells by the ADEC are usually separated into four 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 (Please refer to the Guidance Manual for Class A Public Water Systems for additional information).

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 four protection area zones for wells and the calculated time -of-travel for each:

Table 1. Definition of Zones

Definition
¹ / ₄ the distance for the 2-yr. time-of-travel
Less than the 2 year time-of-travel
Less Than the 5 year time -of-travel
Less than the 10 year time -of-travel

The DWPA for the Kobuk Village PWS was determined using an analytical calculation and includes Zones A and D (See Map A of Appendix A).

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

The Drinking Water Protection Program has completed an inventory of potential and existing sources of contamination within the Kobuk Village PWS DWPA. 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 A public water system assessments, six categories of drinking water contaminants were inventoried. They include:

- Bacteria and viruses,
- Nitrates and/or nitrites,
- Volatile organic chemicals,
- Heavy metals, cyanide and other inorganic chemicals,
- Synthetic organic chemicals, and
- Other 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.

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

Tables 2 through 7 in Appendix B contain the ranking of potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals, and other organic chemicals.

VULNERABILITY OF THE DRINKING WATER SYSTEM

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

- Natural susceptibility, and
- Contaminant risks.

Appendix D contains fourteen charts, which together form the 'Vulnerability Analysis' for a source water assessment for a public drinking water source. Chart 1 analyzes the 'Susceptibility of the Wellhead' to contamination by looking at the construction of the well and its surrounding area. Chart 2 analyzes the 'Susceptibility of the Aquifer' to contamination by looking at the naturally occurring attributes of the water source and influences on the groundwater system that might lead to contamination. Chart 3 analyzes 'Contaminant Risks' for the drinking water source with respect to bacteria and viruses. The 'Contaminant Risks' portion of the analysis considers potential sources of contaminants as well as a review of contamination that has or may have occurred, but has not arrived or been detected at the well. Chart 4 contains the 'Vulnerability Analysis for Bacteria and Viruses'. Charts 5 through 14 contain the Contaminant Risks and Vulnerability Analyses for nitrates and nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals, and other organic chemicals, respectively.

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

Susceptibility of the Wellhead (0 – 25 Points) (Chart 1 of Appendix D)

Susceptibility of the Aquifer (0 – 25 Points) (Chart 2 of Appendix D)

Natural Susceptibility (Susceptibility of the Well) (0 - 50 Points)

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

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

The Kobuk Village PWS's water well is completed in an unconfined aquifer. Unconfined aquifers are more susceptible to potential groundwater quality impacts posed by the migration of surface water contaminants downward from the surface. Table 2 shows the susceptibility scores and ratings for this PWS.

Table 2. Susceptibility

	Score	Rating
Susceptibility of the	25	Very High
Wellhead		, o
Susceptibility of the	25	Very High
Aquifer		
Natural Susceptibility	50	Very High

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. This score has been derived from an examination of existing and historical contamination that has been detected at the drinking water source 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 for the natural susceptibility:

Contaminant Risk Ratings						
40 to 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.

Table 3. Contaminant Risks

Category	Score	Rating
Bacteria and Viruses	50	Very High
Nitrates and/or Nitrites	50	Very High
Volatile Organic Chemica	ls 50	Very High
Heavy Metals, Cyanide an	ıd	
Other Inorganic Chemical	s 50	Very High
Synthetic Organic Chemic	als 50	Very High
Other Organic Chemicals	50	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:

Natural Susceptibility (0 – 50 points)

+

Contaminant Risks (0 – 50 points)

=

Vulnerability of the Drinking Water Source to Contamination (0 – 100).

Again, rankings are assigned according to a point score:

Overall Vulnerability Ratings						
80 to 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 six categories of drinking water contaminants. Note: scores are rounded off to the nearest five.

Table 4. Overall Vulnerability

Category	Score	Rating
Bacteria and Viruses	100	Very High
Nitrates and Nitrites	100	Very High
Volatile Organic Chemicals	100	Very High
Heavy Metals, Cyanide and		
Other Inorganic Chemicals	100	Very High
Synthetic Organic Chemicals	100	Very High
Other Organic Chemicals	100	Very High

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **Very High**. The risk is primarily attributed to the presence of a sewage lagoon and landfill located in Zone A, and the presence of bacteria and viruses in recent sampling events. Numerous other potential contaminant sources are also found within the protection area (see Table 2 – Appendix B).

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, 2002). Positive samples increase the overall vulnerability of the drinking water source, indicating that the source is susceptible to bacteria and virus contamination.

A positive bacteria count has been reported in recent (within five years) sampling events (See Chart 3 – Contaminant Risks for Bacteria and Viruses in Appendix D). A positive sample on 12/5/2002 was followed by a confirmation sample on 12/18/2002. Only a small amount of bacteria and viruses are required to endanger public health.

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 **Very High**.

Nitrates and Nitrites

The contaminant risk for nitrates and nitrites is **Very High**. The risk to this source of public drinking water is primarily attributed to the presence of a landfill in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 3 – Appendix B).

Nitrates are very mobile, moving at approximately the same rate as water. The sampling history for this well indicates that nitrates have not been detected in recent sampling events. Nitrate concentrations in uncontaminated groundwater are typically less than 2 mg/L; therefore, nitrate concentrations above 2 mg/L may be indicative of man-made sources (See Chart 5 - Contaminant Risks for Nitrates and/or Nitrites in Appendix D).

Nitrate levels are often derived from the decomposition of organic matter in soils.

After combining the contaminant risk for nitrates and

nitrites with the natural susceptibility of the well, the overall vulnerability of the well to nitrate and nitrite contamination is **Very High.**

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **Very High**. The risk is primarily attributed to the presence of a bulk fuel facility in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 4 – Appendix B).

Recent sampling results indicated low levels of Total Trihalomethanes (TTHM's). TTHM's are generally not an indication of source water conditions as they are a byproduct of water treatment. Risk points were not assigned due to the TTHM's not exceeding the MCL of 0.08 mg/L (See Chart 7 – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

Other possible sources of volatile organic chemicals include facilities with automobiles, residential areas, fuel tanks, and roads. See Table 4 in Appendix B for a complete listing.

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**.

Heavy Metals, Cyanide and Other Inorganic Chemicals

The contaminant risk for heavy metals, cyanide and other inorganic chemicals is **Very High**. The risk is primarily attributed to the presence of copper, lead and arsenic in recent sampling events and the presence of a landfill in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 5 – Appendix B).

Based on review of recent sampling records for this PWS, moderate levels of copper, lead and arsenic have been detected; however have not exceeded their MCLs of 1.3, .015 and .05 mg/L, respectively (see Chart 9 – Contaminant Risks for Heavy Metals, Cyanide, and Other Inorganic Chemicals in Appendix D).

The reported concentrations of copper and lead are likely attributed to the water treatment/conveyance system.

According to the EPA "Arsenic occurs naturally in rocks and soil, water, air, and plants and animals. It can be further released into the environment through natural activities such as volcanic action, erosion of

rocks, and forest fires, or through human actions. Approximately 90 percent of industrial arsenic in the U.S. is currently used as a wood preservative, but arsenic is also used in paints, dyes, metals, drugs, soaps, and semi -conductors. Agricultural applications, mining, and smelting also contribute to arsenic releases in the environment." (EPA, 2001) Studies have linked long-term exposure to arsenic in drinking water to cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate. Noncancer effects of ingesting arsenic include cardiovascular, pulmonary, immunological, neurological, and endocrine (e.g., diabetes) effects. Short-term exposure to high doses of arsenic can cause other adverse health effects, but such effects are unlikely to occur from U.S. public water supplies that are in compliance with the previous arsenic standard of 50 ppb. (EPA, 2001)

After combining the contaminant risk for heavy metals, cyanide and other inorganic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Very High**.

Synthetic Organic Chemicals

The contaminant risk for synthetic organic chemicals is **Very High**. The risk is primarily attributed to a landfill located in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 6 – Appendix B).

No recent sampling data was available in ADEC records for the Kobuk Village PWS (See Chart 11 – Contaminant Risks for Synthetic Organic Chemicals in Appendix D).

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

Other Organic Chemicals

The contaminant risk for other organic chemicals is **Very High**. The risk is primarily attributed to the presence of a landfill in Zone A. Several other potential contaminant sources are also found within the protection area (see Table 7 – Appendix B).

No recent sampling data was available in ADEC records for the Kobuk Village PWS (See Chart 13 – Contaminant Risks for Other Organic Chemicals in Appendix D).

After combining the contaminant risk for other 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 the community of Kobuk 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 Community and Economic Development (ADCED), 2003 [WWW document]. URL: http://www.dced.state.ak.us/cbd/commdb/CF COMDB.htm
- Alaska Department of Environmental Conservation, Contaminated Sites Database, 2003 [WWW database], URL http://www.state.ak.us/dec/dspar/csites/cs_search.htm
- Alaska Department of Environmental Conservation, Leaking Underground Storage Tank Database, 2003 [WWW database], URL http://www.dec.state.ak.us/spar/stp/ust/search/fac_search.asp
- Freeze, R. A., and Cherry, J.A. 1979, Groundwater, Prentice-Hall, Englewood Cliffs, New Jersey
- Indian Health Service, 1986, Information from Project Summary for Kiana, Indian Health Service, Project AN-86-331 dated February 1986.
- United States Environmental Protection Agency (EPA), 2002 [WWW document]. URL http://www.epa.gov/safewater/mcl.html.

United States Environmental Protection Agency (EPA, Office of Water). 2001, July 23.Retrieved February 2002 [WWW document]. URL http://www.epa.gov/safewater/ars/ars_rule_factsheet.html

APPENDIX A

Drinking Water Protection Area Location Map (Map A)

APPENDIX B

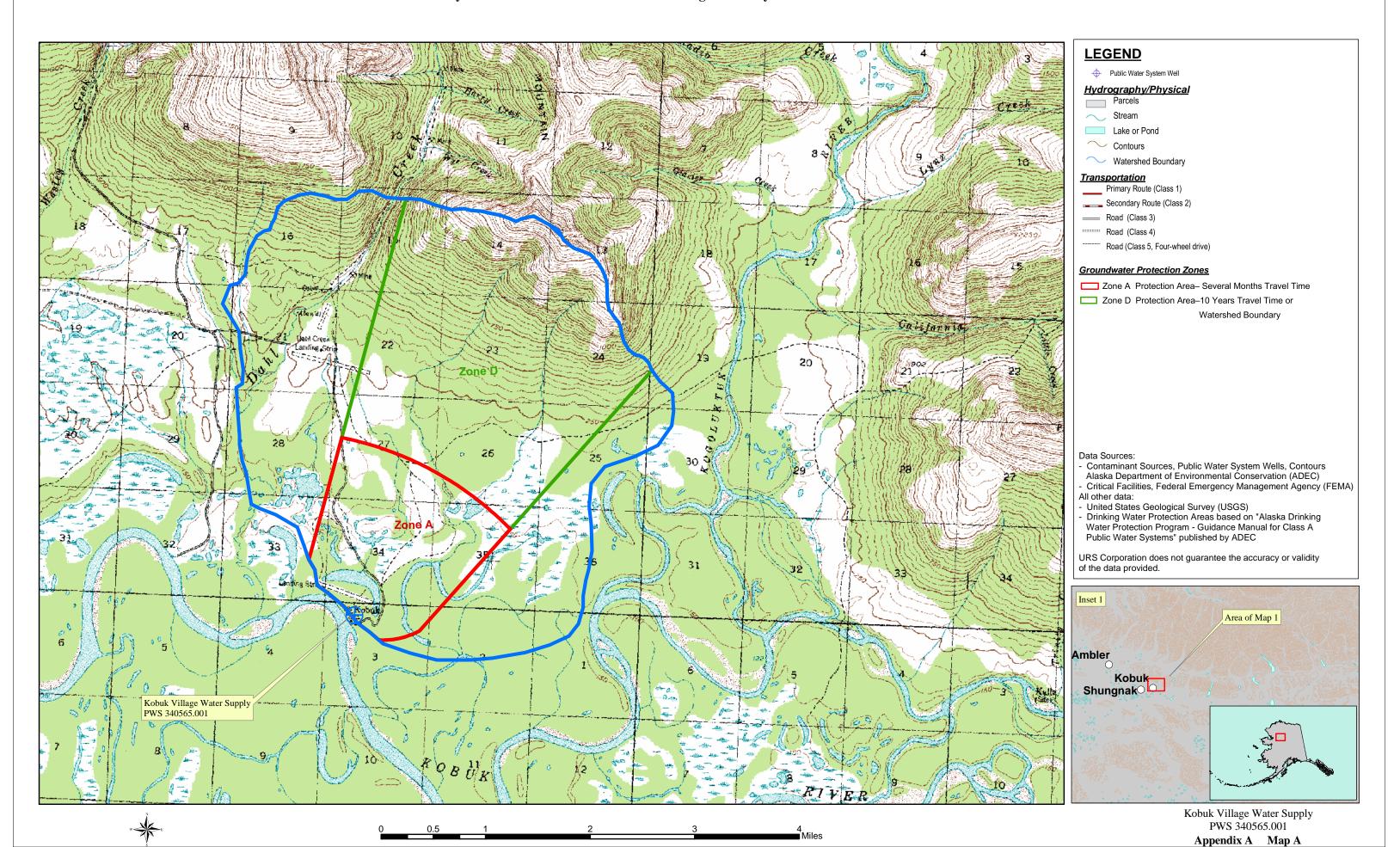
Contaminant Source Inventory and Risk Ranking (Tables 1-7)

APPENDIX C

Drinking Water Protection Area and Potential and Existing Contaminant Sources (Map C)

APPENDIX D

Vulnerability Analysis for Public Drinking Water Source (Charts 1-14)



Contaminant Source Inventory for Kobuk Village Water Supply

PWSID 340565.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Map Number	Comments
Laundromats without dry cleaning	C22	C22-01	A	С	Washeteria
Motor /motor vehicle repair shops	C31	C31-01	A	С	Airport Service and Maintenance Shop
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	С	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	С	Lift Station-North
Pit toilets (open hole), nonresidential (one or more)	D16	D16-01	A	С	Assume 35 or less honeybucket pits/outhouses in Zone A
Landfills (municipal; Class III)	D51	D51-01	A	С	Landfill/Incinerator
Tanks, heating oil, residential (above ground)	R08	R08-01	A	С	Assume 14 or less aboveground residential heating oil tanks in Zone A
Tanks, diesel (above ground)	T06	T06-01	A	С	Washeteria
Tanks, diesel (above ground)	T06	T06-01	A	С	School
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	C	Kobuk Health Clinic
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	C	Kobuk Store
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	С	Principal Housing
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	С	GCI Phone Module
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	С	Baptist Church
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	С	Friends Church
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	С	Community Hall
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	С	City of Kobuk Offices
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	A	С	IRA Office Bldg.
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	A	С	VPSO
Tanks, heating oil, nonresidential (aboveground)	T14	T14-11	A	С	Post Office
Tanks, heating oil, nonresidential (aboveground)	T14	T14-12	A	С	GCI

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Map Number	Comments
Tanks, heating oil, nonresidential (aboveground)	T14	T14-13	A	С	City
Tanks, heating oil, nonresidential (aboveground)	T14	T14-14	A	С	Elementary School
Cemeteries	X01	X01-01	A	С	Cemetery I
Cemeteries	X01	X01-02	A	С	Cemetery2
Petroleum product bulk station/terminals	X11	X11-01	A	С	School Fuel Tanks
Airports	X14	X14-01	A	С	Kobuk Airport
Highways and roads, dirt/gravel	X24	X24-01	A	С	Assume 1 - 20 roads in Zone A
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	С	Kobuk Health Clinic
Airports	X14	X14-02	D	C	Dahl Creek Landing Strip

Table 2

Contaminant Source Inventory and Risk Ranking for Kobuk Village Water Supply Sources of Bacteria and Viruses

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Laundromats without dry cleaning	C22	C22-01	A	Low	С	Washeteria
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	High	С	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Medium	C	Lift Station-North
Pit toilets (open hole), nonresidential (one or more	D16	D16-01	A	Medium	C	Assume 35 or less honeybucket pits/outhouses in Zone A
Landfills (municipal; Class III)	D51	D51-01	A	High	С	Landfill/Incinerator
Highways and roads, dirt/gravel	X24	X24-01	A	Low	С	Assume 1 - 20 roads in Zone A
Medical/veterinary facilities (doctor or dentist offic hospitals, nursing homes)	X40	X40-01	A	Medium	С	Kobuk Health Clinic

Table 3

Contaminant Source Inventory and Risk Ranking for Kobuk Village Water Supply Sources of Nitrates/Nitrites

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Laundromats without dry cleaning	C22	C22-01	A	Low	С	Washeteria
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	High	С	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Medium	С	Lift Station-North
Pit toilets (open hole), nonresidential (one or more	D16	D16-01	A	Medium	C	Assume 35 or less honeybucket pits/outhouses in Zone A
Landfills (municipal; Class III)	D51	D51-01	A	Very High	C	Landfill/Incinerator
Cemeteries	X01	X01-01	A	Medium	C	Cemetery1
Cemeteries	X01	X01-02	A	Medium	C	Cemetery2
Airports	X14	X14-01	A	Low	C	Kobuk Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1 - 20 roads in Zone A
Medical/veterinary facilities (doctor or dentist offic hospitals, nursing homes)	X40	X40-01	A	Low	С	Kobuk Health Clinic

Table 4

Contaminant Source Inventory and Risk Ranking for Kobuk Village Water Supply Sources of Volatile Organic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Laundromats without dry cleaning	C22	C22-01	A	Low	С	Washeteria
Motor /motor vehicle repair shops	C31	C31-01	A	Medium	C	Airport Service and Maintenance Shop
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	С	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Lift Station-North
Pit toilets (open hole), nonresidential (one or more	D16	D16-01	A	Low	C	Assume 35 or less honeybucket pits/outhouses in Zone A
Landfills (municipal; Class III)	D51	D51-01	A	High	C	Landfill/Incinerator
Tanks, heating oil, residential (above ground)	R08	R08-01	A	Medium	C	Assume 14 or less aboveground residential heating oil tanks in Zone A
Tanks, diesel (above ground)	T06	T06-01	A	Medium	C	Washeteria
Tanks, diesel (above ground)	T06	T06-01	A	Medium	C	School
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	Low	C	Kobuk Health Clinic
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	Low	C	Kobuk Store
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	Low	C	Principal Housing
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	Low	C	GCI Phone Module
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	Low	C	Baptist Church
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	Low	C	Friends Church
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	Low	C	Community Hall
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	Low	C	City of Kobuk Offices
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	A	Low	C	IRA Office Bldg.
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	A	Low	C	VPSO
Tanks, heating oil, nonresidential (aboveground)	T14	T14-11	A	Low	C	Post Office

Table 4 (continued)

Contaminant Source Inventory and Risk Ranking for Kobuk Village Water Supply Sources of Volatile Organic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Tanks, heating oil, nonresidential (aboveground)	T14	T14-12	A	Low	С	GCI
Tanks, heating oil, nonresidential (aboveground)	T14	T14-13	A	Low	С	City
Tanks, heating oil, nonresidential (aboveground)	T14	T14-14	A	Low	С	Elementary School
Petroleum product bulk station/terminals	X11	X11-01	A	Very High	С	School Fuel Tanks
Airports	X14	X14-01	A	High	C	Kobuk Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1 - 20 roads in Zone A
Medical/veterinary facilities (doctor or dentist offic hospitals, nursing homes)	X40	X40-01	A	Low	С	Kobuk Health Clinic
Airports	X14	X14-02	D	High	С	Dahl Creek Landing Strip

Table 5

Contaminant Source Inventory and Risk Ranking for Kobuk Village Water Supply Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Motor /motor vehicle repair shops	C31	C31-01	A	Medium	С	Airport Service and Maintenance Shop
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	С	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Lift Station-North
Pit toilets (open hole), nonresidential (one or more	D16	D16-01	A	Low	C	Assume 35 or less honeybucket pits/outhouses in Zone A
Landfills (municipal; Class III)	D51	D51-01	A	High	C	Landfill/Incinerator
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	Low	C	Kobuk Health Clinic
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	Low	C	Kobuk Store
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	Low	C	Principal Housing
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	Low	C	GCI Phone Module
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	Low	C	Baptist Church
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	Low	C	Friends Church
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	Low	C	Community Hall
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	Low	C	City of Kobuk Offices
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	A	Low	С	IRA Office Bldg.
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	A	Low	С	VPSO
Tanks, heating oil, nonresidential (aboveground)	T14	T14-11	A	Low	C	Post Office
Tanks, heating oil, nonresidential (aboveground)	T14	T14-12	A	Low	С	GCI
Tanks, heating oil, nonresidential (aboveground)	T14	T14-13	A	Low	С	City
Tanks, heating oil, nonresidential (aboveground)	T14	T14-14	A	Low	С	Elementary School
Cemeteries	X01	X01-01	A	Low	С	Cemetery1

Table 5 (continued)

Contaminant Source Inventory and Risk Ranking for Kobuk Village Water Supply

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Cemeteries	X01	X01-02	A	Low	С	Cemetery2
Petroleum product bulk station/terminals	X11	X11-01	A	Low	С	School Fuel Tanks
Airports	X14	X14-01	A	Low	С	Kobuk Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	С	Assume 1 - 20 roads in Zone A
Medical/veterinary facilities (doctor or dentist offichospitals, nursing homes)	X40	X40-01	A	Low	С	Kobuk Health Clinic

Table 6

Contaminant Source Inventory and Risk Ranking for Kobuk Village Water Supply Sources of Synthetic Organic Chemicals

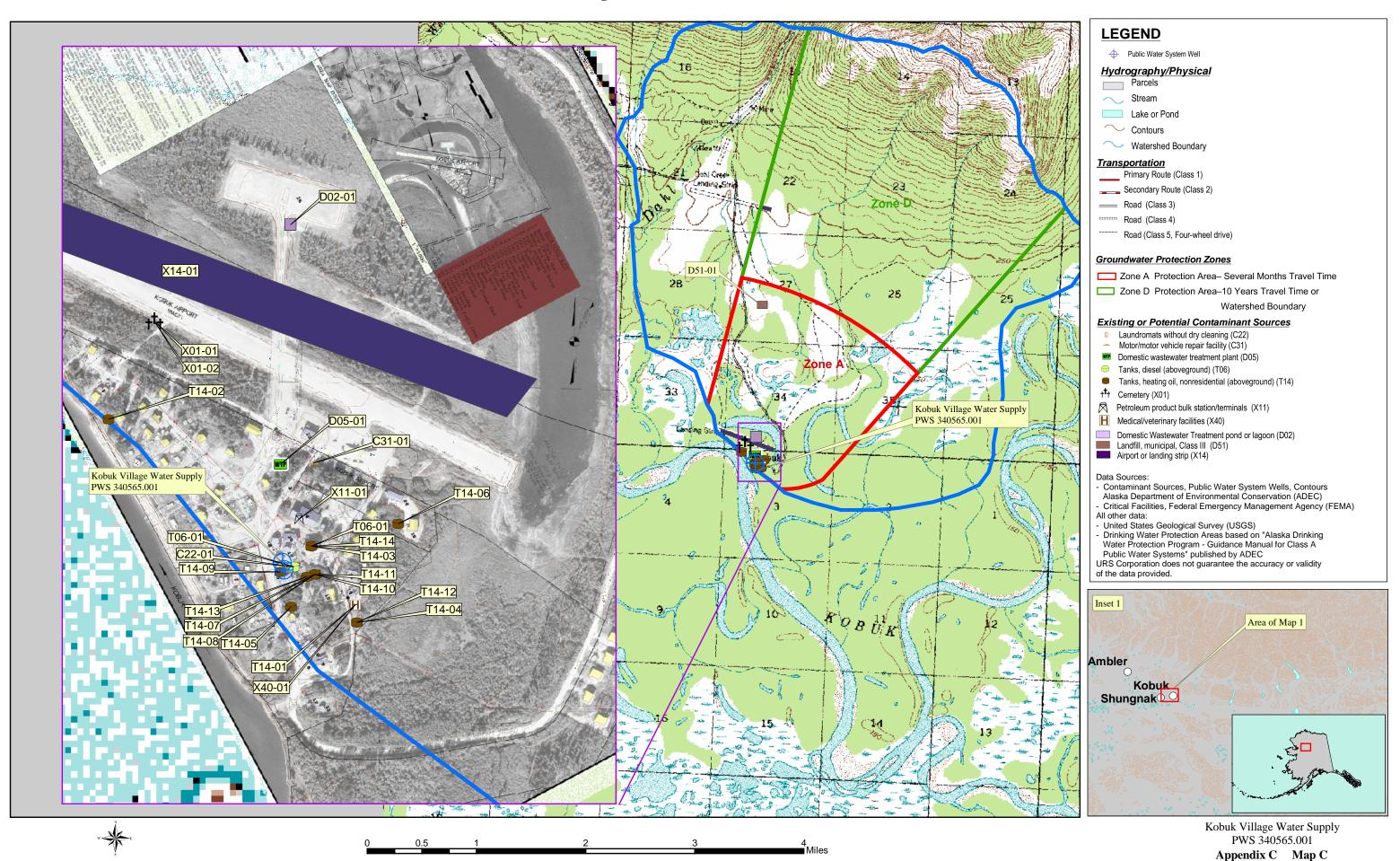
Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	С	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Lift Station-North
Landfills (municipal; Class III)	D51	D51-01	A	Very High	C	Landfill/Incinerator
Cemeteries	X01	X01-01	A	Medium	C	Cemetery l
Cemeteries	X01	X01-02	A	Medium	C	Cemetery2
Petroleum product bulk station/terminals	X11	X11-01	A	Low	С	School Fuel Tanks
Airports	X14	X14-01	A	Medium	С	Kobuk Airport
Medical/veterinary facilities (doctor or dentist office hospitals, nursing homes)	X40	X40-01	A	Low	С	Kobuk Health Clinic

Table 7

Contaminant Source Inventory and Risk Ranking for Kobuk Village Water Supply Sources of Other Organic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Motor /motor vehicle repair shops	C31	C31-01	A	Medium	С	Airport Service and Maintenance Shop
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	С	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Lift Station-North
Landfills (municipal; Class III)	D51	D51-01	A	Very High	С	Landfill/Incinerator
Petroleum product bulk station/terminals	X11	X11-01	A	High	C	School Fuel Tanks
Airports	X14	X14-01	A	Medium	C	Kobuk Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1 - 20 roads in Zone A

Public Water Well System for PWS #340565.001 Kobuk Village Water System Sources of Potential and Existing Contamination



Susceptibility initially assumed to be low. Susceptibility of wellhead = 0 pts NO Is the well Increase susceptibility 5 pts + 5 pts properly grouted? Is the well Increase susceptibility 20 pts 0 pts capped? YES YES Very High Susceptibility of wellhead 25 pts Increase susceptibility: YES Is the well 10 pts: suspected floodplain + 20 pts within a Wellhead Susceptibility Ratings 20 pts: known floodplain floodplain? 20 to 25 pts very high 15 to < 20 pts 10 to < 15 pts medium NO < 10 pts low Is the land surface sloped Increase susceptibility 5 pts 0 pts away from the

Chart 1. Susceptibility of the wellhead - Kobuk Village Water System (PWS No. 340565.001)

Chart 2. Susceptibility of the aquifer Kobuk Village Water System (PWS No. 340565.001)

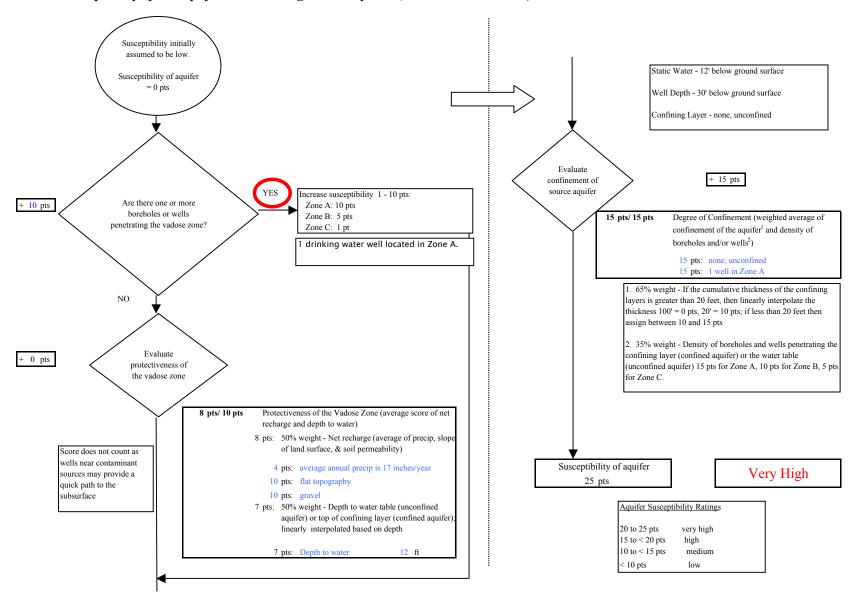


Chart 3. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Bacteria & Viruses

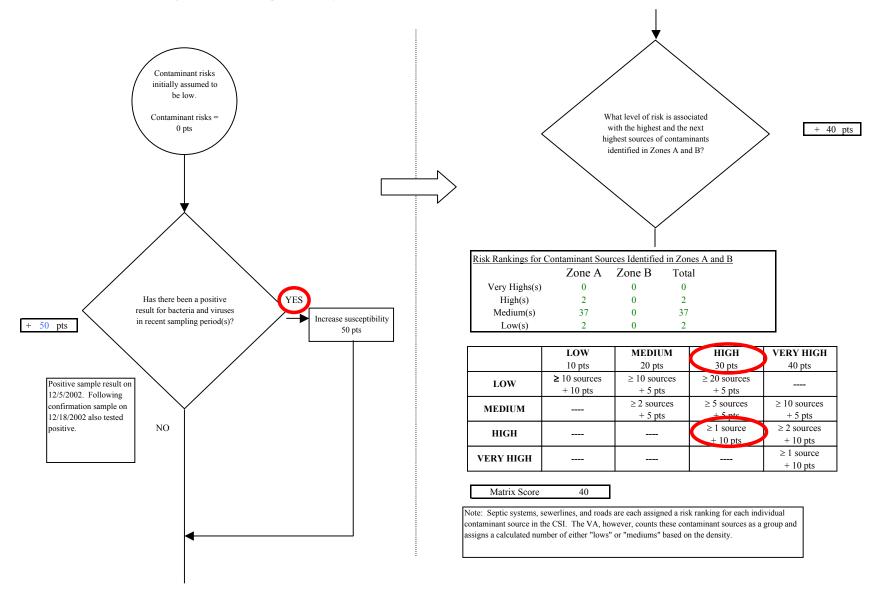


Chart 3. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Bacteria & Viruses NO Are there sufficient Initial assessment of risk posed by Risk unchanged controls, conditions, or potential sources of contamination monitoring to warrant = 40 pts downgrading risk? Are any YES significant Risk unchanged contaminant Reduce risk 1 - 10 pts sources within - 0 pts Zone A? The number and magnitude of Risk posed by potential sources of contaminant sources in YES contamination with controls Zone A determines a risk increase. See Table 2 for 50 + 10 pts Increase risk 1 - 10 pts inventory. Existing Risk due to existing 50 pts contamination Are there any conditions that Risk unchanged Risk posed by potential sources warrant upgrading Potential of contamination with controls risk? 50 pts Contaminant risks Contaminant Risk YES 100 pts Increase risk 1 - 10 pts + 0 pts Contaminant risks* * Truncate risk at 50 pts Contaminant Risk Ratings Risk posed by potential sources of contamination 40 to 50 pts very high 50 30 to < 40 ptshigh Very High $20 \text{ to} \le 30 \text{ pts}$

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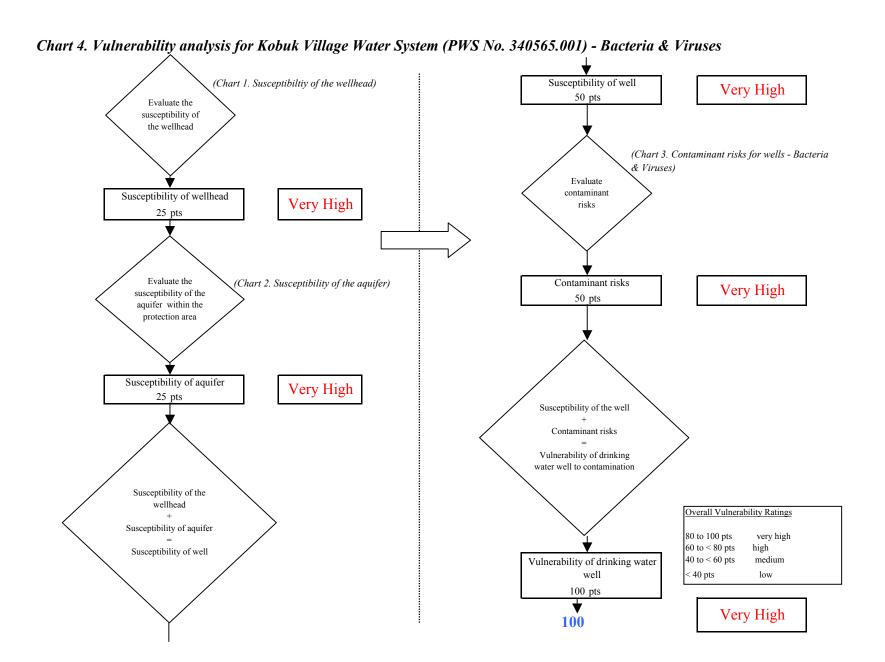
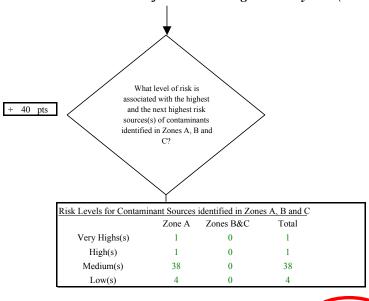


Chart 5. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Nitrates and Nitrites Contaminant risks initially assumed to be low. Current level of Evaluate the level of Contaminant risks background contamination due to man-= 0 ptscontamination from made source(s) natural sources 0 pts Is the concentration of Has nitrates and/or the contaminant nitrites been detected in increasing, decreasing, the source waters in or staying the same? recent sampling period(s)? Recent Nitrate Sampling Results (mg/L) All recent nitrate and nitrite sampling data was below detection levels (ND) Increasing: risk up 1 - 10 pts YES Decreasing: risk down 1 - 5 pts + 0 pts Same: risk unchanged Risk due to existing man-Risk due to natural made sources sources 0 pts Risk due to existing contamination 0 pts Was the source of Evaluate the level of NO. contamination contamination from natural? man-made sources YES

Chart 5. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Nitrates and Nitrites



	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
LOW	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	
MEDIUM		≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
HIGH			≥ 1 source + 10 pts	≥ 2 sources + 10 pts
VERY HIGH				≥ 1 source + 10 pts

Matrix Score 40

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.

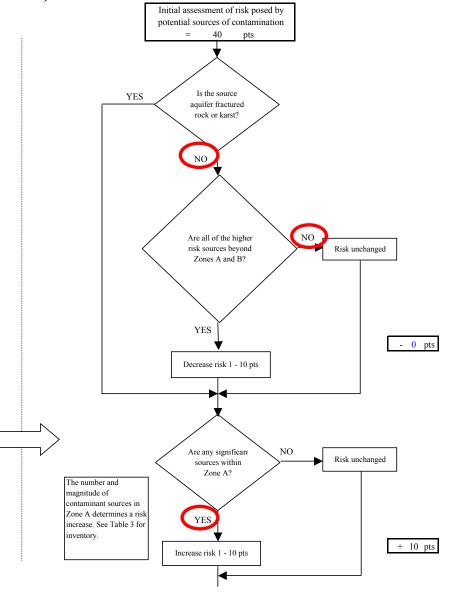
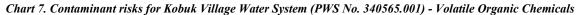


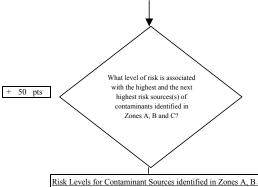
Chart 5. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Nitrates and Nitrites Existing NO Are there conditions 0 pts Risk unchanged that warrant upgrading risk? Risk due to existing Potential contamination 50 pts The number and magnitude of Risk posed by potential sources contaminant sources in of contamination with controls Contaminant Risk Zone D determines a risk YES 50 pts increase. See Table 3 for Contaminant risks inventory. 0 pts Increase risk 1 - 10 pts Risk posed by potential sources of contamination 50 pts *Truncate risk at 50 pts Contaminant risks* 50 Are there sufficient Contaminant Risk Ratings Very High controls, conditions, NO. Risk unchanged or monitoring to 40 to 50 pts very high warrant downgrading 30 to < 40 pts high 20 to < 30 pts risk? medium < 20 pts low YES 0 pts Decrease risk 1 - 10 pts Risk posed by potential sources of contamination with controls

Chart 6. Vulnerability analysis for Kobuk Village Water System (PWS No. 340565.001) - Nitrates and Nitrites (Chart 1. Susceptibiltiy of the wellhead) Susceptibility of well Very High 50 pts Evaluate the susceptibility of the wellhead (Chart 5. Contaminant risks for wells - Nitrates and Nitrites) Evaluate Susceptibility of wellhead contaminant risks Very High 25 pts Evaluate the (Chart 2. Susceptibility of the aquifer) Contaminant risks Very High susceptibility of the 50 pts aquifer within the protection area Susceptibility of aquifer Very High 25 pts Susceptibility of the well Contaminant risks Vulnerability of drinking water well to contamination Susceptibility of the wellhead Overall Vulnerability Ratings Susceptibility of aquifer 80 to 100 pts very high Susceptibility of well 60 to < 80 pts high 40 to < 60 pts medium Vulnerability of drinking water well < 40 pts 100 pts Very High 100

Chart 7. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Volatile Organic Chemicals Contaminant risks initially assumed to be Current level of Evaluate the level of Contaminant risks background contamination due to man-=0 pts contamination from made source(s) Although other analytes may have reported natural sources 8 pts above detection limits in recent sampling events, the analyte reporting the highest percent MCL exceedence was used for assessing risk points. Points are based on linear interpolation of most recent detect [MCL = 50 pts; detect = 0 pts] Is the concentration of the NO contaminant increasing, Have volatile organic decreasing, or staying the chemicals been detected ir same? the source waters in recent Risk was downgraded sampling period(s)? because TTHMs are a Recent VOC Sampling Results (mg/L) possible byproduct of water treatment and the TTHM MCL was not exceeded in recent sample result. Increasing: risk up 1 - 10 pts YES Decreasing: risk down 1 - 5 pts + -8 pts Same: risk unchanged Maximum Contaminant Level (MCL) in mg/L % of MCI TTHM 0.08 17% Risk due to natural Risk due to existing mansources made sources 0 pts 0 pts Existing contamination points based on linear interpolation of most recen detect [MCL = 50 pts; detect = 0 pts] Risk due to existing contamination 0 pts NO. Was the source of Evaluate the level of contamination contamination from mannatural? made sources YES

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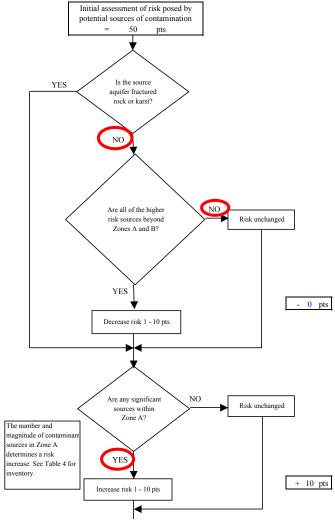


	Zone A	Zones B&C	Total
ery Highs(s)	1	0	1
High(s)	2	0	2
Medium(s)	17	0	17
Low(s)	54	0	54

	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
LOW	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	
MEDIUM		≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
HIGH			≥ 1 source + 10 pts	≥ 2 sources + 10 pts
VERY HIGH				≥ 1 source + 10 pts

Matrix Score 50

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in tl CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.



Existing NO Are there conditions 0 pts Risk unchanged that warrant upgrading Risk due to existing risk? Potential contamination 62 pts The number and magnitude of Risk posed by potential sources contaminant sources in of contamination with controls Contaminant Risk Zone D determines a risk YES increase. See Table 4 for 62 pts Contaminant risks inventory. + 2 pts Increase risk 1 - 10 pts Risk posed by potential sources of contamination 62 pts *Truncate risk at 50 pts Contaminant risks* Contaminant Risk Ratings Are there sufficient Very High NO , controls, conditions, or Risk unchanged 40 to 50 pts very high monitoring to warrant 30 to < 40 pts high downgrading risk? 20 to < 30 pts medium < 20 pts YES 0 pts Decrease risk 1 - 10 pts Risk posed by potential sources of contamination with controls 62 pts

Chart 7. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Volatile Organic Chemicals

Chart 8. Vulnerability analysis for Kobuk Village Water System (PWS No. 340565.001) - Volatile Organic Chemicals (Chart 1. Susceptibiltiy of the wellhead) Susceptibility of well Very High 50 pts Evaluate the susceptibility of the wellhead (Chart 7. Contaminant risks for wells - Volatile Organic Chemicals) Evaluate Susceptibility of wellhead contaminant risks Very High 25 pts Evaluate the (Chart 2. Susceptibility of the aquifer) Contaminant risks Very High susceptibility of the 50 pts aquifer within the protection area Susceptibility of aquifer Very High 25 pts Susceptibility of the well Contaminant risks Vulnerability of drinking water well to contamination Susceptibility of the wellhead Overall Vulnerability Ratings Susceptibility of aquifer 80 to 100 pts very high Susceptibility of well 60 to < 80 pts high 40 to < 60 pts medium Vulnerability of drinking water well 100 pts Very High 100

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Chart 9. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals Contaminant risks According to the EPA "Arsenic occurs naturally in rocks and soil, water, air, and plants and animals. initially assumed to It can be further released into the environment through natural activities such as volcanic action, be low. rosion of rocks, and forest fires, or through human actions. Approximately 90 percent of industrial arsenic in the U.S. is currently used as a wood preservative, but arsenic is also used in paints, dyes, Evaluate the level of Current level of metals, drugs, soaps, and semi-conductors. Agricultural applications, mining, and smelting also Contaminant risks background contamination due to manontribute to arsenic releases in the environment." (EPA, 2001) studies have linked long-term exposure to arsenic in drinking water to cancer of the bladder, lungs, contamination from made source(s) skin, kidney, nasal passages, liver, and prostate. Non-cancer effects of ingesting arsenic include natural sources 42 pts cardiovascular, pulmonary, immunological, neurological, and endocrine (e.g., diabetes) effects. Short term exposure to high doses of arsenic can cause other adverse health effects, but such effects are unlikely to occur from U.S. public water supplies that are in compliance with the previous arsenic standard of 50 ppb. (EPA, 2001) NO or Is the concentration of Have heavy metals, UNKNOWN The reported the contaminant cyanide or other inorganic increasing, decreasing, concentrations of lead and chemicals been detected or staying the same? copper are likely attributed in the source waters in to the water Recent Metals Sampling Results recent sampling period(s)? treatment/conveyance (mg/L) 12/31/2003 Copper 0.7 12/31/2000 Lead 12/31/2003 0.008 12/31/2002 0.005 YES Arsenic 9/16/2002 0.028 Increasing: risk up 1 - 10 pts Decreasing: risk down 1 - 5 pts + 0 pts Same: risk unchanged Maximum Contaminant Although other inorganic compounds have % of MCI Level (MCL) (mg/L) been detected in previous sampling events, Copper= arsenic, copper and lead have reported the highest percent MCL values in the past 5 Lead = 0.015 53% years. 0.05 Arsenic= 56% Risk due to natural Risk due to existing mansources made sources Existing contamination points based on linear interpolation of most recent detect [MCL = 50 pts; 0 pts 42 pts detect = 0 ptsRisk due to existing contamination 42 pts Evaluate the level Was the source of NO of contamination contamination from man-made natural? sources YES

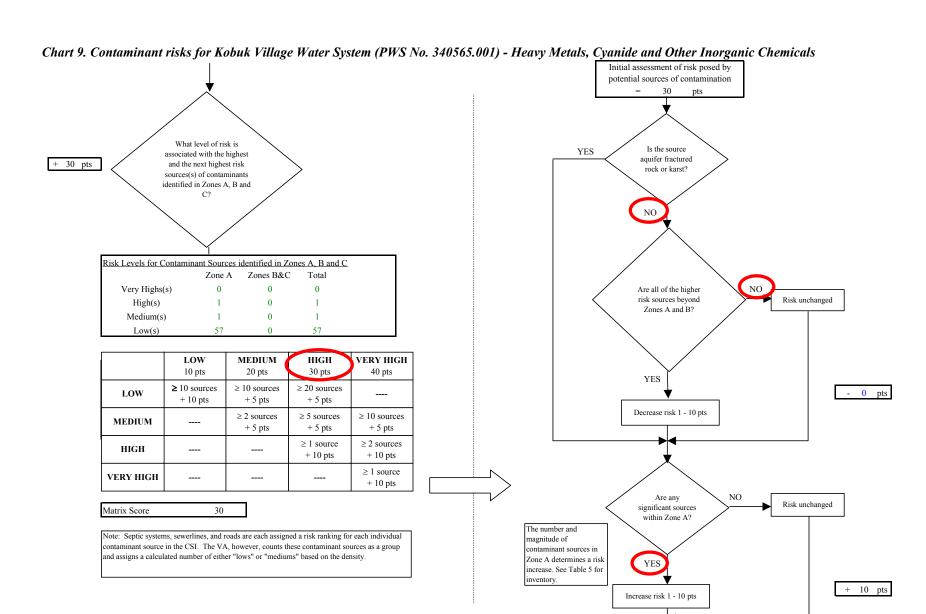


Chart 9. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals Existing NO Are there conditions 42 pts Risk unchanged that warrant upgrading risk? Risk due to existing Potential contamination 40 pts The number and magnitude of Risk posed by potential sources contaminant sources in of contamination with controls Contaminant Risk Zone D determines a YES 82 pts risk increase. See Table Contaminant risks 5 for inventory. 0 pts Increase risk 1 - 10 pts Risk posed by potential sources of contamination Contaminant risks* *Truncate risk at 50 pts Are there sufficient Contaminant Risk Ratings Very High NQ Risk unchanged controls, conditions, or monitoring to 40 to 50 pts very high 30 to < 40 pts warrant downgrading high risk? 20 to < 30 pts medium < 20 pts YES 0 pts Decrease risk 1 - 10 pts Risk posed by potential sources of contamination with controls 40 pts

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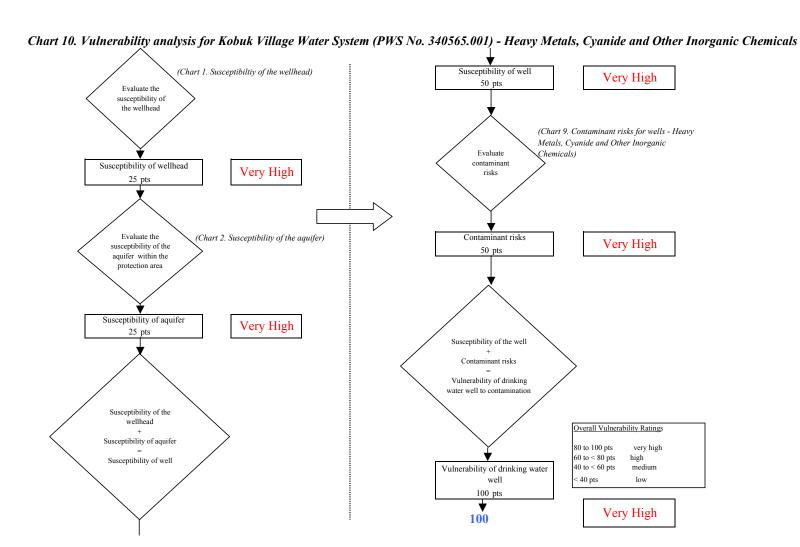
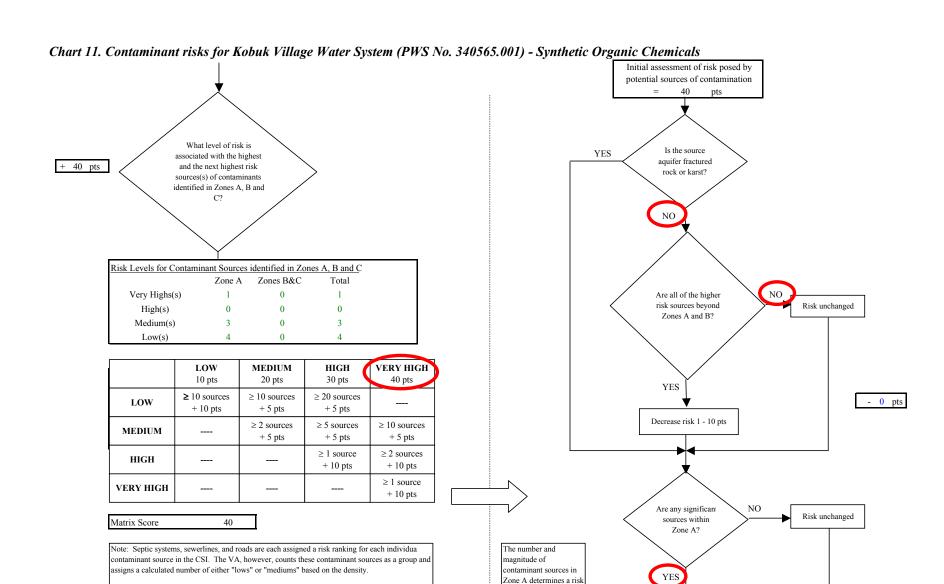


Chart 11. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Synthetic Organic Chemicals Contaminant risks initially assumed to be low. Current level of Evaluate the level of Contaminant risks background contamination due to man-= 0 ptscontamination from made source(s) natural sources NO or Is the concentration of Have synthetic organic UNKNOWN the contaminant chemicals been detected increasing, decreasing, in the source waters in or staying the same? recent sampling period(s)? Recent SOC Sampling Results (mg/L) No recent SOC sampling data was available in ADEC records for this PWSID Increasing: risk up 1 - 10 pts YES Decreasing: risk down 1 - 5 pts + 0 pts Same: risk unchanged Existing contamination points based on linear interpolation of most recent detect [MCL = 50 pts; detect = 0 pts]Risk due to natural Risk due to existing mansources made sources 0 pts 0 pts Risk due to existing contamination 0 pts Was the source of Evaluate the level of NO. contamination contamination from man-made sources YES

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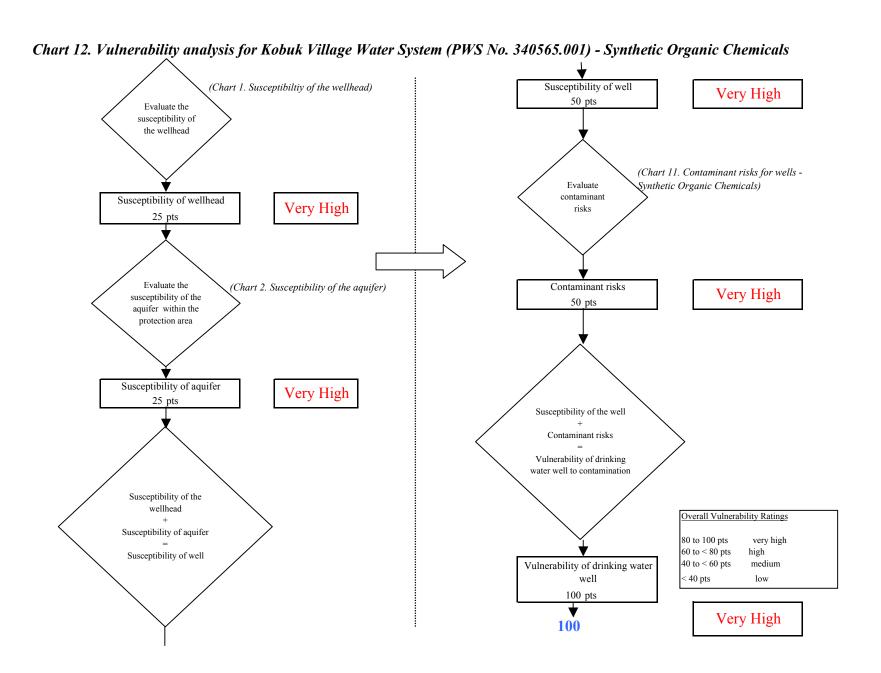
increase. See Table 6 for inventory.

Increase risk 1 - 10 pts

+ 10 pts

Chart 11. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Synthetic Organic Chemicals Existing NO Are there conditions 0 pts Risk unchanged that warrant upgrading risk? Risk due to existing Potential contamination 50 pts The number and magnitude of Risk posed by potential sources contaminant sources in of contamination with controls Contaminant Risk Zone D determines a risk YES 50 pts increase. See Table 6 for Contaminant risks inventory. 0 pts Increase risk 1 - 10 pts Risk posed by potential sources of contamination 50 pts *Truncate risk at 50 pts Contaminant risks* 50 Are there sufficient Contaminant Risk Ratings Very High controls, conditions, NO. Risk unchanged or monitoring to 40 to 50 pts very high warrant downgrading 30 to < 40 pts high 20 to < 30 pts medium < 20 pts low YES 0 pts Decrease risk 1 - 10 pts Risk posed by potential sources of contamination with controls

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Chart 13. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Other Organic Chemicals Contaminant risks initially assumed to be low. Current level of Evaluate the level of Contaminant risks background contamination due to man-= 0 ptscontamination from made source(s) natural sources NO or Is the concentration of Have other organic UNKNOWN the contaminant chemicals been detected increasing, decreasing, in the source waters in or staying the same? recent sampling period(s)? Recent OOC Sampling Results (mg/L) No recent OOC sampling data was available in ADEC records for this PWSID Increasing: risk up 1 - 10 pts YES Decreasing: risk down 1 - 5 pts + 0 pts Same: risk unchanged Existing contamination points based on linear interpolation of most recent detect [MCL = 50 pts; detect = 0 pts]Risk due to natural Risk due to existing mansources made sources 0 pts 0 pts Risk due to existing contamination 0 pts Was the source of Evaluate the level of NO. contamination from natural? man-made sources YES

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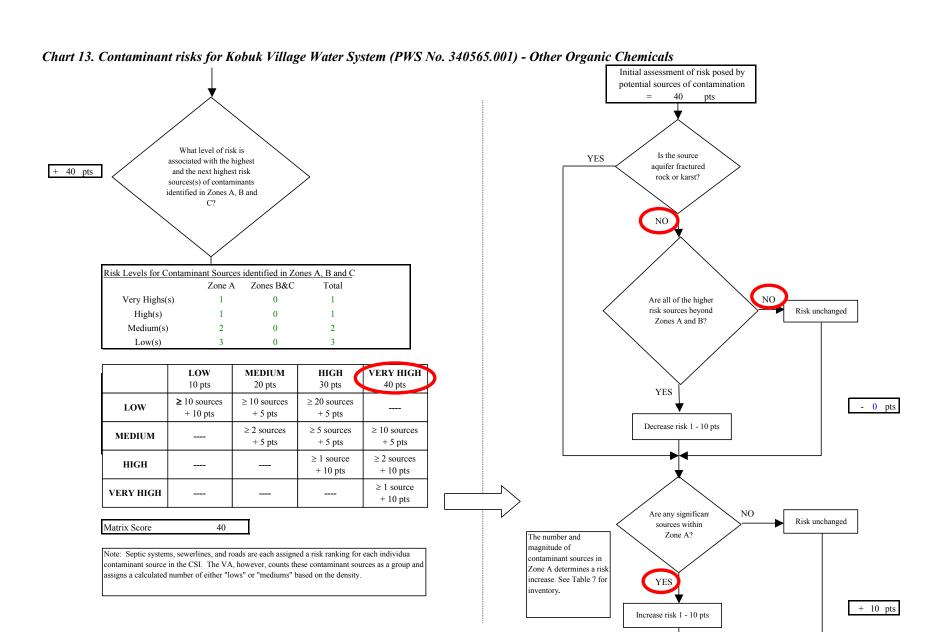


Chart 13. Contaminant risks for Kobuk Village Water System (PWS No. 340565.001) - Other Organic Chemicals Existing Are there conditions 0 pts Risk unchanged that warrant upgrading risk? Risk due to existing Potential contamination 50 pts The number and magnitude of Risk posed by potential sources contaminant sources in of contamination with controls Contaminant Risk Zone D determines a risk YES 50 pts increase. See Table 7 for Contaminant risks inventory. 0 pts Increase risk 1 - 10 pts Risk posed by potential sources of contamination 50 pts *Truncate risk at 50 pts Contaminant risks* 50 Are there sufficient Contaminant Risk Ratings Very High controls, conditions, NO. Risk unchanged or monitoring to 40 to 50 pts very high warrant downgrading 30 to < 40 pts high 20 to < 30 pts medium < 20 pts low YES 0 pts Decrease risk 1 - 10 pts Risk posed by potential sources of contamination with controls

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