Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for Cold Bay (Well #1) Drinking Water System, Cold Bay, Alaska

PWSID # 260414.001

June 2004

DRINKING WATER PROTECTION PROGRAM REPORT 1458
Alaska Department of Environmental Conservation

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Cold Bay (Well #1)
Drinking Water System
Cold Bay, Alaska

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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.

CONTENTS

TABLES

APPENDICES

Source Water Assessment for Cold Bay (Well #1) Source of Public Drinking Water, Cold Bay, Alaska

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Cold Bay (Well #1) Public Water System (PWS) has one water supply well. The well (PWS No. 260414.001) has been used as a drinking water source since it was drilled in 1994.

The well is a Class A (community and non-transient non-community) water system located at #1 Mitchell Avenue in Cold Bay, Alaska. The 1999 sanitary survey indicates that there is secondary storage with a capacity of 212,000-gallons, and that the drinking water source is treated with sodium hypochlorite. The water source operates year round serving 125 residents. The wellhead received a susceptibility rating of **Low** and the aquifer received a susceptibility rating of **Very High**. Combining these two ratings produce a **Medium** rating for the natural susceptibility of the well.

Identified potential and current sources of contaminants for the public drinking water source include: a domestic wastewater treatment plant disposal pond/lagoon, DEC recognized contaminated sites, a petroleum product bulk station/terminal, and an airport. Other potential contaminant sources are also found within the protection area (see 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 water well received a vulnerability rating of **High** for bacteria and viruses, nitrates and nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, and other organic chemicals, and a vulnerability rating of **Medium** for synthetic organic chemicals.

PUBLIC DRINKING WATER SYSTEM

The Cold Bay (Well #1) well is a Class A (community/non-transient/non-community) public water system. The system is located at #1 Mitchell Avenue in Cold Bay, Alaska (Sec. 01, T058S, R089W, Seward Meridian; see Map A of Appendix A). The community of Cold Bay is located in the Izembek National Wildlife Refuge at the western end of the Alaska Peninsula, 634 miles southwest of Anchorage, and 180 miles northeast of Unalaska (ADCED, 2003). The community has a population of 125 (ADEC, 2003). Average annual precipitation in King Cove is 36 inches, including approximately 55 inches of snowfall. Temperatures range from 25 to 60°F.

The community of Cold Bay obtains their water from two wells and most residents are connected to the piped water and sewer system. A few homes have individual well and septic systems. The sewage treatment plant can process up to 45,000 gallons a day (ADCED, 2003). Residents transport their own refuse to the landfill, located 1.5 miles north of the city. Cold Bay residents obtain their electricity from G & K Incorporated; electricity is diesel powered (ADCED, 2003).

According to information supplied by ADEC for the Cold Bay (Well #1) PWS, the depth of the primary water well is 320 feet below the ground surface. Based on available well construction details, it is unknown whether the well is screened, however it is in an unconfined aquifer. The well is not located within a floodplain.

Information acquired from a September 1999 sanitary survey for the public water system 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 grouted according to ADEC regulations. Proper grouting provides added protection against contaminants traveling along the well casing annulus and into source waters.

The Cold Bay area was formed as a result of volcanism and glaciation. Surficial deposits are of glacial, volcanic, and coastal origin. Coastal deposits are composed of interlayered marine and alluvial deposits with grain size ranging from mud to

boulders. No permafrost exists in this area (Rice, et.al., 1995).

DRINKING WATER PROTECTION AREA

In order to evaluate whether a drinking water source is at risk, we must first evaluate what the most likely pathways are 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 Cold Bay (Well #1) 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

Zone	Definition
A	¼ the distance for the 2-yr. time-of-travel
B	Less than the 2 year time-of-travel
C	Less Than the 5 year time-of-travel
D	Less than the 10 year time-of-travel

The DWPA for the Cold Bay (Well #1) PWS was determined using an analytical calculation and includes Zones A, B, C, 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 Cold Bay (Well #1) 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,
- 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 4 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 Cold Bay (Well #1) water well was 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 Wellhead	0	Low
Susceptibility of the Aquifer	25	Very High
Natural Susceptibility	25	Medium

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	45	Very High

Nitrates and/or Nitrites	46	Very High
Volatile Organic Chemicals	50	Very High
Heavy Metals, Cyanide and Other Inorganic Chemicals	33	High
Synthetic Organic Chemicals	25	Medium
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	70	High
Nitrates and Nitrites	70	High
Volatile Organic Chemicals	75	High
Heavy Metals, Cyanide and Other Inorganic Chemicals	60	High
Synthetic Organic Chemicals	50	Medium
Other Organic Chemicals	75	High

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **Very High**. The risk is primarily attributed to the presence of a domestic wastewater treatment plant disposal pond/lagoon in Zone A. 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, 2003).

No positive bacteria counts have been reported in recent (within five years) sampling events (See Chart 3 – Contaminant Risks for Bacteria and Viruses in Appendix D). 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 **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 domestic wastewater treatment plant disposal pond/lagoon in Zone A. 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 low levels of nitrates have been detected in recent sampling events, however they did not exceed the MCL of 10mg/L.

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. Although the nitrate source is unknown, such occurrences may be attributed to septic systems or other sources.

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 **High.**

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **Very High**. The risk is primarily attributed to the presence of a petroleum product bulk station/terminal in Zone A. Other potential contaminant sources are also found within the protection area (see Table 4 – Appendix B).

Detectable concentrations of trihalomethanes (TTHM) were reported in recent sampling events for this public water system. However, the detectible concentrations of TTHM reported in 1998, 1999, 2001 and 2002 were below the MCL of 0.08 mg/L. TTHM's are considered water treatment byproducts and are not representative of source water conditions; therefore, no risk points assigned since analyte did not exceed 100% of the MCL.

Aside from being possible water treatment contaminants, possible sources of volatile organic chemicals include facilities with automobiles, residential areas, fuel tanks, roads, and airports. 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 **High**.

Heavy Metals, Cyanide and Other Inorganic Chemicals

The contaminant risk for heavy metals, cyanide and other inorganic chemicals is **High**. The risk is primarily attributed to the presence of electric power generation in Zone A. 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 public water system, low levels of copper have been detected but have not exceeded the MCL of 1.3 mg/L (see Chart 9 – Contaminant Risks for Heavy Metals, Cyanide, and Other Inorganic Chemicals in Appendix D). The reported concentrations of copper are likely attributed to the water treatment/conveyance system. No risk points were assigned since the analyte did not exceeded 100% of the MCL in most recent sampling event.

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 **High**.

Synthetic Organic Chemicals

The contaminant risk for synthetic organic chemicals is **Medium**. The risk is primarily attributed to an airport in Zone A. Other potential contaminant sources are also found within the protection area (see Table 6 – Appendix B).

All recent SOC sampling data available in ADEC records for the Cold Bay (Well #1) PWS was below the detection levels (ND) (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 **Medium**.

Other Organic Chemicals

The contaminant risk for other organic chemicals is **Very High**. The risk is primarily attributed to the presence of a petroleum product bulk station/terminal, a pipeline, and electric power generation in Zone A. Other potential contaminant sources are also found within the protection area (see Table 7 – Appendix B).

All recent OOC sampling data available in ADEC records for the Cold Bay (Well #1) PWS was below the detection levels (ND) (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 **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 Cold Bay 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.

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

Rice, W.A., Hogan, E.V., 1995, Overview of Environmental and Hydrogeologic Conditions at Cold Bay, Alaska, U.S. Geological Survey Open File Report 95-179, prepared in Cooperation with the FAA.

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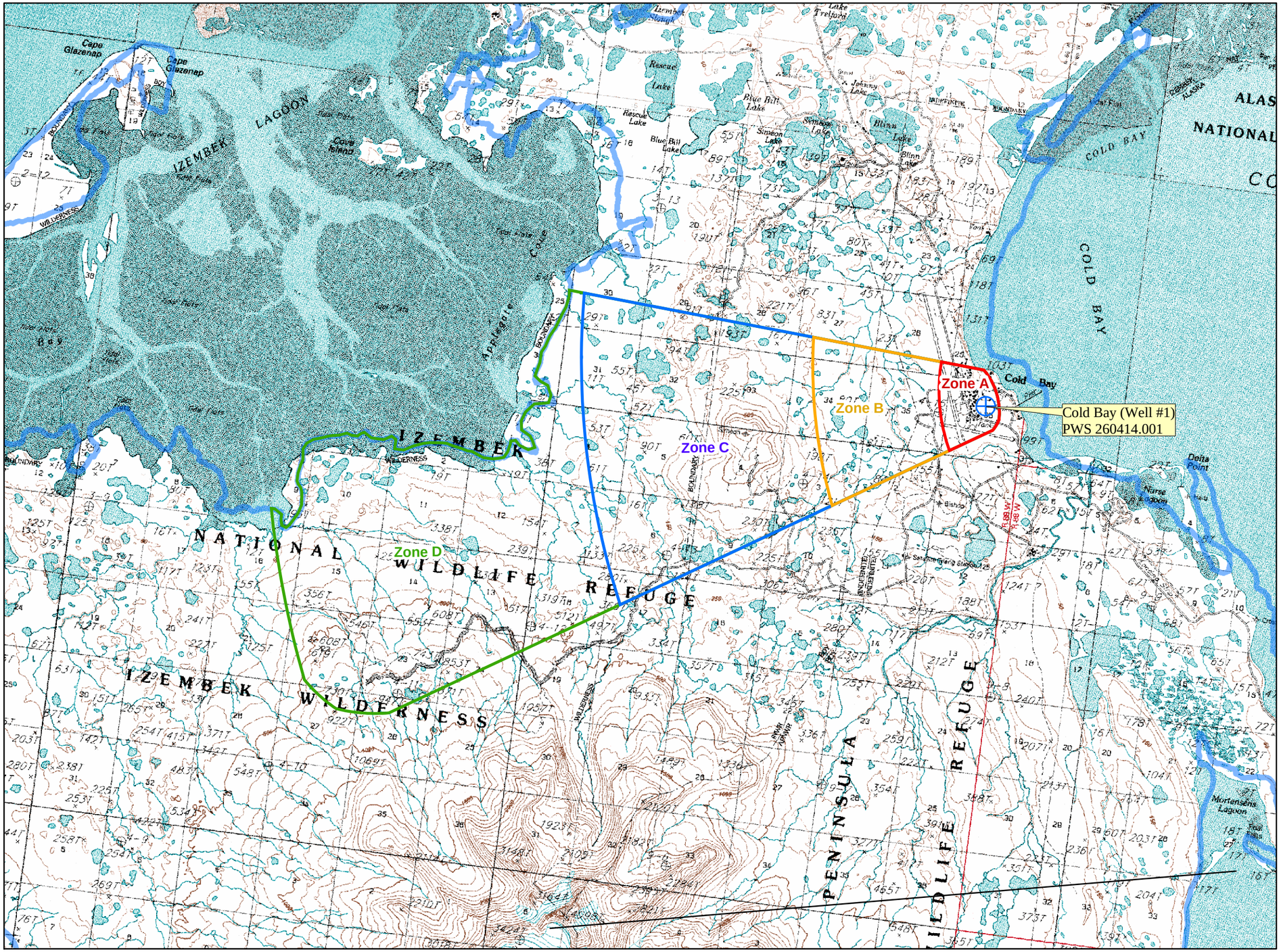
APPENDIX A

Drinking Water Protection Area Location Map
(Map A)

Public Water Well System for PWS #260414.001 Cold Bay (Well #1)



LEGEND

Public Water System Well

Hydrography/Physical

- Parcels
- Stream
- Lake or Pond
- Contours
- Watershed Boundary

Transportation

- Primary Route (Class 1)
- Secondary Route (Class 2)
- Road (Class 3)
- Road (Class 4)
- Road (Class 5, Four-wheel drive)

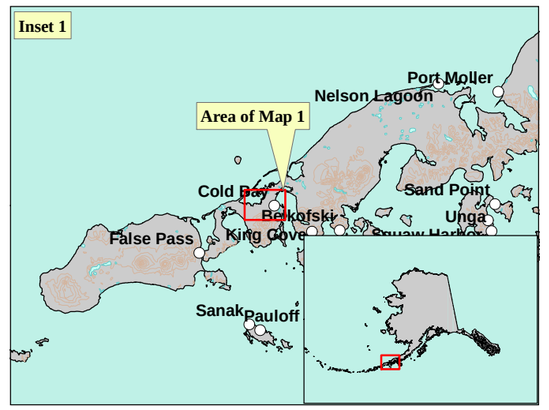
Protection Zones

- Zone A Protection Area– Several Months Travel Time
- Zone B Protection Area– 2 Years Travel Time
- Zone C Protection Area– 5 Years Travel Time
- Zone D Protection Area– 10 Years Travel Time

Data Sources:
- Contaminant Sources, Public Water System Wells, Contours Alaska Department of Environmental Conservation (ADEC)
- Critical Facilities, Federal Emergency Management Agency (FEMA)

All other data:
- United States Geological Survey (USGS)
- Drinking Water Protection Areas based on "Alaska Drinking Water Protection Program - Guidance Manual for Class A Public Water Systems" published by ADEC

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



Cold Bay (Well #1)
PWS 260414.001
Appendix A Map A

APPENDIX B

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

Table 1

Contaminant Source Inventory for ***Cold Bay (Well #1)***

PWSID 260414.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	C	Assume 25 or less sewer lines in Zone A
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	C	
Domestic wastewater treatment plants	D05	D05-01	A	C	Sewage Lagoon
Pit toilets (open hole), nonresidential (one or more)	D16	D16-01	A	C	Assume 5 or less pit toilets/outhouses in Zone A
Septic systems (serves one single-family home)	R02	R02-01	A	C	Assume 10 or less individual septic systems in Zone A
Tanks, heating oil, residential (above ground)	R08	R08-01	A	C	Assume 35 or less residential heating oil tanks in Zone A
Closed tanks, diesel (underground)	T09	T09-01	A	C	Cold Bay FUDS
Closed tanks, gasoline (underground)	T13	T13-01	A	C	Cold Bay FUDS
Closed tanks, gasoline (underground)	T13	T13-02	A	C	Cold Bay FUDS
Closed tanks, gasoline (underground)	T13	T13-03	A	C	Cold Bay FUDS
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	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	C	Cold Bay School
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	C	Frosty Fuel Return Line, Reckey #1992250103501, Status: Inactive; 6,000 gallons of Jet A-50, 2/4/1992; fuel line broke under snow.

Table 2

Contaminant Source Inventory and Risk Ranking for Cold Bay (Well #1) Sources of Bacteria and Viruses

PWSID 260414.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Medium	C	Assume 25 or less sewer lines in Zone A
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	High	C	
Domestic wastewater treatment plants	D05	D05-01	A	Medium	C	Sewage Lagoon
Pit toilets (open hole), nonresidential (one or more)	D16	D16-01	A	Medium	C	Assume 5 or less pit toilets/outhouses in Zone A
Septic systems (serves one single-family home)	R02	R02-01	A	Low	C	Assume 10 or less individual septic systems in Zone A
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1-20 roads in Zone A
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	Medium	C	

Table 3

Contaminant Source Inventory and Risk Ranking for Cold Bay (Well #1) Sources of Nitrates/Nitrites

PWSID 260414.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Medium	C	Assume 25 or less sewer lines in Zone A
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	High	C	
Domestic wastewater treatment plants	D05	D05-01	A	Medium	C	Sewage Lagoon
Pit toilets (open hole), nonresidential (one or more)	D16	D16-01	A	Medium	C	Assume 5 or less pit toilets/outhouses in Zone A
Septic systems (serves one single-family home)	R02	R02-01	A	Low	C	Assume 10 or less individual septic systems in Zone A
Airports	X14	X14-01	A	Low	C	Public 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 offices, hospitals, nursing homes)	X40	X40-01	A	Low	C	

Table 4

Contaminant Source Inventory and Risk Ranking for Cold Bay (Well #1) Sources of Volatile Organic Chemicals

PWSID 260414.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	C	Assume 25 or less sewer lines in Zone A
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	C	
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Sewage Lagoon
Pit toilets (open hole), nonresidential (one or more)	D16	D16-01	A	Low	C	Assume 5 or less pit toilets/outhouses in Zone A
Septic systems (serves one single-family home)	R02	R02-01	A	Low	C	Assume 10 or less individual septic systems in Zone A
Tanks, heating oil, residential (above ground)	R08	R08-01	A	Medium	C	Assume 35 or less residential heating oil tanks in Zone A
Closed tanks, diesel (underground)	T09	T09-01	A	Medium	C	Cold Bay FUDS
Closed tanks, gasoline (underground)	T13	T13-01	A	Medium	C	Cold Bay FUDS
Closed tanks, gasoline (underground)	T13	T13-02	A	Medium	C	Cold Bay FUDS
Closed tanks, gasoline (underground)	T13	T13-03	A	Medium	C	Cold Bay FUDS
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	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	Low	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	Low	C	Cold Bay School
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	High	C	Frosty Fuel Return Line, Reckey #1992250103501, Status: Inactive; 6,000 gallons of Jet A-50, 2/4/1992; fuel line broke under snow.

Table 4 (continued)

Contaminant Source Inventory and Risk Ranking for Cold Bay (Well #1)
Sources of Volatile Organic Chemicals

Contaminant Source Type	***Contaminant Source ID***	***CS ID tag***	***Zone***	***Risk Ranking for Analysis***	***Map Number***	***Comments***
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	A	High	C	Cold Bay Fort Randall-CWB, Reckey #199725X105004, Status: Active; stack of approximately 300 drums located in a collapsed wooden structure northwest of the runway intersection; some had holes or were missing bungs. DRO to 840mg/kg found in surface soil.
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-03	A	High	C	Cold Bay Fort Randall-E-West Runway, Reckey #199725X105005, Status: Active; USTs 3,4,5, & 6 were removed in 1999 with piping; contaminated soil was stockpiled and treated; presence or absence of USTs 1 & 2 has not been confirmed.
Petroleum product bulk station/terminals	X11	X11-01	A	Very High	C	Bulk Fuel Tank Facility
Airports	X14	X14-01	A	High	C	Public Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1-20 roads in Zone A
Pipelines (oil and gas)	X28	X28-01	A	Medium	C	Transmission Line between Dock and Bulk Tanks
Electric power generation (fossil fuels)	X36	X36-01	A	Medium	C	
Firehouses	X38	X38-01	A	Low	C	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	Low	C	

Table 5

Contaminant Source Inventory and Risk Ranking for Cold Bay (Well #1)

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 260414.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	C	Assume 25 or less sewer lines in Zone A
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	C	
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Sewage Lagoon
Pit toilets (open hole), nonresidential (one or more)	D16	D16-01	A	Low	C	Assume 5 or less pit toilets/outhouses in Zone A
Septic systems (serves one single-family home)	R02	R02-01	A	Low	C	Assume 10 or less individual septic systems in Zone A
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	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	Low	C	
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	Low	C	Cold Bay School
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	Low	C	Frosty Fuel Return Line, Reckey #1992250103501, Status: Inactive; 6,000 gallons of Jet A-50, 2/4/1992; fuel line broke under snow.
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	A	Low	C	Cold Bay Fort Randall-CWB, Reckey #199725X105004, Status: Active; stack of approximately 300 drums located in a collapsed wooden structure northwest of the runway intersection; some had holes or were missing bungs. DRO to 840mg/kg found in surface soil.
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-03	A	Low	C	Cold Bay Fort Randall-E-West Runway, Reckey #199725X105005, Status: Active; USTs 3,4,5, & 6 were removed in 1999 with piping; contaminated soil was stockpiled and treated; presence or absence of USTs 1 & 2 has not been confirmed.
Petroleum product bulk station/terminals	X11	X11-01	A	Low	C	Bulk Fuel Tank Facility

Contaminant Source Inventory and Risk Ranking for Cold Bay (Well #1)

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***
Airports	X14	X14-01	A	Low	C	Public Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1-20 roads in Zone A
Pipelines (oil and gas)	X28	X28-01	A	Low	C	Transmission Line between Dock and Bulk Tanks
Electric power generation (fossil fuels)	X36	X36-01	A	Medium	C	
Firehouses	X38	X38-01	A	Low	C	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	Low	C	

Table 6

Contaminant Source Inventory and Risk Ranking for Cold Bay (Well #1)
Sources of Synthetic Organic Chemicals

PWSID 260414.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	C	Assume 25 or less sewer lines in Zone A
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	C	
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Sewage Lagoon
Septic systems (serves one single-family home)	R02	R02-01	A	Low	C	Assume 10 or less individual septic systems in Zone A
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	Low	C	Frosty Fuel Return Line, Reckey #1992250103501, Status: Inactive; 6,000 gallons of Jet A-50, 2/4/1992; fuel line broke under snow.
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	A	Low	C	Cold Bay Fort Randall-CWB, Reckey #199725X105004, Status: Active; stack of approximately 300 drums located in a collapsed wooden structure northwest of the runway intersection; some had holes or were missing bungs. DRO to 840mg/kg found in surface soil.
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-03	A	Low	C	Cold Bay Fort Randall-E-West Runway, Reckey #199725X105005, Status: Active; USTs 3,4,5, & 6 were removed in 1999 with piping; contaminated soil was stockpiled and treated; presence or absence of USTs 1 & 2 has not been confirmed.
Petroleum product bulk station/terminals	X11	X11-01	A	Low	C	Bulk Fuel Tank Facility
Airports	X14	X14-01	A	Medium	C	Public Airport
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	Low	C	

Table 7

Contaminant Source Inventory and Risk Ranking for Cold Bay (Well #1) Sources of Other Organic Chemicals

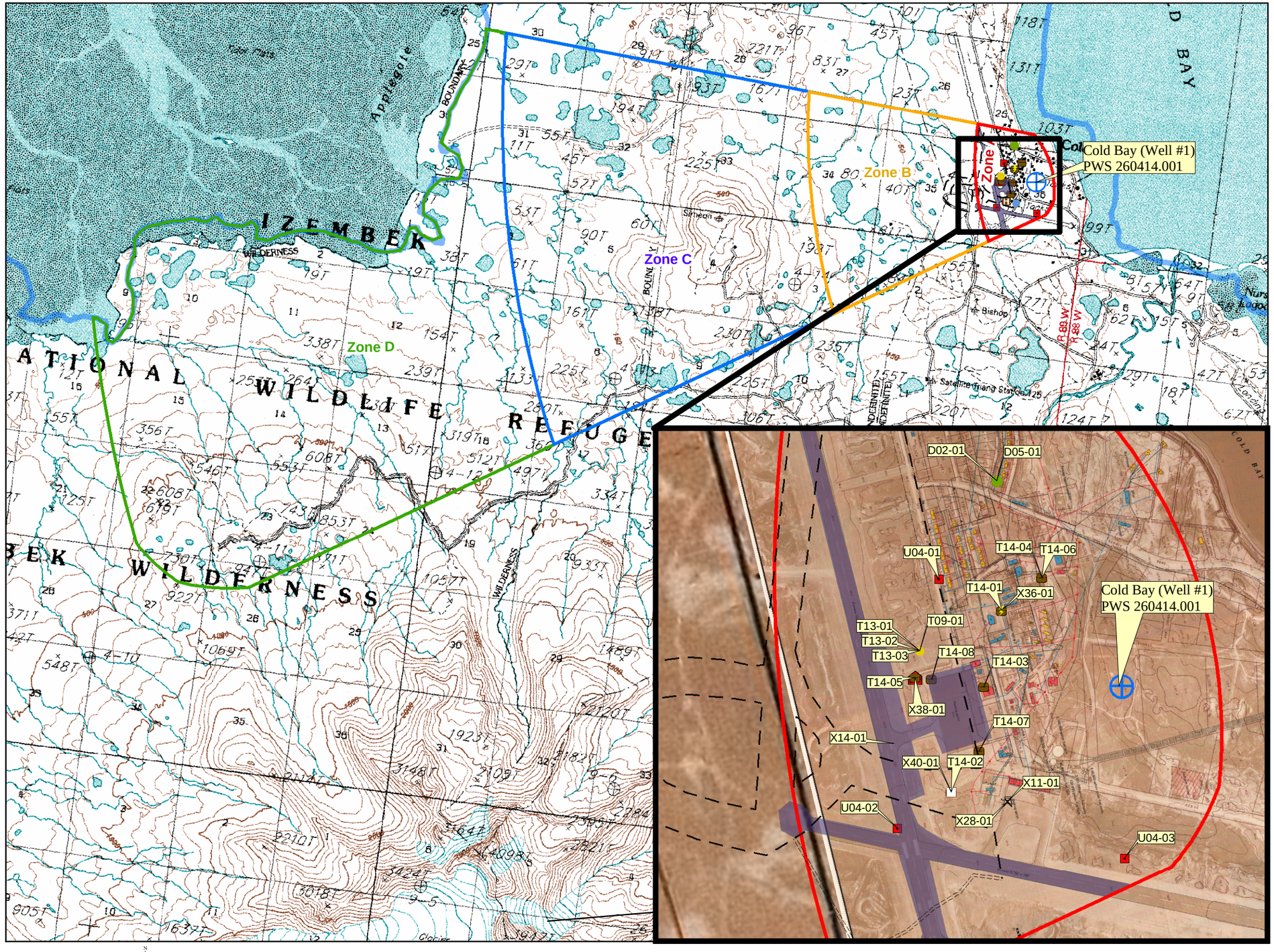
PWSID 260414.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	C	Assume 25 or less sewer lines in Zone A
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	C	
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Sewage Lagoon
Septic systems (serves one single-family home)	R02	R02-01	A	Low	C	Assume 10 or less individual septic systems in Zone A
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	Low	C	Frosty Fuel Return Line, Reckey #1992250103501, Status: Inactive; 6,000 gallons of Jet A-50, 2/4/1992; fuel line broke under snow.
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	A	Low	C	Cold Bay Fort Randall-CWB, Reckey #199725X105004, Status: Active; stack of approximately 300 drums located in a collapsed wooden structure northwest of the runway intersection; some had holes or were missing bungs. DRO to 840mg/kg found in surface soil.
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-03	A	Low	C	Cold Bay Fort Randall-E-West Runway, Reckey #199725X105005, Status: Active; USTs 3,4,5, & 6 were removed in 1999 with piping; contaminated soil was stockpiled and treated; presence or absence of USTs 1 & 2 has not been confirmed.
Petroleum product bulk station/terminals	X11	X11-01	A	High	C	Bulk Fuel Tank Facility
Airports	X14	X14-01	A	Medium	C	Public Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1-20 roads in Zone A
Pipelines (oil and gas)	X28	X28-01	A	High	C	Transmission Line between Dock and Bulk Tanks
Electric power generation (fossil fuels)	X36	X36-01	A	High	C	

APPENDIX C

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

Public Water Well System for PWS #260414.001 Cold Bay (Well #1)
Showing Potential and Existing Sources of Contamination



0 0.375 0.75 1.5 2.25 3 Miles

LEGEND

Public Water System Well

Hydrography/Physical

- Parcels
- Stream
- Lake or Pond
- Contours
- Watershed Boundary

Transportation

- Primary Route (Class 1)
- Secondary Route (Class 2)
- Road (Class 3)
- Road (Class 4)
- Road (Class 5, Four-wheel drive)

Protection Zones

- Zone A Protection Area– Several Months Travel Time
- Zone B Protection Area– 2 Years Travel Time
- Zone C Protection Area– 5 Years Travel Time
- Zone D Protection Area– 10 Years Travel Time

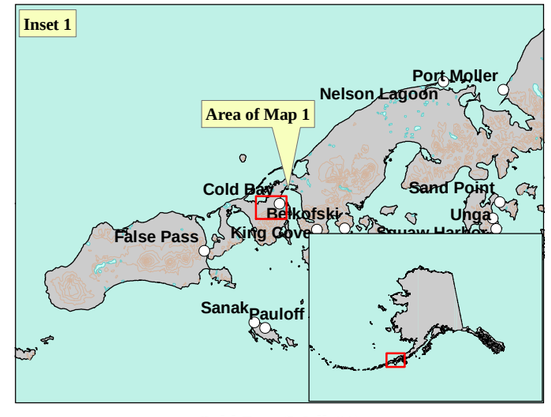
Existing or Potential Contaminant Sources

- Domestic wastewater treatment plant disposal ponds/lagoons (D02)
- Domestic wastewater treatment plants (D05)
- Closed tanks, diesel (underground) (T09)
- Closed tanks, gasoline (underground) (T13)
- Tanks, heating oil, nonresidential (aboveground) (T14)
- Contaminated sites, DEC recognized, non-Superfund, non-RCRA (U04)
- Petroleum product bulk station/terminals (X11)
- Pipelines (oil and gas) (X28)
- Electric Power Generation (fossil fuels) (X36)
- Firehouses (X38)
- Medical/veterinary facilities (X40)
- Airport or landing strip (X14)

Data Sources:
- Contaminant Sources, Public Water System Wells, Contours Alaska Department of Environmental Conservation (ADEC)
- Critical Facilities, Federal Emergency Management Agency (FEMA)

All other data:
- United States Geological Survey (USGS)
- Drinking Water Protection Areas based on "Alaska Drinking Water Protection Program - Guidance Manual for Class A Public Water Systems" published by ADEC

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



Cold Bay (Well #1)
PWS 260414.001
Appendix C Map C

APPENDIX D

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

Chart 1. Susceptibility of the wellhead - Cold Bay (Well 1) (PWS No. 260414.001)

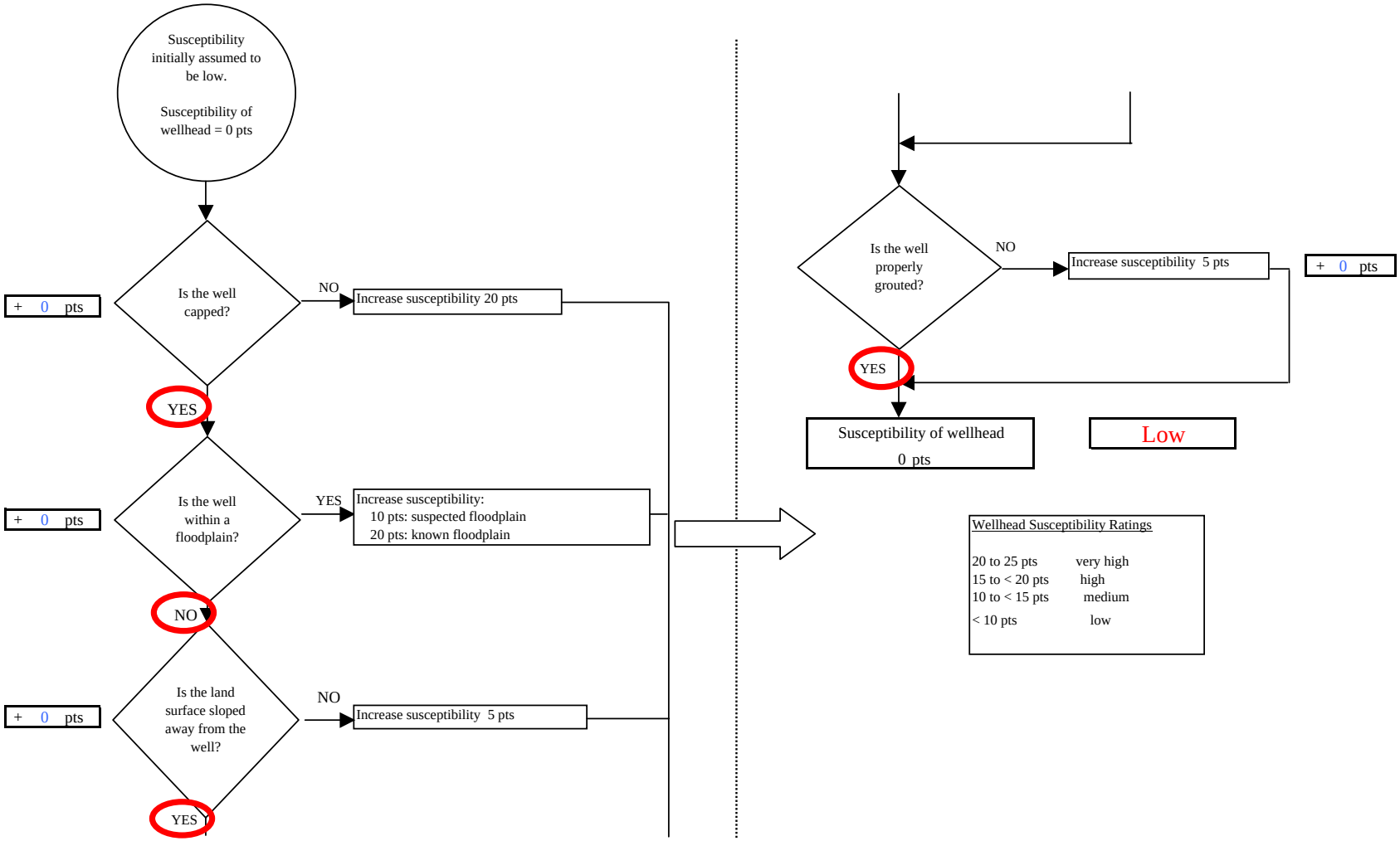


Chart 2. Susceptibility of the aquifer Cold Bay (Well 1) (PWS No. 260414.001)

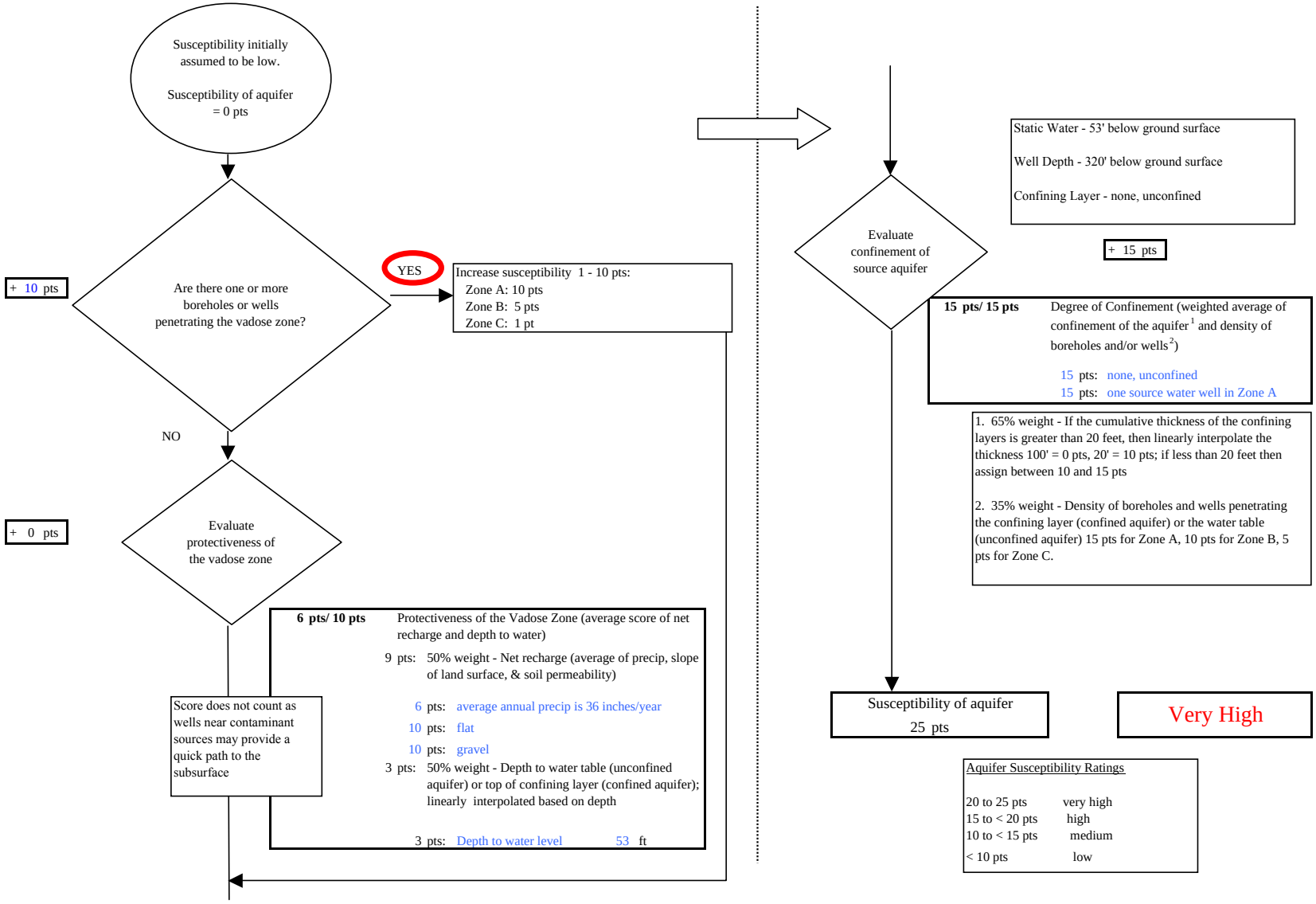
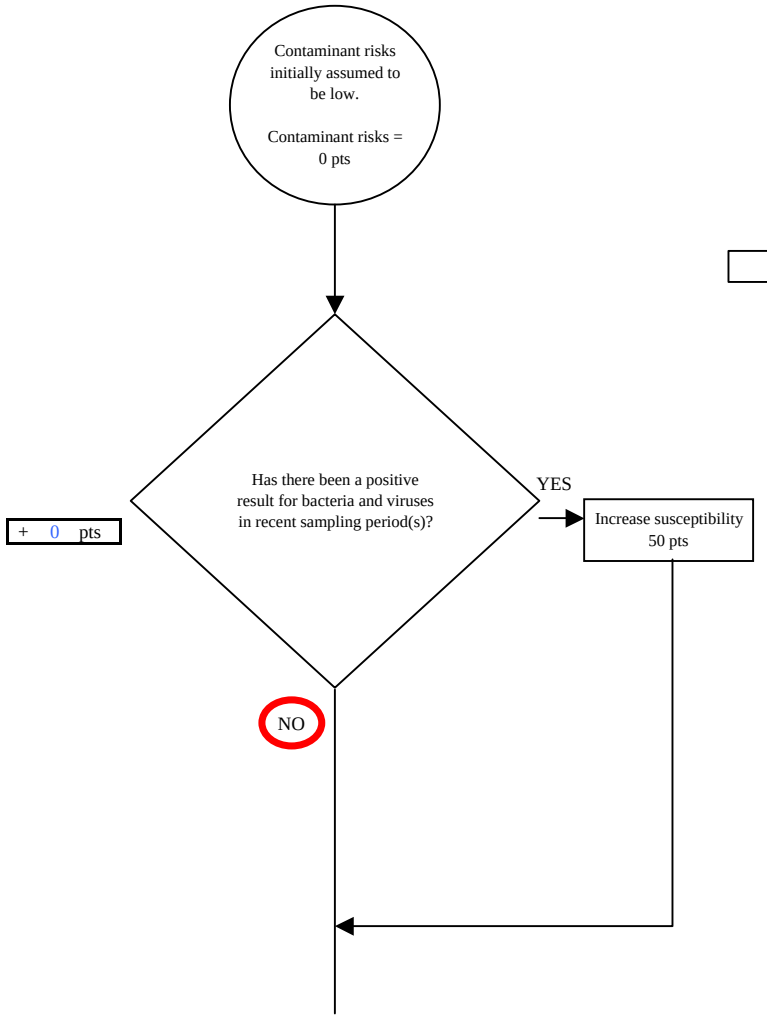
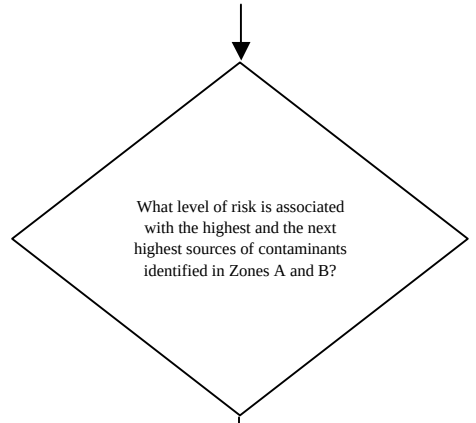


Chart 3. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Bacteria & Viruses





+ 35 pts

Risk Rankings for Contaminant Sources Identified in Zones A and B

	Zone A	Zone B	Total
Very Highs(s)	0	0	0
High(s)	1	0	1
Medium(s)	10	0	10
Low(s)	10	0	10

	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 35

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 3. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Bacteria & Viruses

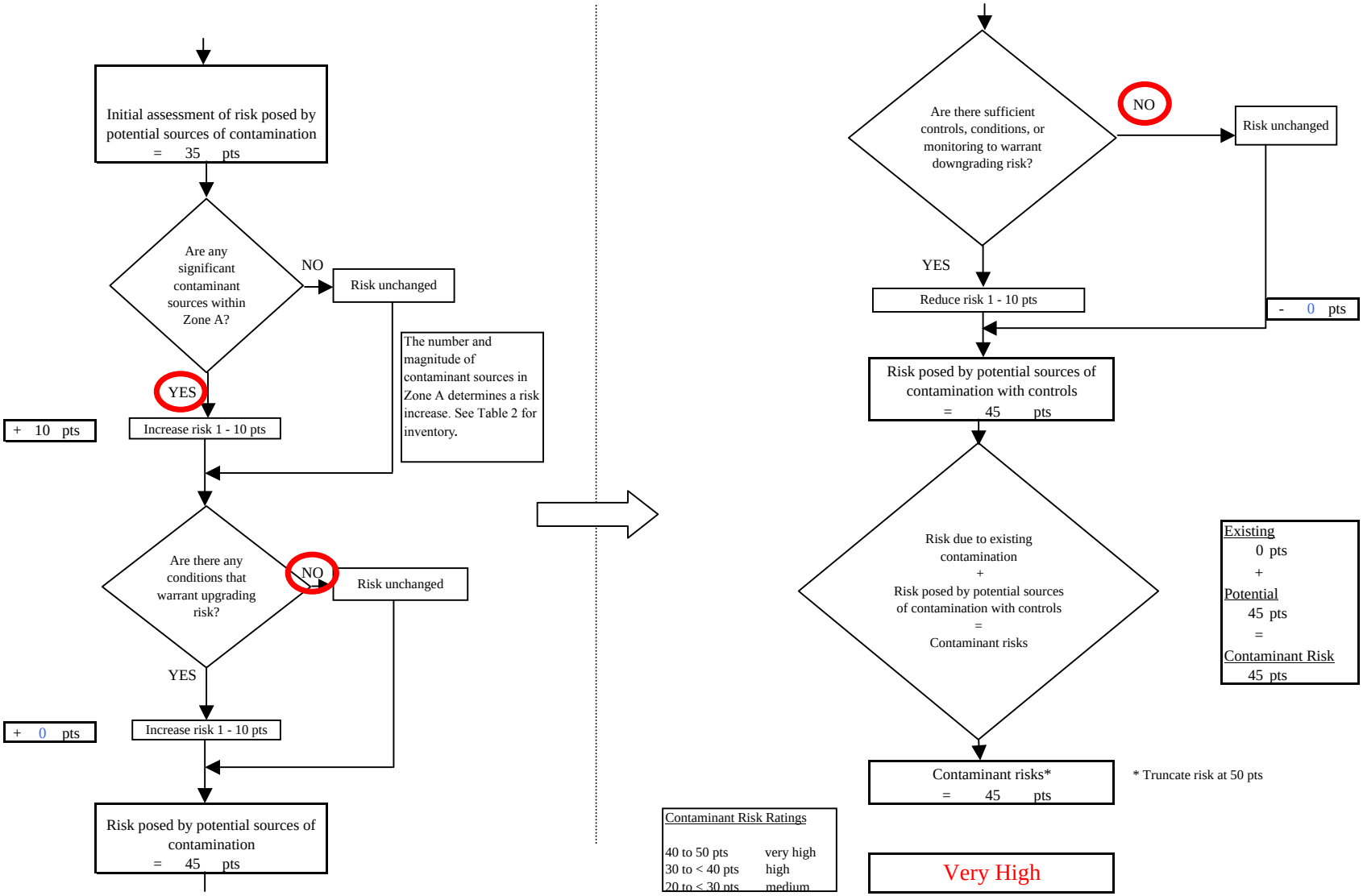


Chart 4. Vulnerability analysis for Cold Bay (Well 1) (PWS No. 260414.001) - Bacteria & Viruses

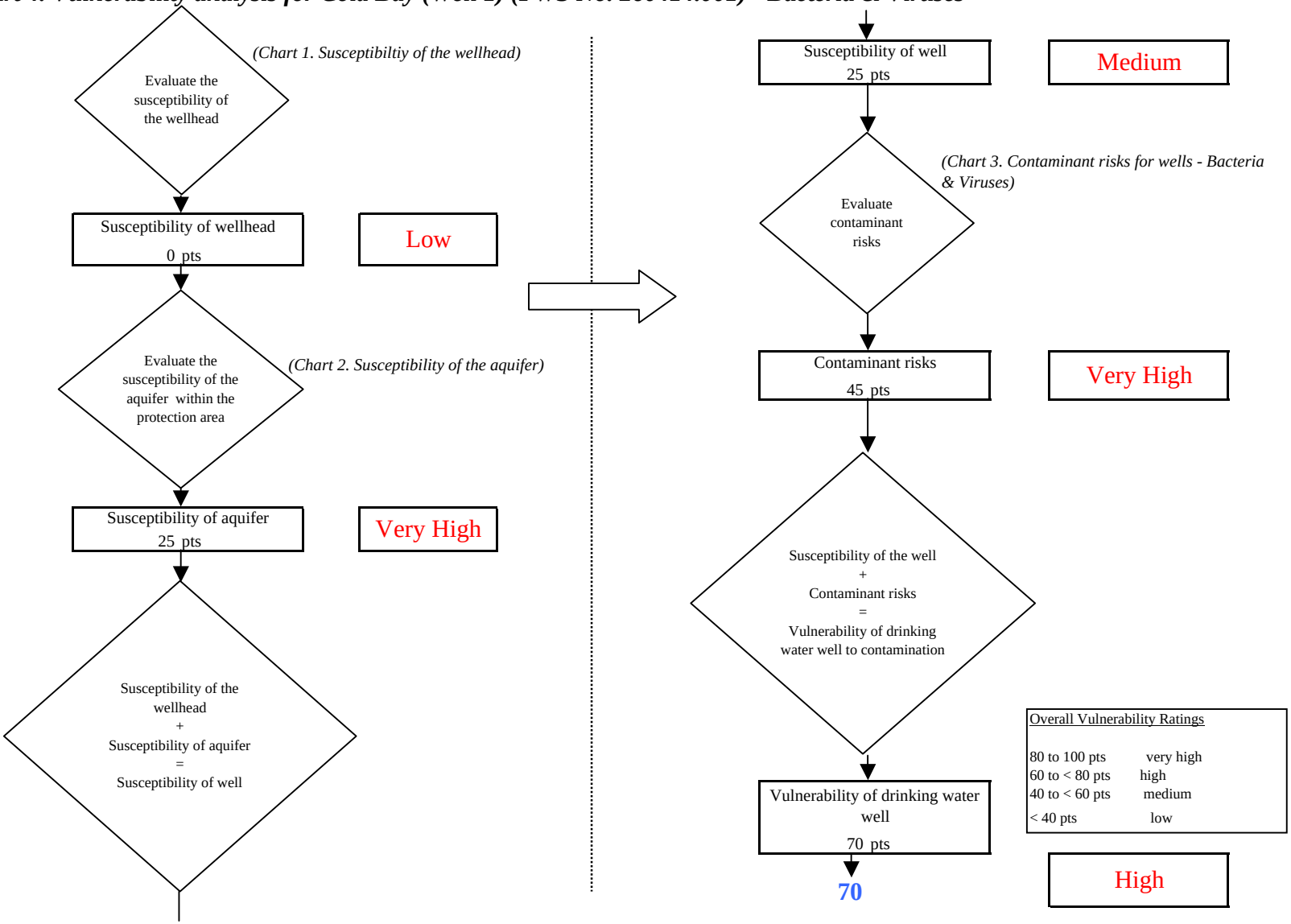


Chart 5. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Nitrates and Nitrites

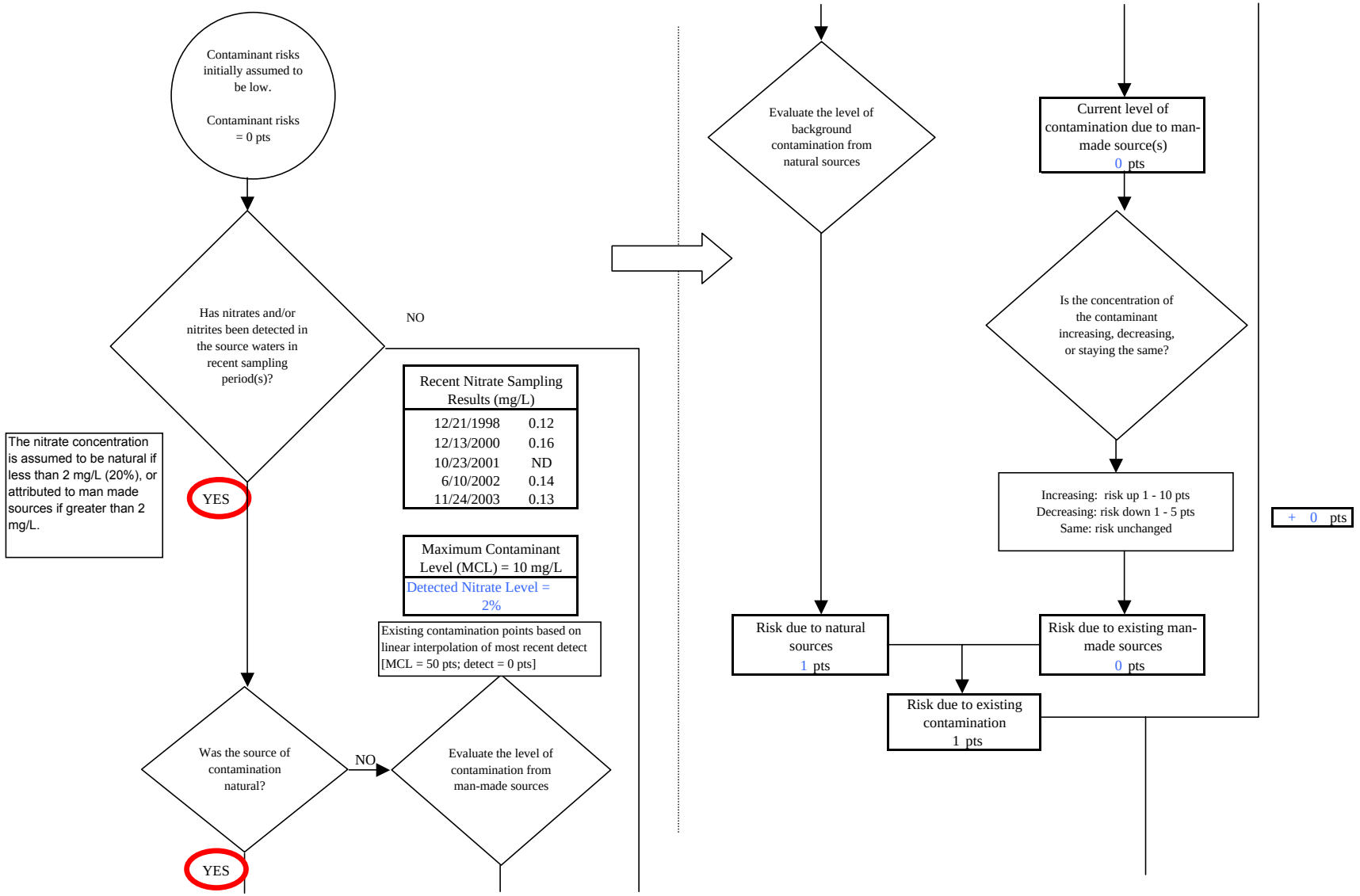


Chart 5. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Nitrates and Nitrites

+ 35 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A, B and C?

Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	1	0	1
Medium(s)	9	0	9
Low(s)	12	0	12

	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 35

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.

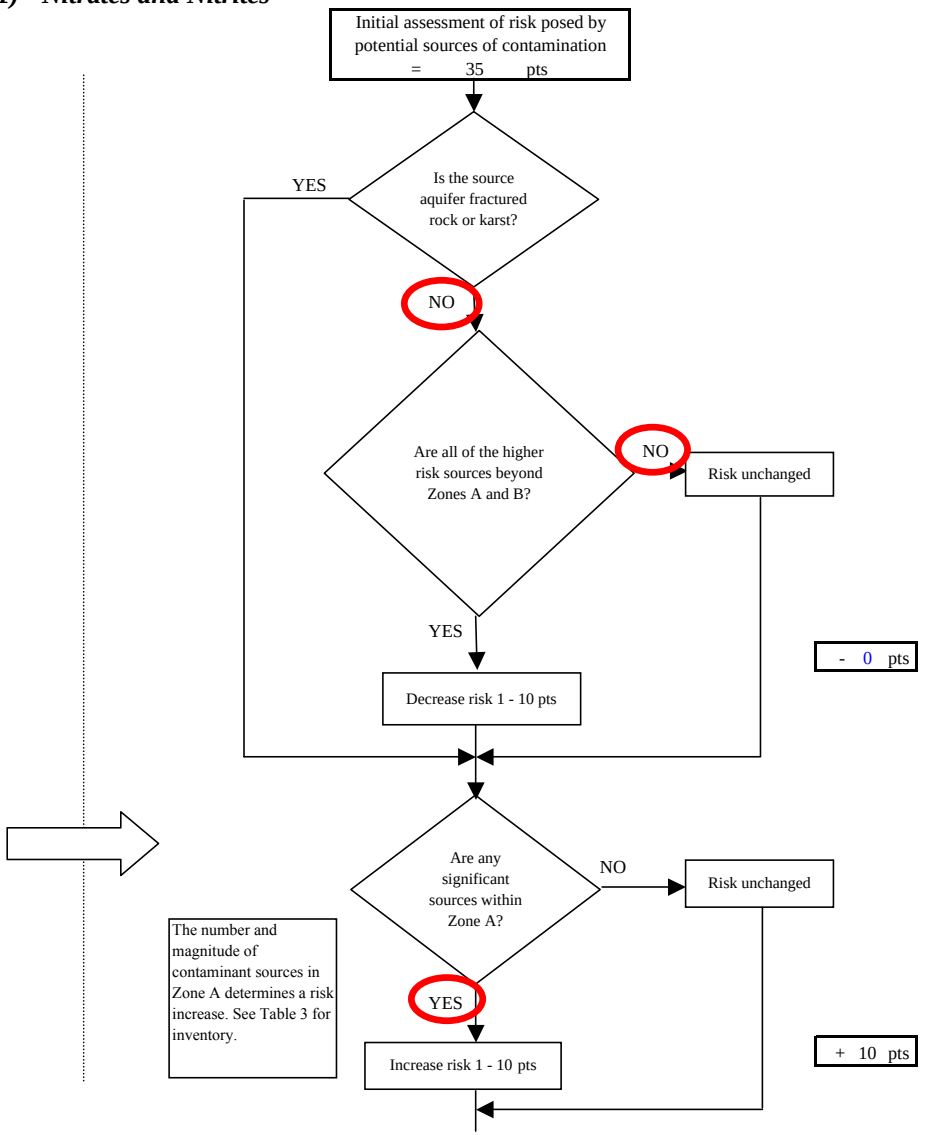


Chart 5. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Nitrates and Nitrites

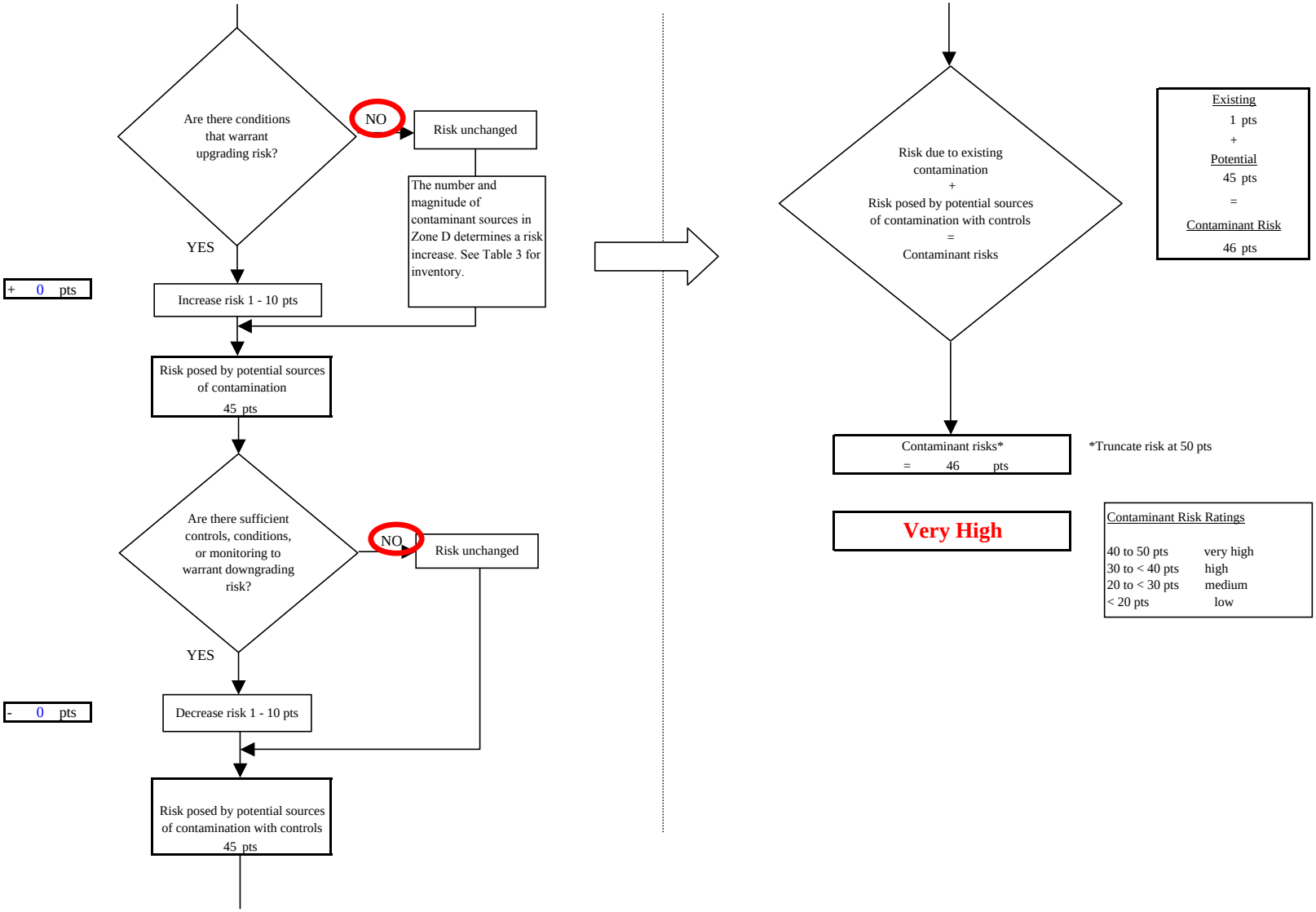


Chart 6. Vulnerability analysis for Cold Bay (Well 1) (PWS No. 260414.001) - Nitrates and Nitrites

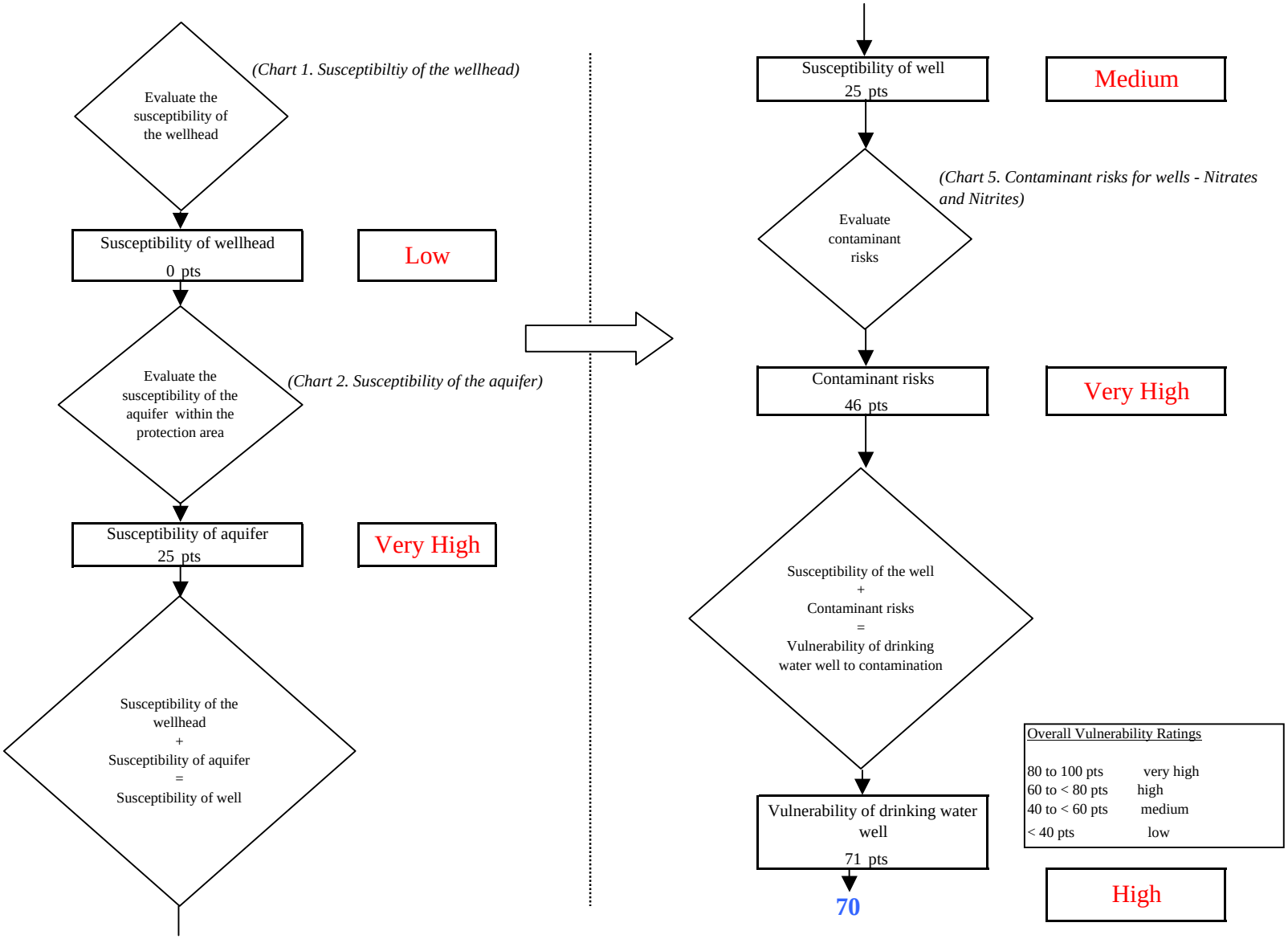


Chart 7. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Volatile Organic Chemicals

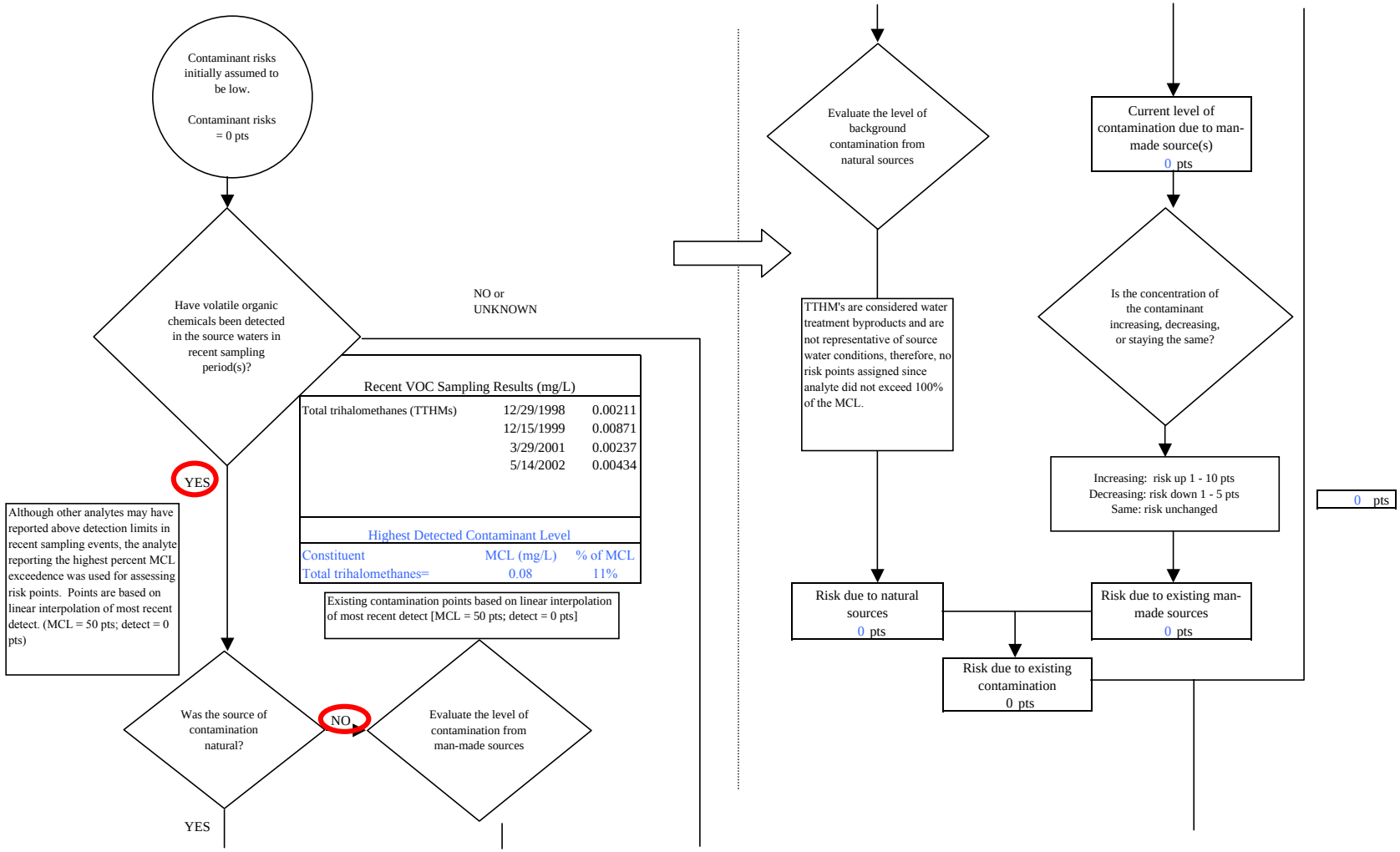


Chart 7. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Volatile Organic Chemicals

+ 50 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A, B and C?

Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	1	0	1
High(s)	4	0	4
Medium(s)	41	0	41
Low(s)	22	0	22

	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 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.

Initial assessment of risk posed by potential sources of contamination = 50 pts

Is the source aquifer fractured rock or karst?

YES

NO

Are all of the higher risk sources beyond Zones A and B?

NO → Risk unchanged

YES → Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO → Risk unchanged

YES → Increase risk 1 - 10 pts

+ 10 pts

The number and magnitude of contaminant sources in Zone A determines a risk increase. See Table 4 for inventory.

Chart 7. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Volatile Organic Chemicals

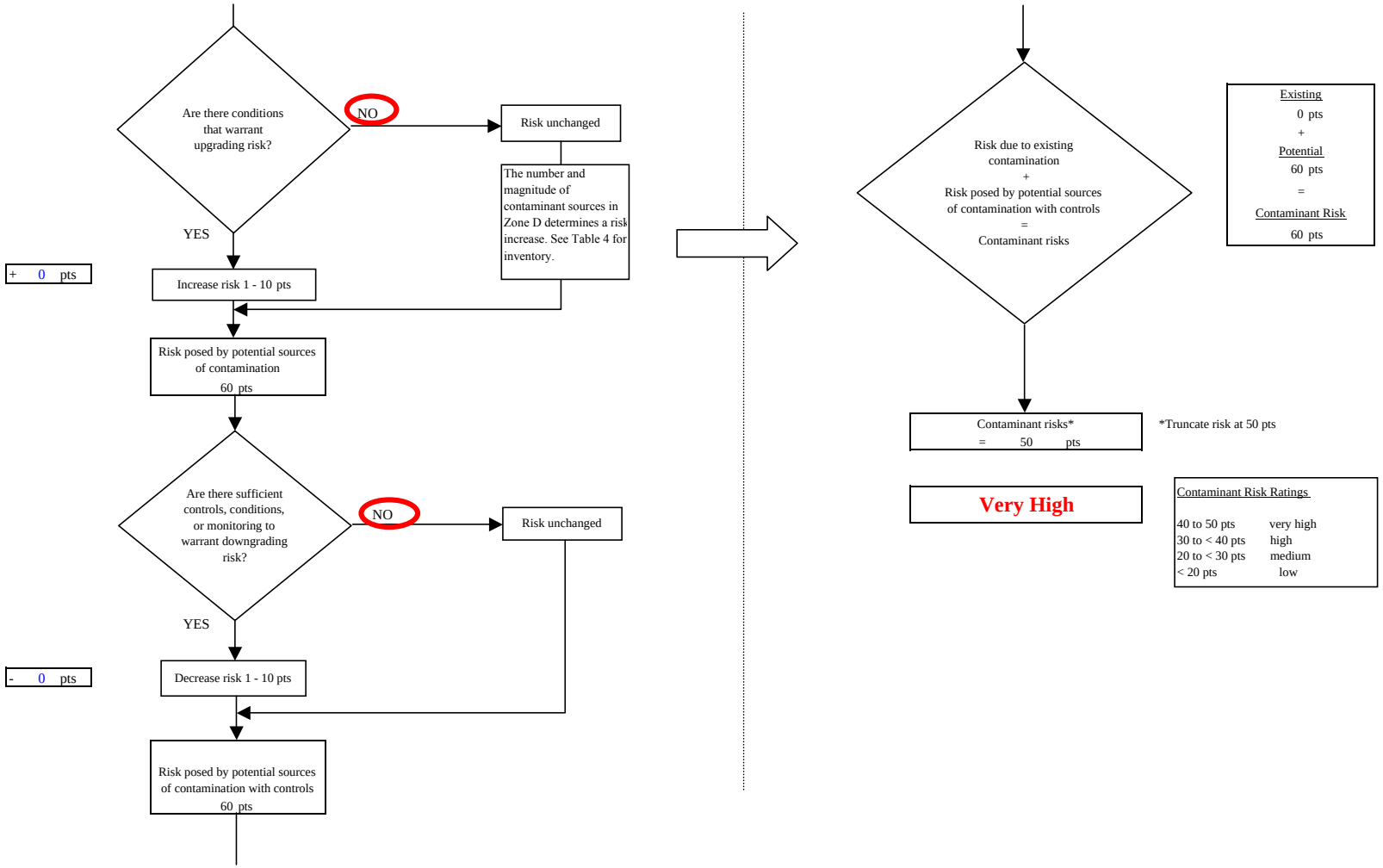


Chart 8. Vulnerability analysis for Cold Bay (Well 1) (PWS No. 260414.001) - Volatile Organic Chemicals

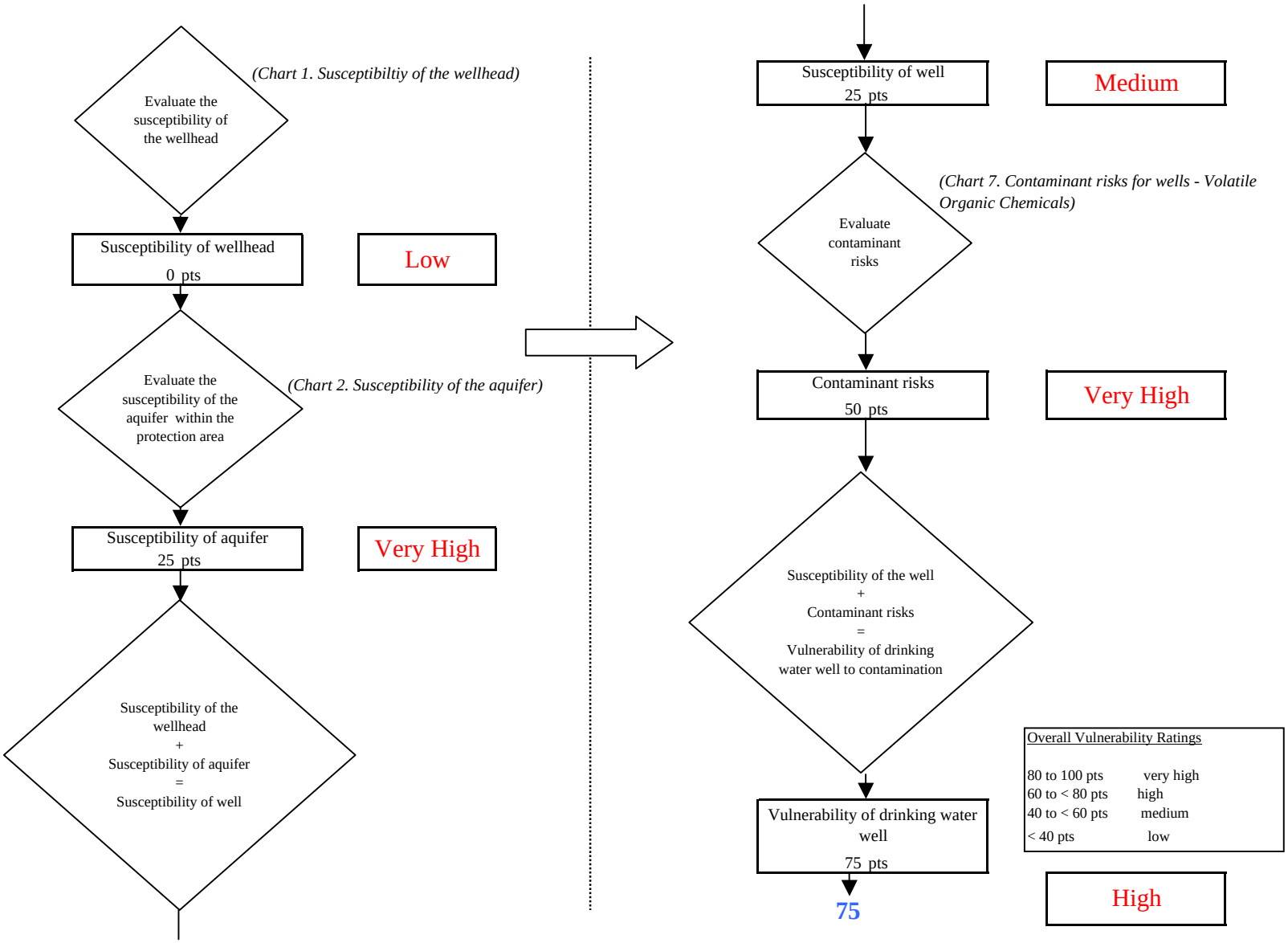


Chart 9. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

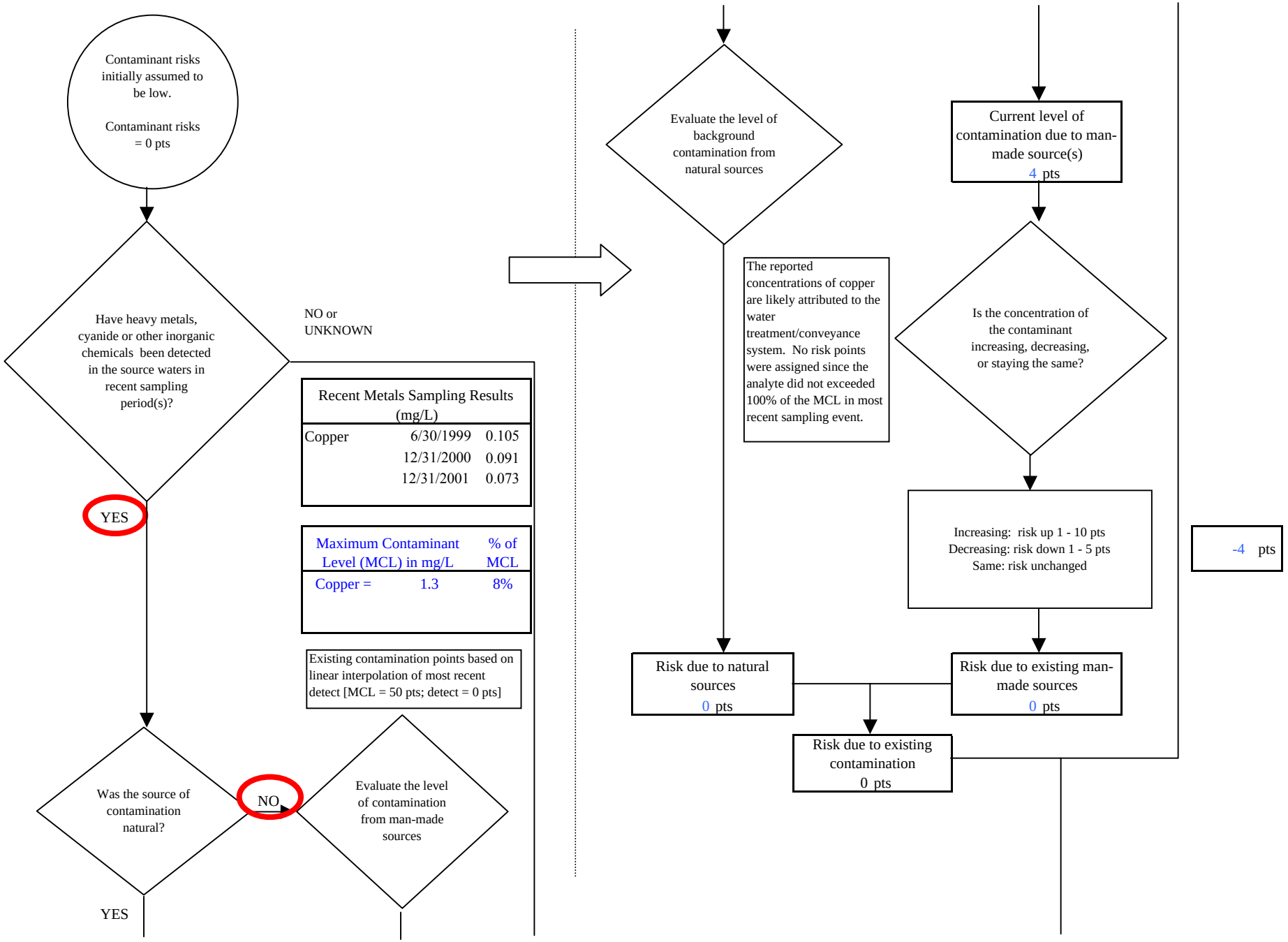


Chart 9. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

+ 25 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A, B and C?

Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	1	0	1
Low(s)	26	0	26

	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 25

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.

Initial assessment of risk posed by potential sources of contamination = 25 pts

Is the source aquifer fractured rock or karst?

YES

NO

Are all of the higher risk sources beyond Zones A and B?

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

Risk unchanged

The number and magnitude of contaminant sources in Zone A determines a risk increase. See Table 5 for inventory.

YES

Increase risk 1 - 10 pts

+ 8 pts

Chart 9. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

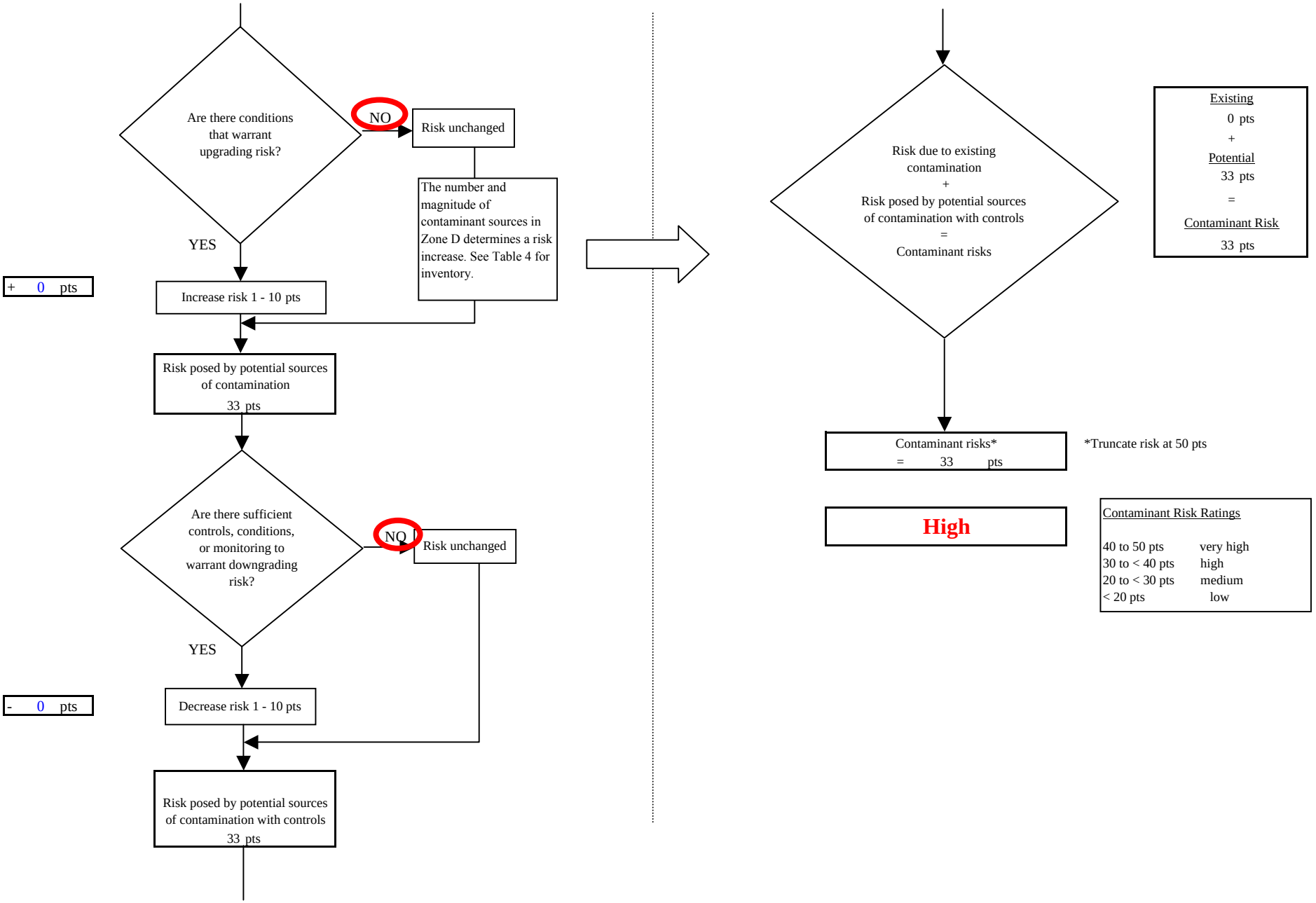


Chart 10. Vulnerability analysis for Cold Bay (Well 1) (PWS No. 260414.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

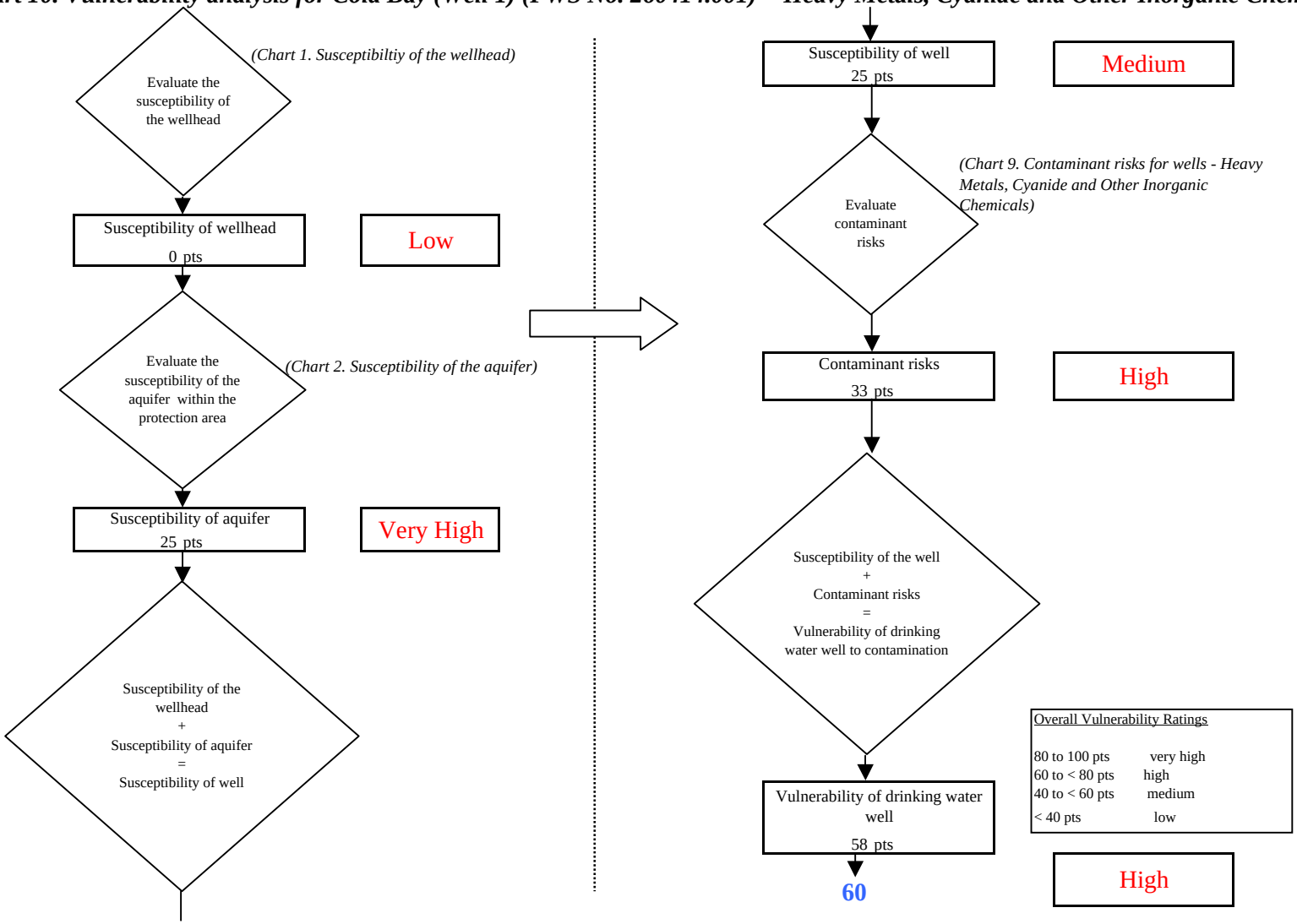


Chart 11. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Synthetic Organic Chemicals

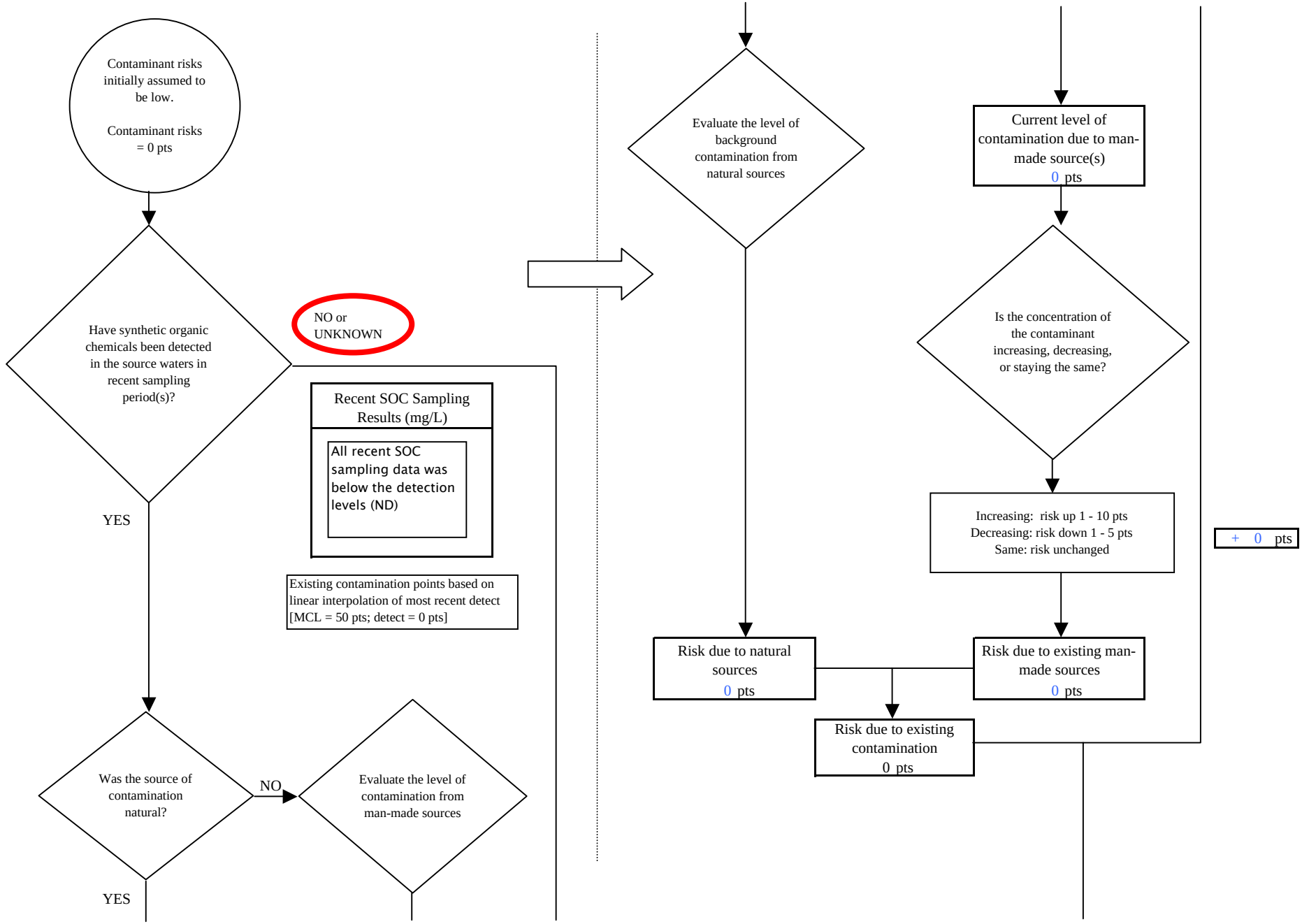


Chart 11. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Synthetic Organic Chemicals

+ 20 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A, B and C?

Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	1	0	1
Low(s)	9	0	9

	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 20

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.

Initial assessment of risk posed by potential sources of contamination = 20 pts

Is the source aquifer fractured rock or karst?

YES

NO

Are all of the higher risk sources beyond Zones A and B?

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

Risk unchanged

The number and magnitude of contaminant sources in Zone A determines a risk increase. See Table 6 for inventory.

YES

Increase risk 1 - 10 pts

+ 5 pts

Chart 11. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Synthetic Organic Chemicals

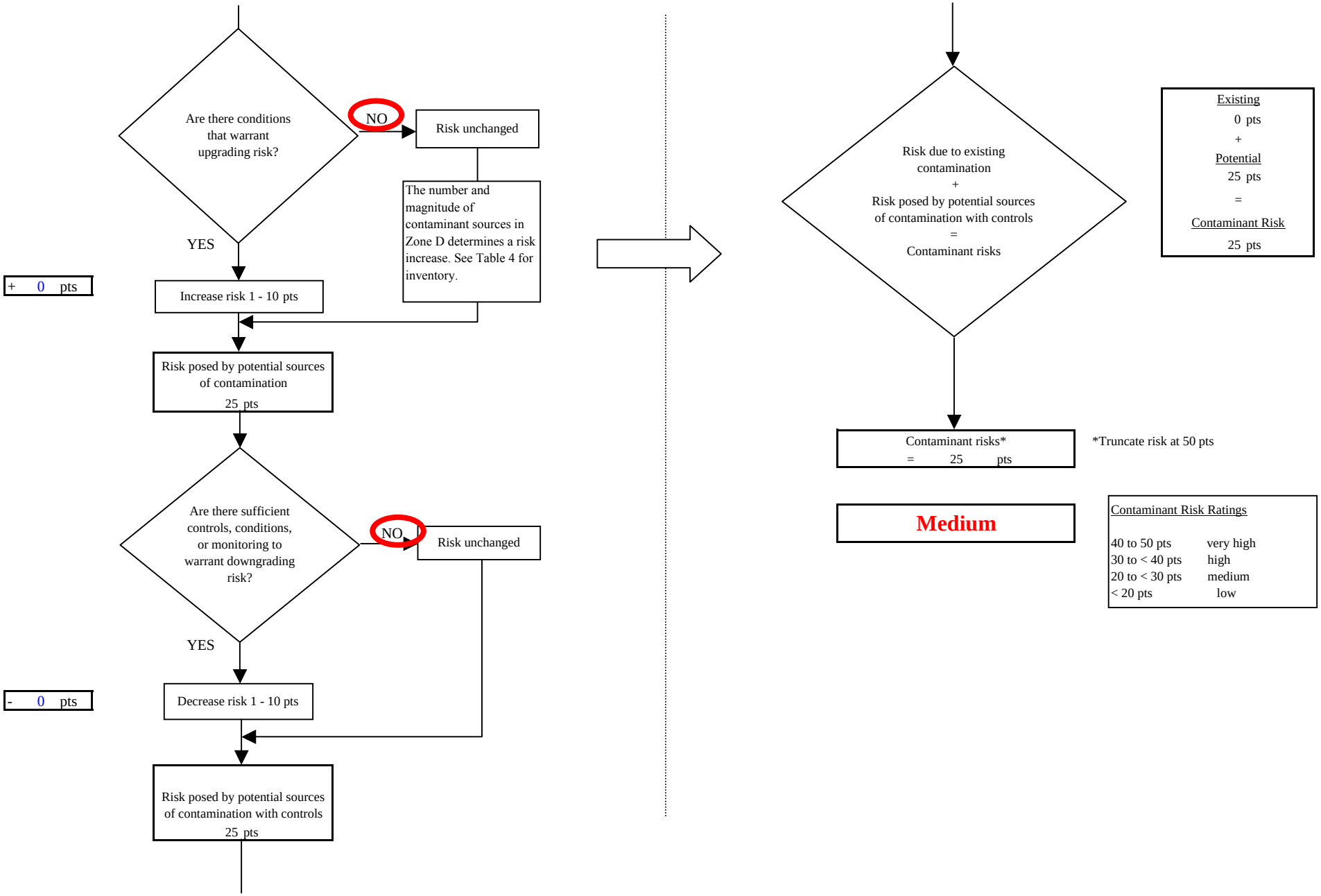


Chart 12. Vulnerability analysis for Cold Bay (Well 1) (PWS No. 260414.001) - Synthetic Organic Chemicals

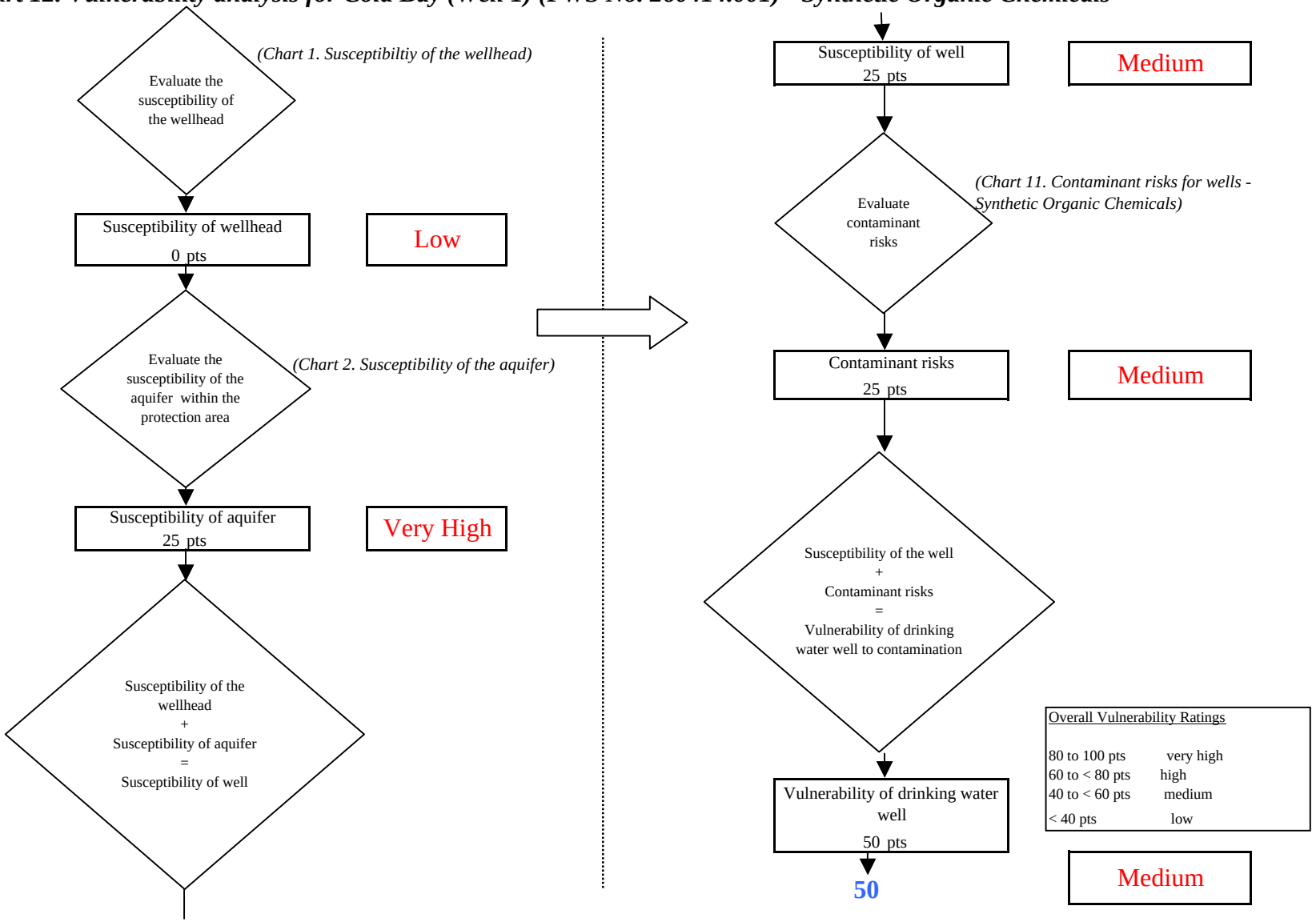


Chart 13. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Other Organic Chemicals

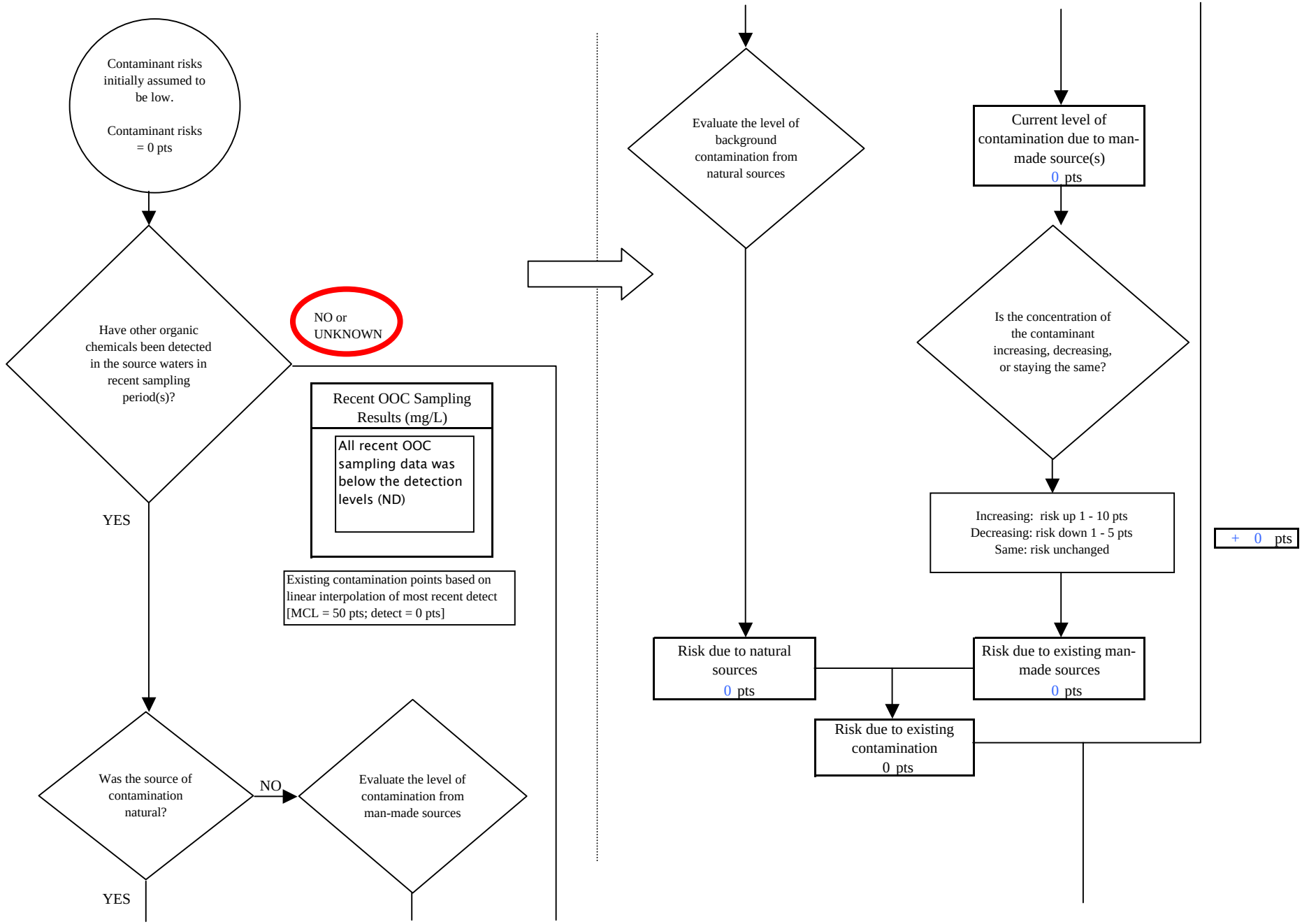


Chart 13. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Other Organic Chemicals

+ 40 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A, B and C?

Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	3	0	3
Medium(s)	1	0	1
Low(s)	8	0	8

	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.

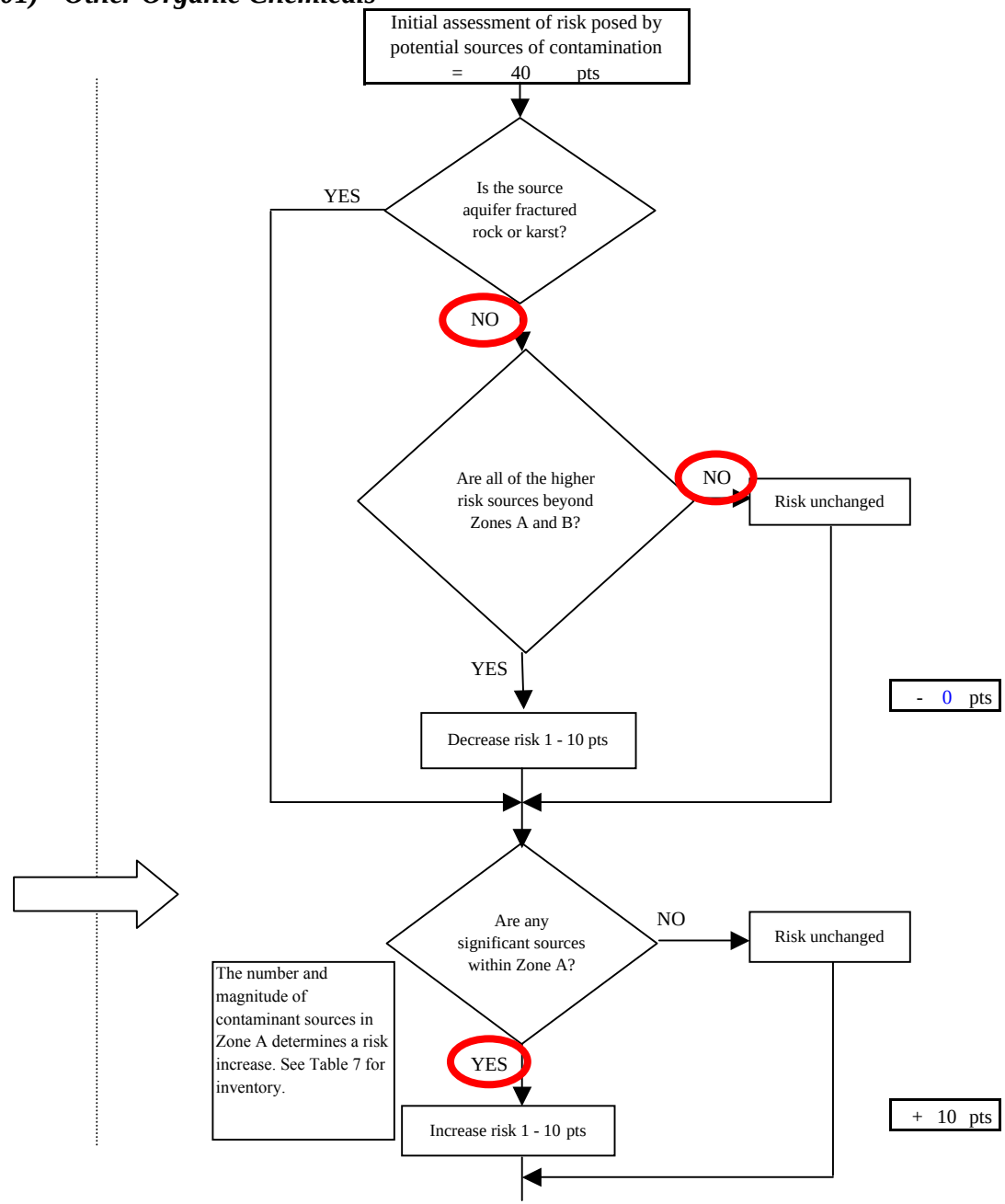
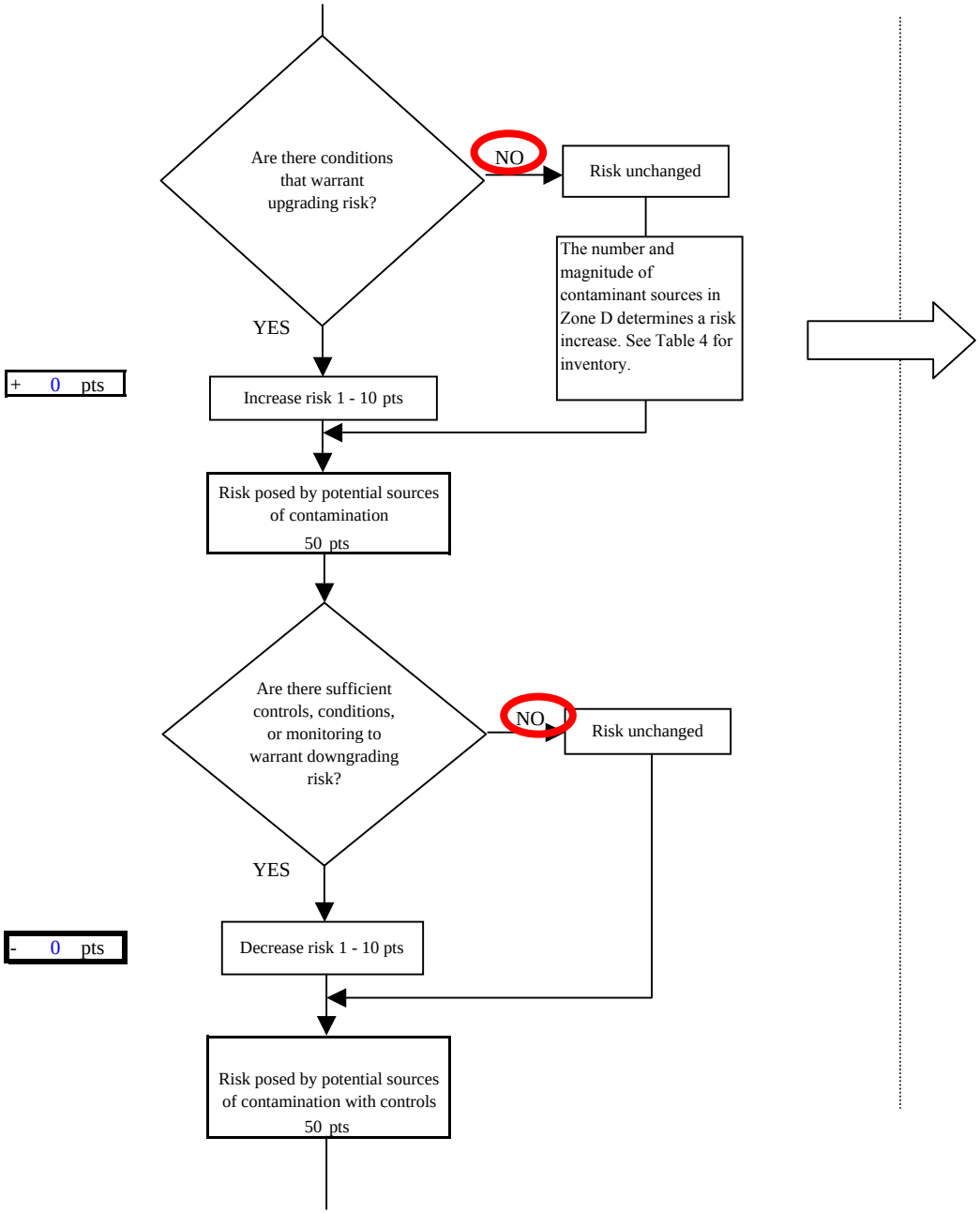


Chart 13. Contaminant risks for Cold Bay (Well 1) (PWS No. 260414.001) - Other Organic Chemicals



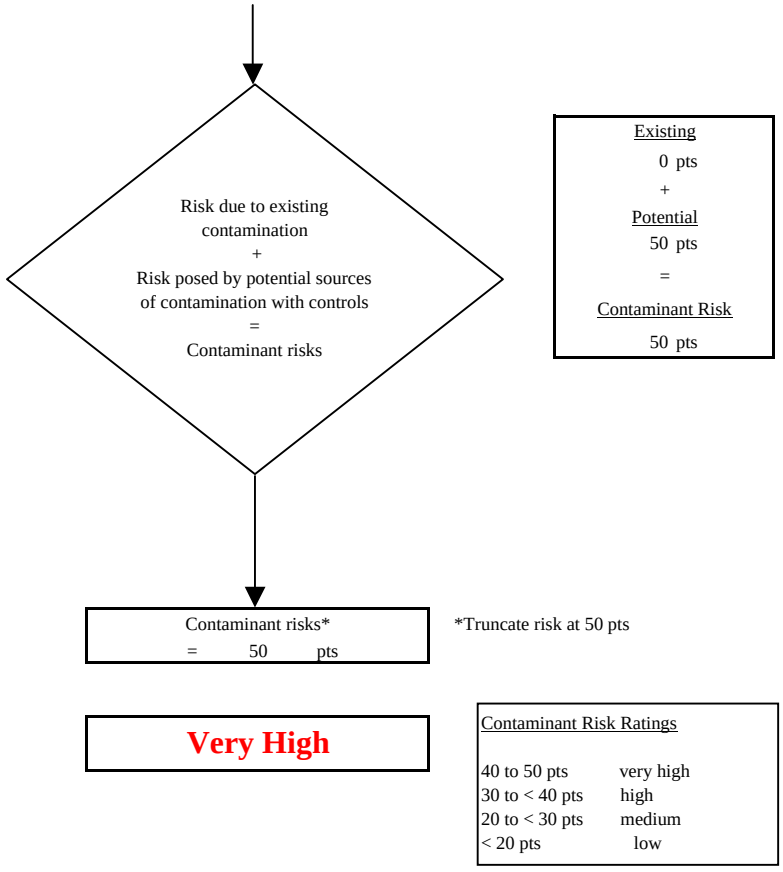


Chart 14. Vulnerability analysis for Cold Bay (Well 1) (PWS No. 260414.001) - Other Organic Chemicals