11.0 BUILDING 5629: MAYO GRADER STATION

11.1 Description of Existing Water Supply System

The Mayo Grader Station (Building 5629) is currently serviced by a water supply system that delivers water from an approximately 12.5 m deep well. The well is located in an enclosure off from the southwest corner of the maintenance garage. There was no well cap present at the time of water system assessment. A site plan is provided as Figure 5629-A in Appendix A11. The coordinates of the wellhead, as measured by a handheld GPS device, were recorded as:

- UTM ZONE 8
- Northing: 7054099
- Easting: 456418

There is no treatment or disinfection system for this water system. A bottled drinking water station is present in the kitchen of the building and it is unlikely that water from the well system is used for drinking water. Signs indicating that the water is not suitable for drinking were not evident at the time of the assessment. A schematic detailing the water supply system is provided as Figure 5629-B in Appendix A11. Photos of the well and water system are also included at the back of this appendix.

11.2 Description of Existing Wastewater Systems

Wastewater from the Grader Station building is discharged to an in-ground septic disposal system located south of the maintenance garage. The septic tank is located approximately 14 m east of the well. The effluent field may begin as close as 15 m from the well; however, it appears that there is leach pit style culvert for sewage disposal that is approximately 26 m from the well. A site plan showing the location of the septic system is given by Figure 5629-A in Appendix A11.

11.3 Water Quality Results

11.3.1 Water Quality Results from Previous Sampling

Bacteriological

Nine samples were collected from the Mayo Grader Station water system between October 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 5629-1 in Appendix A11. One sample of nine for which results were provided tested positive for total coliform. *E. coli* was not present in any of the samples during this period.

Potability

YTG representatives collected water samples from the Mayo Grader Station water system on September 29, 2004 and June 8, 2005. Results are summarized in Table 5629-2 in Appendix A11. EBA reviewed the analytical results for comparison with the Canadian Drinking Water Quality Guidelines (CDWQG) to observe general water quality; to identify and recommend additional sampling and analytical; and to identify potential indicators of contamination. Details are as follows:

- The first sampling event reported turbidity to be 1.5 NTU, which is above the CDWQG MAC of 1.0 NTU;
- At 79.8 mg/L during the first sampling event and 100 mg/L during the second sampling event, the chloride concentrations, although not in exceedence of the CDWQG AO of 250 mg/L, were significantly elevated above the normal background concentrations for the Mayo region;
- The water quality results indicated that all other health based and aesthetic objectives were met for the parameters analyzed;
- The water quality results indicated that the groundwater is calcium bi-carbonate type with a pH of approximately 8; and,
- The hardness (as $CaCO_3$) at approximately 365 mg/L is considered very hard.

11.3.2 Identification of Additional Analytical Testing Required

Additional analytical for the Mayo Grader Station that was identified to be included during the water system assessments is detailed below:

- UV absorbance and UV transmissivity, as well as tannins and lignin, to determine potential for UV treatment as a disinfection option for this water system;
- Chloride, nitrate, nitrite, and ammonia to determine if the well is potentially under the influence of surficial sources of contamination;
- Total organic carbon (TOC);
- Extractable Petroleum Hydrocarbons (EPH) and Polycyclic Aromatic Hydrocarbons (PAH) to evaluate potential impacts of hydrocarbon contamination; and,
- Measurements in the field for total dissolved solids, conductivity, pH, and temperature.

Additional Analytical Results

EBA collected a water sample during the water system assessment on August 17 2005. The sample was submitted to ALS Environmental in Vancouver BC for analysis of additional analytical parameters included as part of the assessment. These results are summarized in Table 3440-2 in Appendix A11 and the laboratory reports are included in Appendix B. The following points regarding the water quality results are of significance:

- Results indicated that EPH and PAH parameters were below laboratory detection limits;
- At 112 and 0.261 mg/L respectively, the chloride and nitrate concentrations were higher than previously reported; and,
- Water quality analysis reported no exceedences of CDWQG MACs or AOs.

11.3.3 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surface sources or septic waste. Chloride concentrations appear to be extremely elevated with respect to normal background ranges for groundwater in the area. Samples from this water system reported chloride concentrations as high as 112 mg/L. A well upgradient from this system had chloride concentration below the detection

limit, and a well downgradient had a chloride concentration of approximately 13 mg/L. Nitrate and nitrite concentrations for this sample were low, but may still be elevated above the normal background range for this area. Nitrate was 0.261 mg/L, and it should be noted that both chloride and nitrate concentrations have shown an increase over the past three sampling events. These water quality results suggest that the Mayo Grader Station well was being impacted from a surficial source of contamination such as road salt and/or septic wastes at the time of sampling.

11.4 Conceptual Hydrogeology

The Grader Station well is completed at a depth of 12.5 m with a static water level of 7.4 m below ground. A driller's well log was not available for review for this well.

Examination of well logs in the Mayo area indicates that well completion depths and lithology in the area is highly variable. Wells are completed at various depths, ranging from shallow dug wells to drilled wells greater than 150 m deep. The Mayo area has been affected by one or more glaciations. Sediments in the Mayo area tend to consist of recent alluvium overlying fine-grained silts with varying interbedded sand and gravel. Sediment deposits are generally underlain by metamorphic bedrock, which is exposed in much of the upland areas. Widespread discontinuous permafrost is known to exist in the Mayo area and has been noted in several of the well logs examined.

Shallow groundwater flow generally occurs within the overlying alluvial deposits in the Village of Mayo area, this groundwater flow system tends to be perched on underlying silts and permafrost. Based on topography and proximity to surface water sources, the groundwater flow direction is inferred to be in the range of south to west towards the Mayo and/or Stewart River.

11.5 Potential Contaminant Sources

Details and photographs of potential contaminant sources observed during the site investigation are compiled in Appendix A11.

Potential contaminant sources within 30 m of the wellhead include:

- A septic leach pit is located within 26 m;
- A septic tank is located 14 m from the well (this is in contravention of the SPDWSR);
- An above ground waste oil storage tank at 22 m;
- An underground fuel storage tank at 7 m; and
- Industrial activities within 30 m.

It should be noted that at the time of the assessment, a large salt storage pile existed approximately 70 m northwest and in the direction inferred to be upgradien of the well. In addition there are bulk fuel storage facilities on the lots directly north of the site; the closest bulk fuel faciility is approximately 100 m from the well.

11.5.1 Spills Records and Contaminated Sites Search Results

It was reported by Environment Canada that three spills occurred in the 1970's at the White Pass and Yukon Route tank farm (WPYR) which is immediately north of the Grader Station site. The first spill resulted in approximately 1600 L of furnace oil being discharged due to a machanical failure. Reportedly the spill was contained and hydrocarbon impacted soils were disposed of off-site. Later in the decade two other spills resulted in dicharges of 3700 L of fuel oil and 1600 L of gasoline respectively. Spill records are inclued in Appendix A11.

Another spill was reported in 1991 at the WPYR site when an unknown quantity of fuel caught fire and a truck exploded. 756, 000 L of water was used to control the fire and reportedly, runoff was contained.

Two reported spills also occurred at the North 60 Petroleum Tank Farm in 1997 and 1999 due to the overfilling of a storage tank. Approximately 1000 L of diesel was spilled, however no record of remediation was reported.

These bulk fuel facities are located immediately northwest of the existing Grader Station site. As mentioned in Section 11.4, the groundwater flow direction in the vicinity of the site is inferred to be southwesterly based on topography and proximity to surface water bodies. These reported spills are significant because they may have impacted on shallow groundwater quality in the vicinity of this site, or could potentially impact on the quality of the groundwater in this shallow aquifer at some point in the future.

The Government of Yukon Environmental Programs Branch and Environment Canada Environmental Protection Branch did not identify any other recorded spill events or contaminated sites issues for this site or neighbouring sites in close proximity.

11.6 Identified Water System Deficiencies and Associated Risk

11.6.1 High and Medium Risk Deficiencies

High and medium risk deficiencies for this water system that were identified during this study include:

- Poor surface completion of the well (there was no well cap on the casing at the time of the assessment and the casing does not extend the required 500 mm above grade). We understand that a well cap has been installed since the assessment;
- There is no surface sanitary seal (grout or bentonite seal as required by the Canadian Groundwater Association's Guidelines for Water Well Construction);
- There is no driller's log available to review lithology and well construction, however, the well is completed at a depth of only 12.5 m, likely within a shallow, unconfined aquifer that is potentially under the direct influence of surface water (GUDI);
- The well is located within 30 m of potential contaminant sources including an underground fuel storage tank, an above ground waste oil storage tank, a on-site sewage disposal system (septic field), and industrial activities;
- The site is downgradient from bulk fuel facilities where documented fuel spills have occurred;
- Chloride concentrations are elevated above the normal background concentrations for the Mayo region which indicates contamination from a surficial anthropogenic source;
- A water sample collected for bacteriological analysis tested positive for total coliform bacteria;
- The turbidity has previously been reported above the CDWQG MAC; and,
- There is no treatment or disinfection system present.
- There are no posted signs in the Grader station building indicating that the water from the taps should not be used for drinking water.

11.6.2 Low Risk Deficiencies

There were no low-risk deficiencies identified for this site. All deficiencies are considered either high or medium risk.

11.7 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).

The existing well is not considered suitable for a drinking water source based on the depth of the well, water quality, and proximity to contaminant sources. The options presented below include construction of a replacement water well that is properly constructed and located in consideration of potential contaminant sources, or water delivery from a treated source at the Village of Mayo are presented below for comparision.

11.7.1 Priority 1

Regardless of which option is ultimately chosen, water from this well should not be used for human consumption until Priority 1 upgrades are completed. In the interim, until one of the options presented below is selected and implemented, YTG should provide bottled water and post suitable advisories.

Option 1:

The first option presented involves drilling a new well that would be located and constructed in consideration of the following:

- The well should be equipped with a surface seal to at least 6 m and a pitless unit should be installed with the casing raised above grade (500 mm);
- The well must be located at a distance greater than 30 m and upgradient from any potential source of contamination;
- The well should be at least 15 m in depth; and,
- The water from the new well must meet all CDWQG health based guidelines. If there are any exceedences in the CDWQG health-based guidelines then a treatment system must be designed and installed as necessary. A treatment/disinfection system would likely consist of a

filtration system (to 1 micron (absolute)) followed by a UV disinfection system. Pretreatment would likely be required.

A shallow well at this site is not considered to be a safe option given the land on adjacent properties and at the Grader Station. It should be noted that groundwater obtained from deep wells in this area is typically highly mineralized and generally has aesthetically poor water quality. Water from a deep well in this vicinity would likely require treatment for hardness and possibly arsenic, iron and manganese.

Option 2:

The second option would involve disconnecting the existing well from the domestic system and converting to bulk water delivery with UV disinfection and filtration. This option would involve the least risk, and the least capital cost, but would result in higher operation and maintenance costs. It should be noted that there is already water delivery to the PMA shop at the southwest corner of the site. For this option, the existing well could be maintained for equipment cleaning and non-potable use. Appropriate advisories, signs and precautions would be necessary to ensure that the non-potable water would not be accessible to the public.

Water treatment options presented herein are for project planning and budgeting purposes. Some engineering will be required for final system design/specification.

11.7.2 Priority 2 and 3

There are no Priority 2 or 3 mitigative options associated with this site.

11.8 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.

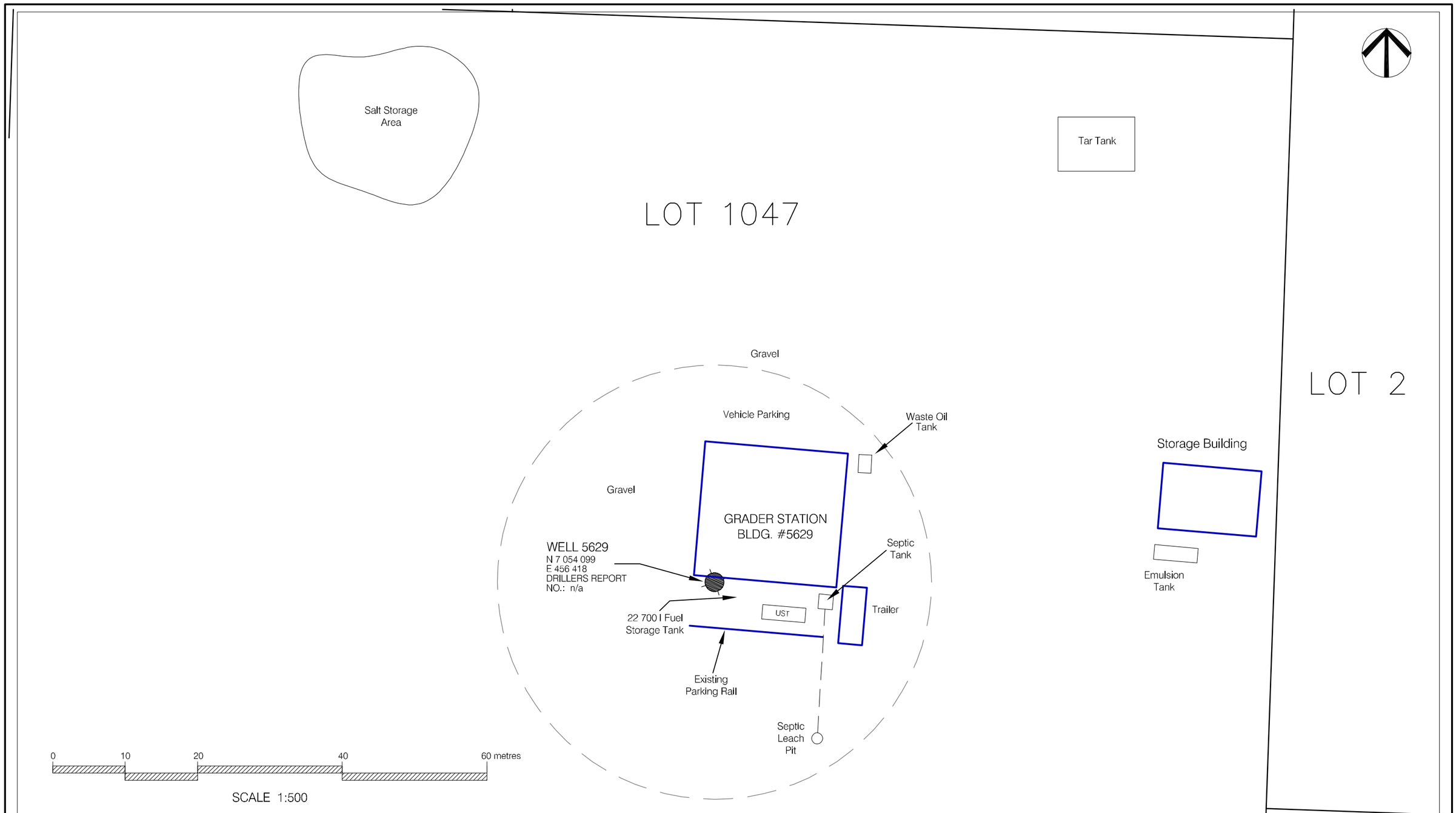
11.8.1 Priority 1

Option 1:

- A new well, assuming approximately 50 m of overburden, would likely cost in the order of **$40,000** to drill, test, and connect (including pump, drop pipe, freeze-protected underground piping etc.); and,
- The materials and labour costs for a treatment/disinfection system (based on water quality from other deep wells in the area) would likely cost in the order of **$7,700**; assuming **$600** for the duplex filtration system, **$4,000** for a duplex softening system, **$2,400** for the proposed NSF/ANSI 55 certified UV disinfection system, and **$700** for a point of use Reverse Osmosis system.
- Freeze protected piping installed below grade would cost in the order of **$5,000** depending on the depth of bury and the distance required.

Option 2:

To supply and install a water storage tank, new jet pump and hook to existing plumbing would likely cost in the order of **$3,000**. A filtration and UV system (to ensure adequate disinfection of delivered water) would also cost in the order of **$3,000** installed. Therefore, the capital cost for this option would be approximately **$6,000**. The Na Cho Nyak Dun First Nation delivers water from a treated source operated by the Village of Mayo, and could be retained to provide water delivery to the Grader Station. Delivery costs should be considered when comparing life cycle costs of this option with Option 1.



NOTES:

1. UTM COORDINATES OBTAINED WITH A HAND HELD GPS USING NAD83 SYSTEM AND ARE CONSIDERED TO BE ACCURATE TO 10.0 m, APPROXIMATELY.

30 m RADIUS FROM WATER WELL FOR CONSIDERATION OF PROXIMITY TO POTENTIAL CONTAMINANT SOURCES.

No.	DESCRIPTION	DATE	APPROVED
0	ISSUED FOR CLIENT REVIEW	DD/MM/YY	XXX

REVISION

EBA Engineering Consultants Ltd.

DESIGNED BY:	R. MARTIN
DRAWN BY:	J. BUYCK
DATE:	SEPT. 2005
SCALE:	AS SHOWN
PROJECT No.:	1260002.004
ACAD FILENAME:	004-NORTHERN REGION

CLIENT: Yukon
Highways and Public Works
Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
NORTHERN REGION

GOVERNMENT OF YUKON
HIGHWAYS & PUBLIC WORKS

MAYO GRADER STATION
BUILDING # 5629
SITE LOCATION DIAGRAM
WELL ID: 5629

REVISION ISSUE 0

FIGURE No. FIGURE 5629-A

\\eba.local\corp\Whitehorse\Data\0201Drawings\1260002 Water Assessment YTG\004 - Northern Region\mayo\1260002004 Mayo Grader Station_5629A Site Plan.dwg, 1/13/2006 11:34:58 AM, Adobe PDF, jbuyck

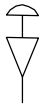
LEGEND


PUMP


PRESSURE GAUGE


GATE VALVE


CHECK VALVE

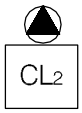

SOLENOID

#2 COMPONENT ID. No.
(SEE TABLE ON FOLLOWING PAGE)

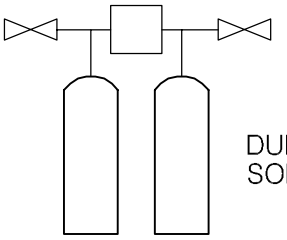
FLOW METER

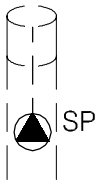
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

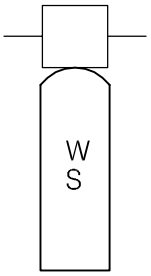


CHLORINE RESERVOIR AND
INJECTION PUMP


DUPLEX WATER
SOFTENER

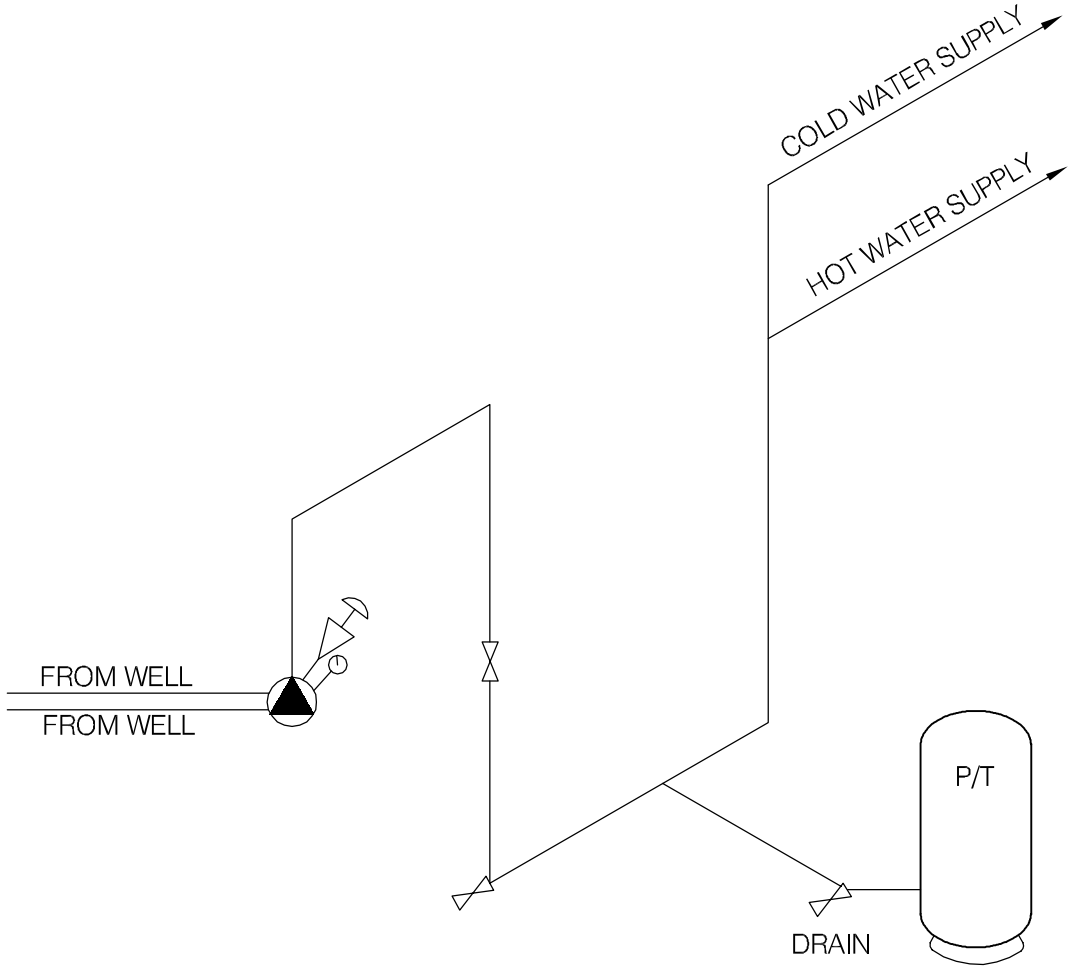


WELL WITH
SUBMERSIBLE PUMP



ACTIVATED
CARBON

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT WESTERN REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			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.

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT NORTHERN REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			TITLE	WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 5629 GRADER STATION - MAYO, YT.	
DATE SEPT. 2005	DWN. JSB	CHKD. RMM	FILE NO. 1260002.004		DWG.: FIGURE 5629-B

Z:\0201Drawings\1260002 Water Assessment YTG\004 - Northern Region\mayo\1260002004 Mayo Grader Station_5629B Schematic.dwg, 4/5/2006 2:55:36 PM, Adobe PDF, jbuyck

Northern Region – Mayo Grader Station
Building # 5629

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	JET PUMP	MONARCH	JKC - 4			1 HP.
2	PRESSURE TANK	MONARCH	PC-122			122 L
3						
4						
5						
6						
7						
8						
9						
10						

TABLE 5629 - 1: SUMMARY OF BACTERIOLOGICAL RESULTS

Building #	Building Name	Number of Sampling Events	Time Period over which Sampling was Done	Any Positive Total Coliform Results? (yes or no)	Fraction of Positive Total Coliform Results vs. Total Sampling Events	Any positive E.Coli results? (yes or no)	Most Recent Sampling Event Available for EBA Review	Is Most Recent Result Positive?
5629	Mayo Grader Station	9	Oct-04 to Jun-05	**yes**	1/9	no	16-Jun-05	no

Table 5629 - 2: Water Quality Results

SOURCE:	Building 5629 - Mayo Grader Station			GCDWQ Criteria		
Location/ Resident	Mayo					
Address						
Treatment	None					
Disinfection	None					
Source of Water	On-site well					
Purpose of Sampling	Base Line	Base Line	Additional Sampling			
Sample Location			Kitchen faucet			
Date Sampled	29-Sep-04	8-Jun-05	17-Aug-05	Lower	Upper Limit	
Physical Tests *(ALS)*				**AO**	**MAC**	**AO**
Colour (CU)	<5	<5.0				15
Conductivity (uS/cm)		884				
Total Dissolved Solids	422	483				500
Hardness CaCO3	362	369		AO >200 = poor, > 500 unacceptable^		
pH	7.92	8.1		6.5		8.5
Turbidity (NTU)	1.5	0.51			1	5
UV Absorbance			0.0100			
% UV Transmittance			97.7			
Dissolved Anions *(ALS)*						
Alkalinity-Total CaCO3	278	274				
Chloride Cl	79.8	100	112			250
Fluoride F	0.07	0.075			1.5	
Silicate SiO4						
Sulphate SO4	21.8	22.3				500
Nitrate Nitrogen N	0.2	0.22	0.261		10	
Nitrite Nitrogen N	<0.05	<0.10	<0.0010		1	
Ammonia Nitrogen N			0.023			
Total Phosphate PO4						
Total Metals *(ALS)*						
Aluminum T-Al	<0.005	<0.040			0.1	
Antimony T-Sb	<0.0002	<0.0010			0.006	
Arsenic T-As	0.0009	0.0007			0.025	
Barium T-Ba	0.254	0.224			1	
Boron T-B	0.008	<0.20			5	
Cadmium T-Cd	<0.00001	<0.00040			0.005	
Calcium T-Ca		109				
Chromium T-Cr	0.0022	<0.0040			0.05	
Copper T-Cu	0.016	0.0207			1	
Iron T-Fe	0.04	0.077				0.3
Lead T-Pb	0.0007	<0.0020			0.01	
Magnesium T-Mg		23.4				
Manganese T-Mn	<0.005	<0.0040				0.05
Mercury T-Hg		<0.00020			0.001	
Potassium T-K		1.78				
Selenium T-Se		<0.0020			0.01	
Sodium T-Na	22.1	21.8				200
Uranium T-U	0.0013	0.00119			0.02	
Vanadium T-V						
Zinc T-Zn	0.023	<0.10				5
Organic Parameters						
Tannin and Lignin			0.18			
Total Organic Carbon C			1.49			
Polycyclic Aromatic Hydrocarbons						
Acenaphthene			<0.000050			
Acenaphthylene			<0.000050			
Acridine			<0.000050			
Anthracene			<0.000050			
Benz(a)anthracene			<0.000050			
Benzo(a)pyrene			<0.000010		0.00001	
Benzo(b)fluoranthene			<0.000050			
Benzo(g,h,i)perylene			<0.000050			
Benzo(k)fluoranthene			<0.000050			
Chrysene			<0.000050			
Dibenz(a,h)anthracene			<0.000050			
Fluoranthene			<0.000050			
Fluorene			<0.000050			
Indeno(1,2,3-c,d)pyrene			<0.000050			
Naphthalene			<0.000050			
Phenanthrene			<0.000050			
Pyrene			<0.000050			
Quinoline			<0.000050			
Extractable Hydrocarbons						
EPH10-19			<0.30			
EPH19-32			<1.0			
LEPH			<0.30			
HEPH			<1.0			
Field Chemistry (EBA)						
pH			7.76	6.5		8.5
TDS (ppm)			393			500
EC (uS/cm)			787			
Temperature (°C)			12.2			
Free Available Chlorine						

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)

eba

EBA Engineering Consultants Ltd.
Creating and Delivering Better Solutions

SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin, Luke Lebel Date August 17, 2005

WELL ID #	Owner	Location Description
5629	YTG	Mayo Grader Station

1. Well Location and Potential Contaminant Sources

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

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

c. GPS location: N 7054099 E456418 elv 508m ±10m

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_____
Mayo Grader Station
☐ 5 or more delivery sites on a trucked distribution system? If so how many_____

g. Nearest building, specify In enclosure attached to maintenance garage

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: Tank at ~14m. Field <26m as close as 15m possibly

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

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

---

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

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

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

Unauthorized access by humans? ☐ Yes ☒ No Unlocked enclosure
Entrance by animals? ☐ Yes ☒ No 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 ~7 m

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: Waste Oil AST; Distance from well to Potential Source 1: ~22m
Potential Source 2: Salt; Distance from well to Potential Source 2: >80m
Potential Source 3: Tar tanks; Distance from well to Potential Source 3: >80m
Potential Source 4: _____; Distance from well to Potential Source 4: _____

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

How many? _____ ☐ in use ☐ abandoned ☐ require proper sealing

2. Well and Wellhead information:

a. When was well installed? Year unknown Month _____

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: 12.515 m bg ☒ measured (if possible) ☐ reported ☐ from log

h. Static water level below ground: 7.39 m bg

☒ 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 _____ slot size(s) _____
Location of screen: from _____ to _____ from log reported

l. Is there a sump below the screen? ☐ Yes ☒ No unlikely, unknown

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,

i. Is the well head below grade? describe in detail no, ~ 0.1 m above 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

iv. Any evidence of rodents? Specify Access possible

v. Does the well casing have a proper seal cap? ☐ Yes ☒ No

If no, describe condition None present

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…)_____

---

4. Aquifer Supplying This Well:

a. The aquifer is: ☐ bedrock ☒ granular sediment likely ☒ 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 _____

d. Date installed: _____ By: _____

e. For submersible pump, depth of setting below surface _____

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

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: Heat trace. Pump located inside

l. Comments on pump installation: _____

6. Conclusions

a. Comments on overall installation:

This well is not equipped with a cap

b. Recommendations: _____

PART B: EBA Site Inspection

Inspector: BERT ALMSSER Date AUG 17/05

WELL ID #	Owner	Location Description
5629	YTG	MAYO GRADER STATION

6. Water Treatment

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

☐ chlorination ☐ iron and or manganese removal ☐ other _____

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_2S ☐ Other _____

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: Compressor 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 IS A OLD STYLE JET PUMP SYSTEM THAT HAS A BAD PIPING CONFIGURATION THAT WILL DRIVE YOU MAD SHOULD IT EVER LOOSE SUCTION

b. Recommendations:

WHEN WELL HEAD UPGRADES ARE DONE, CHANGE THE PUMP TO A SUBMERSIBLE PUMP CONFIGURATION. INSTALL 5 MICRON PREFILTER AND 8 GALLON PER MINUTE UV SYSTEM (NSF55 CERTIFIED)

Environment Canada Environnement Canada

Enforcement and Emergencies Section
91782 Alaska Highway, Whitehorse, YT Y1A 5B7
PH: 867.667.3400 FAX: 867.667.7962

Spill Report Information

Spill #	7613
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	WPYR tank farm - failure of loading hose
Latitude	63.6133333333333
Longitude	-135.879166666667
Incident Date	8/26/1976 10:00:00 PM
Lead Agency	Department of Indian Affairs and Northern Development
Other Agency	
Company(s)	White Pass & Yukon Route
Amount	1512
Units	Litres
Quantity	Actual
Release Description	Spilled
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Furnace Oil
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	spill dyked off immediately - contaminated area 15' x 150' - cleaned-up (contaminants removed to Mayo dump)

Environment Canada Environnement Canada

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Spill Report Information

Spill #	7718
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	tank farm - tank overfilled
Latitude	63.6133333333333
Longitude	-135.879166666667
Incident Date	8/22/1977 9:00:00 AM
Lead Agency	Environment Canada - Environmental Protection Service
Other Agency	Department of Indian Affairs and Northern Development
Company(s)	White Pass & Yukon Route
Amount	3742
Units	Litres
Quantity	Actual
Release Description	Spilled
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Fuel Oil
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	no fuel recovered - possible contamination of groundwaters but not known - suggests action be taken as too many spills with no recovery in area

Environment Canada Environnement Canada

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Spill Report Information

Spill #	9130
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	White Pass yard - garage caught on fire - explosion ensued
Latitude	63.6166666666667
Longitude	-135.884444444444
Incident Date	11/26/1991
Lead Agency	Yukon Government - Fire Marshall
Other Agency	
Company(s)	White Pass
Amount	
Units	
Quantity	Unknown
Release Description	Burned
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Hydrocarbons
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	fuel or propane truck exploded inside building - building consumed - used 756,000L water - water runoff contained in ditch - oil and fuel in water

Environment Canada Environnement Canada

Enforcement and Emergencies Section
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Spill Report Information

Spill #	9703
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	North 60 Petroleum Bulk Plant - overfill of bulk storage tank - miscommunication between truck operator and plant operator
Latitude	63.6134
Longitude	-135.8793
Incident Date	1/15/1997 6:40:00 PM
Lead Agency	Yukon Government - Public Safety
Other Agency	Environment Canada - Environmental Protection Service
Company(s)	North 60 Petroleum
Amount	1000
Units	Litres
Quantity	Estimate
Release Description	Spilled
Additional Quanitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Diesel
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	300 L recovered - EC recommended excavation of contaminated soil and installation of monitoring wells - fuel discrpency of 22,000 L reported by Mayo plant - not verified

Environment Canada Environnement Canada

Enforcement and Emergencies Section
91782 Alaska Highway, Whitehorse, YT Y1A 5B7
PH: 867.667.3400 FAX: 867.667.7962

Spill Report Information

Spill #	9947
Jurisdiction	Yukon
Community	Mayo
Address	
Highway	
Milepost	
Feature	Mayo
Location and Cause	North 60 Petroleum Tank Farm - overfill of storage tank
Latitude	63.6134
Longitude	-135.8793
Incident Date	12/10/1999 5:10:00 PM
Lead Agency	Environment Canada - Environmental Protection Service
Other Agency	
Company(s)	North 60 Petroleum
Amount	
Units	
Quantity	Unknown
Release Description	Spilled
Additional Quanitit	negligible amount
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Diesel
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	overfill caused product to run down sides of tank and small amount to ground at base of tank within berm - no loss noted in records check - minimal amount spilled - no action

Photo 044: 5629 Wellhead enclosure.

Photo 033: 5629 Well enclosure and wellhead in pit.

Photo 042: 5629 Wellhead – note that there was no well cap at the time of assessment.

Photo 192: 5629 Grader station pressure tank and jet pump.