From:	Travis Ritchie
To:	"Elizabeth.Barker@gov.yk.ca"
Subject:	Faro Generating Station
Date:	August 27, 2020 5:28:34 PM
Attachments:	image001.png image002.png image003.png image004.png image005.png
Importance:	High

Hello Elizabeth,
I was wondering if you might have some time for a phone call to discuss an amendment to our air emissions permit to authorize the temporary installation of portable back-up diesel generators at the Faro Generating Station, similar to what we have had to do that last few winters in Whitehorse. If you have time tomorrow that would be great otherwise the earliest time you have next week would be appreciated. If you would kindly let me know what might work for you that would be great.
Thanks for your consideration.
Regards,

Travis

Travis Ritchie P.Biol.
Manager - Environment, Assessment, & Licensing
Telephone: 867-393-5350 | Mobile: 867-333-0300

From: Travis Ritchie
To: "Elizabeth.Barker@gov.yk.ca"
Subject: RE: AEP 60-010 Amendment Application
Date: September 21, 2020 5:19:01 PM
Attachments: image001.png image002.png image003.png image004.png image005.png

Hello Elizabeth,
Thanks for your email.
The current capacities (or current rated output) of FD1 and FD7 are as you have them in your table (2.4 MW and 2.8 MW, respectively). They have both had their outputs de-rated over the last few years from their name plate capacities of 5.15 MW and 3.2 MW, respectively. There is likely little difference between the name plate capacity and output capacity of the mobile diesels (YM20 - YM25) as they are brand new units.
Please let me know if you have any further questions or would like to review anything.
Regards,

Travis

From: Elizabeth.Barker@gov.yk.ca [mailto:Elizabeth.Barker@gov.yk.ca]
Sent: September 21, 2020 4:42 PM
To: Travis Ritchie
Subject: RE: AEP 60-010 Amendment Application

Good Afternoon Travis,
I have a question in regards to the generator capacities at Faro.
In your amendment application, you have the following capacities listed:

FD1	2.4MW
FD2	2.8MW
YM20	1.8MW
YM21	1.8MW
YM22	1.8MW
YM23	1.8MW
YM24	1.8MW
YM25	1.8MW

The 2014 YESAB Evaluation Report lists FD1 and FD7 capacities as 5.15MW and 3MW respectively.
Would you be able to confirm the capacities of FD1 and FD7? Also, I assume the capacities provided in the application are nameplate capacities; would you be able to provide me with the rated capacities for all the generators?
Thanks,
Liz

From: Travis Ritchie <Travis.Ritchie@yec.yk.ca>
Sent: September 10, 2020 11:57 AM
To: Elizabeth.Barker <Elizabeth.Barker@gov.yk.ca>
Subject: AEP 60-010 Amendment Application

Hello Elizabeth,
Further to our conversation on the phone last week, please find our application and supporting documentation to amend Air Emissions Permit (No. 60-010) to approve re-installation of previously

relocated generating capacity at the Faro Diesel Generating Station. As I mentioned on the phone, Yukon Energy is also requesting your consideration to connect 3 additional 1.8 MW generators to the grid at this site for short-term emergency back-up only purposes, similar to the emergency back-up provisions at the Whitehorse Rapids Generating Station that are currently contained in the air emissions permit (Part 9).
If you have any questions, comments, or concerns with the application please let me know.
Thank you for your time and consideration.
Regards,

Travis

Travis Ritchie P.Biol.
Manager - Environment, Assessment, & Licensing
Telephone: 867-393-5350 | Mobile: 867-333-0300

From: Travis Ritchie
To: "Elizabeth.Barker@gov.yk.ca"
Subject: RE: AEP 60-010 Amendment
Date: September 24, 2020 10:06:06 AM
Importance: High

Hi Elizabeth,
Thanks for your reply.
Given that the facility was assessed favourably under YESAA in both 2008 and 2011, prior to relocating units FD3 (1 MW) and FD5 (1.4 MW) and there have been no other changes to the facility since 2008, I was anticipating that either Decision Document 2008.0230 or 2011.0246 were technically still valid for the purposes of granting an approval to at least reinstall both the relocated and de-rated generating capacity at the site. Those were the only changes to the facility during its last assessment, so the activities remain the same across all assessments. I understand the need to assess the additional capacity (beyond what has been assessed historically) before it can be permitted, but I would ask for approval to reinstall the previously relocated and de-rated capacity pursuant to the 2008/2011 assessment findings and related decision documents.
If you need, I can resubmit the amendment application for reinstallation of only the previously assessed capacity, removing reference to the 3 additional units (YM23-YM25). YEC can then work on getting a YESAA assessment completed for the additional capacity, which could be permitted afterward.
Does that sound reasonable? If it's helpful to speak on the phone please let me know and I will call you at a convenient time.
Thanks again.
Regards,
Travis

From: Elizabeth.Barker@gov.yk.ca [mailto:Elizabeth.Barker@gov.yk.ca]
Sent: September 23, 2020 5:03 PM
To: Travis Ritchie
Subject: AEP 60-010 Amendment
Good Afternoon Travis,
According to the Assessable Activities Regulation under YESAA, Part 4, Item 2 (b) applies to your AEP 60-010 amendment application.

PART 4

Energy and Telecommunications

	Column 1	Column 2
Item	Activity	Specific Exception
1	Construction, installation, operation, modification, decommissioning or abandonment of, or other activity in relation to, a power line or a telecommunications line	
2	Construction, operation, modification, decommissioning or abandonment of, or other activity in relation to, • **(a)** a hydroelectric generating station; • **(b)** a fossil fuel-fired electrical generating station; • **(c)** a wind-powered electrical generating station; • **(d)** a wood-fired electrical generating station; or • **(e)** a wood-fuelled heating facility for the commercial sale of heat	Construction, operation, modification, decommissioning or abandonment of, or other activity in relation to, a wind-powered electrical generating station if its production capacity is, and in the case of a modification remains, 50 kW or less

Specifically, the Faro generating station underwent a YESAA assessment in 2014. In the assessment, FD1 and FD7 were assessed with production capacities of 5.15MW and 3MW for a total of 8.15MW.
Currently, FD1 and FD7 have been derated to 2.4MW and 2.8MW however, with the addition of YM20-22 (5.4MW) and the addition of the YM23-25(5.4MW) as emergency backup, this brings the station capacity to a total of 16MW. This is 7.85MW greater than the capacity that was previously assessed in 2014. As the modification of production capacity is greater than 50kW, this project will need to proceed through YESAB before we can issue any permit amendments.
Please let me know if you would like to discuss this further.

Have a great day,
Liz

September 10, 2020 File: 2515.03.01

Elizabeth Barker, Environmental Protection Analyst
Department of Environment, Standards & Approvals Section
Yukon Government
Box 2703
Whitehorse, Yukon Y1A 2C6

(Via email)

Dear Ms. Barker,

RE: AIR EMISSIONS PERMIT NO. 60-010 – APPLICATION FOR APPROVAL TO INSTALL PREVIOUSLY REPLOCATED AND DERATED GENERATING CAPACITY AND PERMIT AMENDMENT TO AUTHORIZE CONNECTION OF EMERGENCY-ONLY GENERATING CAPACITY - FARO GENERATING STATION

Please find an application and supporting documentation regarding the above referenced permit amendment request. Pursuant to permit Part 2, Item 5, we are seeking approval to reinstall site capacity that was relocated to other generating stations in recent years, as well derated site capacity with existing units. Additionally we are seeking approval for temporary connection of additional site capacity for emergency-only back-up purposes.

Please contact me by telephone at 867.393.5350 or by email: travis.ritchie@yec.yk.ca if you have any questions, comments, or concerns with this submission.

Thank you for your time and consideration in this matter.

Yours Sincerely,

Travis Ritchie, P.Biol.

Manager – Environment, Assessment, & Licensing

Attachment:
Air Emissions Permit Application and Supporting Attachments A-C

Yukon
Environment

APPLICATION FOR RENEWAL, AMENDMENT OR CANCELLATION OF *ENVIRONMENT ACT* PERMITS

Please complete the following and ensure that all information is legibly printed or typed:

Permittee: Yukon Energy Corporation
(Business or individual name)

Permit type: Air Emissions Permit
(e.g. pesticide, special waste, air emissions, solid waste, land treatment facility, relocation, ODS/OH)

Permit number: 60-010
(e.g. 4201-XX-XXX)

Please check (✓) appropriate box:

Renewal

☐ I have fully reviewed my permit and the information on my current permit is correct and complete and my business is operating as described therein.

Amendment

☑ I have fully reviewed my permit and the following changes or additions have occurred and should be taken into account when renewing my permit (attach additional information if necessary):

Ownership: Yukon Energy Corporation (no change)
Mailing Address: Box 5920
Whitehorse Yukon Y1A 6S7
Site Location(s): Faro Generating Station (XX, Faro, YT

Telephone #: 867.393.5350 Fax #:
Email: travis.ritchie@yec.yk.ca
Products/Activities: Reinstall relocated/derated capacity (aprx. 5.65 MW) & add 3 x1.8 MW emerg-only units
Transport special wastes: yes: ☐ no: ☑
Other: See attached supporting documents.
Note: additional information may be required depending on the nature of the change.

Cancellation

❑ I am no longer undertaking the activities authorized by the above permit. I understand that I will be contacted by enforcement officials to confirm that a permit is no longer required, at the following coordinates: ☐

Mailing Address:
Site Location(s):
Telephone #: Fax #:
Email:
Permitted Activities:

I, ~~Travis Ritchie~~ *[print name clearly]*, certify that I am an authorized representative of ~~Yukon Energy Corporation~~ *[business name]*, and hereby make application for the renewal, amendment or cancellation of the above-noted permit, as indicated, and certify that the information provided on this form is correct.

Signature of applicant	Date	# of attachments
	~~Sepetmber 10, 2020~~	~~3 (Attachments A-C)~~

This information is being collected under the authority of s.90 of the *Environment Act*. For further information contact the Environmental Programs Branch at (867) 667-5683.

Print Form Clear Form

YG(5694E)E1 Rev. 04/2010

AIR EMISSIONS PERMIT (NO. 60-010)
AMENDMENT APPLICATION
SUPPORTING DOCUMENT

ATTACHMENT A

FIGURE 1

INSTALLATION SITE LAYOUT

September 2020

NOTES:
1. EXHAUST STACK HEIGHTS:
FD1 - 8.3m
FD5 - 3.7m
FD7 - 8.9m

FD1 (rated capacity 2.4 MW) and FD7 (rated capacity 2.8MW) to remain on site and connected

Fuel Storage Tanks for Emergency Back Up Diesel Generators (with tertiary containment)

YM20-YM22 connected to system to replace previously relocated and derated site capacity

YM23-YM25 to be connected to system for N-1 emergency-only back-up

YM27 (unconnected spare)

All YM Units are Caterpillar 3516C Engines with 1.8 MW generators

FD7 BUILDING
BUILDING
DIESEL FUEL TANK 3.55m x 10.1m
11m x 12.3m BERMED AREA
BERMED AREA 36m x 36m
BUILDING
COOLERS
FD1 PLANT
OFFICE
CONTROL BUILDING
6.3m HIGH 14.5m dia. DIESEL FUEL TANK
RENTAL FUEL TANKS
STORAGE BUILDING
138kV
72/T
25kV
50/T
14/60V
870S SUBSTATION
ROAD
YM20
YM21
YM22
YM23
YM24
YM25
YM26
5146

METERS
50 25 0

MITCHELL ROAD
LOT 413, QUAD 105 K/03
PLAN 75828 CLSR

REFERENCE DRAWINGS

DWG. NO.	DRAWING TITLE

REV.	DATE	DESCRIPTION	BY	DES.	APP.
C	APR 20 2020	UPDATED TX LOCATION	CM	LP	
B	APRIL 14 2020	REVISED TX LOCATION	CM	LP	
A	MAR 19 2020	REVIEW	CM	LP	

COMPANY PERMIT

ENGINEERS STAMP

YUKON ENERGY CORPORATION

C20028 - RENTAL DIESELS

CHECKED BY -
DATE -
DRAWN BY -

FARO DIESEL & SUBSTATION
SITE PLAN
LOT 413, FARO - YUKON

SCALE A1

farositeplan.dgn

REV. C

AIR EMISSIONS PERMIT (NO. 60-010)
AMENDMENT APPLICATION
SUPPORTING DOCUMENT

ATTACHMENT B

EPA APPROVED TIER 2
3516C CATERPILLAR ENGINE
GENERATOR SPECIFICATIONS

September 2020

SCHEDULE "B"

XQ2000 RENTAL

CATERPILLAR®

Image shown may not reflect actual package

STANDBY 2000 kW
PRIME 1825 kW
POWER MODULE
50/60 Hz

Frequency	Voltage	Standby kW (kVA)	Prime kW (kVA)
60	480/277V	2000 (2500)	1825 (2281)
50	400V	1440 (1800)	1310 (1638)

FEATURES

EPA TIER 2 and CARB certified for non-road mobile applications. Factory designed, certified prototype tested with torsional analysis. Production tested and delivered in a package that is ready to be connected to your fuel and power lines. Supported 100% by your Caterpillar® dealer with warranty on parts and labor. Extended warranty available in some areas. The generator set is designed and manufactured in an ISO 9001:2000 compliant facility. Generator set and components meet or exceed the following specifications: AS1359, AS2789, ABGSM TM3, BS4999, DIN6271, DIN6280, EGSA101P, JEM1359, IEC 34/1, ISO3046/1, ISO8528, NEMA MG1-22

CATERPILLAR SR4B GENERATOR

Single bearing, wye-connected, static regulated, brushless permanent magnet excited generator designed to match the performance and output characteristics of the Caterpillar diesel engine driving it.

RELIABLE, FUEL EFFICIENT DIESEL ENGINE

The compact, four-stroke-cycle diesel engine combines durability with minimum weight while providing dependability and economy. The fuel system operates on a variety of fuels.

CATERPILLAR COOLING SYSTEM

Sized compatible to rating with energy efficient fan and core.

CATERPILLAR SWITCHGEAR

Provides single unit and/or multi-unit/utility paralleling components. Standby, load sense/load demand, import, export, and base load modes. Comes standard with Basler Utility Multi-function Relay IPS-100.

EXCLUSIVE CATERPILLAR DIGITAL VOLTAGE REGULATOR (CDVR)

Three-phase sensing and adjustable Volts-per-Hertz regulation give precise control, excellent block loading, and constant voltage in the normal operating range.

ENVIRONMENTALLY FRIENDLY

110% spill containment of onboard engine fluids.

SOUND ATTENUATED CONTAINER

For ease of transportation and protection. Meets 75 dB(A) at 50 ft or below per SAE J1074 measurement procedure at 110% prime load.

LEHE8746-02

XQ2000 RENTAL

CATERPILLAR®

FACTORY INSTALLED STANDARD EQUIPMENT

SYSTEM	STANDARD EQUIPMENT
Engine	EPA approved Tier 2 3516C Caterpillar engine Heavy duty air cleaner with service indicator 60-Amp charging alternator Fuel filters – primary and duplex secondary with integral water separator and change-over valve Lubricating oil system with spin-on, full flow oil filters and water cooled oil cooler Oil drain lines routed to engine rail Jacket water heater Fuel cooler and priming pump Electronic ADEM™ A3 controls 24V electric starting motors with battery rack and cables
Generator	SR-4B brushless, permanent magnet excited, three-phase with Caterpillar digital voltage regulator (CDVR), space heater, 6-lead design, Class H insulation operating at Class F temperature for extended life, winding temperature detectors and anti-condensation space heaters (120/240V 1.2 kW)
Containerized Module	40' ISO high cube container, CSC certified 3-axle, 40' ISO container chassis Seven (7) sound attenuated air intake louvers and 4 lockable personnel doors with panic release Side bus bar access door, external access load connection bus bars Shore power connection via distribution block connections for jacket water heater, battery charger, space heaters, and generator condensate heaters Standard lighting 3 AC/4 DC, one (1) single duplex service receptacle, 2 external break-glass emergency stop push buttons 1,250 gal fuel tank, UL listed, double wall, 9 hr runtime @ prime rating Sound attenuated 75 dB(A) @ 50 ft Spill containment 110% of all engine fluids Four (4) oversized maintenance-free batteries, battery rack and 20-Amp battery charger Hospital grade, internally insulated, rectangular exhaust silencer with vertical discharge Vibration isolators, corrosion resistant hardware and hinges External drain access to standard fluids Fire extinguishers (Qty 2) Standard Cat rental decals and painted standard Cat power module white Interior walls and ceilings insulated with 100 mm of acoustic paneling Floor of container insulated with acoustic glass and covered with galvanized steel
Cooling	Standard cooling provides 43° C ambient capability (60 Hz) at prime +10% rating Vertically mounted, separate ATAAC and JW cores with vertical air discharge
Generator Paralleling Control	Custom switchgear control with EMCP 3.3 genset mounted controller and wall mounted paralleling controls Automatic start/stop with cool down timer Protections: 25, 27/59, 40, 32, 81 O/U Utility multi-function relay protections: 25,27/59, 32, 47, 50/51, 62, 67, 81 O/U UMR is IEEE1547-2003 compliant in most applications Reverse compatibility module provided for interface to legacy power modules Touch screen controls with event log Multi-mode operation (island, multi-island and utility parallel), load sharing (multi-unit only) Import & export control (utility parallel only), manual and automatic paralleling capability Touch screen display (status and alarms) Metering display: voltage, current, frequency, power factor, kW, WHM, kVAR, and synchroscope
Quality	Standard genset and package factory tested UL, NEMA, ISO and IEEE standards O&M manuals

XQ2000 RENTAL

CATERPILLAR®

SPECIFICATIONS

CAT SR4B GENERATOR

Frame Size 825
Pitch 0.6667
No. of poles 4
Excitation . . . . . Static regulated brushless PM excited
Constructions . . . . . Single bearing, close coupled
Insulation . . . . . Class H
Enclosure . . . . . Drip proof IP22
Alignment . . . . . Pilot shaft
Overspeed capability – % of rated . . . . . 125% of rated
Voltage regulator . . . . . 3 phase sensing with Volts-per-Hertz
Voltage regulation . . . . . Less than ± ½% voltage gain
Adjustable to compensate for engine speed droop and line loss
Wave form deviation . . . . . Less than 5% deviation
Telephone Influence Factor (TIF) . . . . . Less than 50
Harmonic Distortion (THD) . . . . . Less than 5%

CAT 3516C DIESEL ENGINE

3516C, 4-Stroke diesel
Bore – mm (in) 170 (6.7)
Stroke – mm (in) 190 (7.5)
Displacement – L (cu in) 69 (4,210)
Compression ratio 15:1
Aspiration . . . . . ATAAC
Fuel system . . . . . EUI
Governor type . . . . . Caterpillar ADEM™ A3 Control System

TECHNICAL DATA

Materials and specifications are subject to change without notice.

Generator Set Technical Data		50 Hz		60 Hz	
	Units	Prime	Standby	Prime	Standby
Performance Specification		DM8754		DM8264	
Power Rating	kW (kVA)	1310 (1637)	1440 (1800)	1825 (2281)	2000 (2500)
Lubricating System					
Oil pan capacity	L (gal)	401.3 (106)		401.3 (106)	
Fuel System					
Fuel Consumption					
100% load	L (gal)	350.1 (92.5)	372.9 (98.5)	483.2 (127.6)	525.7 (138.9)
75% load	L (gal)	281.9 (74.5)	302.8 (80)	380 (100.4)	408.2 (107.8)
50% load	L (gal)	205.5 (54.3)	350.1 (92.4)	270.5 (71.5)	294.2 (77.7)
Fuel tank capacity	L (gal)	4731 (1,250)		4731 (1,250)	
Running time @ 75% rating	Hours	16.7	15.6	12.5	11.5
Cooling System					
Radiator coolant capacity including engine	L (gal)	630 (166)		630 (166)	
Air Requirements					
Combustion air flow	m^3/min (cfm)	114.8 (4052)	118.1 (4173)	174.7 (6169)	180.3 (6367)
Maximum air cleaner restriction	kPa (in H_2O)	6.2 (24.9)		6.2 (24.9)	
Generator cooling air	m^3/min (cfm)	140 (5,933)		168 (4,995)	
Exhaust System					
Exhaust flow at rated kW	m^3/min (cfm)	311.3 (10,993)	320.8 (11,335)	404 (14,260)	428.6 (15,137)
Exhaust stack temperature at rated kW – dry exhaust	°C (°F)	502.1 (935.8)	513.1 (955.6)	387 (728)	405 (762)
Noise Rating (with enclosure)					
@ 7 meters (23 feet)	dB(A)	77	78	78	79
@15 meters (50 feet)	dB(A)	73	74	74	75

Model	Length mm (in)	Width mm (in)	Height mm (in)	Weight	
				With Lube Oil and Coolant kg (lb)	With Fuel, Lube Oil and Coolant kg (lb)
XQ2000 w/o Chassis	12 192 (480)	2438 (96)	2896 (114)	34 019 (75,000)	38 102 (84,000)
XQ2000 w/Chassis	12 192 (480)	2438 (96)	4267 (168)	38 102 (84,000)	42 184 (93,000)

RATING DEFINITIONS

Standby – Applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The generator on the generator set is peak prime rated (as defined in ISO8528-3) at 30° C (86° F).

Prime – Applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and the generator set can supply 10% overload power for 1 hour in 12 hours.

XQ2000 RENTAL

CATERPILLAR®

STANDARD FEATURES

GENERATOR SET EMCP 3.3 LOCAL CONTROL PANEL

- Generator mounted EMCP 3.3 provides power metering, protective relaying and engine and generator control and monitoring.
- Provides MODBUS datalink to paralleling control for monitoring of engine parameters.
- Convenient service access for Caterpillar service tools (not included).
- Integration with the CDVR provides enhanced system monitoring.
- Ability to view and reset diagnostics of all controls networked on J1939 datalink.
- Network modules via the control panel removes the need for a separate service tool for troubleshooting.
- Real-time clock allows for date and time stamping of diagnostics and events.

EMCP 3.3 ENGINE OPERATOR INTERFACE

- Graphical display with positive image, transflective LCD, adjustable white backlight/ contrast.
- Two LED status indicators (1 red, 1 amber).
- Three engine control keys and status indicators (Run/Auto/Stop).
- Lamp test key.
- Alarm acknowledgement key.
- Display navigation keys.
- Two shortcut keys: Engine Operating Parameters and Generator Operating Parameters.
- Fuel level monitoring and control.

CIRCUIT BREAKER

- 3000A fixed type, 3 poles, genset mounted, electrically operated, insulated case circuit breaker.
- Solid state trip unit for overload (time overcurrent) and fault (instantaneous) overcurrent protection.
- Includes DC shunt trip coil activated on any monitored engine or electrical fault, 100 KA-interrupting capacity at 480 VAC.

VOLTAGE REGULATION AND POWER FACTOR CONTROL CIRCUITRY

- Generator mounted automatic voltage regulator, microprocessor based.
- Manual raise/lower voltage adjust capability and VAR/power factor control circuitry for maintaining constant generator power factor while paralleled with the utility.
- Includes RFI suppression, exciter limiter and exciter diode monitoring.
- Voltage and power factor adjustments are performed on the setting screen of the HMI touch screen.

FUEL TANK

- UL Listed 1250 gallon double walled.
- Fuel transfer system

CURRENT TRANSFORMERS

- CT's rated 3000:5 with secondaries wired to shorting terminal strips.

POTENTIAL TRANSFORMERS

- 4:1 ratio with primary and secondary fuse protection.

BUS BARS

- Three phase, plus full rated neutral, bus bars are tin-plated copper with NEMA standard hole pattern for connection of customer load cables and generator cables.
- Bus bars are sized for full load capacity of the generator set at 0.8 power factor.
- Includes ground bus, tin-plated copper, for connection to the generator frame ground and field ground cable.

AC DISTRIBUTION

- Provides 240 VAC for all module accessories.
- Includes controls to de-energize jacket water heaters and generator space heater when the engine is running.

SHORE POWER TWO (2)

- One (1) shore power connection distribution block for jacket water heaters.
- One (1) for generator space, battery charger, and fuel pump.

INTERNAL LIGHTING

- Four (4) internal DC lights with one (1) timer and two switches installed at each side of the container door.
- Three (3) internal AC lights.
- One (1) single duplex service receptacle.

BATTERY CHARGER AND BATTERIES

- 24 VDC/20A battery charger with float/equalize modes and charging ammeter.
- Maintenance free batteries.

EMERGENCY STOP PUSHBUTTON

- Two external ESPs located near each access door.

MODES OF OPERATION

Caterpillar utility paralleling controls are intended for automatic or manual paralleling with a utility power source as a load management system, with provisions for standby operation feeding an isolated load network. Load management operation involves microprocessor-based automatic loading controls with soft loading, base load, Import/Export control and soft unloading. For Standby operation, the generator operates as an isochronous machine isolated from the utility supply. The controls allow for automatic operation, initiated locally or remotely by the customer's SCADA system. Detailed modes of operation are listed below:

SINGLE UNIT ISLAND AND MULTI-UNIT ISLAND OPERATION

1. Utility Standby Mode (Normal)
   a. The utility is providing power for the plant loads.
   b. The Power Module Generator breaker is open.
   c. The pm is in automatic standby mode to respond to a utility failure.
2. Emergency Mode (Emergency)
   a. Utility Failure
      1) The customer protective relaying senses a utility abnormal condition.
      2) A run request is sent to the Power Module Generator plant.
      3) The first Power Module Generator reach rated to voltage and frequency is closed to the bus.
      4) In Multi-Unit Island Mode, the remaining Power Module Generators are paralleled to the bus as they reach rated voltage and frequency. This function is performed via the ModBus Plus data link connected between the Power Modules.
      5) Plant load is transferred to the Power Modules, which share load equally via ModBus Plus data link.
      6) The system is now in Emergency Mode.

GENERATOR DEMAND PRIORITY CONTROL

The System Controls include a Generator Demand Priority Control function to automatically match the on-line Power Module Generator capacity to the loads in order to avoid unnecessary operation of all the Power Module Generators when the plant loads are low.

The following controls are provided for each Power Module Generator:

a. User-settable Generator Priority Selector
b. Status indicator for the Generator Priority selected
c. Status indicator for Power Module Generator on-line or off-line
d. Generator Demand Priority Control Switch (On/Off)
e. User-settable Generator Remove Level (% as a function of single generator capacity)
f. User-settable Generator Remove Time Delay
g. User-settable Generator Add Level (% as a function of single generator capacity)
h. User-settable Generator Add Time Delay

Upon entrance into Emergency Mode, all generators will be started and paralleled to the bus. After the Remove Time Delay, Power Module Generators will be removed from the bus as a function of the generator percentage loading. Generators will be removed from the bus in descending priority order.

Should the generator percentage loading increase to the user-selected Generator Add Level after the user-selected Generator Add Time Delay, the next priority generator will be started, synchronized and paralleled to the bus. Should the Power Module Generator plant ever reach 100% loading, the next priority generator will be started and added to the bus, bypassing the Generator Add Time Delay.

MODES OF OPERATION (continued)

SINGLE UNIT IMPORT, EXPORT OR BASE LOAD OPERATION

During periods of peak demand the system may be placed in operation using the operator interface panel on the front of the switchgear.

1. Entry – Local
   a. The operator places the System Control Switch into Load Management.
   b. The operator selects Import, Export or Base Load Operation.
   c. The Load Management Setpoint is the amount of power Imported, Exported or Base-Loaded. A 4-12-20mA signal is provided by the customer and is linearly proportional to the utility load, with 12mA equaling 0 kW. The 4-12-20mA utility load signal is wired to one and only one Power Module. If the Power Module selected for Load Management is not available, the 4-12-20mA signal will be routed to a different Power Module.
   d. The operator sets the Load Management Setpoint and Power Factor Setpoint.
   e. A Run request signal is received by the Single Unit Power Module.
   f. The Power Module Generator is started and will run for a predetermined warm-up time before it is synchronized and paralleled to the utility.
   g. When the generator is on the bus, it is soft-ramp-loaded until the generator output reaches the Load Management Setpoint.
   h. The generator output is dynamically adjusted to maintain the Load Management Setpoint.
   i. Should the utility fail during Load Management Operation, the Protective Relay will cause the Paralleling Circuit Breaker 52G to open and be locked out until the Lockout Relay is manually reset by an operator on site. The generator is allowed to run for the duration of the cooldown time.
2. Exit – Local
   a. The Run Request signal is removed from the power module.
   b. The generator is soft-ramp-unloaded until the plant load is fully supported by the utility.
   c. The Paralleling Circuit Breaker 52G is opened.
   d. The generator is allowed to run for the duration of the cooldown time.

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STANDARD PARALLELING CONTROL

GENERATOR PARALLELING CONTROLS

The switchgear includes:

- Single unit island mode.
- Multiple unit island mode.
  - Includes Load Sense/Load Demand control.
  - Load sharing capability is provided via network communication.
- Single unit utility parallel mode.
  Selectable for Import/Export control.
  If import or export control is selected a 4-12-20mA signal is required (provided by others) scalable to the utility contribution.
- 6 inch black and white HMI touch screen.
- Reverse compatibility module provided for interface to legacy designed Power Module Switchgear. Includes PLC, load share and voltage droop.

Incoming Utility Breaker Status Circuit – Circuit to accept customers contact from remote utility disconnect device. Customer to provide a normally open form 'a' contact to indicate when the local load network is connected to the utility grid.

Utility Transfer Trip Circuit – Circuit accepts input (normally open dry contact) from customer's system protective relay(s) or other controlling device. Operation of contacts causes tripping of the generator circuit breaker via the generator (software) 86 lock-out function and places the engine in cooldown mode. Circuit is disabled when operating in single unit or multiple unit island.

GENERATOR PARALLELING CONTROLS OPERATOR INTERFACE

Graphical mimic one line diagram that shows generator with its respective circuit breaker in a one-line representation of the system. The graphics utilize black and white indicators and bar graphs while actively displaying the following information:

- Utility CB Open/Closed. Input contacts provided by others.
- Utility kW 4-12-20mA signal required and provided by customer that is scalable to the utility contribution.
- Generator CB Open/Closed/Tripped.
- Generator Volts/Amps/kW/Frequency.
- Engine Stopped/Running/Cooldown/Pre-Alarm/Shutdown.
- Engine ECS Position Stop/Auto/Run.
- Utility Output kW.
- System Summary Alarm.

Event logging is also included with up to 500 stored events.

GENERATOR METERING AND PROTECTION

Generator metering that will graphically display 3Ø Voltage, 3Ø Current, Frequency, Power Factor, kW, kVAR and a Synchroscope Display of EMCP 3.3 faults, CDVR or ADEM 3 will be provided via Modbus RTU interface to EMCP 3.3.

Generator/Intertie Protective Relaying including:

- Device 27/59 – Under/Over Voltage.
- Device 81O/U – Under/Over Frequency.
- Device 40 – Loss of Excitation.
- Device 32 – Reverse Power.
- Device 25 – Synchronizing Check.
- Device 15 – Auto Synchronizer.
- Device 65 – Governor Load Sharing, Soft Loading Control.
- Device 90 – VAR/PF and Cross Current Compensation Controller.

PROGRAMMING AND DIAGNOSTICS

Includes field programmable set points for engine control and monitoring variables and self-diagnosis of the EMCP 3.3 system component and wiring failures.

ENGINE CONTROL SWITCH

Keypad selectable, four (4) positions – Off, Auto, Man, Cool:

- Off for engine shutdown and resetting faults.
- Auto for local or remote automatic operation when initiated by switch operation or contact closure.
- Man for local starting and manual paralleling.
- Cool for normal engine shutdown with timed cool-down cycle.

CIRCUIT BREAKER CONTROL SWITCH

Heavy duty, three- (3) position spring return to center with momentary trip and close position and slip contacts for automatic closing. Includes circuit breaker position indicating lamps.

EMERGENCY STOP PUSHBUTTON

- Mushroom head, twist to reset, causes engine shutdown and tripping of the generator circuit breaker. Prevents engine starting when depressed.

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STANDARD PARALLELING CONTROL (continued)

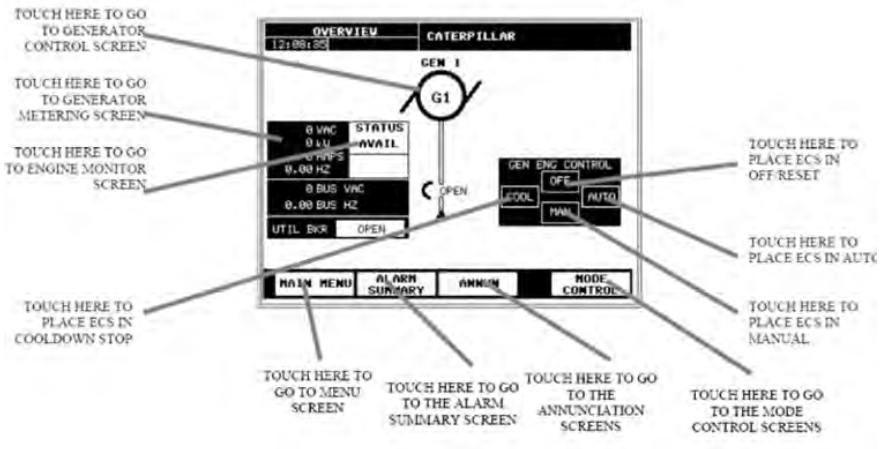
ELECTRONIC LOAD SHARING GOVERNOR
- Includes speed adjustment, and auto load share capability when in parallel with legacy power modules.

ALARM MODULE
- Dedicates annunciator screens for warning and shutdown faults. Includes external mounted horn and acknowledge push-button.

AUTOMATIC/MANUAL PARALLELING
- Automatically synchronizes and parallels the generator with another power source.
- Includes provisions for manual permissive paralleling.

HUMAN MACHINE INTERFACE (HMI) HIGHLIGHTS
- Engine/Generator function is performed thru the 6" HMI touch screen interface.

Overview Screen (Typical)
Shows the generator status, generator metering data, bus metering data, ECS position, and generator/utility breaker status.



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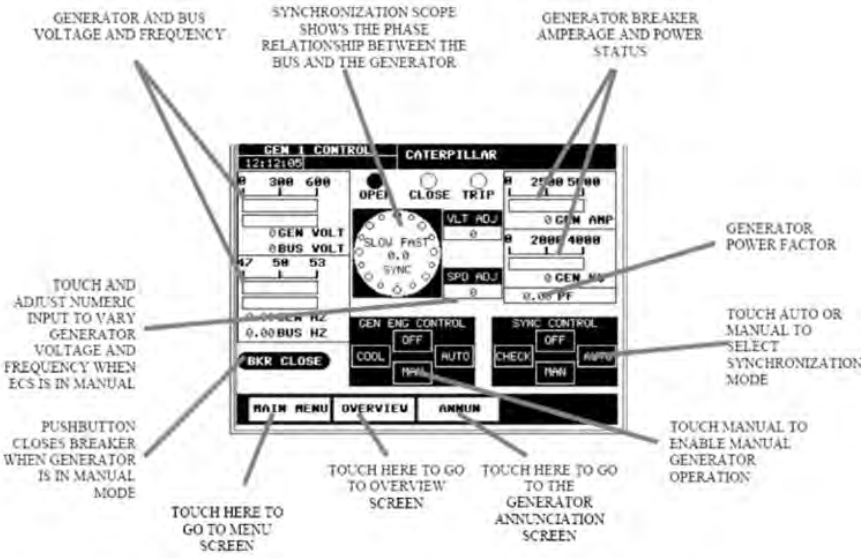
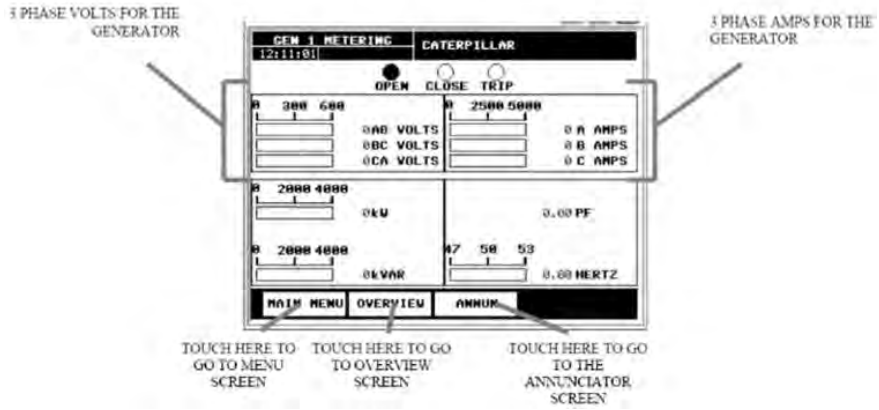
STANDARD PARALLELING CONTROL (continued)

Generator Control Screen (Typical)
It allows the operator to observe the automatic synchronization and transfer of the load to and from the generator. Engine control allows the operator to run the engine in manual, or switch to automatic modes. Voltage and frequency offset adjustment allows the operator to control generator frequency and voltage.



Generator Metering Screen (Typical)
Allows the operator to view three phases of voltage and amperage for the bus and the generator.



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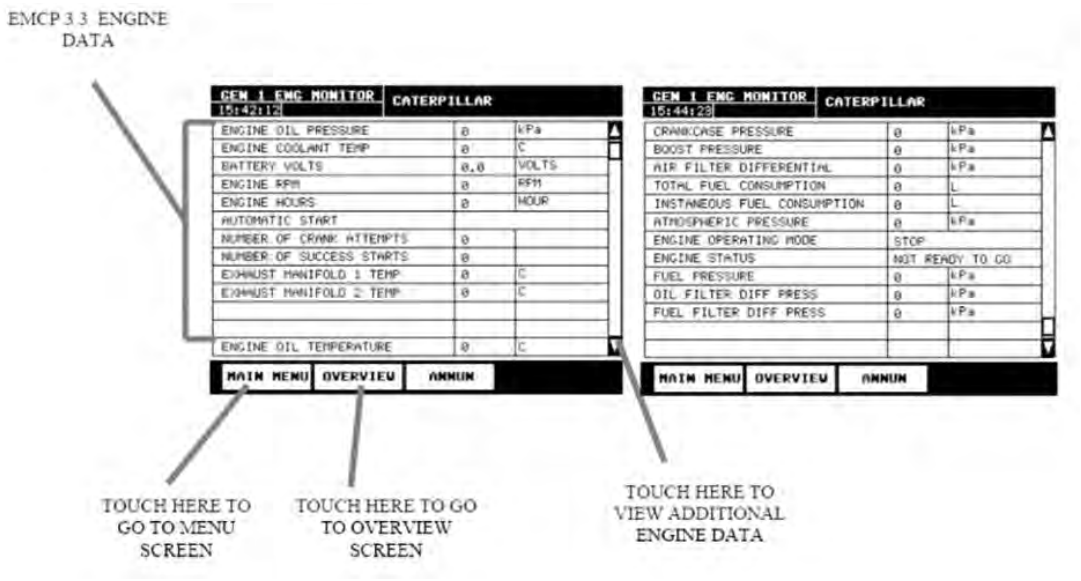
STANDARD PARALLELING CONTROL (continued)

Engine Monitoring Screen (Typical)
Engine status is obtained directly from the EMCP 3. Engine starts and total hours can be used by the operator to determine when regular preventive maintenance is required. Other metering includes engine battery and oil filter health.



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LEHE8746-02 (01-10)

AIR EMISSIONS PERMIT (NO. 60-010)
AMENDMENT APPLICATION
SUPPORTING DOCUMENT

ATTACHMENT C

EMS

ENVIRONMENTAL WORK PRACTICES

September 2020

DIESEL GENERATOR EMISSIONS

EMS-EWP-002

1.0 Introduction

1.1 Purpose

Provide steps to use Yukon Energy Diesel generators efficiently and with the fewest air emissions and least pollution emitted into the environment, as well as to minimize the impact of such air emissions where they are unavoidable.

1.2 Requirements

- A copy of the Air Emissions Permit, from Environment Yukon, is kept at each site.

1.2.1 Operation and Maintenance

- Except for maintenance purposes (e.g., exercise, run after repair) SCC and Plant Operators must use the generators at each site **in order of highest efficiency** under the circumstances. In the rare event that is not possible the operator and SCC must keep a record of why this was done.
- Whenever possible schedule maintenance with surplus hydroelectricity availability so diesel generation is not needed to meet electrical demand.
- Follow manufacturers maintenance presciptions and conduct all necessasary maintenance for generators and environmental emissions controls so the units are as efficient as possible. Monthly run-ups are currently done as scheduled maintenance.
- All particulates collected by emissions control equipment shall be contained such that they are not released to the environment.
- All inspections carried out on the diesel generators shall be documented and retained and will include the name of inspector, date, observations, and actions taken and date of actionsand the date each action was taken.

2.0 Monitoring, Reporting and Record Keeping

1. Keep all records for a minimum of three years and make them available upon request for inspection by a Yukon GovernmentEnvironmental Protection Officer.
2. Records will be kept at Records Management
3. The unit operating authority (i.e., SCC, by way of YEC Environment Department) must obtain approval from an Environmental Protection Officer with YG prior to:
   a. any addition, modification, removal or replacement of any equipment or components related to the release, abatement, control or treatment of air emissions; or
   b. any change in the location of the source(s) (i.e., if there is a plan to move a generator).

3.0 Applicable Legislation and Other Requirments

4. *Yukon Environment Act Yukon Air Emissions Regulations*
5. *Yukon Air Emissions Permit No. 60-010*

4.0 Other Related Information

Yukon Energy Safe Work Practices
SWP's can be found on the Health and Safety Sharepoint site.

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FUELS, LUBRICANTS AND COOLANTS

EMS-EWP-005

1.1 Purpose

The purpose of the **Environmental Work Practice** for **Fuels, Lubricants and Coolants** is to provide the steps required to purchase, store, use, products in compliance with applicable laws and otherwise in an environmentally responsible manner.

2.0 Fuels, Lubricants and Coolants

Spills and leaks of oils, coolants, liquids and fuels can harm soil and water and human health. Spills need to be documented, reported, and cleaned up immediately.

2.1 Requirements

- All fuel storage containers should have secondary containment and ideally include integral leak detection and recovery capabilities.
- In addition to absorbent material required to cleanup drips, leaks and minor spills, a fully stocked spill kit shall be available where substances are stored and/or where oil filled equipment will be working.
- Once a spill kit is used, any materials taken out shall be replaced as soon as possible.
- Replacement materials can be obtained through the supplier.
- Lead hands will be responsible for storing spill response equipment in their areas of responsibility.
- All service vehicles transporting hazardous materials and all heavy equipment, must maintain suitable spill response equipment with the vehicle/equipment at all times.
- Staff and contractors on site will be familiar with the contents of onsite spill kits and will be trained in the proper use of spill kits.
- Use external secondary containment for single-walled tanks, for double-walled tanks with capacities more than 4,000 litres, or when storing more than twenty-four 45-gallon drums in one group.
- For 45-gallon drums, use drip pans or similar containers.
- For single walled tanks or double walled tanks over 4,000L, use an approved liner or a curbed concrete pad surrounding the tank, and a spill containment device attached to the intake valve.

The liner or pad and spill containment device must be made of materials that are compatible with the stored materials.

Records Maintenance

- Spill Contingency Plans will be located at each facility. Project managers, lead hands and the site supervisors shall have a copy of the spill contingency plan available on site at a central location.
- Spill contingency plans will also be located in T&D service vehicles.
- Monthly summaries of fuel inventories must be maintained on site as well as records of anytime fuel is added to the system

Reporting

- If a fuel system fails a leak test, it must be reported to the Yukon Energy Department of Environment
- Reporting to the Yukon Spill Report line by the YEC Dept of Environment is necessary if;
    - There is a shortage of 1.0% on monthly tank capacity or tank thouroughput,
    - if there are 4 shortages of 50 litres or more;
    - or consecutive losses totaling 200 litres or more
    - Any loss to water

Fuelling

- Ensure personel is present during fuelling
- Do not refuel equipment within 30m of a watercourse or waterbody. Exceptions to this requirement include equipment refueled within secondary containment (e.g., water pump contained within spill tray).
- Ensure written standard operating procedures, work practices or guidleines (this EWP) are in place during fuelling activities.
- Keep adequate quantities of spill response equipment near fuelling areas
- Use secondary containment at all times when refueling.

Transportation

- All fuels, lubricants, coolants and other hazardous substances must be transported under applicable Transportation of Dangerous Goods Act and Regulation. When transporting any hazardous materials, refer to TDG regulations and the MSDS sheet for the product.
- Contractors hauling hazardous goods for YEC must have Transporation of Dangerous Goods training and certification as well as MSDS sheets for the product in the vehicle.

Waste Handling

WHITEHORSE PLANTS: PUT OILY WASTE INTO RED METAL CONTAINERS.

- Put all contaminated absorbent pads, spent oil filters and contaminated rags into the red oily waste bins in the Whitehorse Hydro and Diesel plants. Oily waste bins will get emptied into a larger dumpster for oily waste outside the WH Diesel plant.
- Do not line red bins with plastic bags as it could cause a fire.
- Waste oil/fuel/solvents/coolants must be stored in clearly labeled and sealed containers, located upright and out of the elements (i.e., not exposed to precipitation or excessive ultraviolet light), and ideally will be stored in outdoor shelters, or indoors on pallets, with integral leak containment
- Keep storage sites secure
- Keep containers at least 30m away from surface waters, catch basins (stormwater), private and public water supply wells.

Waste Records Collection & Retention

- Leadhands are responsible for storing this material and coordinating with waste collection contractor for regular pick-ups.
- Properly completed and signed records and waste manifests must be completed for all waste disposal events and must be retained and regularly provided to Yukon Energy Records Management for filing.

3.0 Applicable Legislation

- Yukon Environment Act, *Spills Regulations*, Yukon Territorial Government
- The storage of hazardous substances is regulated under the *Yukon's Storage Tank Regulations*
- Oil and Gas Act, *Gas Processing Plant Regulations*, Yukon Territorial Government

4.0 Additional Information

YEC Spill Contingency Plans
Can be found on the EMS SharePoint site under Environmental Documents.

SPECIAL WASTES

EMS-EWP-008

1.0 Introduction

1.1 ***Purpose***

The purpose of this **Work Practice** for **Special Wastes** (commonly known as hazardous wastes) is to provide the steps required to purchase, store, use and dispose of hazardous wastes in an environmentally responsible manner and according to the YEC Special Waste Permit **41-120.**

2.0 Special Wastes

Yukon Energy is permitted to generate and store the following:

- Waste oil
- Waste solvent
- Waste anti-freeze
- Waste lead based paint chips

Other examples of special wastes include waste batteries, SF6 and asbestos. In addition, any waste dangerous goods are considered special wastes.

2.1 Requirements

If the contractor or employee works with special waste in any way, they need to understand the YEC Special Waste Permit. The following are requirements under the permit:

Documentation

- Keep the Special Waste Permit posted at each site
- Keep a waste manifest everytime you transport or get rid of special wastes, send to YEC Environment Department
- Maintain records of the types of special wastes in and out of your storage areas, volume, origin and storage location. File with YEC Records Management on a yearly basis.

- Submit inspection reports of weekly, monthly and annual inspections (see below requirements) to YEC Environment Department

Storage

- Prevent contamination and leaks by ensuring containers are:
    - properly labelled,
    - sealed, covered and
    - stored within secondary containment.
- Never mix or dilute special wastes.
- Routinely remove special wastes from site to an approved facility

Inspection

- Weekly - inspect for leaks of special waste storage weekly
- Monthly - Inspect storage containers for change in volume
- Annually – check container integrity, check for cracks or other issues

The Yukon *Special Waste Regulations* and the *Gas Processing Plant Regulations* state that a person who possesses or controls a special waste at the time of a release (spill), or who causes a release, **must report the incident** to the Yukon Spill Report Line (667-7244) and the Chief Operating Officer of the Oil and Gas Branch (334-3112, if LNG). The Manager of Environment or Environmental Analyst will make this report.

Containment and clean-up action should begin as soon as possible to protect human health and the environment.

Note that for all but very small quantities of special waste, most placarding, shipping documentation, and transporter certification requirements consistent with the *Transportation of Dangerous Goods Regulations* apply to the transport of special waste.

3.0 Other Special Wastes not included in the Special Waste Permit 41-120

3.1 Pest Control Products

3.1.1 Requirements

Pest control products include herbicides (e.g., weeds, other undesirable vegetation) and pesticides (e.g., insects, rodents). One must ensure that the certified applicator or his/her assistant performs the work as specified in the permit.

The applicator must have a **Pesticide Service Permit** (see separate Fact Sheet) to apply commercial or restricted pesticides. A **Pesticide Applicator Certificate** is required to purchase any commercial or restricted pesticides.

3.2 Mercaptan

Mercaptan is used to add smell to natural gas and has the ability to leach through soil or the sediment at a moderate rate. Accumulates very little in the bodies of living organisms. Highly volatile from water.

3.2.1 Requirements

- Store and handle in accordance with federal and territorial regulations. Grounding and bonding required. Keep separated from incompatible substances.

3.3 Used Batteries and Aerosol Cans

- Batteries contain sulfuric acid and lead. Both of these materials can damage the environment and pose a safety hazard if handled improperly.
- Under the *Yukon Special Waste Regulations*, you must have a Special Waste Permit if you handle more than five kilograms of lead-acid batteries per month.
- Keep used batteries in a bin and call KBL environmental when the bin is full for disposal.

3.3.1 Requirements

When storing batteries, or preparing them for shipment, follow the steps outlined below to help prevent leaks and spills and to avoid contamination of the storage site:

- Batteries and aerosol cans should be collected and stored in a leak-proof container out of direct sunlight and exposure to precipitation (rain/snow).
- Leadhands shall ensure the proper storage and disposal of such materials. They are also responsible for coordinating the collection and disposal of the material in cooperation with the Environmental Coordinator on an annual or more frequent basis, as required.
- Larger batteries can be placed on wooden pallets. Do not make stacks of batteries more than **three layers thick**. Separate each layer with a sheet of plywood or other suitable material.
- **Layers of pallets** should not be stacked more than **two** high.
- Enclose batteries on the pallet with thick plastic to prevent leaks. All sides must be wrapped to protect the batteries from the weather and to prevent any acid from being discharged into the environment.
- After wrapping the batteries in plastic, strap the stack of batteries to the pallet to prevent the batteries from shifting.

4.0 Disposal methods

- **Collection by a Permitted Facility**
  There are several facilities in Yukon that have permits in place for treating and/or disposing of special waste.

- Liquid natural gas, natural gas
  In the event of a spill, allow to vapourize and disperse to the atmosphere

- Mercaptan: Contain in leak proof container and dispose at permited special waste handling facility.

5.0 Applicable Legislation

- Environment Act, *Pesticides Regulation*, Yukon Territorial Government
- Environment Act , *Spills Regulations*, Yukon Territorial Government
- Environment Act, *Solid Waste Regulations*, Yukon Territorial Government
- Environment Act, *Special Waste Regulations*, Yukon Territorial Government
- Canadian Environmental Protection Act. *Ozone Depleting Substances Regulations*, Environment Canada
- Oil and Gas Act, *Gas Processing Plant Regulations*, Yukon Territorial Government
- Transportation of Dangerous Goods Act, Government of Canada

6.0 Additional Information

YEC Safe Work Practices (SWP)
SWP's can be found on the Health and Safety Departments SharePoint site.

YEC Spill Contingency Plans
Can be found on the Environmental Management System (EMS) Sharepoint site under the Environment Department.