

## **18.0 BUILDING 3171: KLUANE LAKE SCHOOL**

### **18.1 Description of Existing Water Supply System**

Building 3171, Kluane Lake School, is currently served by a water supply system that delivers water from an approximately 31.7 m deep well. The well is located in pit approximately 5 m from the school. The well location and other details about the surrounding area are provided in Figure 3171-A in Appendix A18. The coordinates of the wellhead, as measured by a handheld GPS device, were recorded as:

- UTM ZONE 7
- Northing: 6792831
- Easting: 617972

The water system is equipped with a duplex water softener and an activated carbon filter, and is also equipped with a pellet chlorination system that is installed on the wellhead. Field chemistry done at the time of the water system assessment reported a residual chlorine concentration of 0.00 mg/L for both raw and treated water, indicating that the either the chlorination system is likely not functioning properly, or that all chlorine is removed by the activated carbon vessel. A schematic detailing the well supply system is provided as Figure 3171-B in Appendix A18.

### **18.2 Description of Existing Wastewater Systems**

Kluane Lake School is serviced by a community sewage disposal system. The community effluent tanks and discharge fields are located greater than 60 m cross gradient and downgradient from this well.

### **18.3 Water Quality Results**

#### **18.3.1 Water Quality Results from Previous Sampling**

##### *Bacteriological*

Nine samples were collected from the Kluane Lake School water system between September 2004 and June 2005 and were tested for total coliform and *E. coli* by Yukon Environmental Health Services using the presence/absence test method. Results are tabulated in Table 3171-1 in Appendix A18. Coliform bacteria and *E. coli* were reported as absent in each of the nine samples for which results are provided.

### *Potability*

Water samples were previously collected from the Kluane Lake School water system on September 21, 2004 and June 15, 2005. The samples were submitted to Northwest Labs in Surrey, BC and ALS Environmental in Vancouver, BC for potability analyses. The results of these analyses are summarized in Table 3171-2 in Appendix A18. EBA reviewed the analytical results to compare them with the Canadian Drinking Water Quality Guidelines (CDWQG) to observe general water quality, identify and recommend additional sampling and analytical, and to identify indicators of potential contamination.

Water quality results indicated a significantly varying degree of hardness. The first sampling event reported the hardness (as  $\text{CaCO}_3$ ) to be 1.8 mg/L, while the second sampling event reported the hardness to be 446 mg/L. There was also a significant change in the total dissolved solids reported in water quality results. Water quality results likely indicate that a water softener that was operational during the first sampling event would not have been functioning properly during the second sampling event, or that a raw water sample was collected during the second sampling event.

- The turbidity during the second sampling event was 1.1 NTU, which is in exceedence of the CDWQG MAC of 1.0 NTU;
- The total dissolved solids during the first sampling event was 680 mg/L, and during the second sampling event to be 528 mg/L, both of which are in exceedence of the CDWQG aesthetic objective of 500 mg/L;
- The manganese concentration during the second sampling event was 0.0974 mg/L, which is in exceedence of the CDWQG aesthetic objective of 0.05 mg/L;
- The water quality results indicated that all other health based and aesthetic objectives were met for the parameters analyzed; and,
- The water quality results indicated that the groundwater from which this system receives its water supply is a magnesium bicarbonate type water.

#### 18.3.2 Identification of Additional Analytical Testing Required

Additional analytical for Kluane Lake School that was identified to be included during the water system assessments is detailed below:

- As turbidity had previously been in exceedence of the CDWQG MAC, a sample was taken to re-test for turbidity;
- Total and dissolved manganese as there had been a previous exceedence of the CDWQG aesthetic objective;

- Total organic carbon (TOC); and
- Measurements in the field for total dissolved solids, conductivity, pH, temperature and residual chlorine concentration.

#### *Additional Analytical Results*

A water sample was obtained during the water system assessment on July 29, 2005, and was submitted to ALS Environmental in Vancouver, BC for analysis. These results are summarized in Table 3440-2 in Appendix A4 and the laboratory reports are included in Appendix B.

- The water quality results from additional analytical sampling indicated that all health based and aesthetic objectives were met for the parameters analyzed.

#### 18.3.3 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surfacewater sources or septic waste. Chloride concentrations were reported to be low and are considered to be within the normal background ranges for groundwater in the area. Nitrate and nitrite concentrations for this sample are also low and within the normal background range for this area. These water quality results do not suggest that the aquifer from which the groundwater is obtained for Kluane Lake School is under the influence of surfacewater sources or septic wastes.

### **18.4 Conceptual Hydrogeology**

The log for this well indicates that the well is completed at a depth of 30.8 m within a sand aquifer. Overlying the aquifer is approximately 30.1 m of fine grained silt and till. The static water level at the time of drilling was 7.6 m below grade. This is consistent with most well logs in the Destruction Bay area, which typically indicate 25 m to 50 m of fine grained silt overlying a confined sand and gravel aquifer. The presence of 30 m of fine grained material overlying the aquifer provides protection from surficial sources of contamination. The expected direction of groundwater flow in the vicinity of the site is likely east to northeast towards Kluane Lake.

## 18.5 Potential Contaminant Sources

Potential contaminant sources from observations during the water system assessment are compiled in field notes in Appendix A18. Photos of potential contaminant sources are also provided in Appendix A18.

Potential contaminant sources within 30 m of the wellhead are:

- An above ground fuel storage tank (AST) at 26 m; and,
- An underground fuel storage tank (UST) at 9 m.

A significant number of scrap cars are located approximately 30 m away from the wellhead. Septic lines are located at 10 m and 30 m away from the wellhead, the closest in ground sewage disposal system is located greater than 60 m away.

### 18.5.1 Spills Records and Contaminated Sites Search Results

The Environment Canada Environmental Protection Branch did identify recorded spill events near this site as detailed below:

On September 26, 2003, approximately 500 L of diesel fuel spilled at the Yukon Electrical Company complex in Destruction Bay due to a faulty vent. The spill had reportedly been cleaned up but the soil was reportedly not removed.

There had been multiple spill events of raw sewage due to failures with the community sewage system in Destruction Bay. On two occasions in 1993, a mechanical failure caused approximately 37 800 L and 11 340 L of raw sewage to spill. The sewage had in both cases reportedly flowed over the ground surface and ponded near Kluane Lake. Additionally, four recorded spill events occurred in 1995 and 1996 caused by leaking or broken sewer mains, spilling raw sewage in the Destruction Bay area. Two events recorded spills of approximately 200 L each, but the other two events spilled an unknown amount.

The Government of Yukon Environmental Programs Branch and Environment Canada Environmental Protection Branch did not identify any other recorded spill event or any contaminated sites issues for this site or neighbouring sites. Spill records are provided in Appendix A18.

## **18.6 Identified Water System Deficiencies and Associated Risk**

### **18.6.1 High and Medium Risk Deficiencies**

- Poor surface completion of the wellhead (located in a pit below grade);
- There is no surface sanitary seal (grout or bentonite seal as required by the Canadian Groundwater Association's Guidelines for Water Well Construction;
- By definition of the Draft Yukon GUDI Assessment Guideline, the well is potentially under the direct influence of surface water because does not meet the requirements of the Guidelines for Water Well Construction;
- The well is located within 30 m of potential sources of contamination, including an underground fuel storage tank at 9 m, an above ground fuel storage tank at 26 m, and scrap vehicles at approximately 30 m;
- Field chemistry indicated that the chlorination system was not functioning at the time of the water system assessment; and,
- The configuration of the water treatment system does not allow for a residual chlorine concentration at the point of use.

### **18.6.2 Low Risk Deficiencies**

- There had been raw sewage spill events reported for the community sewage system;
- There had been as previous CDWQG MAC exceedence for turbidity;
- The total dissolved solids concentration has been reported to be in exceedence of the CDWQG aesthetic objective;
- Water quality indicates that the water softener may not always be functional; and,
- There had been a previous exceedence of the CDWQG aesthetic objective for manganese, however, with a functioning softener, this should not be an issue.

## **18.7 Mitigative Options for Deficiencies**

Mitigative options were developed to address the deficiencies identified in the previous section. Deficiencies are categorized by recommended level of priority (with Priority 1 being most critical).

### 18.7.1 Priority 1

The following recommendations are provided in order to mitigate deficiencies that are of immediate concern for the Kluane Lake School. Priority 1 remedial recommendations include:

- The casing should be extended to at least 500 mm above the base of the well pit, or as high as possible, and a temporary near surface sanitary seal should be installed around the well casing;
- The well and water system should be superchlorinated, and a chlorination tap installed at the wellhead to facilitate future superchlorination;
- Disinfection treatment consisting of a proportion feed chlorine injection system with appropriately sized retention tanks and appurtenances should be installed. The selection of this disinfection system is to ensure adequate residual chlorine within the distribution system. It has also been selected in consideration that the recommended upgrade option for the water supply serving the adjacent Fire hall would be to connect to this treated system; and,
- The activated carbon should be removed from the vessel and replaced with a multimedia bed.

These are conceptual design recommendations based on the information available for planning and budgeting purposes. Engineering input will be required for final system specifications.

### 18.7.2 Priority 2

Priority 2 upgrades to protect the water supply system in the long-term are provided below:

- Standard wellhead upgrades consisting of a pitless unit installation, extending the casing to at least 500 mm above grade, and retrofitting of a surface sanitary seal (grout or bentonite to at least 3 m in depth);
- Installation of a commercial sized stainless steel duplex water NSF 61 filtration system with 5 micron followed by 1 micron absolute; and,
- Replace AST with a doubled walled “EnviroTank” type UST and relocate to at least 30 m from well.

### 18.7.3 Priority 3

All lower risk deficiencies indicated previously should be mitigated through Priority 1 and Priority 2 upgrades.

## 18.8 Cost Estimates for Mitigative Options

Engineering costs for mitigative options are estimated to be 20% of construction costs, and would include inspection and completion reporting. The costs for materials and labour (not including engineering) are provided in the sections below. An additional contingency allowance of 20% is suggested for budgetary purposes.

### 18.8.1 Priority 1

The estimated costs for the recommended Priority 1 upgrades are detailed below:

- The proposed casing extension would cost in the order of **\$500**;
- Well and water system superchlorination and installation of chlorination tap is estimated to cost **\$400**; and,
- The cost for installation of proportional feed chlorine injection system with retention tanks including materials and labour would cost approximately **\$8,000**.

### 18.8.2 Priority 2

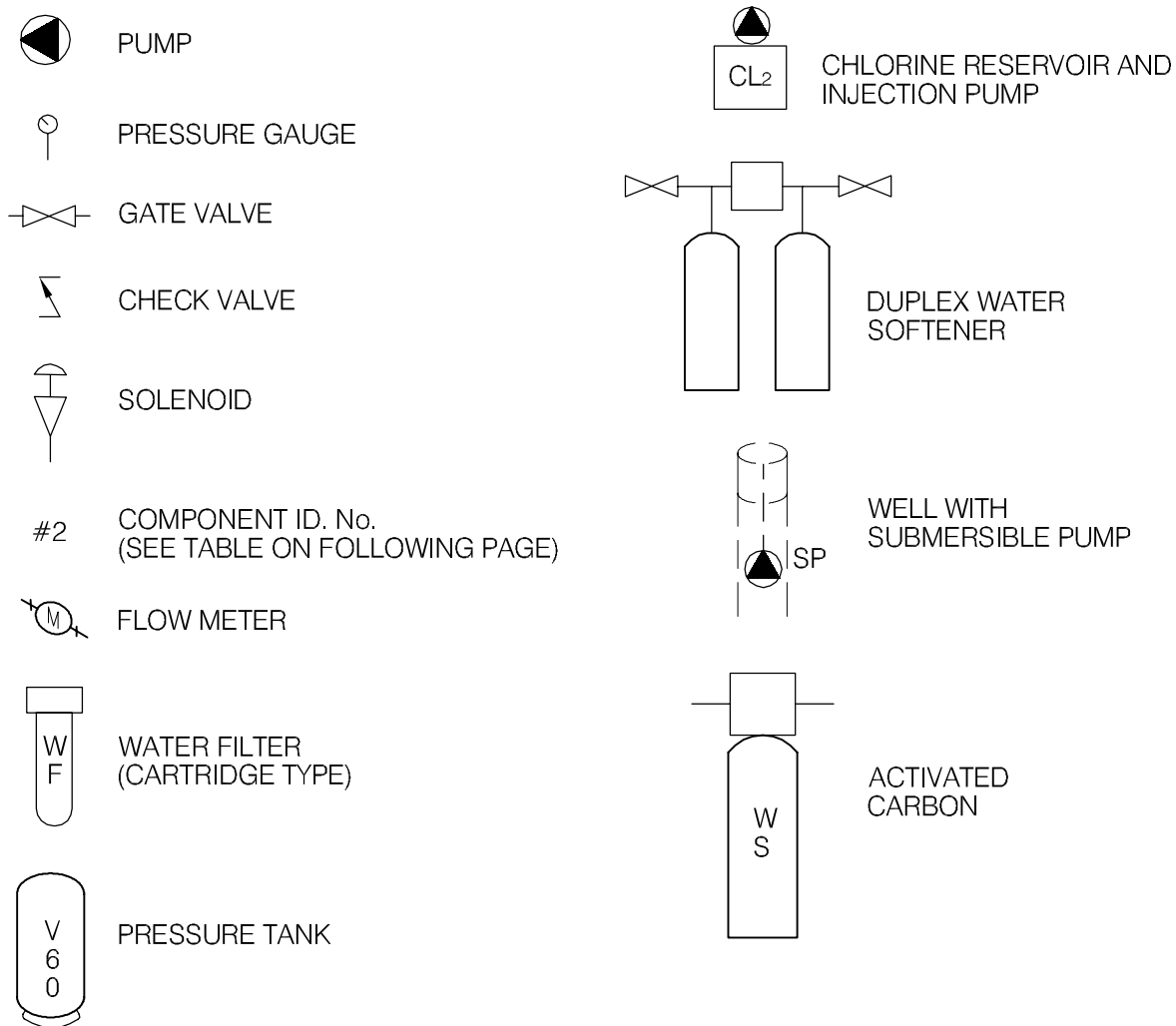
The estimated costs for the recommended Priority 2 upgrades are provided below:

- Standard wellhead upgrades with pitless unit, casing extension, retrofitted sanitary seal would cost approximately **\$5,000**;
- Removal of UST and replacement with double walled AST would cost in the order of **\$5,000** (class D and depending on extent of potential soil contamination),
- The cost for installation of a commercial stainless steel NSF 61 filtration system as previously indicated, including materials and labour, would cost approximately **\$2,900**.





## LEGEND



**EBA Engineering Consultants Ltd.**

CLIENT

**Yukon**  
Highways and Public Works  
Property Management Branch

PROJECT

SMALL PUBLIC WATER SYSTEMS ASSESSMENT  
WESTERN REGION

TITLE

SCHEMATIC SYSTEM  
LEGEND

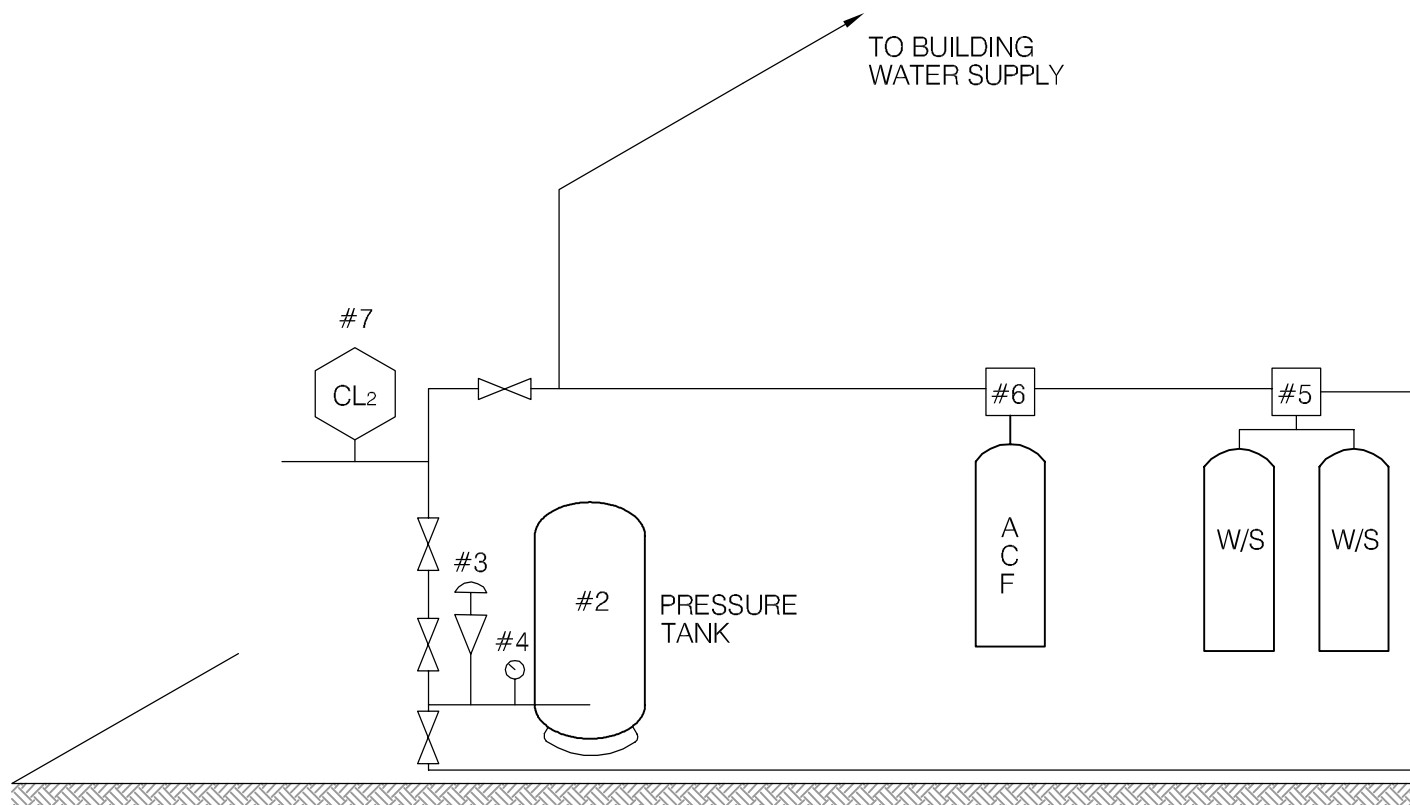
DATE    APRIL 2006

DWN.    JSB



CHKD.    RMM

FILE NO.    1260002

DRWG.    LEGEND



SCHEMATIC PRODUCED BY BERT ALBISSER OF AQUA TECH SUPPLIES AND SERVICES LTD.

|   |            |      |  |       |     |          |             |       |               |
|---|------------|------|--|-------|-----|----------|-------------|-------|---------------|
|  <div>EBA Engineering Consultants Ltd.</div>   |            |      | PROJECT<br>SMALL PUBLIC WATER SYSTEMS ASSESSMENT<br>WESTERN REGION                               |       |     |          |             |       |               |
| CLIENT<br> <div>Yukon<br/>Highways and Public Works<br/>Property Management Branch</div> |            |      | TITLE<br>WATER SYSTEM DISTRIBUTION/TREATMENT<br>SCHEMATIC SYSTEM ID.: 3171<br>KLUANE LAKE SCHOOL |       |     |          |             |       |               |
| DATE  | SEPT. 2005 | DWN. | JSB  | CHKD. | RMM | FILE NO. | 1260002.003 | DWG.: | FIGURE 3171-B |

KLUANE LAKE  
 Western Region - ~~Destruction Bay~~ School  
 Building # 3171

DISTRIBUTION & TREATMENT SYSTEM DATA

| Item | Description        | Manufacturer | Model          | Part No. | Serial No. | Size         |
|------|--------------------|--------------|----------------|----------|------------|--------------|
| 1    | SUB. PUMP          | MONARCH      | 3/4 HP         |          |            | 4"           |
| 2    | PRESSURE TANK      | CON AIRE     | SC 82T         |          |            |              |
| 3    | PRESSURE SWITCH    | SQUARED      | FSG-2          |          |            | 2" - 1/4 NPT |
| 4    | PRESSURE GAUGE     | MARSH        | 2" (0-100 PSI) |          |            | 1/4" NPT     |
| 5    | WATER SOFTENER     | AQUA TECH.   | 9000-45MI      | -DUPLEX  |            | 10x54        |
| 6    | CHARCOAL FILTER    | AQUA TECH.   | L5600-2.0      |          |            | 2 cu ft.     |
| 7    | PELLET CHLORINATOR | BETTER WATER | SENTRY I       |          |            |              |
| 8    |                    |              |                |          |            |              |
| 9    |                    |              |                |          |            |              |
| 10   |                    |              |                |          |            |              |

**TABLE 3171- 1: SUMMARY OF BACTERIOLOGICAL RESULTS**

|            |                    | Number of<br>Sampling<br>Events | Time Period<br>over which<br>Sampling<br>was Done | Any Positive<br>Total Coliform<br>Results?<br>(yes or no) | Fraction of<br>Positive<br>Total<br>Coliform<br>Results vs.<br>Total<br>Sampling<br>Events | Any positive<br>E.Coli results?<br>(yes or no) | Most Recent<br>Sampling Event<br>Available for<br>EBA Review | Is Most<br>Recent Result<br>Positive? |
|------------|--------------------|---------------------------------|---|---|--|--|--|---------------------------------------|
| Building # | Building Name      |                                 |   |   |  |  |  |                                       |
| 3171       | Kluane Lake School | 9                               | Sept-04 to<br>Jun-05                              | no  | 0/9  | no   | 16-Jun-05  | no                                    |



Table 3171-2: Water Quality Results

| SOURCE:                 |  | Building 3171 - Kluane Lake School |           |                       | GCDWQ Criteria                                  |             |      |
|-------------------------|--|------------------------------------|-----------|-----------------------|---|-------------|------|
| Location/ Resident      |  | Destruction Bay                    |           |                       |   |             |      |
| Address                 |  |                                    |           |                       |   |             |      |
| Treatment               |  |                                    |           |                       |   |             |      |
| Disinfection            |  | Chlorination (not in use)          |           |                       |   |             |      |
| Source of Water         |  | On-site well                       |           |                       |   |             |      |
| Purpose of Sampling     |  | Base Line                          | Base Line | Additional Analytical |   |             |      |
| Sample Location         |  | Soft                               | Raw       | Arts room sink        |   |             |      |
| Date Sampled            |  | 21-Sep-05                          | Jun-15-05 | 28-Jul-05             | Lower   | Upper Limit |      |
| Physical Tests (ALS)    |  |                                    |           |                       | AO  | MAC         | AO   |
| Colour (CU)             |  | <5                                 | <5.0      | -                     |   |             | 15   |
| Conductivity (uS/cm)    |  |                                    | 830       | -                     |   |             |      |
| Total Dissolved Solids  |  | 680                                | 528       | -                     |   |             | 500  |
| Hardness CaCO3          |  | 1.8                                | 446       | -                     | AO >200 = poor, > 500 unacceptable <sup>A</sup> |             |      |
| pH                      |  | 8.36                               | 8.33      | -                     | 6.5   |             | 8.5  |
| Turbidity (NTU)         |  | 0.3                                | 1.08      | 0.41                  |   | 1           | 5    |
| UV Absorbance           |  |                                    |           | -                     |   |             |      |
| % UV Transmittance      |  |                                    |           | -                     |   |             |      |
| Dissolved Anions (ALS)  |  |                                    |           |                       |   |             |      |
| Alkalinity-Total CaCO3  |  | 292                                | 295       | -                     |   |             |      |
| Chloride Cl             |  | 1.3                                | 1.06      | -                     |   |             | 250  |
| Fluoride F              |  | 0.18                               | 0.269     | -                     |   | 1.5         |      |
| Silicate SiO4           |  |                                    |           | -                     |   |             |      |
| Sulphate SO4            |  | 165                                | 184       | -                     |   |             | 500  |
| Nitrate Nitrogen N      |  | <0.1                               | <0.10     | -                     |   | 10          |      |
| Nitrite Nitrogen N      |  | <0.05                              | <0.10     | -                     |   | 3.2         |      |
| Ammonia Nitrogen N      |  |                                    |           | -                     |   |             |      |
| Total Phosphate PO4     |  |                                    |           | -                     |   |             |      |
| Total Metals (ALS)      |  |                                    |           |                       |   |             |      |
| Aluminum T-Al           |  | 0.034                              | <0.010    | -                     |   |             |      |
| Antimony T-Sb           |  | <0.0002                            | <0.00050  | -                     |   | 0.006       |      |
| Arsenic T-As            |  | 0.0043                             | 0.00373   | -                     |   | 0.025       |      |
| Barium T-Ba             |  | 0.002                              | 0.021     | -                     |   | 1           |      |
| Boron T-B               |  | 1.27                               | 1.04      | -                     |   | 5           |      |
| Cadmium T-Cd            |  | <0.00001                           | <0.00020  | -                     |   | 0.005       |      |
| Calcium T-Ca            |  |                                    | 67.4      | -                     |   |             |      |
| Chromium T-Cr           |  | 0.0008                             | <0.0020   | -                     |   | 0.05        |      |
| Copper T-Cu             |  | 0.002                              | <0.0010   | -                     |   | 1           |      |
| Iron T-Fe               |  | <0.01                              | 0.190     | -                     |   |             | 0.3  |
| Lead T-Pb               |  | 0.0002                             | <0.0010   | -                     |   | 0.01        |      |
| Magnesium T-Mg          |  |                                    | 67.5      | -                     |   |             |      |
| Manganese T-Mn          |  | <0.005                             | 0.0974    | <0.0050               |   |             | 0.05 |
| Mercury T-Hg            |  |                                    | <0.00020  | -                     |   | 0.001       |      |
| Potassium T-K           |  |                                    | 5.82      | -                     |   |             |      |
| Selenium T-Se           |  |                                    | <0.0010   | -                     |   | 0.01        |      |
| Sodium T-Na             |  | 19.1                               | 27.2      | -                     |   |             | 200  |
| Uranium T-U             |  | <0.0005                            | 0.00131   | -                     |   | 0.02        |      |
| Vanadium T-V            |  |                                    |           | -                     |   |             |      |
| Zinc T-Zn               |  | 0.010                              | <0.050    | -                     |   |             | 5    |
| Dissolved Metals (ALS)  |  |                                    |           |                       |   |             |      |
| Aluminum D-Al           |  |                                    |           | -                     |   | 0.1         |      |
| Antimony D-Sb           |  |                                    |           | -                     |   | 0.006       |      |
| Arsenic D-As            |  |                                    |           | -                     |   | 0.025       |      |
| Barium D-Ba             |  |                                    |           | -                     |   | 1.0         |      |
| Boron D-B               |  |                                    |           | -                     |   | 5           |      |
| Cadmium D-Cd            |  |                                    |           | -                     |   | 0.005       |      |
| Calcium D-Ca            |  |                                    |           | -                     |   |             |      |
| Chromium D-Cr           |  |                                    |           | -                     |   | 0.05        |      |
| Copper D-Cu             |  |                                    |           | -                     |   |             | 1.0  |
| Iron D-Fe               |  |                                    |           | -                     |   |             | 0.3  |
| Lead D-Pb               |  |                                    |           | -                     |   | 0.01        |      |
| Magnesium D-Mg          |  |                                    |           | -                     |   |             |      |
| Manganese D-Mn          |  |                                    |           | <0.0050               |   |             | 0.05 |
| Mercury D-Hg            |  |                                    |           | -                     |   | 0.001       |      |
| Potassium D-K           |  |                                    |           | -                     |   |             |      |
| Selenium D-Se           |  |                                    |           | -                     |   | 0.01        |      |
| Sodium D-Na             |  |                                    |           | -                     |   |             | 200  |
| Uranium D-U             |  |                                    |           | -                     |   | 0.02        |      |
| Vanadium D-V            |  |                                    |           | -                     |   |             |      |
| Zinc D-Zn               |  |                                    |           | -                     |   |             | 5.0  |
| Organic Parameters      |  |                                    |           |                       |   |             |      |
| Tannin and Lignin       |  |                                    |           | -                     |   |             |      |
| Total Organic Carbon C  |  |                                    |           | 2.15                  |   |             |      |
| Field Chemistry (EBA)   |  |                                    |           |                       |   |             |      |
| pH                      |  |                                    |           | 8.48                  | 6.5   |             | 8.5  |
| TDS (ppm)               |  |                                    |           | 575                   |   |             | 500  |
| EC (uS/cm)              |  |                                    |           | 1158                  |   |             |      |
| Temperature (°C)        |  |                                    |           | 8.7                   |   |             |      |
| Free Available Chlorine |  |                                    |           | 0.00                  |   |             |      |

## Notes:

A. Guidelines indicated for hardness are not CDWQG, rather they are general aesthetic guidelines  
- exceedences are indicated in yellow highlighting.

Italics and underline indicates exceedence of proposed MAC (ie. arsenic)

**Bold with Yellow** highlighting indicates exceedence of CDWQG Aesthetic Objective (AO)

**Bold Underline with Yellow** highlighting indicates exceedence of CDWQG MAC

Results are expressed as milligrams per litre except for pH and Colour (CU)

Conductivity (umhos/cm), Temperature (°C) and Turbidity (NTU)

< = Less than the detection limit indicated.

AO = Aesthetic Objective

MAC = Maximum Acceptable Concentration (Health Based)



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## SMALL PUBLIC WATER SYSTEM ASSESSMENT

### PART A. EBA Site Inspection

Inspector: Ryan Martin, Luke Lebel

Date July 28, 2005

| WELL ID # | Owner | Location Description |
|-----------|-------|----------------------|
| 3171      | YTG   | Kluane Lake School   |

#### 1. Well Location and Potential Contaminant Sources

a. General location of well: (Community, Subdivision, etc.)

Destruction Bay

b. Specific location: (Road or street, Building number, name of owner and/, legal description,

km 1760 Alaska Highway

c. GPS location: N 6792831 E 617972 elv 798m ± 8m

d. Is there electric power? ☒ Yes ☐ No

e. Is there outside water access? ☒ Yes ☐ No

f. Does the well system have:

☐ 15 or more service connections to a piped distribution system? If so how many \_\_\_\_\_

Kluane Lake School

☐ 5 or more delivery sites on a trucked distribution system? If so how many \_\_\_\_\_

g. Nearest building, specify School @ ~5m

h. Distance from well to building \_\_\_\_\_

i. If there is an effluent disposal field, is its location known? ☐ Yes ☐ No

j. Distance from well to nearest point of known field: community septic 760m

k. Well location relative to field: ☐ upslope ☒ downslope ☐ lateral

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- l. Is there any part of a sewage disposal system(s) or other potential sources of pollution that may pose a health and safety risk within 30 m? ☒ Yes ☐ No

Sewer service lines < 5m; sewer main likely < 30m

- m. Is the well located within 300 m from a sewage lagoon or pit? ☐ Yes ☒ No unlikely

- n. Is the well located within 120 m from a solid waste site or dump, cemetery? ☐ Yes ☒ No unlikely

- o. Is the infrastructure protecting the wellhead, pump house, storage tank and/or water treatment plant designed and secured to prevent:

Unauthorized access by humans? ☒ Yes ☐ No Entrance by animals? ☐ Yes ☒ No  
fastened shut w/ screws Access possible

- p. Is well site subject to flooding? ☐ Yes ☒ No

- q. Is the well site well drained? ☒ Yes ☐ No

- r. Is there a buried fuel tank on the property? ☒ Yes ☐ No

If yes, is it ☒ in use ☐ abandoned

Is the location known? ☒ Yes ☐ No

Distance from the well to known buried tank ~ 9m

- s. Are there any other known contaminant sources on the property?

☐ Yes ☐ No Describe \_\_\_\_\_

If yes, specify the source: ☐ dump ☐ sewage lagoon ☐ cemetery ☐ other

Potential Source 1: AST 1; Distance from well to Potential Source 1: ~26m

Potential Source 2: Creek; Distance from well to Potential Source 2: ~42m

Potential Source 3: Scrap Cars; Distance from well to Potential Source 3: ~30m

Potential Source 4: \_\_\_\_\_; Distance from well to Potential Source 4: \_\_\_\_\_

- t. Are there other wells on this property? ☒ Yes ☐ No

How many? 1 ☒ in use ☐ abandoned ☐ require proper sealing

Fire Hall well @ ~26m

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## 2. Well and Wellhead information:

- a. When was well installed? Year 1989 Month October
- b. Type: ☒ drilled ☐ dug ☐ sand point ☐ other \_\_\_\_\_
- c. Is there a drillers log for the well: ☒ Yes ☐ No
- d. Is there a surface seal to 6 m ☐ Yes ☒ No ☐ unknown ☐ unlikely
- e. Surface casing: ☐ Yes Diameter \_\_\_\_\_ ☒ No
- f. Well casing: Diameter 15 cm Material: ☒ steel ☐ plastic ☐ concrete
- g. Depth of well: 104 ft ☐ measured (if possible) ☐ reported ☒ from log
- h. Static water level below ground: 21 ft  
☐ measured (if possible) ☐ reported ☒ from log ☐ flowing
- i. (If granular) Is the well completed: ☐ open end casing ☒ with a well screen  
☐ with slotted pipe ☐ unknown other \_\_\_\_\_
- j. (If bedrock) Does the well have a liner? ☐ yes ☐ No ☐ steel ☐ plastic
- k. If there is a well screen: length 3 ft slot size(s) \_\_\_\_\_  
Location of screen: from 101 ft to 104 ft from log ☐ reported
- l. Is there a sump below the screen? ☐ Yes ☒ No unlikely  
9 w f p f t
- m. Is the well head: ☐ in pumphouse ☒ in pit ☐ pitless adaptor ☐ in a building  
☒ in a wooden enclosure other, describe \_\_\_\_\_
- n. If the well head is located in a wooden enclosure,



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- i. Is the well head below grade? describe in detail ~0.65 m below grade
- ii. Are there signs of ponding on the enclosure(e.g. water stains, etc.)? ☐ Yes ☒ No
- iii. Is the wellhead enclosed by fiberglass insulations? ☐ Yes ☒ No styrofoam insulation
- iv. Any evidence of rodents? Specify Access possible
- v. Does the well casing have a proper seal cap? ☒ Yes ☐ No

If no, describe condition \_\_\_\_\_

## **3. Water Supplying This Well:**

- a. By definition is the water from a surface water source or under the direct influence of surface water?
- ☒ Yes ☐ No ☐ farther investigation required.

If yes is there treatment or disinfection ☒ Yes ☐ No

Explain (filtration, disinfection etc...) chlorination, water softener, AC filter

## **4. Aquifer Supplying This Well:**

- a. The aquifer is: ☐ bedrock ☒ granular sediment ☐ unknown
- b. Does water level and/or well capacity show seasonal fluctuation? ☐ Yes ☒ No  
unlikely

## **5. Pump Installation:**

- a. Is the well equipped with a pump? ☒ yes ☐ No
- b. Type of pump: ☐ hand ☒ electric submersible ☐ jet
- ☐ shallow well centrifugal ☐ other, \_\_\_\_\_
- c. Description: Manufacturer \_\_\_\_\_ Model \_\_\_\_\_
- horsepower \_\_\_\_\_ capacity \_\_\_\_\_ voltage \_\_\_\_\_

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d. Date installed: \_\_\_\_\_ By: \_\_\_\_\_

e. For submersible pump, depth of setting below surface \_\_\_\_\_

f. Drop pipe for submersible pump: ☐ steel ☒ plastic *likely*

g. Pump delivers water to: ☒ pressure tank ☐ elevated tank ☐ other

h. Are there automatic pump controls: ☒ Yes ☐ No

i. Is there provision for taking water samples before water reaches storage? ☒ Yes ☐ No

j. Is there a water meter on the system? ☐ Yes ☒ No

k. Is the pump and piping protected from freezing? ☒ Yes ☐ No

If yes, describe: Styrofoam insulation, likely heat trace

l. Comments on pump installation: \_\_\_\_\_  
\_\_\_\_\_

## **6. Conclusions**

a. Comments on overall installation:

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b. Recommendations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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## PART B: EBA Site Inspection

Inspector: BERT ALBISSER

Date July 28/05

| WELL ID # | Owner | Location Description                    |
|-----------|-------|---|
| 3171      | VTG   | <del>DEBATE</del> SCHOOL<br>KLLANE LAKE |

### 6. Water Treatment

a. Is well water treated? ☒ Yes ☐ No; Type of treatment:

☒ chlorination ☒ iron and or manganese removal ☒ other WATER SOFTENER

b. Is water entering plumbing or piped distribution system treated with chlorine or another treatment that is as effective as chlorine used to achieve disinfection throughout the system?

☒ Yes ☐ No If so how \_\_\_\_\_

c. If treated with chlorine, is the free residual chlorine concentration less than 0.2 mg/L

☐ Yes ☒ No \_\_\_\_\_ reading.

Tested at \_\_\_\_\_ (location)

d. Is testing for chlorine residual concentration done at the tap (eg. Kitchen faucet) or from representative points in a piped distribution system, including a point from tap at the end line

☐ Yes ☒ No If yes how often? \_\_\_\_\_

e. If the drinking water is being transported by water delivery truck does it have a minimum chlorine free residual of 0.4 mg/L at the time of fill. ☐ Yes ☒ No

### 7. Water Quality (observations):

a. Does the water stain plumbing? ☐ yes ☐ No ☒ slight ☐ severe

Type of stain: ☐ brown ☐ red ☐ black

b. Does the water contain sediment? ☐ Yes ☒ No ☐ occasional ☐ constant

c. Is there an unpleasant odour? ☐ Yes ☒ No ☐ H<sub>2</sub>S ☐ Other \_\_\_\_\_

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- d. Is there an unpleasant taste? ☐ Yes ☒ No ☐ brackish ☐ Other \_\_\_\_\_
- e. Is there a history of bad bacterial analyses? ? ☐ Yes ☐ No
- f. Is there a chemical analysis? ? ☐ Yes ☐ No ☐ adequate ☐ incomplete
- g. Is there analysis of trihalomethanes (THMs) where the water source is a surface water supply or a well under the direct influence of surface water? ☐ Yes ☒ No
- h. Is the drinking water tested daily with an accurate reading chlorine test kit capable of reading in the range 0 to 3.5 mg/L of free chlorine residual in increments of 0.1mg/L? ☐ Yes ☒ No ☐ unknown
- i. If yes is the test performed in accordance with manufactures directions? ☐ Yes ☒ No ☐ unknown
- j. Is a record of the date, time, name of person performing the test and results of the drinking water sample kept? ☐ Yes ☒ No

## **TANK AND PIPING DETAILS**

### ***Tank Room***

Is there a water tank? Yes No Details: PRESSURE TANK.

Where is it located?

Comments: MECHANICAL ROOM.

Is the room in which the water tank is located heated to maintain an optimum temperature of 4°C for stored water?

YES NO

Comments: \_\_\_\_\_

Are there windows in the add-on that may allow direct sunlight onto the water holding tank? YES  
NO

Comments: \_\_\_\_\_

Are there other heat sources near the tank? YES NO

Comments: \_\_\_\_\_

Is there waterproof flooring with a sealed base to contain spills? YES NO

Comments: \_\_\_\_\_

## ***Overall Tank***

What are the tank size and dimensions?

\_\_\_\_\_

What material is the tank constructed of? \_\_\_\_\_

Is tank and associated piping constructed of safe materials (i.e. CSA approved and material that does not affect the taste of the water)? YES NO

Comments: \_\_\_\_\_

## ***Tank Inlet, Outlet and Lid***

Is there adequate access on the tank for cleaning (i.e. min 15" access lid)? YES NO

Does the lid have a tight seal and is it watertight when closed? YES NO

Does the tank have an overflow or high level whistle? YES NO

Is the water tank drain accessible? YES NO

## **WATER TANK AND WATER QUALITY CONDITION**

Are there signs of staining or biofouling? YES NO

Comments: \_\_\_\_\_

Is there any sediment or scum in bottom of tank? YES NO

Comments: \_\_\_\_\_

Is there any odour associated with the water or tank? YES NO

Have there been any bacteriological analyses conducted previously? YES NO

Does the tank appear that it has been cleaned recently? YES NO

Are the tanks easily assessed for the purpose of cleaning and disinfection? YES NO

## **8. Conclusions**

### **a. Comments on overall installation:**

THIS INSTALLATION IS SOUND. HOWEVER IF  
A CHLORINE RESIDUAL IS DESIRED, CONFIGURATION  
CHANGES ARE REQUIRED.

### **b. Recommendations:**

REMOVE POUET CHLORINATOR - INSTALL  
12 GPM NSF55 CERTIFIED UV WITH PREFILTER.

PH. 633-3070 TELEX 036-8496  
P.O. BOX 4391  
WHITEHORSE, YUKON

# Field Report 107071012

Started Oct. 2 ..... 1987

Completed. Oct 2.....1989

| NAME AND ADDRESS OF CLIENT | DESCRIPTION OF WORK | LOCATION OF WORK |
|----------------------------|---------------------|------------------|
| Municipal Engineering      | W / W               | School           |
|                            |                     | Destruction Bay  |
|                            | 89-1A-36            |                  |

[illegible][illegible]

## SIGNATURES

MIDNIGHT SUN.....

CLIENT.....

TITLE.....

TITLE.....



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## Enforcement and Emergencies Section

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PH: 867.667.3400 FAX: 867.667.7962

### Spill Report Information

|                      |   |
|----------------------|---|
| Spill #              | 0334  |
| Jurisdiction         | Yukon   |
| Community            | Destruction Bay   |
| Address              |   |
| Highway              |   |
| Milepost             |   |
| Feature              | Destruction Bay   |
| Location and Cause   | vent leak   |
| Latitude             | 61.25274646   |
| Longitude            | -138.80244846   |
| Incident Date        | 9/26/2003 12:00:00 PM   |
| Lead Agency          | Yukon Government - Environmental Programs   |
| Other Agency         |   |
| Company(s)           | Yukon Electrical Company Ltd  |
| Amount               | 500   |
| Units                | Litres  |
| Quantity             | Estimate  |
| Release Description  | Spilled   |
| Additional Quantitit |   |
| Concentration        |   |
| Concentration Unit   |   |
| Phase                | Liquid  |
| Major Contaminant    | Diesel  |
| 2nd Contaminant      |   |
| 3rd Contaminant      |   |
| 4th Contaminant      |   |
| Outcome              | cleaned-up but soil had not been removed at time of report - no further information on file |



**Spill Report Information**

|                             |  |
|-----------------------------|--|
| <b>Spill #</b>              | 9303   |
| <b>Jurisdiction</b>         | Yukon  |
| <b>Community</b>            | Destruction Bay  |
| <b>Address</b>              |  |
| <b>Highway</b>              |  |
| <b>Milepost</b>             |  |
| <b>Feature</b>              | Destruction Bay  |
| <b>Location and Cause</b>   | untreated sewage spilled due to mechanical failure - rubber coupling separated on the force main pipe elbow                                      |
| <b>Latitude</b>             | 61.252546  |
| <b>Longitude</b>            | -138.800598  |
| <b>Incident Date</b>        | 2/5/1993 2:30:00 PM  |
| <b>Lead Agency</b>          | Department of Indian Affairs and Northern Development  |
| <b>Other Agency</b>         | Yukon Government - Transportation  |
| <b>Company(s)</b>           | Community of Destruction Bay   |
| <b>Amount</b>               | 37,800   |
| <b>Units</b>                | Litres   |
| <b>Quantity</b>             | Estimate   |
| <b>Release Description</b>  | Spilled  |
| <b>Additional Quantitit</b> |  |
| <b>Concentration</b>        |  |
| <b>Concentration Unit</b>   |  |
| <b>Phase</b>                | Liquid   |
| <b>Major Contaminant</b>    | Raw Sewage   |
| <b>2nd Contaminant</b>      |  |
| <b>3rd Contaminant</b>      |  |
| <b>4th Contaminant</b>      |  |
| <b>Outcome</b>              | effluent flowed over natural terrain and collected in a pond beside Kluane Lake - some collected, most frozed - to be excavated to sewage lagoon |



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## Spill Report Information

|                     |  |
|---------------------|--|
| Spill #             | 9304   |
| Jurisdiction        | Yukon  |
| Community           | Destruction Bay  |
| Address             |  |
| Highway             |  |
| Milepost            |  |
| Feature             | Destruction Bay  |
| Location and Cause  | untreated sewage spilled due to mechanical failure - coupling/pipe separation again  |
| Latitude            | 61.252546  |
| Longitude           | -138.800598  |
| Incident Date       | 3/29/1993  |
| Lead Agency         | Department of Indian Affairs and Northern Development  |
| Other Agency        | Yukon Government - Transportation  |
| Company(s)          | Community of Destruction Bay   |
| Amount              | 11340  |
| Units               | Litres   |
| Quantity            | Estimate   |
| Release Description | Spilled  |
| Additional Quantit  |  |
| Concentration       |  |
| Concentration Unit  |  |
| Phase               | Liquid   |
| Major Contaminant   | Raw Sewage   |
| 2nd Contaminant     |  |
| 3rd Contaminant     |  |
| 4th Contaminant     |  |
| Outcome             | similar to PACY 9303 - sewage collected in same pond - repairs to sewage system to be completed - spill being cleaned up with vacuum truck |



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## Spill Report Information

|                      |   |
|----------------------|---|
| Spill #              | 9515  |
| Jurisdiction         | Yukon   |
| Community            | Destruction Bay   |
| Address              |   |
| Highway              |   |
| Milepost             |   |
| Feature              | Destruction Bay   |
| Location and Cause   | pipeline sleeve broke 10m from final discharge - unknown cause for breakage   |
| Latitude             | 61.248055555556   |
| Longitude            | -138.793888888889   |
| Incident Date        | 5/12/1995   |
| Lead Agency          | Department of Indian Affairs and Northern Development   |
| Other Agency         |   |
| Company(s)           | YTG   |
| Amount               | 180   |
| Units                | Litres  |
| Quantity             | Estimate  |
| Release Description  | Spilled   |
| Additional Quantitit |   |
| Concentration        |   |
| Concentration Unit   |   |
| Phase                | Liquid  |
| Major Contaminant    | Raw Sewage  |
| 2nd Contaminant      |   |
| 3rd Contaminant      |   |
| 4th Contaminant      |   |
| Outcome              | spill occurred sometime at the end of April 1995 - not reported to spill line - pipeline repaired - improvements to system to be made byt YTG in summer |



## Spill Report Information

|                            |   |
|----------------------------|---|
| <b>Spill #</b>             | 9634  |
| <b>Jurisdiction</b>        | Yukon   |
| <b>Community</b>           | Destruction Bay   |
| <b>Address</b>             |   |
| <b>Highway</b>             |   |
| <b>Milepost</b>            |   |
| <b>Feature</b>             | Destruction Bay   |
| <b>Location and Cause</b>  | break in main sewer line  |
| <b>Latitude</b>            | 61.248055555556   |
| <b>Longitude</b>           | -138.793888888889   |
| <b>Incident Date</b>       | 6/12/1996   |
| <b>Lead Agency</b>         | Department of Indian Affairs and Northern Development   |
| <b>Other Agency</b>        |   |
| <b>Company(s)</b>          | YTG   |
| <b>Amount</b>              |   |
| <b>Units</b>               |   |
| <b>Quantity</b>            | Unknown   |
| <b>Release Description</b> | Spilled   |
| <b>Additional Quantit</b>  |   |
| <b>Concentration</b>       |   |
| <b>Concentration Unit</b>  |   |
| <b>Phase</b>               | Liquid  |
| <b>Major Contaminant</b>   | Raw Sewage  |
| <b>2nd Contaminant</b>     |   |
| <b>3rd Contaminant</b>     |   |
| <b>4th Contaminant</b>     |   |
| <b>Outcome</b>             | pump activated 3x per day - approx 500 ga each time but sewage doesn't reach lagoon - DIAND inspected - to be repaired - no risk to environment |

**Spill Report Information**

|                             |   |
|-----------------------------|---|
| <b>Spill #</b>              | 9649  |
| <b>Jurisdiction</b>         | Yukon   |
| <b>Community</b>            | Destruction Bay   |
| <b>Address</b>              |   |
| <b>Highway</b>              |   |
| <b>Milepost</b>             |   |
| <b>Feature</b>              | Destruction Bay   |
| <b>Location and Cause</b>   | leaking sewer line  |
| <b>Latitude</b>             | 61.2480555555556  |
| <b>Longitude</b>            | -138.793888888889   |
| <b>Incident Date</b>        | 8/7/1996  |
| <b>Lead Agency</b>          | Department of Indian Affairs and Northern Development   |
| <b>Other Agency</b>         |   |
| <b>Company(s)</b>           | YTG   |
| <b>Amount</b>               | 50  |
| <b>Units</b>                | Gallons (US, liquid)  |
| <b>Quantity</b>             | Estimate  |
| <b>Release Description</b>  | Leaked  |
| <b>Additional Quantitit</b> | rate of spill reported at 1L/s  |
| <b>Concentration</b>        |   |
| <b>Concentration Unit</b>   |   |
| <b>Phase</b>                | Liquid  |
| <b>Major Contaminant</b>    | Raw Sewage  |
| <b>2nd Contaminant</b>      |   |
| <b>3rd Contaminant</b>      |   |
| <b>4th Contaminant</b>      |   |
| <b>Outcome</b>              | leak stopped 8/9/96 - line repaired by patching - Tony will take up with YTG on way back from site - no further information on file |



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### Spill Report Information

|                             |   |
|-----------------------------|---|
| <b>Spill #</b>              | 9672  |
| <b>Jurisdiction</b>         | Yukon   |
| <b>Community</b>            | Destruction Bay   |
| <b>Address</b>              |   |
| <b>Highway</b>              |   |
| <b>Milepost</b>             |   |
| <b>Feature</b>              | Destruction Bay   |
| <b>Location and Cause</b>   | leaking utilidor - similar to Spill No. 9649  |
| <b>Latitude</b>             | 61.248055555556   |
| <b>Longitude</b>            | -138.793888888889   |
| <b>Incident Date</b>        | 9/24/1996 2:30:00 PM  |
| <b>Lead Agency</b>          | Department of Indian Affairs and Northern Development                                     |
| <b>Other Agency</b>         |   |
| <b>Company(s)</b>           | YTG   |
| <b>Amount</b>               |   |
| <b>Units</b>                |   |
| <b>Quantity</b>             | Unknown   |
| <b>Release Description</b>  | Leaked  |
| <b>Additional Quantitit</b> |   |
| <b>Concentration</b>        |   |
| <b>Concentration Unit</b>   |   |
| <b>Phase</b>                | Liquid  |
| <b>Major Contaminant</b>    | Raw Sewage  |
| <b>2nd Contaminant</b>      |   |
| <b>3rd Contaminant</b>      |   |
| <b>4th Contaminant</b>      |   |
| <b>Outcome</b>              | education truck needed to pump up before it enters creek - no further information on file |

**Photo 0614:** 3171 Kluane Lake School**Photo 0617:** 3171 Wellhead enclosure**Photo 0615:** 3171 Wellhead in pit, pellet chlorinator**Photo 0616:** 3171 Underground fuel storage tank





**Photo 0124:** 3171 Water softener and brine tank



**Photo 0123:** 3171 Pressure tank (right), activated carbon filter (left)