Nathaniel YEE
(NY)

REFERENCE: **Page 1-8, "Diesel rental unit costs of approximately $3.8 million are forecast for the diesel rental units expected to be required for the 2021 GRA test year,5 and [5] 15 units at 1.8 MW for each unit to total 27 MW for 2021 plus two spare units to total of 17 units."**

QUESTION:

a) Please provide a breakdown of all rental and installation infrastructure costs, also noting those attributable to the "spare units."

b) Please explain the decision to rent and install "spare units."

c) As they are rented to increase "reliable capacity," what is the reliability/failure history of rental diesels?

d) How is service and maintenance handled with the supplier?

e) What are the terms of the rental? Monthly, yearly or?

ANSWER:

(a)

Diesel rental unit costs of approximately $3.8 million are broken out in Table 1. Costs for spare units are included in the categories of Generators and Transformers. Each unit whether initially designated as spare or not has the same cost. See YUB-YEC-1-49 for a breakdown of capital costs for N-1 Capacity Shortage Faro Thermal Rental Site; and N-1 Capacity Shortage Whitehorse Thermal Rental Site. See also discussion in NY-YEC-1-3.

Table 1: Diesel Rental Cost Summary

Rental	**Cost ($millions)**
Generators	$ 2.1
Transformers	$ 0.7
Fuel Tanks	$ 0.2
Total Rental	$ 3.0
Other	
Delivery fees	$ 0.4
Stand-down fees	$ 0.2
Start-up and Commissioning	$ 0.2
Total	$ 3.8

(b)

Based on the 2019/2020 rental season, the availability of the units averaged 85.7%, effectively reducing the dependable capacity of the rental fleet from 16.2 MW to 13 MW. The rental fleet provides the N-1 scenario generation capacity. To ensure YEC has the capability to meet the N-1 capacity requirement YEC rented two additional units.

(c)

The following is noted regarding the units:

- 2019/2020 – Availability 82.4%; and
- 2020/2021 – YTD availability 86.6% (Whse), 78.6% (Faro).

(d)

Twice daily reports are issued to the vendor in a group email identifying unit unavailability for service. The vendor dispatches service technicians to the sites and reports back on resolutions or delays to equipment issues. YEC has a comprehensive report provided to the vendor upon request that provides current status and historical availability statistics (see below).

S150 YM Running Hours & Availability Report

2019-2020	YM10	YM11	YM12	YM13	YM14	YM15	YM16	YM17	YM18	Row Total
Availability	75.9%	97.9%	60.0%	87.6%	90.1%	59.3%	90.9%	93.8%	86.0%	82.4%
Current Status	Avail	Avail	Off Rent	Avail	Avail	Avail	Unavail	Unavail	Unavail	
Dec 13 - Jan 9	148.8	131.3	113.6	124.2	136.6	26.6	128.7	114.9	62.5	987.0
Jan 10 - Feb 6	201.1	196.7	91.1	182.9	171.5	0.4	155.5	166.1	124.2	1289.4
Feb 7 - Mar 5	145.5	138.2	138.7	96.8	140.4	127.1	103.0	79.6	71.6	1040.9
Mar 6 - Apr 2	74.2	180.7	44.5	163.7	172.1	132.3	87.2	90.8	90.4	1035.9
Apr 3 - May 1	22.3	13.9	0.0	17.4	25.1	26.3	9.0	10.6	5.6	130.2
Unused Hours (To Date)	-91.7	-160.8	112.2	-85.0	-145.6	187.4	16.6	38.0	145.6	16.7
Total Used Hours	591.8	660.8	387.8	585.0	645.6	312.6	483.5	462.1	354.4	4483.3
									Contract Hours Used	99.6%
									Contract Duration Completed	85.7%

Report Date: 11/04/2020

S140 & S150 YM Running Hours & Availability Report

2020-2021	YM10	YM11	YM12	YM13	YM14	YM15	YM16	YM17	YM18	YM19	Row Total
Availability	81.7%	86.4%	94.8%	81.7%	93.9%	62.1%	89.5%	88.2%	93.8%	94.1%	86.6%
Current Status	Avail	Avail	Avail	Avail	Avail	Unavail	Avail	Unavail	Avail	Unavail	
Used Hours Dec 01 - Apr 19	331.5	506.7	510.9	477.9	511.9	182.6	512.3	491.7	514.0	494.2	4533.6
Unused Hours (To Date)	268.6	93.3	89.1	122.1	88.1	417.4	87.7	108.3	86.0	105.8	1466.4
Accepted Meter Start	2,202.7	4,159.2	3,703.2	16,097.4	6,124.9	11,232.4	25,929.1	14,453.1	3,029.8	16,183.2	6000 Total
Breaker Cycles	28.5	30.5	32.0	29.5	38.0	22.5	33.0	32.5	24.0	34.5	
Engine Cycles	32.0	34.0	34.0	33.0	42.5	23.5	34.5	39.5	30.5	37.5	
Issues	5	4	4	4	7	6	6	8	5	3	

2020-2021	YM20	YM21	YM22	YM23	YM24	YM25	YM26	Row Total
Availability	73.5%	73.0%	64.5%	95.1%	62.6%	87.3%	93.9%	78.6%
Current Status	Avail	Avail	Avail	Avail	Avail	Avail	Avail	
Used Hours Dec 01 - Apr 19	21.0	43.0	5.0	136.0	5.0	44.0	117.0	371.0
Unused Hours (To Date)	336.1	314.1	352.1	221.1	352.1	313.1	240.1	2128.9
Accepted Meter Start	5279.1	2120.3	3124.2	916.1	17704	6,810.0	18,446.0	2500 Total
Breaker Cycles	7.5	5.5	3.0	11.0	8.0	4.5	13.5	
Engine Cycles	10.0	5.5	2.5	11.5	15.0	7.0	28.0	
Issues	3	2	4	1	2	3	3	
							Contract Hours Used	57.7%
							Contract Duration Completed	65.7%

Report Date: 3/3/2021

(e)

The existing rental agreements have a term from December 1, 2020 to April 20, 2021.

REFERENCE: **Page 1-8, "Non-industrial peak load has increased from 86.4 MW in the approved 2018 GRA forecast to 100.7 MW (or 100.6 on page 2-4?) forecast for 2021 (14 MW increase), accounting for most of the 17 MW growth in the N-1 dependable capacity shortfall."**

and

Page 2-12 Item 2.4 "As indicated in Table 2.2, the peak demand for the integrated system is forecast to be 112.7 MW in 2021. The actual peak demand was 93.0 MW in 2018, 90.0 MW in 2019 and 103.8 MW in 2020."

and

QUESTION:

a) 103.8MW is indicated as "Forecast" in Table 2.2 and "Actual" on page 2-12. Which is correct? Is this forecast or actual?

b) Please explain the inputs and forecasting methodology that resulted in 100.7 MW (or 100.6 MW) non-industrial peak load, and 112.7 MW integrated system peak.

c) Please also provide peak loads by month (Non-industrial and integrated system separately), approved, actual and forecast for 2017 to 2021 inclusive.

ANSWER:

(a)

2020 columns in the 2021 GRA reflect preliminary actuals for January through June, and forecasts for July through December. Therefore, the 2020 columns are shown as forecasts. The peak demand of 103.8 MW shown in Table 2.2 was realized in January 2020. Therefore, on page 2-12 it is noted as actual peak.

(b)

As part of the development of YEC's 10-year Renewable Electricity Plan, the non-industrial peak forecast was updated using the Itron model (as described in the 2016 Resource Plan) and calibrated to consider the updated recorded actual 2019/20 peak. The integrated system peak includes the non-industrial and industrial peaks. The industrial peaks were added based on data provided by the industrial customers.

(c)

The YEC peak forecast model only models a winter peak (maximum load expected in coldest period) – this data is not forecast by month. Peak loads are recorded as the maximum load experienced in each winter. Please see response to CW-YEC-1-1 (a).

REFERENCE:

QUESTION:

a) What is the actual rental cost of the 17 diesels? The GRA has rental cost of 3.834 (or 3.8) million, while according to the Hansard, Andrew Hall cited 4.1 million on 15-Dec, 2020. Should the GRA reflect 4.1 million rather than 3.8 million for the rental diesels? Please provide documentation.

ANSWER:

(a)

The diesel rental costs of $3.834 million included in the operating and maintenance costs reflect forecast rental payments required for 17 rental units.

In addition to the rental costs, there are capital costs required to accommodate and connect rental diesel units to the Yukon Integrated System. As reviewed in section 5.2.1.2 of the Application the capital cost for N-1 Capacity Shortage Thermal Rental Site Infrastructures in Whitehorse and Faro at $3.335 million which has annual capital related costs of about $0.243 million [annual depreciation and return on rate base]. With the annual capital related costs, the total annual cost for 2021 for diesel rentals at about $4.1 million.

Please also see response to YUB-YEC-1 (a).

REFERENCE: **Page 5-7 "N-1 Capacity Shortage Faro Thermal Rental Site Infrastructure[7] ($2.037 million forecast in 2020). The project involves the design and installation of temporary rental site electrical infrastructure at Faro (870S) to ensure Yukon Energy can continue to meet its N-1 capacity planning requirements."**

QUESTION:

a) As the project has been completed, is/was the $2.037 million accurate? Are actuals available?

b) Please provide a breakdown of all costs of this infrastructure.

ANSWER:

(a) and **(b)**

The actual cost was $2.446 million. Please see response to YUB-YEC-1-49 and CW-YEC-1-26 (a) and (b).

REFERENCE: **Page 2-14, "Installed YEC and AEY dependable grid capacity for the winter peak in 2021, based on existing capacity today and any planned additions/retirements and excluding Fish Lake hydro, is 139.1 MW in 2021 (70.5 MW of YEC hydro, 12.6 MW YEC LNG, 23.5 MW of YEC diesel, 5.6 MW of AEY diesel and plus 27 MW20 diesel from rented diesel units in order to meet the N-1 criterion assessment).21"**

and

"21 Yukon Energy's 2016 Resource Plan provides details on YEC's updated generation inventory and dependable winter capacity of 114,983 kW (see Chapter 4, Table 4.1). The updates since 2016 Resource Plan include reduced Mayo GS dependable capacity to 6.5 MW due to restricted winter outflows, increased WH GS dependable capacity to 27 MW, retired WH diesel #3, added LNG 3rd engine and other changes to the dependable capacity of the existing diesel units."

I believe that the note is actually referencing Table 4.2 of the 2016 Resource Plan, as Table 4.1 is comparisons with BC Hydro and Hydro-Québec – and not generation inventory.

QUESTION:

a) Please provide an updated Yukon Integrated System Generation Inventory, incorporating the changes in note 21. This would be an update of Table 4.2 from the 2016 resource plan.

b) While referencing the 2016 Resource Plan, noted discrepancies between Table 4.2 and Figure 4-7, Yukon's Transmission and Generation Facilities. Please also provide an update/correction of Figure 4-7 from the 2016 Resource Plan.

ANSWER:

(a) and **(b)**

Please see Appendix A to YEC's 10-Year Renewable Electricity Plan that provides updated version of Table 4.2 from the 2016 Resource Plan. Figure 1 of 10-Year Renewable Electricity Plan illustrates Yukon Electrical System in similar way as Figure 4-7 from 2016 Resource Plan, but without a list of generation capacities. As noted, the generation capacity list is provided in Appendix A of the 10-Year Renewable Electricity Plan.

The copy of the 10-Year Renewable Electricity Plan is provided in response to CW-YEC-1-36 (a).

It is also confirmed that the correct reference to the 2016 Resource Plan is Table 4.2, not Table 4.1.

REFERENCE:

QUESTION:

a) Please provide the stacking order for all thermal generation, YEC owned and rentals – for each site and for the integrated system.

ANSWER:

(a)

The stacking order for all thermal generation is as follows:

	Type/ Location	Units	Comment
1	YEC LNG	WG1, WG2 and WG3	
2	Whse rentals	YM-10, YM-11, YM-12, YM-13, YM-14, YM-15, YM-16, YM-17, YM-18, YM-19.	There is no particular stacking order for these units
3	Faro rentals	YM-20, YM-21, YM-22, YM-23, YM-24, YM-25 and YM26	There is no particular stacking order for these units
4	YEC Whse	WD4, WD5, WD6, WD7	
5	YEC Dawson	DD5, DD4, DD3, DD2, DD1	
6	YEC Faro	FD7, FD1	
7	YEC Mayo	MD1, MD2, MD3	

REFERENCE:

QUESTION:

a) What modifications have been made to the Faro diesel plant since the 2014 YESAB assessment? Please provide details and dates of any and all changes/modifications to the Faro plant.

ANSWER:

(a)

Please see the summary provided below – which provides the modification to the plant and the date of the modification since 2014.

S/N	Modification	Date
1	Moved FD5 Dawson	2014
2	FD0 plant RTU replacement	2017
3	Heating system UG leak replacement (FD7 to FD1)	2017
4	Faro plant repairs	2016

REFERENCE:

QUESTION:

Please provide all documents relating to permits for the addition of the rental generators. If any of these are not available or steps were not taken, please explain.

a) Any and all applications and correspondence with regulator(s) regarding rental diesels.

b) Community consultation and feedback results.

c) YESAB assessment documentation relating to the rental generators.

d) Compliance documents, decision documents and permits.

ANSWER:

(a)

Please see Attachment 1 and Attachment 2 to this response which provide correspondence related to rental diesels at the WRGS and FGS.

(b)

Yukon Energy has undertaken the following effort to inform governments, residents and Citizens in the Faro area of the Corporation's requirement to install temporary rentals diesels at the existing Faro diesel plant:

- **Ross River Dena Council:**

    - Between April 2020 and January 2020, Yukon Energy contacted representatives of the Dena Nezzidi Limited Partnership (DNLP) (designate for the Ross River Dena Council) at least nine times by email and phone to share information about the Faro rental diesel project and procurement opportunities, and to request a meeting with Ross River Dena Council to discuss the project.

- The Dena Nezzidi Limited Partnership representative attended Yukon Energy's December 2, 2020 public information meeting. Copies of the presentation and a summary of the discussion were provided following the meeting.

- As of February 9, 2021, representatives of the Dena Nezzidi Limited Partnership have not provided Yukon Energy with a date and time for the requested meeting with Ross River Dena Council to discuss the specific Faro rental diesel project and YESAA project proposal.

- **Town of Faro:**
  - On April 14, 2020, Yukon Energy emailed the Town of Faro advising of its plans to add rental diesels in Faro in 2020. The email included a request for a follow-up discussion.

  - On July 27, 2020, Yukon Energy met with the Town of Faro Council to discuss the 10-Year Renewable Electricity Plan. As part of this meeting, Yukon Energy shared information about the rental diesel project with Council and garnered feedback on the project.

  - Additional information about the project and public consultation efforts were shared with Town staff and Council members in follow-up emails and conversations.

- **Residents and Citizens:**
  - An information piece about the Faro rental project was mailed to all residents and citizens in Faro in September 2020. Information about the project, along with a copy of the mailer, was added to Yukon Energy's website at the same time. See Attachment 1 to this response.

  - Yukon Energy hosted a public information meeting about the project on December 2, 2020. The session was hosted online due to COVID-19 concerns. Six members of the public attended. The meeting was advertised with community posters, radio and print ads, and social media. A copy of the presentation was made available after the meeting on Yukon Energy's website. See Attachment 2 to this response.

- Yukon Energy responded to questions received by phone, email and social media about the project as received.

- Key themes of questions and comments raised by public members were:
  - Noise levels from rentals
  - Air quality
  - Consultation with local residents
  - Consultation with Ross River Dena Council
  - Faro Air Permits (allowances, changes and subsequent consultation)

(c)

The rental diesels at the Whitehorse Rapids Generating Station (WRGS) have been installed and operated under Air Emission Permit amendments that were made under existing YESAA Decision Documents. No YESAA assessments have been required to date for the use of rental diesels as the activities represented by their use are sufficiently similar to those generating activities that have been previously assessed under YESAA and the YG regulatory authority determined that the existing decision documents for previous assessments of these activities are sufficient for the purposes of amending YEC's air emissions permit.

The rental diesels at the Faro Generating Station (FGS) can be operated up to an operating cap of 10.6 MW and no YESAA assessment is required for that purpose as the previous YESAA assessments of the facility and the associated Decision Documents allow for this operational cap at the site under YEC's existing air emissions permit.

(d)

Per the response to NY-YEC-1-8 (c), the rentals have not required specific assessment under YESAA to be authorized for use under YEC's air emissions permit, therefore there are no compliance documents, decision documents, or permits issued pursuant to a specific YESAA assessment for the rentals, other than the existing air emissions permit, which authorizes the use of temporary diesel generators beyond those permanently installed at the facility within a generating capacity limit.

From: Elizabeth.Barker@gov.yk.ca
To: Travis Ritchie
Subject: RE: AEP 60-010 Amendment
Date: October 13, 2020 4:05:52 PM

Good Afternoon Travis,
We have determined that the information provided in YEC's previous Faro station YESAA assessments (2008-0230 and 2011-0246) is still valid for the proposed 2020 amendment of reinstalling capacity of approximately 5.65MW at the Faro generating station. YEC has authorization to reinstall previously relocated/de-rated capacity of up to 10.6MW, cumulative station capacity, without proceeding through the YESAA assessment process. As discussed, any additional capacity increase that will bring the Faro station's cumulative capacity above 10.6MW will need to proceed through the YESAA assessment process before being considered.
As this amendment doesn't change the content of your current Air Emissions Permit 60-010, we will not be issuing an amended permit and you may continue to use permit 60-010 as is .
Cheers,
Liz

Elizabeth Barker
Environmental Protection Analyst
Department of Environment
Government of Yukon
(867) 667-5456

From: Travis Ritchie
Sent: September 28, 2020 1:30 PM
To: Elizabeth.Barker
Subject: RE: AEP 60-010 Amendment

***** External E-mail: Do not click on links or attachments except from trusted senders. *****
*****

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 <Travis.Ritchie@yec.yk.ca>
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

Yukon Energy Corporation
P.O. Box 5920
Whitehorse
Yukon Y1A 6S7
Ph: (867) 393-5300
Fax: (867) 393-5322

September 28, 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 - 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.

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 previoulsy relocated/derated capacity (aprx. 5.65 MW)
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 28, 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.

YG(5694E)E1 Rev. 04/2010

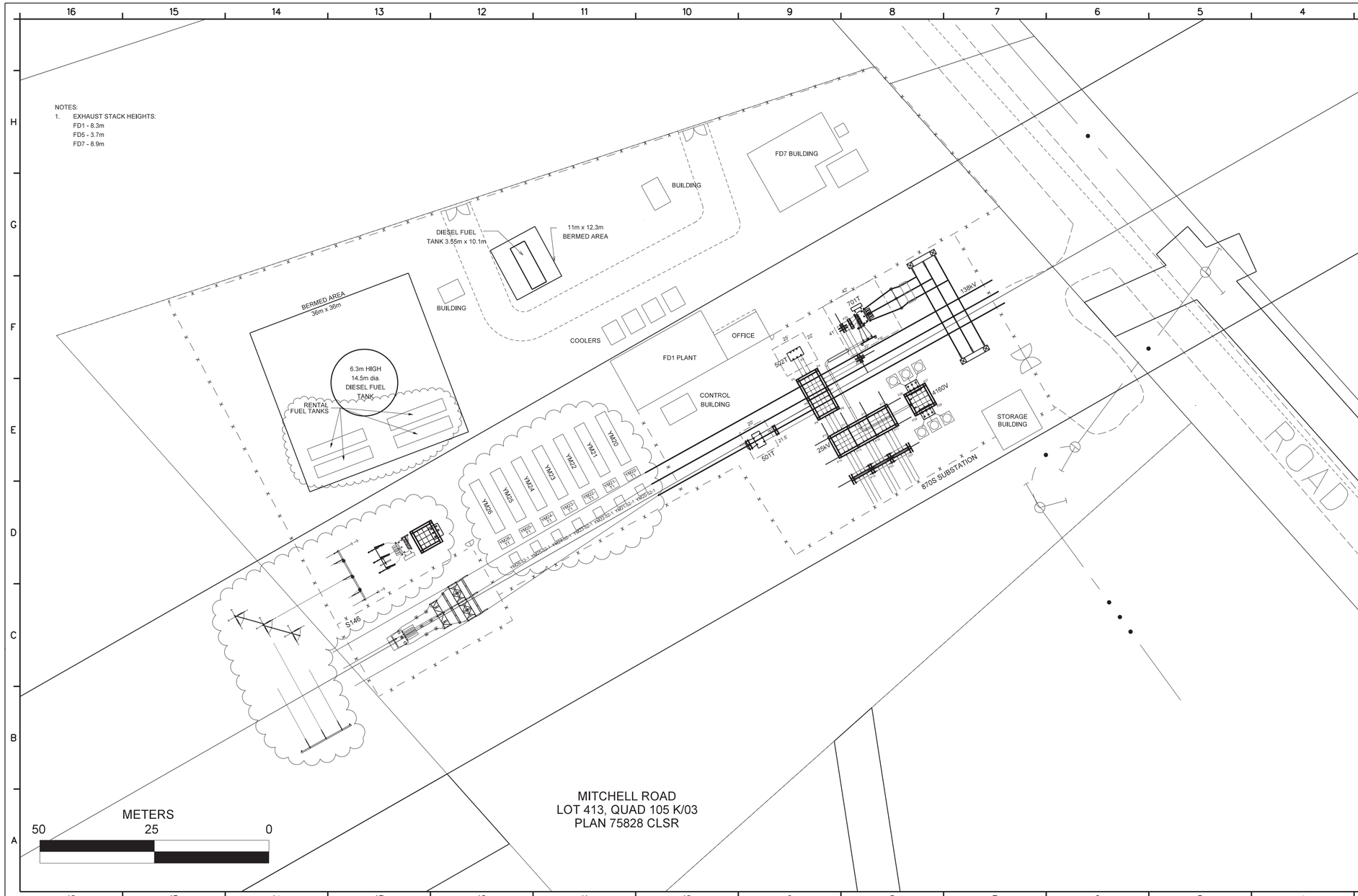
AIR EMISSIONS PERMIT (NO. 60-010)
AMENDMENT APPLICATION
SUPPORTING DOCUMENT

ATTACHMENT A

FIGURE 1

INSTALLATION SITE LAYOUT

September 2020



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

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

CHECKED BY -
DATE -
DRAWN BY -
SCALE A1
farositeplan.dgn
REV. C

THIS DRAWING IS THE PROPERTY OF YUKON ENERGY CORPORATION AND CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION WHICH MUST NOT BE DUPLICATED, USED OR DISCLOSED OTHER THAN AS EXPRESSLY AUTHORIZED BY YUKON ENERGY CORPORATION.

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.

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.

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.

XQ2000 RENTAL

CATERPILLAR®

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

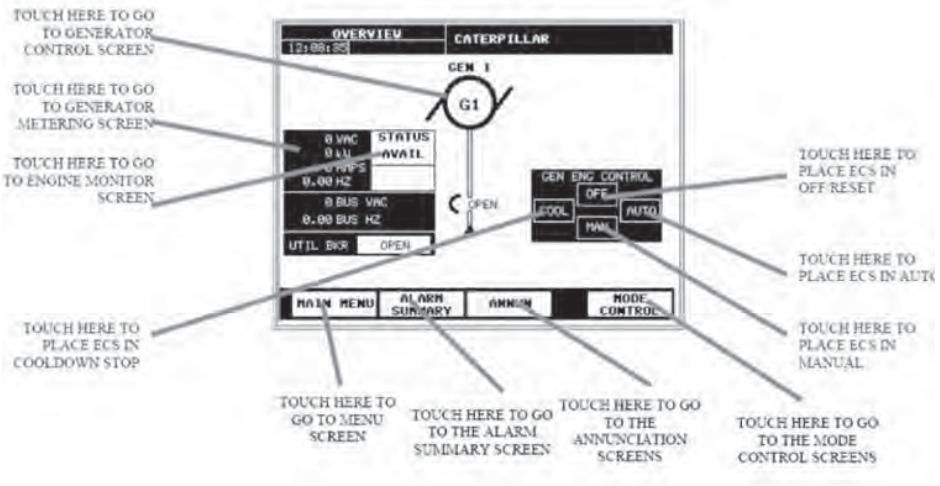
- Automatically synchronizes and parallels the generator with another power source.
- Includes provisions for manual permissive paralleling.

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.

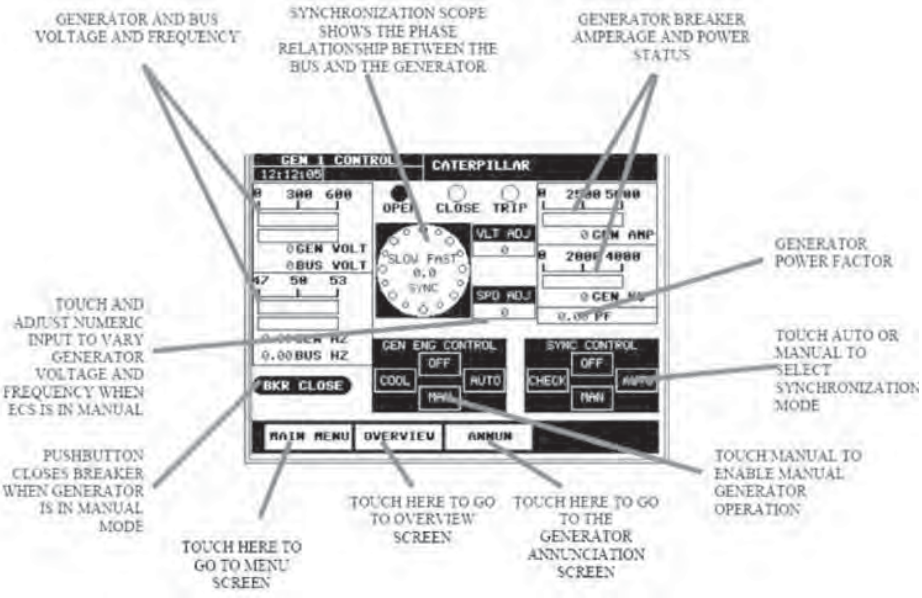


XQ2000 RENTAL

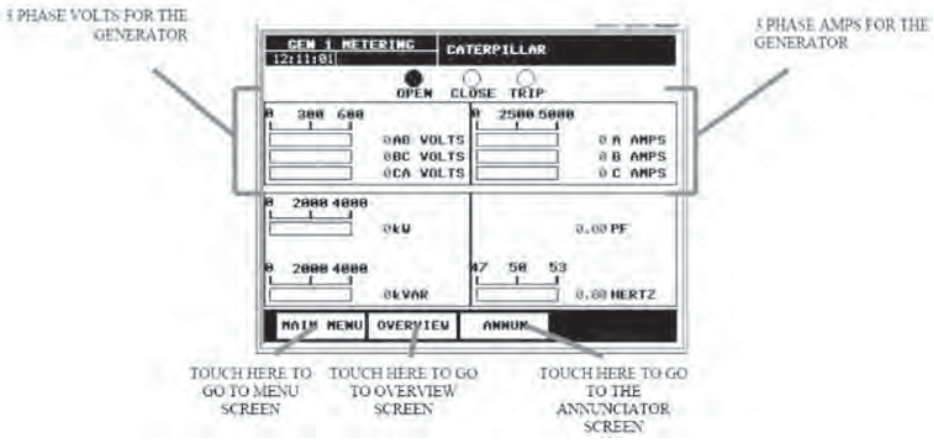
CATERPILLAR®

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.

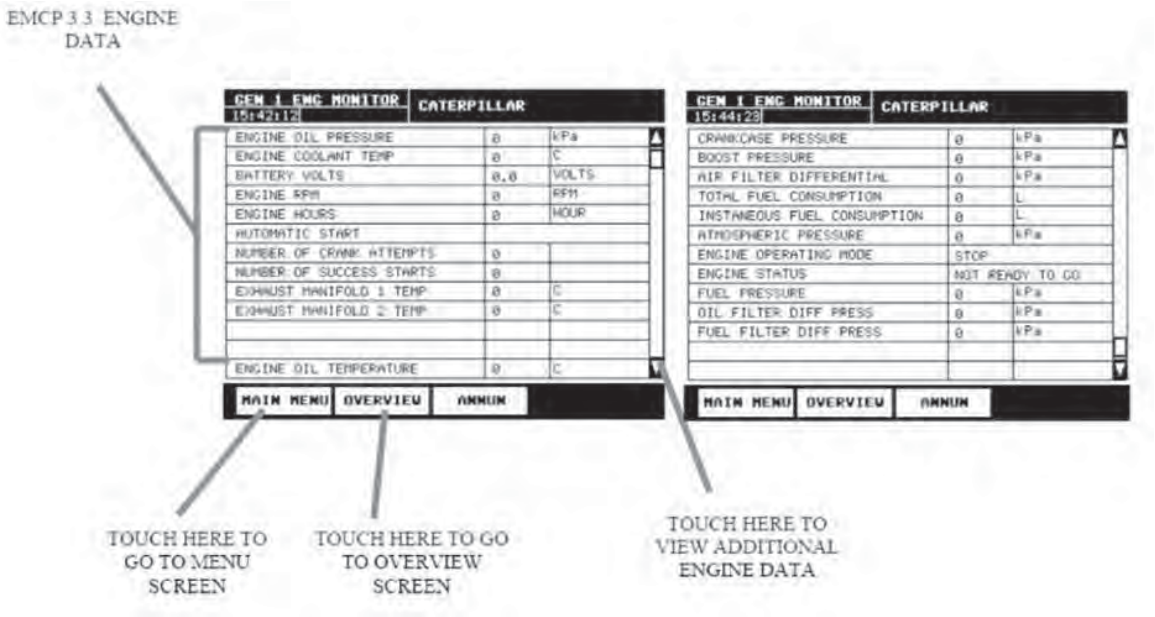


XQ2000 RENTAL

CATERPILLAR®

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.



Information contained in this publication may be considered confidential.
Discretion is recommended when distributing.
Materials and specifications are subject to change without notice.
CAT, CATERPILLAR, their respective logos, "Caterpillar Yellow," the "Power Edge" trade dress, as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission.

© 2010 Caterpillar
All Rights Reserved.
Printed in U.S.A.

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

ATTACHMENT C

EMS

ENVIRONMENTAL WORK PRACTICES

September 2020

ENVIRONMENTAL WORK PRACTICE

An Environmental Work Practice is a set of positive guidelines or "Do's and Don'ts" on how to control an aspect of the services, activities, or products of Yukon Energy that may have a negative effect on the environment.

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.

.

ENVIRONMENTAL WORK PRACTICE

An Environmental Work Practice is a set of positive guidelines or "Do's and Don'ts" on how to control an aspect of the services, activities, or products of Yukon Energy that may have a negative effect on the environment.

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.

ENVIRONMENTAL WORK PRACTICE

An Environmental Work Practice is a set of positive guidelines or "Do's and Don'ts" on how to control an aspect of the services, activities, or products of Yukon Energy that may have a negative effect on the environment.

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.

From:	Jacquie.VanMarck@gov.yk.ca
To:	Travis Ritchie
Cc:	Lindsay.Dehart@gov.yk.ca; Tim.Smith@yesab.ca; John.Ryder@gov.yk.ca; EMO.Yukon@gov.yk.ca; Joyia.Chakungal@gov.yk.ca; patrick.ross@whitehorse.ca; Andrew.Smith@gov.yk.ca; Janine.Kostelnik@gov.yk.ca; Todd.Powell@gov.yk.ca; Chioma.Izugbokwe@gov.yk.ca
Subject:	Requirement for Assessment under the YESAA for Renewal of Permit #60-010
Date:	December 15, 2017 2:45:14 PM
Attachments:	Record of Determination dec 2017.pdf Air Emissions Permit 60-010 dec 2017.pdf TRitchie letter dec 2017.pdf

---

Please find attached a letter from Todd Powell, A/Director of Environmental Programs regarding the requirement for assessment under the Yukon Environmental and Socio-economic Assessment Act for Renewal of Permit #60-010.
Also attached is Air Emissions Permit #60-010 and the Record of Determination of Significant Change for Proponent Yukon Energy Corporation.

Jacquie Van Marck
Administrative Assistant
Environmental Programs Branch
Yukon Government
(PH) 867-667-5683
(Fax) 867-393-6213

Yukon
Environment
Box 2703, Whitehorse, Yukon Y1A 2C6

December 12, 2017

Travis Ritchie
Manager, Environment, Assessment & Licensing
Yukon Energy Corporation
Email: Travis.Ritchie@yec.yk.ca

Dear Mr. Ritchie:

Re: Requirement for Assessment under the *Yukon Environmental and Socio-economic Assessment Act* for Renewal of Permit #60-010

As you are aware, s.49.1(1) of the *Yukon Environmental and Socio-economic Assessment Act* (*YESAA*) as amended in 2015 placed the responsibility for determining whether an assessment is required prior to renewal or amendment of an authorization on the Decision Body for the project. Assessment of an existing project is required when an authorization is renewed or amended, if, in the opinion of a Decision Body for the project, there is a significant change to the original project that would otherwise be subject to an assessment.

As the Decision Body on *YESAA* project 2011-0241 (YEC AEP renewal – Whitehorse Rapids Generating Station), and a regulator on project 2013-0115 (YEC Whitehorse Natural Gas Conversion), the Department of Environment has determined that there have been no significant changes to the air emissions components of the projects since these two previous assessments. Therefore, the amendment of Air Emissions Permit #60-010 does not require a *YESAA* assessment at this time.

We are in receipt of your amendment form and will proceed in issuing the permit to complete the renewal process.

Your project may require a new *YESAA* assessment in the future if there are significant changes to the site or activities. You are required to notify an environmental protection analyst if there are any changes to the air emissions components of your project as compared to the scope of the most recent *YESAA* assessment, so that the significance of the change can be determined. Inspections and/or enforcement officials may also conduct permit inspections to assess whether any changes have occurred.

.../2

Please do not hesitate to contact either myself (867-667-8177; Todd.Powell@gov.yk.ca) or Janine Kostelnik (667-5456; Janine.Kostelnik@gov.yk.ca) if you have any questions about this determination.

Sincerely,

Todd Powell
A/Director, Environmental Programs

Enclosure: Record of Determination for Yukon Energy Corporation

cc: Lindsay DeHart, Development Assessment Branch (Lindsay.DeHart@gov.yk.ca)
Tim Smith, Yukon Environmental and Socioeconomic Assessment Board
John Ryder, Department of Environment (john.ryder@gov.yk.ca)
Yukon Oil & Gas Branch (Chioma.izugbokwe@gov.yk.ca)
EMO, Yukon (EMO.Yukon@gov.yk.ca)
Fire Marshal's Office (Joyia.Chakungal@gov.yk.ca)
City of Whitehorse (pat.ross@city.whitehorse.yk.ca)
Andrew Smith, Major Project Yukon (andrew.smith@gov.yk.ca)

RECORD OF DETERMINATION OF SIGNIFICANT CHANGE

DATE: December 11, 2017

NAME OF DECISION BODY: Department of Environment

PROJECT NAME: Yukon Energy Corporation

YESAB File #: 2011-0241, 2013-0115

PROPONENT NAME: Yukon Energy Corporation

REGULATORY AUTHORIZATION(S), LEGISLATION AND PERMIT #:

1. **Air Emissions Permit**
   Air Emissions Regulations, Permit #60-010

YESAA subsection 49.1(1) states: "A new assessment of a project or existing project is not required when an authorization is renewed or amended unless, in the opinion of a decision body for the project, there is a significant change to the original project that would otherwise be subject to an assessment."

Following are the criteria, factors and analysis that have been taken into consideration by the Decision Body:

Criteria/Factors Considered	Analysis
1. Is the activity listed in the Assessable Activities, Exceptions and Executive Committee Regulations? Identify the section of the regulations and how the exemptions do not apply.	**Schedule 1, Part 4.2** Activity: Construction, operation, modification, decommissioning or abandonment of, or other activity in relation to a fossil fuel-fired electrical generating station. Specific Exemption: 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. The exemption does not apply because the modification is specific to fossil fuel-fired electrical generation.

Criteria/Factors Considered	Analysis
2. How has the project changed since the previous assessment?	Yukon Energy Corporation (YEC) have requested an amendment to their Air Emissions permit to include the use of four (with a potential 5th unit in 2018/2019) Tier 2 diesel engines to the Whitehorse facility for N-1 emergency use only, to address potential capacity gaps over the winter months on an interim basis.
3. Were the subject, scale and scope of the changes to the project identified in #2 above discussed in the previous Evaluation Report or Decision Document? If the changes were discussed in the Evaluation Report or Decision Document, did YESAB provide any comment on how these changes would affect the environment?	The installed thermal capacity that was assessed in 2011-0241 was 25.2 MW of diesel. In 2013-0115 two of the diesel engines identified in 2011-0241 were taken out and replaced by LNG units. The two diesel generators decommissioned were rated at 3.92 MW and 5.15 MW (9.1 MW total). They were replaced by 2 modern natural gas units rated at 4.4 MW each (8.8 MW total). The proposed additional temporary engines were not directly discussed in either of the past two assessments, however the overall capacity of the facility remains within the 25MW. The air quality impact assessments conducted for each WRGS plant configuration (25MW diesel in 2008 and 2011 and 16.1 MW diesel + 8.8 MW natural gas in 2013) indicated that no significant adverse human health effects would result even under the worst case operating scenario for either facility configuration (all units operating under the most adverse meteorological conditions). The potential for temporary use of up to five units with 10 MW of diesel generation, using more modern and cleaner operating EPA Tier 2 rated engines, is not anticipated to result in significant changes to the overall facility emissions and the conclusions of previous air quality impact assessments for the station.
4. Do any of the changes identified in #2 conflict with any of the terms and conditions of the Decision Document in the previous	N/A

Criteria/Factors Considered	Analysis
assessment?	
5. During the previous assessment, did First Nations, organizations, other stakeholders, or the public indicate concerns about the project that could be intensified as a result of the proposed changes?	2011-0241: residents of Riverdale raised some concerns about the cumulative short and long term health impact of diesel emissions on the already poor air quality in their neighbourhood. Concerns were also raised about a potential increase to noise levels, and about industrial customers being required to supply their own power. These concerns were raised by residents, Riverdale Community Association, and Yukon Conservation Society. 2013- 0115: Many concerns were raised about the use and transportation of LNG to Whitehorse. These comments were specific to impacts about use of LNG, rather than the removal of the two diesel engines and therefore falls outside of the scope of this determination of significant change.
6. Do you consider the changes to the project to be "significant"? Why?	Yukon Environment has deemed that there are no significant changes to the project proposed.

RATIONALE FOR DETERMINATION

Two previous YESAA assessments are relevant to this determination:

1. 2011-0241: renewal of Air Emissions Permit in order to maintain the ability to operate its diesel generating facilities.
2. 2013-0115: construction and operation of natural gas powered, reciprocating engine driven generation station and associated liquefied natural gas transfer, storage and vapourization facilities on the site adjacent to YECs hydroelectric facility. The two LNG generators replaced two existing diesel generators which were at the end of their life cycle with a total capacity of 8MW (9.1 MW nameplate rating).

An N-1 emergency event is a very unlikely incident where an extended winter power outage occurs due to loss of their largest source of electricity (Aishihik hydro plant or Aishihik to Whitehorse transmission line). YEC's 2016 Resource Plan identified that should they find themselves in an N-1 event situation, they may not be able to produce enough electricity to meet demand at peak times. Without emergency

back-up, rolling black-outs would be initiated, which is not a preferable solution.

YEC will be renting four diesel engines as back up this winter (2017/18), which if all ran at the same time, would generate less emissions than the two which were taken out of service in 2013, due to higher efficiency. The units are Tier 2 engines that meet current US Environmental Protection Agency guidelines for diesel generators, and would be the cleanest in their diesel fleet at the Whitehorse facility. The applicant is requesting this emergency use be approved during the winter seasons until 2021, which is when they plan on having a more permanent solution to addressing the longer term capacity gap.

The potential need for a 5th unit is based on a load forecast and the consideration of historic winter temperatures. Should ongoing load monitoring and any updating of the load forecast suggest that an additional 2 MW is needed to protect against an N-1 event, then an additional unit would be temporarily installed during the winter period in 2018/2019 and in future winters until such time as a permanent solution can be brought into service to address the current capacity gap.

The potential significance of this change may be considered both in light of the capacity but also of the air emissions resulting from the activity. Notwithstanding the contribution of the natural gas generators, the temporary use of up to 10 MW of Tier 2 diesel engines, the air quality impact assessment from previous assessments that indicated that there would be no significant adverse human health effects would result even under the worst case operating scenario for either facility configuration (all units operating under the most adverse meteorological conditions.

The amended air emissions permit will include appropriate operational, reporting and record keeping requirements.

The Decision Body has:

Consulted with other decision bodies on the determination (if there are multiple decision bodies).	☒ N/A-there are no other decision bodies for this project.
Discussed determination with other regulator(s) on the determination (if applicable)	☒ The Department of Environment provided Yukon departments of EMR (O&G) and EMO, and the City of Whitehorse, with an opportunity to provide comments. No comments were received.
Ensured that First Nation consultation obligations are being met for this renewal or amendment	☒ The Department of Environment initiated written consultation with Ta'an Kwächän Council and Kwanlin Dün First Nations on November 28, 2017. No comments were received from either of these First Nations.

In the opinion of the Decision Body for this project, as noted in the reasons mentioned above, it has been determined that the renewal or amendment to the regulatory authorization:

☐ **Requires a *YESAA* assessment**
☒ **Does not require a *YESAA* assessment**

Todd Powell
A/Director, Environmental Programs
Department of Environment

THERMAL ENERGY PART OF OUR
Future-Focused Portfolio

yukon energy

planning for cold weather, emergencies and increased demand

THE INSTALLATION OF RENTAL DIESEL GENERATORS AT THE EXISTING FARO DIESEL PLANT

next steps

Over the next few months, we'll be working to get our Faro diesel plant site ready for the arrival of the rental generators. During that time you can expect to see the following.



Yukon Energy crews and contractors at the Faro diesel plant doing groundwork and installing additional electrical equipment in the yard



The arrival of the seven generators



The delivery of additional shipments of fuel now and throughout the winter

staying safe during COVID-19

Yukon is our home too. Like you, we are committed to the health and safety of our employees, families and customers. We have developed a strict COVID-19 safety plan that makes the Faro diesel generator project COVID-safe. We will:



Maintain two metres of separation between workers



Use Personal Protective Equipment at all times



Disinfect equipment regularly



Stagger work breaks to help enforce social distancing

For more information, visit **yukonenergy.ca** or contact **communications@yec.yk.ca.**

yukon energy

At Yukon Energy, it's our job to supply the electricity Yukoners need when and where they need it. Our ability to keep the lights on is especially important during Yukon's cold and dark winters when demand for electricity is the highest.

This means we're always planning for cold weather, emergencies and increased demands for electricity. That's why we rent diesel generators each year as our insurance policy against prolonged power outages until we can build more dependable renewable resources.

This winter, we're renting 17 portable diesel generators; seven more than last year. If the cold snap in January 2020 reinforced anything for us, it's that, collectively, Yukoners are using more electricity than ever before, and that more sources of dependable electricity are needed at the flip of a switch during the winter.

Ten of the rental diesel generators will be installed in our Whitehorse parking lot like last year. The other seven will be installed at our diesel power plant in Faro.

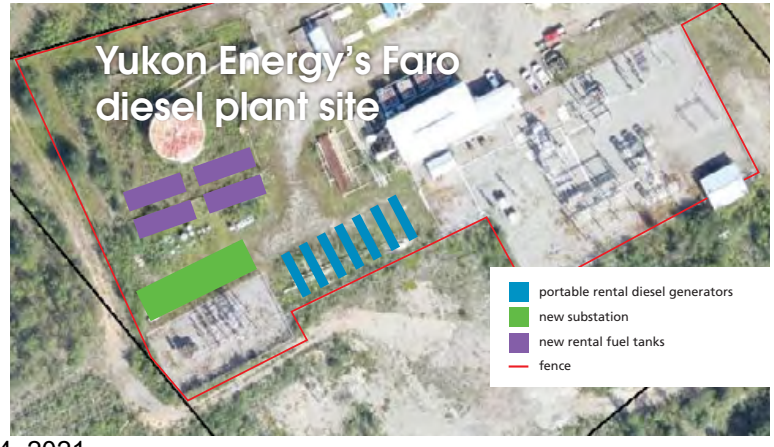
why Faro?

Our diesel plant in Faro is the ideal second location for these portable rental diesel generators because:

- There's enough room to install the generators within our property's fenceline.
- There's room in our yard to build the new substation we need to connect the generators to the Yukon grid.
- There's an existing fuel storage tank on site and room to add the extra temporary fuel tanks we'll need.

When researching this project, we also looked at the option of adding rental generators at our existing diesel plants in Dawson and Mayo. We ruled out those options because:

1. There isn't enough room at the Dawson and Mayo plants to add the extra rental units, fuel and electrical equipment we would need.
2. Our studies showed that by having all seven of the extra rentals located in Faro, they could more efficiently meet peak demands for electricity across the entire Yukon grid.
3. Setting up the seven extra rentals in Faro is less expensive than having to set them up in three separate locations.



how often will they be used?

We rent portable diesel generators each winter to protect Yukoners from prolonged power outages during emergencies and periods of high demand.

The rental diesel generators in Faro won't run all of the time. They'll be used:

- On extremely cold winter days when Yukoners need more electricity (usually around breakfast and dinner time).
- In case of a breakdown at one of our major hydro power plants.
- Each month, for a few hours, to test the engines.

how loud will they be?

We know that diesel generators can be loud.

This winter, we will monitor noise levels emitted by the rental diesel units at the Faro plant. If sound levels are found to be higher than permissible levels, we'll look at ways to help muffle the noise in future years.

Rental Diesels in Faro

December 2, 2020

With thanks and gratitude

Yukon Energy recognizes that we live and work on the Traditional Territories of Yukon First Nations.

We give thanks to the Ross River Dena Council for allowing our facilities and this project to take place on their Traditional Territory.

2

Today's discussion

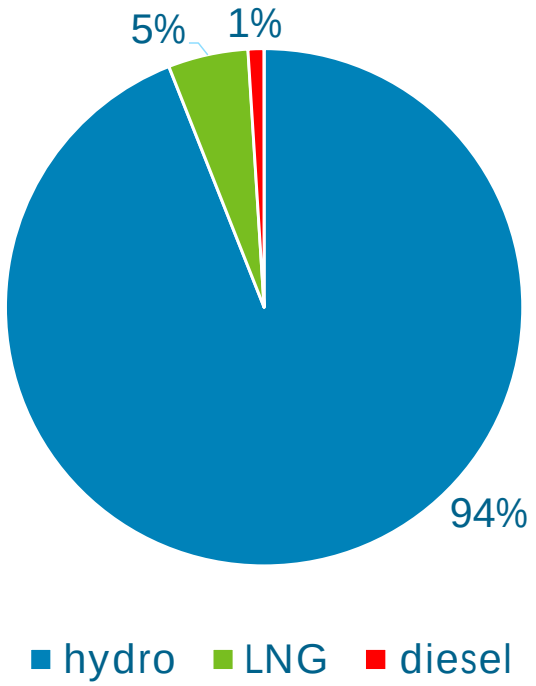
- Why diesel?
- Why more now?
- Why Faro?
- When will they be used?
- What does it mean?
- What does the future hold?
- Discussion

3

Why diesel?

It’s a key part of our electricity mix

Generation Sources, 2015-2019 average

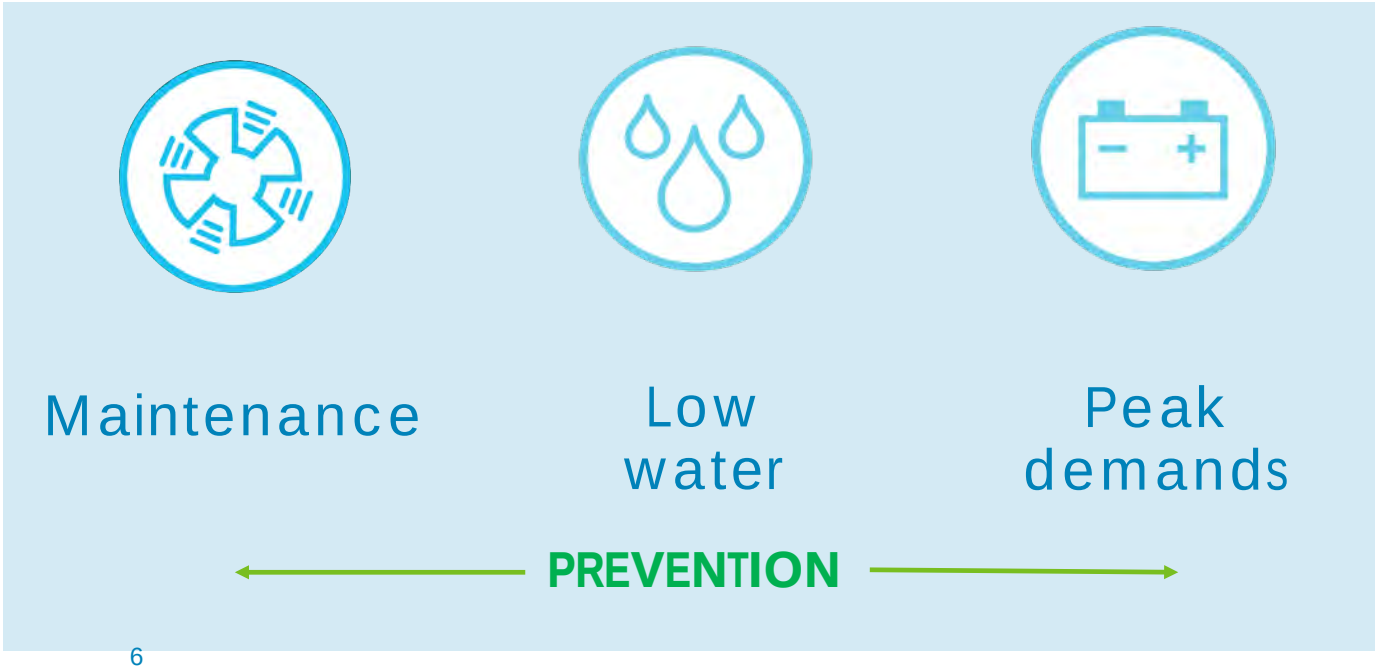


5

Yukon's electricity system is one of the greenest in Canada, using mostly hydro.

We're an isolated grid, not connected to any other province or territory. We need to be self-sufficient.

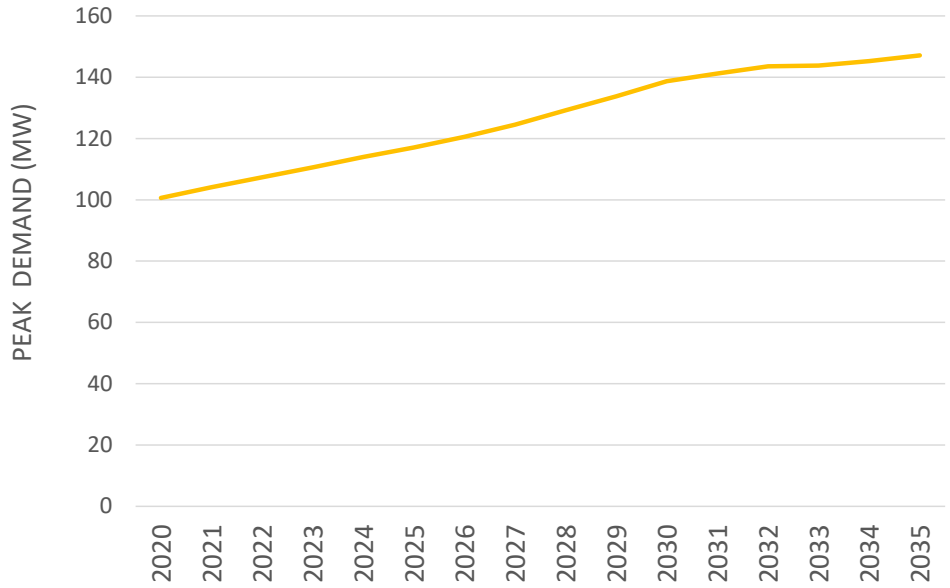
Diesel is used during:



Why more now?

Peak demand for electricity is growing

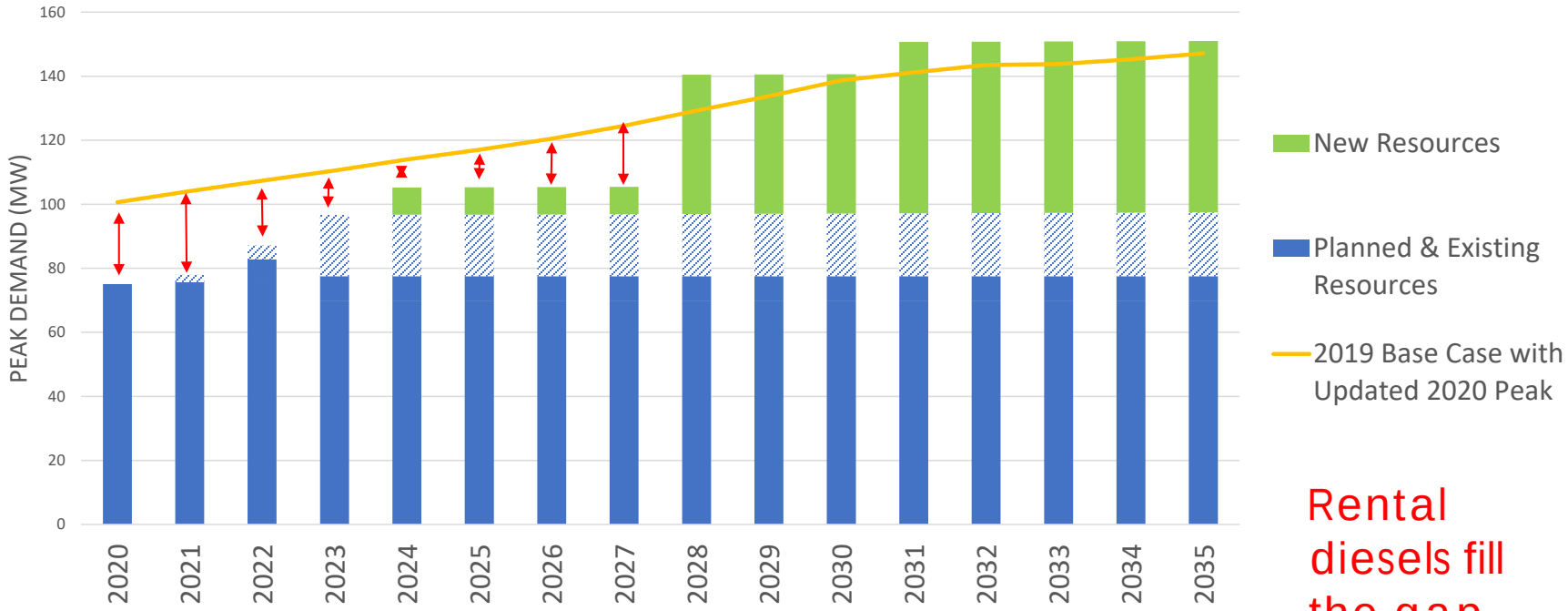
We expect peak demand for electricity to grow by 40% in the next 10 years



- Continued growth in population & electricity use
- Policy actions to address the climate change emergency

8

Rental diesels are needed to fill the gap until new projects are built



Rental diesels fill the gap

9

Why Faro?

The ideal second site for rentals

Whitehorse is full



11

Project location considerations

Site specific:

- Existing diesel sites only
- Allowances in existing air permit
- Space for units, fuel and substation

General:

- Whitehorse is maxed out
- Operating efficiencies (output and resources)
- Cost efficiencies

12

Faro as the preferred site



Site layout



14

Space in our yard



Equipment and fuel tanks





New substation





Rental units





18

Commissioning





19

When will they be used?

To keep the lights on

Running the rentals





During cold weather for peaking



In case of an emergency

21

What does it mean?

Environment, sound and air assessments

Environmental & socio-economic assessments

Sound assessment

Existing Site	With Rentals
58 dB	<1 dB change

Note: nearest point of reception is barracks bldg. on Ketza Ave.

Rental units are more efficient and have lower emissions than the existing permanent units.

Annual facility emissions are well under those permitted by the Yukon Ambient Air Quality Standards.

An irritant (NOx) may be present under extreme conditions, very infrequently and for short periods of time.

What does the future hold?

Upgrades and improvements on site

Immediate: Diesel will be used to keep the lights on.

Next year: A proposal to YESAB for an expanded air permit.

2-3 years: Replacing an old diesel unit with newer model.

8-10 years: Rentals used each winter until renewables built.

Long-term: Diesel used to prevent & restore outages and during emergencies.

27

Discussion

Thank you for your time

REFERENCE:

QUESTION:

a) As the Faro diesel site is on RRDC Traditional Territory, does YEC have have [sic] the support of Ross River Dena Council for the modifications to the plant? Please provide documentation of any consultation and interaction with RRDC concerning the Faro plant.

ANSWER:

(a)

Between April 2020 and January 2020, Yukon Energy has contacted representatives of the Dena Nezzidi Limited Partnership (designate for the Ross River Dena Council) at least nine times by email and phone to share information about the Faro rental diesel project and procurement opportunities, and to request a meeting with Ross River Dena Council to discuss the project.

The Dena Nezzidi Limited Partnership representative attended Yukon Energy's December 2, 2020 public information meeting. Copies of the presentation and a summary of the discussion was provided to them following the meeting.

As of February 9, 2021, representatives of the Dena Nezzidi Limited Partnership have not provided Yukon Energy with a date and time for the requested meeting with Ross River Dena Council to discuss the specific Faro rental diesel project and YESAA project proposal.

REFERENCE:

QUESTION:

At the (virtual) meeting that YEC held with the community about the rental diesels on 2-Dec, 2020, one slide had the text: “Next Year: A proposal to YESAB for an expanded air permit.”

a) Please explain what is covered by the current 2014-2024 air permit.

b) Please explain what YEC is seeking with the “expanded air permit,” and why it is needed.

c) Please provide the “Project Description” that will be used for the upcoming YESAB assessment for the Faro site.

d) Please explain the business case for applying for the air permit after the installation of infrastructure and the renting of generators.

e) Please discuss the risks and potential financial impacts of building a project before applying for a required YESAB assessment.

f) Please discuss how this approach relates to social license for stakeholders (RRDC and Faro residents)

ANSWER:

(a)

The current air emissions permit authorizes the use of diesel fuel to operate compression ignition engines to generate electricity at the Whitehorse Rapids Generating Station (WRGS), Mayo Generation Station (MGS), Dawson City Generating Station (DCGS), and Faro Generating Station (FGS) generating stations, with WRGS also having authorization to operate three (3) natural gas fired generators.

(b)

Yukon Energy is seeking authorization to operate up to an additional 4.9 MW of diesel generation at the FGS, in addition to its existing generation limit of 10.6 MW (for a total of 15.5 MW).

(c)

The Yukon Energy Corporation (Yukon Energy) is applying under Parts 6 and 9 of the *Environment Act* and Part V of the *Air Emissions Regulations* for an amendment of Air Emissions Permit No. 60-010 authorizing Yukon Energy to modify the thermal generating component (the Project) of its Faro Diesel Facility (the Site).

Yukon Energy is seeking an amendment of the Permit to allow for the addition of up to 4.9 MW of additional (to a maximum total of 15.5 MW) operational capacity for the diesel electricity generators. The Site is currently permitted to operate at a capacity of 10.6 MW. These generators will act as insurance against the very unlikely event that Yukon Energy experiences an extended winter power outage with loss of generation or transmission from the Aishihik Generating Station,[1] if hydroelectricity cannot meet energy demands and for maintenance purposes. An extended power outage has a very low probability, but the likely consequences require Yukon Energy to be prepared to immediately restore supply to customers on the grid to avoid rolling blackouts. Having access to portable diesel generators ensures that Yukon Energy can continue to provide reliable service during the winter in an emergency.

The need for this contingency measure came as a result of analysis of information prepared as part of Yukon Energy's 2016 Resource Plan (2017). The 2016 plan and the 2017-18 GRA identified that there was a capacity gap in 2017-18 of approximately 8 MW between maximum probable (winter) load and the installed capacity of the system under an N-1 event. Yukon Energy's updated 10-Year Renewable Electricity Plan, updated in December 2020, identifies an even greater gap (> 20 MW) between existing resources

[1] **Emergency (or "N-1") Whitehorse-Aishihik-Faro (WAF) and Mayo-Dawson (MD) system capacity planning criteria:** Each grid system (WAF and MD) will be planned to be able to carry the forecast peak winter loads (excluding major industrial loads) under the largest single contingency (known as "N-1"). The N-1 criterion determines system capacity assuming the loss of the system's single largest generating or transmission-related generation source. In the case of WAF, this is presently the Aishihik transmission line, without which the WAF grid loses ability to access approximately 37 MW of generation.

and forecasted peak energy demand (Yukon Energy 2020). This Project is expected to be required until more permanent solutions to address the current N-1 capacity gap are implemented. Yukon Government's document Our Clean Future: A Yukon strategy for climate change, energy and a green economy (Government of Yukon 2020) identifies a renewable energy target of 97% by 2030. Yukon Energy's 10-Year Renewable Electricity Plan outlines key projects and partnerships that will help to address the energy and peak capacity shortfalls over the 10-year planning horizon. A number of projects have been identified in the Future-Focused Portfolio (such as Whitehorse Hydro uprates, the battery energy storage system, the Southern and Mayo Lakes Enhanced Storage Projects) but these projects will take time to plan, design, permit, and construct, and Yukon Energy requires a temporary solution be put in place until new capacity can be added to the system. These back-up units would be at the bottom of stacking order and would only be operated in the case of an emergency, when hydroelectricity cannot meet demands, and for short durations for monthly exercise to confirm operational readiness.

The permit amendment request to modify the existing thermal is subject to a Designated Office level environmental and socio-economic effects assessment by the Yukon Environmental and Socio-economic Assessment Board (YESAB) under the *Yukon Environmental and Socio-economic Assessment Act* (YESAA).

Pursuant to that assessment, Yukon Energy requests a recommendation from the Designated Office to allow the Permit amendment to proceed, on the basis that the Project (i.e., the modifications to Yukon Energy's diesel generating facilities described in this proposal and operated in accordance with the terms and conditions of an air emissions Permit and the applicable provisions of the *Environment Act* and *Air Emissions Regulations*) will not have a significant adverse environmental or socio-economic effect within the meaning of section 56(1)(a) of YESAA.

In contrast to the diesel generation facilities operated by ATCO in communities such as Watson Lake and Old Crow, which are isolated from the transmission grid and must therefore operate continuously (24 hours per day, 365 days per year), Yukon Energy only uses its fossil fuel-fired generators:

- As back up during renewable energy system outages (planned and unplanned);

- To supplement energy demand during colder periods of the year; and

- To exercise the units for very short durations on a monthly basis to ensure operational readiness.

This is because most of the needs of customers on the system are satisfied by Yukon Energy's three hydro generating stations. For the vast majority of the time, the thermal generators do not operate. However, Yukon Energy's thermal generation facilities are essential to its ability to provide a reliable supply of electricity to customers whenever demand exceeds hydro supply (e.g., as a result of planned maintenance, emergency repair, or peaking demand during cold temperatures).[2]

Yukon Energy is regulated principally under the Yukon *Business Corporations Act*, *Public Utilities Act*, and *Waters Act*, and the federal *Fisheries Act.* In particular, under the *Public Utilities Act*, Yukon Energy has an obligation to supply electricity service to its customers, and its rates and operations are subject to regulation by the Yukon Utilities Board. Yukon Energy's thermal generation facilities are also subject to regulation under the Yukon *Environment Act* and *Air Emissions Regulations*, as well as *YESAA*.

Yukon Energy's diesel (thermal) electric generating plants are installed and operated to ensure the ongoing operation of the integrated power system and so all customers on these systems can receive reliable power consistent with Yukon Energy's corporate and regulatory obligations.

Given the current generation mix (hydro, wind, and thermal) and system design, Yukon Energy's ability to operate the installed thermal plants, particularly during conditions where demand for electricity cannot be adequately met by hydro (e.g., planned maintenance, emergency repair, demand during cold winter temperatures), is essential to avoid scenarios where there would be a requirement to impose blackout conditions to various customers. This is particularly relevant during times where the lack of such ability would at best be very inconvenient, and at worst dangerous to infrastructure and human health and safety, such as would be the case during cold winter temperatures.

[2] For example, Yukon Energy's reliance on the thermal generation facilities was essential when a major power outage occurred on the WAF grid in January 2006 due to a failure on the connection to the Aishihik hydro generating facility. If Yukon Energy had not had the ability to operate its diesel units in those circumstances, customers would have been left without power in the middle of the winter.

The current need for thermal generation is related to several factors including:

1. The need to meet demand for electricity during those times when hydro-electric facilities are offline as a result of an emergency condition;

2. The need to meet demand for electricity during those times when hydro-electric facilities are taken offline for routine maintenance;

3. The need to meet demand for electricity during those times when there is a grid separation (i.e., transmission outage) and electricity from hydro-electric facilities is not available;

4. The need to exercise a particular diesel unit as a part of routine maintenance; and

5. The need to meet demand for electricity during those times when hydro-electric facilities are otherwise unable to meet current demand for energy.

This Project includes an amendment to the existing Air Emissions Permit (Permit No. 60-010) to operate additional temporary rental diesel units up to a total site operational capacity of 15.5 MW, as required. The reason these units have been added to the Faro Diesel Facility is add additional capacity to reduce the gap in dependable energy required versus available.

Yukon Energy requires an amendment of its existing Air Emissions Permit No. 60-010 to have the ability to operate additional thermal generation resources and ensure the continuity of a reliable supply of power to Yukoners as described earlier in this proposal. A Permit can be issued by the Minister responsible for the Department of the Environment pursuant to Section 12 of the *Air Emissions Regulations* under the *Environment Act*. It is expected that the existing permit would be amended to allow the requested modification to the Faro Diesel Facility.

To amend the Permit, the Yukon Government regulatory authorities may require a decision document based on the environmental and socio-economic assessment of the amendment application under *YESAA*. An environmental and socio-economic assessment is understood to be required under Schedule 1, Part 4, Item 2(b) of the *Assessable Activities, Exceptions and Executive Committee Projects Regulations* under

YESAA, because the Permit is for the "operation … of … a fossil fuel-fired electrical generating station".

While the amendment request will be to authorize changes to the Faro Diesel Facility to have up to 15.5 MW of standby/back-up diesel generating capacity, the activity is a modification to an existing facility and does not involve the construction, decommissioning, or abandonment of a fossil-fuel fired electrical generating station, as such the proposed activity is not immediately assessable at the Executive Committee level.

Yukon Energy is requesting a recommendation by the Designated Office to allow the Permit amendment to proceed, on the basis that the Project (i.e., the continuing operation of the Yukon Energy's Faro Diesel Facility with the addition of 4.9 MW of additional diesel generating capacity (total of 15.5 MW of generating capacity) in accordance with the terms and conditions of the amended Permit and the applicable provisions of the *Environment Act* and *Air Emissions Regulations*) will not have a significant adverse environmental or socio-economic effect within the meaning of section 56(1)(a) of *YESAA*.

(d)

The Corporation deemed it prudent to advance the project activities in order to ensure it was positioned to meet the grid demand for energy as soon as the assessment and permitting could be completed for the additional capacity beyond the existing facility generating capacity limit. The prudency of sequencing activities in this manner was based on several factors that balanced the very real risks of not being ready to meet demand under an emergency condition with the risks of being denied a recommendation to proceed with the expanded generation capabilities as a consequence of the YESAA assessment and/or the permitting process that would follow under the *Environment Act*, *Air Emission Regulations*. The risk of proceeding with installation of the additional generators was mitigated by the following factors:

- Previous standardized modelling, stack testing, and assessments (including 3 assessments under YESAA) of air emissions at the Whitehorse Rapids Generating Station up to a maximum of 22 MW, with the nearest human receptor being within 250 m of the facility, have repeatedly demonstrated that there is a low likelihood of significant adverse effects arising from the operation of the facility.

- With the nearest receptor in the case of the FGS being more than 300 m from the facility, and the fact that operations would be capped at 15.5 MW, it was concluded that the potential for significant adverse effects associated with the increased generating complement proposed for the FGS was low.

- The FGS has previously been assessed under YESAA and authorized under the Environment Act, Air Emission Regulation for a total generating capacity of 10.6 MW. Through changing operational requirements the installed capacity at the facility has changed periodically, with installed units being moved to other generating stations that required such relocation to optimize operations. The FGS currently has generators with rated capacity lower than the permitted site limit or cap and as such the installation of at least some of the rental diesels could be used at the facility up to the existing permitted cap without further YESAA assessment. The availability capacity room within the permitted cap is another factor in proceeding with making provisions for additional unit installation at site before undertaking the assessment for the additional capacity which is only proposed for use beyond the existing air permit capacity limits once the required assessment and permitting is successfully completed.

(e)

Given the risk assessment and conclusions made under the circumstances described in the response to NY-YEC-1-10(d), the potential financial implications of proceeding with the project installation before applying for YESAA assessment required to add to the site capacity were deemed to be minimal and tolerable when compared to the very serious health, safety, and numerous other relevant implications of not being able to meet customer demand for electricity in the case of an emergency in the cold and darkness of winter in the Yukon.

(f)

Yukon Energy takes its responsibility to provide safe, reliable, affordable, and environmentally responsible electricity very seriously. In the context of the operational requirements driving the emerging need for the Project and the consequences of not being in a position to meet that need in an emergency it was determined that interested and potentially affected governments, organizations, and communities would best served by YEC advancing project planning. This would ensure timely ability to avoid the potential

need for service disruptions up to the current generating capacity limits it was lawfully permitted to operate, and has been for decades, while undertaking the appropriate activities to assess and permit the additional capacity it was proposing only to operate once an amended permit could be issued. On balance, it was assessed that reasonable societal expectations of the Corporation would be met by such an approach given the circumstances and the low likelihood of potentially significant adverse effects of such actions.

REFERENCE:

QUESTION:

Diesel Timeline: Please provide a timeline documenting the decisions and implementations of rental diesel in Faro. Please include the following points:

a) When was the decision made to add more rental diesel?

b) When was the decision made to put the additional rentals in Faro?

c) When did YEC inform Faro residents of the installation of the new diesels?

d) When did work begin on the installation of the rental diesels and related infrastructure?

e) When did YEC seek regulatory approval for the additional rentals?

f) When did YEC receive compliance documentation from the Department of Environment?

g) When was it realized that a YESAB assessment will be required to use the installed capacity?

h) When will the YESAB process for the additional diesels begin?

i) What is the projected date of YESAB completion?

j) How long are rental diesels expected to be part of the system?

k) When will other projects be completed or brought on-line to retire rental diesels? (Faro and Whitehorse) Please include specific projects and estimated completion dates and corresponding reduction in rental diesel.

ANSWER:

(a)

The decision to add more temporary diesel was made in January 2020 following an update of the peak forecast based on the record 2020 peak event recorded January 16, 2020.

(b)

The decision to add additional rental diesels at Faro was made in February 2020.

(c)

An information piece about the Faro rental project was mailed to all residents and citizens in Faro in September 2020. Information about the project, along with a copy of the mailer, was added to Yukon Energy's website at the same time. See response to NY-YEC-1-8 Attachment 1 for referenced materials.

Yukon Energy hosted a public information meeting about the project on December 2, 2020. The session was hosted online due to COVID-19 concerns. Six members of the public attended. The meeting was advertised with community posters, radio and print ads, and social media. A copy of the presentation was made available after the meeting on Yukon Energy's website. See response to NY-YEC-1-8 Attachment 2 for referenced materials.

Yukon Energy responded to questions received by phone, email and social media about the project as received.

(d)

Work began on February 26, 2020.

(e)

Yukon Energy has not yet sought regulatory approval for the additional capacity beyond the capacity limits of the existing air emissions permit. Only once an assessment is completed under YESAA and a Decision Document is issued will Yukon Energy make

application for the additional capacity beyond its existing permit capacity limits for the FGS. Regarding the installation of new units at the site to bring the operating complement of generators on site up the existing permitted capacity limit of 10.6 MW, that formal approval, which is provided for under the permit, was sought in August 2020.

(f)

As outlined in NY-YEC-1-10, “compliance documentation” has not been required for the activities Yukon Energy has undertaken to date.

(g)

It was understood that an assessment under YESAA would be required as soon as it was determined that the project proposed to install operating capacity beyond the existing permit limits of 10.6 MW. That conclusion was reached in summer 2020.

(h)

The YESAB process is tentatively planned for Q1 2021, following additional planned engagement with the RRDC.

(i)

While beyond Yukon Energy’s control, an assessment under YESAA for a project of this nature has historically taken 3-6 months.

(j)

Rental diesels are expected to be required on the system for the next 8 to 10 years.

(k)

The expected annual capacity additions, and forecast rental diesel requirements, are shown in the Table 1 below.

Table 1: Expected Capacity Additions: 2020/21 to 2028/29

	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029
Rental Requirements (# of Units)									
Whitehorse	9	9	9	8	6	8	9	9	0
Faro	6	6	3	0	0	0	1	3	0
New Capacity Resources (MW)									
DSM Programs	-	2.2	4.4	6.6	6.7	6.7	6.8	6.8	7.0
Battery Energy Storage System	-	-	7	7	7	7	7	7	7
Whitehorse #2 Uprate	-	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Diesel Replacement[1]	-	-	-	7.3	7.3	7.3	7.3	7.3	7.3
Atlin Hydro Expansion	-	-	-	-	8.5	8.5	8.5	8.5	8.5
Moon Lake Pumped Storage	-	-	-	-	-	-	-	-	35

[1] While the diesel replacement project replaces retired capacity with like-for-like nameplate capacity, some older units currently have de-rated dependable capacity, and the Whitehorse units being replaced have already been retired from the system. Replacement of these units with like-for-like nameplate capacity results in an increase in 7.3 MW of dependable capacity for the system.

REFERENCE:

QUESTION:

Rental diesel alternatives

a) What alternatives to rental diesel were considered?

b) Please provide cost/benefit analysis on alternatives to rental diesel.

c) What sites/locations were considered?

d) What criteria was used in selection / elimination of sites?

ANSWER:

(a) and **(b)**

YEC experienced a record peak in January 2020, which informed the forecast of required N-1 dependable capacity. This capacity was required for the winter of 2020/2021. No alternative to rental diesels would be available in this timeline. YEC's 10-Year Renewable Electricity Plan (see CW-YEC-1-36(a) Attachment 1) outlines several alternatives which will replace the rental diesels as they are brought online over the next ten years.

(c)

The following sites/locations were considered:

1. New site in Whitehorse
2. Faro
3. Mayo
4. Dawson

(d)

Given the tight timeline for deployment, the main criteria for site section was the existing permitting at each site, in order to maximize how much additional capacity of thermal could

be added under YEC's current air emissions permits. Consideration was also given to whether a YESAB Designated Office review and amended permit would be required (timeline of several months) versus a full YESAB Executive Committee Assessment, as that process would take more than a year to complete.

REFERENCE: **Impacts of rental generators on Faro which may affect future YESAB**

QUESTION:

a) Please provide a copy of the sound modeling study for the Faro generators.

(This study was cited by Travis Ritchie of YEC in a (virtual) meeting that YEC held with the community about the rental diesels on 2-Dec, 2020 – from the YEC meeting summary: "Travis noted that the findings of Yukon Energy's sound modelling study showed that if all rentals were to be running that predicted sound levels from the site at the nearest point of reception (occupied building) would be less than 1 dB more than what is emitted by the permanent generators.")

b) Please provide an updated spill plan and map of the site.

c) Please provide the most recent air quality assessment and dispersion study for the Faro site, and explain how this will be affected by the addition of the rentals.

ANSWER:

(a)

Please see Attachment 1 to this response.

(b)

Please see Attachment 1 to this response for the Faro Spill Contingency Plan. The site plan can be found on page 18 of the Spill Contingency Plan.

(c)

Please see Attachment 1 to this response.

YUKON ENERGY CORPORATION

NOISE IMPACT ASSESSMENT
FARO FACILITY

FEBRUARY 12, 2021



wsp

NOISE IMPACT ASSESSMENT

FARO FACILITY

YUKON ENERGY CORPORATION

FINAL

PROJECT NO.: 191-02438-01
DATE: FEBRUARY 12, 2021

WSP
UNIT 2
126 DON HILLOCK DRIVE
AURORA, ON, CANADA L4G 0G9

T: +1 905 750-3080
F: +1 905 727-0463
WSP.COM

SIGNATURES

PREPARED BY

Original Signed

Carolyn Ropp, B.Sc.
Acoustic Noise and Vibration Specialist

REVIEWED BY

Original Signed

Kana Ganesh, M.Sc., PhD, P.Eng.
Technical Director, Acoustics, Noise & Vibration

WSP Canada Inc. prepared this report solely for the use of the intended recipient, YUKON ENERGY CORPORATION, in accordance with the professional services agreement. The intended recipient is solely responsible for the disclosure of any information contained in this report. The content and opinions contained in the present report are based on the observations and/or information available to WSP Canada Inc. at the time of preparation. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP Canada Inc. does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report. This limitations statement is considered an integral part of this report.

The original of this digital file will be conserved by WSP Canada Inc. for a period of not less than 10 years. As the digital file transmitted to the intended recipient is no longer under the control of WSP Canada Inc., its integrity cannot be assured. As such, WSP Canada Inc. does not guarantee any modifications made to this digital file subsequent to its transmission to the intended recipient.

VERSION HISTORY

VERSION	DATE	TITLE	COMMENTS	PREPARED BY
1.0	February 12, 2021	Noise Impact Assessment – Generator Additions	Upgrade facility from approved 10.6 MW to 15.5 MW.	WSP Canada Inc

EXECUTIVE SUMMARY

WSP Canada Inc., (WSP) was retained by Yukon Energy Corporation (YEC) to prepare a Noise Impact Assessment (NIA) report for its diesel-fuelled electricity generating facility in Faro, Yukon. The Facility is located in south-central Yukon, within the asserted traditional territory of the Kaska Nation and upstream from the territory of the Selkirk First Nation. The Facility is located just northwest of the Town of Faro, Yukon and approximately 15 km south of Faro Mine.

The Facility has an existing Air Emissions Permit which allows the Facility to operate up to a capacity of 10.6 MW. The Facility has been, and is currently operating much below the permitted facility capacity of 10.6 MW with only two existing diesel generators on-site. WSP conducted a NIA to evaluate the potential noise impacts of increasing the Facility's capacity from the existing permitted capacity at 10.6 MW to 15.5 MW in the future. As a conservative approach the assessment of noise impact is based on 16.0 MW capacity. However, it is understood that the YEC will only be applying for a permit amendment with the Yukon Environmental and Socio-economic Assessment Board (YESAB), to allow up to 15.5 MW of capacity at the Faro Facility.

Compliance was established using the manufacturer's sound level data for the existing and proposed generators as noted below:

1. The existing generator, Model: Mirrlees KV16 with rated capacity of 5.15 MW, located within FD1 building shall be operated at or below the capacity of 2.4 MW
2. The existing generator, Model: Caterpillar (CAT) 3612 with rated capacity of 3.3 MW, located within FD7 building shall be operated at or below the capacity of 2.8 MW
3. Seven new generators are proposed (6 will be used for regular operation and 1 standby generator); each generator will be with rated capacity of 1.8 MW. Each of these generators will be with enclosures, silencers or mufflers providing an overall maximum sound level of 78 dBA at 7 metres (23 feet);

The assessment presented in this report are based on the guidelines provided British Columbia Oil and Gas Commission's (BC OGC) "British Columbia Noise Control Best Practices Guideline" (2009) and the principles provided in the Health Canada's (HC) "Guidance for Evaluating Human Health Impacts in Environmental Assessments: Noise" (2017). The assessment indicated that the changes in sound level due to the upgrade is minimal (less than 1 dB). Therefore, it is concluded that the operation of Facility with the proposed expansion complies with the PSL.

TABLE OF CONTENTS

1 INTRODUCTION 1
1.1 Study Area 1
1.2 Facility Description 1
1.2.1 Operating Capacity 2
1.3 Study Objectives 2
2 NOISE SOURCE SUMMARY 3
2.1 Noise Sources 3
2.2 Sources with Negigible Effects 4
3 NOISE RECEPTOR SUMMARY 5
4 ASSESSMENT CRITERIA 6
4.1 British Columbia Noise Control Best Practices Guideline 6
4.2 Acceptable Sound Level 7
5 IMPACT ASSESSMENT 8
5.1 Assessment Methods 8
5.2 Operating Scenarios 8
5.3 Modelling Results 8
6 RECOMMENDATIONS AND CLOSURE 10
6.1 Recommendations 10
6.2 Closure 10

TABLES

TABLE 1.1 GENERATOR CAPACITIES 2
TABLE 2.1 NOISE SOURCE SUMMARY TABLE .3
TABLE 3.1 POINT OF RECEPTION SUMMARY ..5
TABLE 4.1 PERMISSIBLE SOUND LEVEL LIMITS FROM BC OCG 6
TABLE 4.2 NOISE IMPACT RATING 7
TABLE 5.1 SUMMARY OF CHANGES IN SOUND LEVELS BETWEEN EXISTING AND FUTURE SCENARIOS 9

FIGURES

FIGURE 1: AREA MAP SHOWING SITE LOCATION
FIGURE 2: ZONING MAP
FIGURE 3: SITE MAP SHOWING EXISTING FARO FACILITY SOURCES WITH PROPOSED ADDITIONS
FIGURE 4: EQUIVALENT SOUND LEVEL CONTOURS - EXISTING FARO OPERATION
FIGURE 5: EQUIVALENT SOUND LEVEL CONTOURS - FUTURE FARO OPERATION
FIGURE 6: EQUIVALENT SOUND LEVEL CONTOURS – COMPARISON OF EXISTING AND FUTURE OPERATIONS

APPENDICES

A DRAWINGS
B TABLES
C MANUFACTURER SPECIFICATION

1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by Yukon Energy Corporation (YEC) to prepare a Noise Impact Assessment (NIA) report for its facility located in Faro, Yukon (the Facility). The Facility currently includes diesel generators with a permitted generating capacity of 10.6 MW. YEC is planning to expand the Facility's generation capacity to 15.5 MW. This report is required in support of a permit amendment pursuit with the Yukon Environmental and Socio-economic Assessment Board (YESAB) to increase capacity at the diesel-fuelled electric generating facility from the permitted capacity of 10.6 MW to 15.5 MW. Although the application of the Faro Facility is for 15.5 MW capacity, as a conservative approach, the NIA considered a capacity of 16 MW. However, it is understood that the YEC will only be applying for a permit amendment to allow up to 15.5 MW of capacity at the Faro Facility.

The purpose of this assessment is to evaluate the overall changes in noise impact due to the proposed changes at the nearby sensitive receptors. The analysis is based on manufacturer's sound level data and conservative estimates of the source sound levels. The findings of the assessment are discussed further within this report.

1.1 STUDY AREA

The study area surrounding the Facility can be classified as a rural area. The existing acoustic environment in the study area is expected to be dominated by natural environmental sounds during the day and night time.

The Facility is located in south-central Yukon, within the asserted traditional territory of the Kaska Nation and upstream from the territory of the Selkirk First Nation. The Facility is located just northwest of the Town of Faro, Yukon and approximately 15 km south of Faro Mine. The 25-sq. km Faro Mine was once the largest open pit lead-zinc mine in the world. The mine has been closed since 1998 and in the process of reclamation. The town is home to approximately 348 residences (Statistics Canada, 2016).

The Facility is in an area classified as 'Industrial/Commercial' surrounded by 'Industrial/Commercial' to the north; 'Parks & Open Space' to the west, and south; and 'Unsurvey Interim Protected First Nation Lands' to the east. The 'residential' lands located to the south and southeast is known as the Town of Faro. A scaled area map showing the Facility and its surrounding area is shown in **Figure 1** and a zoning map is included in **Figure 2**.

1.2 FACILITY DESCRIPTION

The Facility provides reliable energy supply to supplement renewable energy sources. The Facility provides electricity during loss of hydro generation, peak hours of consumption, low water periods, extreme low temperatures and emergencies. The Facility has the potential to operate 24 hours a day.

The Facility is comprised of the following existing buildings; a site plan showing the Facility buildings is provided in **Figure 3**:

- Generator Building (ID: FD1);
- Generator Building (ID: FD7)
- Office Building;
- Control Building;
- Storage Building and
- Diesel Storage Tanks.

The expansion includes operation of 7 rental units at the Facility; the make and mode of these units are Caterpillar (CAT) model 3516C. During the period of this permit the make and model of these units will remain the same.

1.2.1 *OPERATING CAPACITY*

The following generator operations makes up the proposed operating capacity (**Table 1.1**):

Table 1.1 Generator Capacities

GENSET ID	DESCRIPTION	RATED CAPACITY	OPERATING CAPACITY	REMARKS
FD1 (within building)	Mirrlees KV16 Model	5.15 MW	2.4 MW	Existing Operation
FD7 (within building)	Caterpillar (CAT) 3612	3.3 MW	2.8 MW	Existing Operation
YM20 to YM26[1]	Caterpillar (CAT) 3516C	1.8 MW each	6 units to provide 10.3 MW	New Turbines
Total Operating Capacity			15.5 MW	Total future capacity

[1] One of the rental units (i.e. YM26) will be a standby generator and will be used in case of power failure of another generator.

Other than the generator building, other buildings do not have a source with significant noise generation. The noise sources associated with generator building includes, air intake louvres and dampers, exhaust fans, noise breakout through the façade and combustion exhaust. In addition, there are remote radiators for the existing generators located outside the buildings on the north and southwest side at ground level, respectively. The 1.8 MW units (YM20 to YM26) comes with enclosures, silencers and mufflers designed to control noise emissions.

1.3 STUDY OBJECTIVES

The Facility has an existing Air Emissions Permit which allows the Facility to operate up to a capacity of 10.6 MW. The Facility has been, and is currently operating much below the permitted facility capacity of 10.6 MW with only two existing diesel generators on-site. These generators are housed in separate buildings on-site (FD1 and FD7). The study investigates if the future operation with 15.5 MW capacity has the potential to change the existing conditions.

2 NOISE SOURCE SUMMARY

WSP used drawings and site photographs to identify and establish the source of sound for the existing Facility operation and future Facility upgrade. Drawings from the site are included in **Appendix A**. The sources of noise are primarily air intakes and exhausts, radiators and the generators.

2.1 NOISE SOURCES

A total of thirty-four (34) non-negligible noise sources were identified and included in the assessments. These noise sources considered in the assessment are summarized in **Table 2.1;** the sound power of these sources were estimated based on the manufacturer's data. A detailed summary of the sources is provided in **Appendix B.** Manufacturer specification sheets are provided in **Appendix C**.

A site layout plan showing the source locations within the Facility is provided in **Figure 3**.

Table 2.1 Noise Source Summary Table

SOURCE ID	SOURCE DESCRIPTION	SOUND POWER LEVEL (dBA)	SOURCE LOCATION[1]	NOISE CONTROL MEASURES[2]
FD1_GEN_EXH1	FD1 2.4 MW Generator Combustion Exhaust	139	O	S
FD1_GEN_EXH2	FD1 2.4 MW Generator Combustion Exhaust	139	O	S
FD1_GEN_INT1	FD1 2.4 MW Generator Intake	118	O	S
FD1_GEN_INT2	FD1 2.4 MW Generator Intake	118	O	S
FD1_BLD_DIS1	FD1 2.4 MW Building Discharge	111	O	S
FD1_BLD_INT1	FD1 2.4 MW Building Intake	111	O	S
FD1_GEN_RAD1	FD1 2.4 MW Generator Radiator	114	O	U
FD1_GEN_RAD2	FD1 2.4 MW Generator Radiator	114	O	U
FD1_GEN_RAD3	FD1 2.4 MW Generator Radiator	114	O	U
FD1_GEN_RAD4	FD1 2.4 MW Generator Radiator	114	O	U
FD1_BLD_OUT1	FD1 2.4 MW Building Breakout Noise	116	O	U
FD1_BLD_OUT2	FD1 2.4 MW Building Breakout Noise	116	O	U
FD7_GEN_EXH1	FD7 2.8 MW Generator Combustion Exhaust	140	O	U
FD7_BLD_INT1	FD7 2.8 MW Building Intake	121	O	U
FD7_BLD_INT2	FD7 2.8 MW Building Intake	121	O	U
FD7_BLD_INT3	FD7 2.8 MW Building Intake	121	O	U
FD7_BLD_INT4	FD7 2.8 MW Building Intake	121	O	U
FD7_GEN_INT1	FD7 2.8 MW Generator Intake	112	O	U
FD7_GEN_INT2	FD7 2.8 MW Generator Intake	112	O	U
FD7_BLD_DIS1	FD7 2.8 MW Building Discharge Fan	120	O	U
FD7_BLD_DIS2	FD7 2.8 MW Building Discharge Fan	120	O	U
FD7_BLD_DIS3	FD7 2.8 MW Building Discharge Fan	120	O	U

SOURCE ID	SOURCE DESCRIPTION	SOUND POWER LEVEL (dBA)	SOURCE LOCATION[1]	NOISE CONTROL MEASURES[2]
FD7_BLD_DIS4	FD7 2.8 MW Building Discharge Fan	120	O	U
FD7_GEN_RAD1	FD7 2.8 MW Generator Radiator	112	O	U
FD7_GEN_RAD2	FD7 2.8 MW Generator Radiator	112	O	U
FD7_BLD_OUT1	FD7 2.8 MW Building Breakout Noise	115	O	U
FD7_BLD_OUT2	FD7 2.8 MW Building Breakout Noise	115	O	U
YM20_GEN_CAS	YM20 1.8 MW Generator Casing	103	O	E
YM21_GEN_CAS	YM21 1.8 MW Generator Casing	103	O	E
YM22_GEN_CAS	YM22 1.8 MW Generator Casing	103	O	E
YM23_GEN_CAS	YM23 1.8 MW Generator Casing	103	O	E
YM24_GEN_CAS	YM24 1.8 MW Generator Casing	103	O	E
YM25_GEN_CAS	YM25 1.8 MW Generator Casing	103	O	E
YM26_GEN_CAS	YM26 1.8 MW Generator Casing (Backup)	n/a	O	E

Notes:
[1] Source Location: O = outside of a building, I = inside of a building
[2] Noise Control Measures: S = Silencer/Muffler, A = Acoustic Lining, E = Acoustic Enclosure, U = Uncontrolled.

2.2 SOURCES WITH NEGIGIBLE EFFECTS

Some sources are expected to produce sound levels that are not significant compared to other loud sources. These noise sources are considered negligible and are not included in the assessment as these sources are not expected to contribute to the overall noise effect of the Facility at the nearby noise sensitive receptors. The sources with a negligible contribution (or source with insignificant contribution) at the receptors are listed below.

- Small exhaust fans and HVAC units;
- Small compressor or pumps;
- Indoor equipment with small or no motors;
- Breakout noise through façade of building that do not house generators;
- Small transformers (if any); and
- Worker vehicles (moving and idling).

3 NOISE RECEPTOR SUMMARY

Noise receptors are those locations where sound from noise sources at a facility is received and assessed against applicable limits. Sound may be assessed at the plane of a window (PoW) of a noise receptor such as a dwelling. For the purpose of this assessment, the selected PoWs represent the predictable worst-case noise impacts; it represents the closest PoW to the Facility (i.e., the window of the receptor facing the Facility). Receptors are summarized in **Table 3.1** and locations are shown in **Figure 1**.

Table 3.1 Point of Reception Summary

POR ID	DESCRIPTION	RECEPTOR HEIGHT[1] (M)	DISTANCE FROM FACILITY (M)[2]
R1	One Storey Residence on Dawson Drive	1.5	359
R2	Two Storey Residence on Dawson Drive	4.5	406
R3	Three Storey Residence on Dawson Drive	7.5	415
R4	One Storey Army Barracks on Kitza Avenue	1.5	359
R5	One Storey Del Van Gorder School on 100 Bell Avenue	4.5	792
R6	One Storey Faro Health Centre on 447 Campbell Street	1.5	915

Notes:
[1] The height represents the upper story window, which is most exposed to the site.
[2] Distance are provided from the Facility's closest noise source to the receptor.

4 ASSESSMENT CRITERIA

This section reviews the available criteria and establishes acceptable criteria for the Facility upgrade.

In the absence of any specific regulatory noise guidance or criteria in the Yukon, this assessment takes into account best practices and the following guidelines:

- British Columbia Oil and Gas Commission's (BC OGC) "British Columbia Noise Control Best Practices Guideline" (2009); and
- Health Canada's (HC) "Guidance for Evaluating Human Health Impacts in Environmental Assessments: Noise" (2017).

4.1 BRITISH COLUMBIA NOISE CONTROL BEST PRACTICES GUIDELINE

The BC OCG guidelines (BC Guide) are widely accepted in western Canada and commonly used in the Yukon. The guideline provides guidance regarding noise management from noise emission from energy-industry activities. The guideline requires a noise impact assessment for modifications to existing facilities, if there is a reasonable expectation of changes in noise source or sound level, and if there is a receptor located within 1.5 km distance. There is reasonable expectation of source sound levels as well, as there are receptors nearby for the Yukon Energy Facility. Therefore, a noise assessment is required.

The BC Guide is a receptor-based guideline (not property line-based guideline); it defines Permissible Sound Levels (PSLs) at the receptor locations. A PSL at the nearest residence or nearby receptors can be determined based on the methods discussed in the BC Guide. The BC Guide provides methods to estimate daytime (07:00 to 22:00) PSL and nighttime (22:00 to 07:00) PSL.

In accordance with the BC Guide, facilities constructed in and in operation prior to October 1998 are considered "deferred facilities". Such facilities, without outstanding noise complaints are considered to meet the community noise tolerance levels. It is understood that the Faro Facility was constructed prior to 1998 and does not have outstanding noise complaints. Therefore, the sound level from the existing operation is considered to be the PSL for this assessment.

Accordingly, a baseline model with existing operation was completed and the sound levels at the receptors were estimated. The estimated sound level from existing operation at receptors R1 to R6 are shown in **Table 4.1**.

Table 4.1 Permissible Sound Level Limits from BC OCG

POR ID	EXISTING NOISE LEVEL DAYTIME/NIGHTIME PSL (dBA)[1]
R1	58
R2	59
R3	59
R4	59
R5	48
R6	46

Notes:
[1] Refer Section 5 for modelling and results.

4.2 ACCEPTABLE SOUND LEVEL

As discussed previously, the sound levels in this assessment are expressed in terms of energy equivalent sound level over a one-hour period (Leq (1 hour)). Since the generator upgrade is proposed to an existing facility, the assessment considers changes to the acoustical environment before and after the upgrade.

Table 4.2 below, from published literatures, outlines the noise impact rating in relation to the change in sound levels from the baseline condition (or condition prior to the proposed upgrades). When a "significant" or greater impact is predicted (5 dB or greater), noise mitigation measures and their feasibility should be investigated.

Table 4.2 Noise Impact Rating

CHANGES IN SOUND LEVEL	IMPACT RATING
0 to 2.99 dB	Insignificant
3 to 4.99 dB	Noticeable
5 to 9.99 dB	Significant
Over 10 dB	Very Significant

Therefore, a change of up to 3 dB is considered insignificant and was used to assess the impact.

5 IMPACT ASSESSMENT

The objective of this acoustic assessment is to determine the changes in sound level due to proposed changes at Yukon Energy's Faro generator station upgrades during a predictable worst-case operation. A predictable worst-case operation is considered as an hour of operation during which the facility operates at its capacity (i.e. operates at 16 MW capacity).

Since the generator upgrade is being designed, this assessment is completed using an acoustic modelling approach for Faro Facility's current and future operations. This section discusses the assessment methodology, modelling scenarios, the results of the assessment as well as discusses the compliance of the Faro Facility.

5.1 ASSESSMENT METHODS

The predictive analysis of the Faro Facility's noise impact at the POR was completed using commercially available software package CADNA/A (Ver. 2020), a computerized implementation of the algorithms contained in the ISO 9613 "Acoustics – Attenuation of Sound during Propagation Outdoors". CadnaA modelling takes into account the following:

- Source sound power levels;
- Distance attenuation;
- Source-receptor geometry;
- Ground and air (atmospheric) attenuation; and
- Temperature and humidity effects on noise propagation.

The lands between the Facility and receptors are a mixture of sound abortive (e.g. grass) with some reflective (e.g. paved road) and modelled accordingly. Road pavements were modelled with a ground absorption of 0.4 and remaining surfaces were modelled with a ground absorption of one (1). Typical Yukon meteorological values were used to initialize several parameters in the model. These included a temperature of 10 degrees Centigrade and a relative humidity of 80%.

5.2 OPERATING SCENARIOS

The assessment was done assuming a predictable worst-case operation. Since the Facility has the potential to operate at full capacity 24 hours per day to meet power demands, no differences between daytime, evening, or nighttime operations were considered. Two scenarios were evaluated to determine the changes in sound level as previously discussed:

- Existing/Current Operation; and
- Future Expanded Capacity

5.3 MODELLING RESULTS

Table 5.1 shows the predicted sound level results between existing and future scenarios and compares the change in sound levels. Equivalent sound level contours (isopleths of equal sound level) are presented in **Figure 4** and **Figure 5** at heights of 1.5 m above the ground for existing and future scenarios, respectively.

Table 5.1 Summary of Changes in Sound Levels between Existing and Future Scenarios

POR ID	PREDICTED SOUND PRESSURE LEVELS (SPL), dBA			
	EXISTING SPL /PSL [dBA]	FUTURE SPL [dBA]	CHANGE in SPL[1] [dBA]	IMPACT RATING
R1	58	58	< 1	Insignificant
R2	59	60	< 1	Insignificant
R3	59	59	< 1	Insignificant
R4	59	60	< 1	Insignificant
R5	48	48	< 1	Insignificant
R6	46	46	< 1	Insignificant

Notes:
[1] No changes are also considered less than 1 decibel change for simplicity.

As indicated in **Table 5.1**, the changes in the sound levels produced by addition of generators to reach a capacity of 15.5 MW are predicted to be less than 1 dBA. The change in sound level caused by the proposed changes to the Yukon Energy Facility are therefore not considered a significant change. **Figure 6** shows the equivalent sound level contours for the existing and future operation side by side for comparison purposes; these figures show minimal change in sound level contours near the receptor area.

Since the change in sound level due to proposed modification (i.e. capacity increase) is predicted to be less than 1 dB, no additional mitigation other than those included with the proposed 1.8 MW rental units as identified are required.

6 RECOMMENDATIONS AND CLOSURE

6.1 RECOMMENDATIONS

Compliance was established using the manufacturer's sound level data; therefore, when selecting the new generators to reach operational capacity of 15.5 MW the following shall be implemented:

1. The existing generator, Model: Mirrlees KV16 with rated capacity of 5.15 MW, located within FD1 building shall be operated at or below the capacity of 2.4 MW
2. The existing generator, Model: Caterpillar (CAT) 3612 with rated capacity of 3.3 MW, located within FD7 building shall be operated at or below the capacity of 2.8 MW
3. The proposed new generators (YM20 to YM26) shall be 6 regulars plus 1 standby generator each with rated capacity of 1.8 MW and each with enclosures providing an overall maximum sound level of 78 dBA at 7 metres (23 feet);
4. Prior to installation, a shop drawing can be requested from supplier confirming the sound data to be less than 78 dBA at 7 metres (23 feet);
5. If a complaint is received after installation, an acoustic audit shall be performed consisting of onsite measurements.

6.2 CLOSURE

WSP Canada Inc., was retained by Yukon Energy Corporation (YEC) to conduct a Noise Impact Noise Impact Assessment (NIA) report in support of a permit amendment pursuit with the Yukon Environmental and Socio-economic Assessment Board (YESAB) to increase capacity at the diesel-fuelled electric generating facility in Faro, Yukon (the Facility) from the existing permitted capacity of 10.6 MW to 15.5 MW in the future.

Based on WSP's assessment and available information at the time of this report, the assessment indicated that the changes in sound level due to the upgrade is minimal. Therefore, it is concluded that the operation of Facility with the proposed expansion complies with the PSL.

FIGURES



126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

SITE LOCATION

REPRESENTATIVE RECEPTORS

N
W E
S

POR ID	Description	Receptor Height[1] (m)
R1	One Storey Residence on Dawson Drive	1.5
R2	Two Storey Residence on Dawson Drive	4.5
R3	Three Storey Residence on Dawson Drive	7.5
R4	One Storey Army Barracks on Kitza Avenue	1.5
R5	One Storey Del Van Gorder School on 100 Bell Avenue	4.5
R6	One Storey Faro Health Centre on 447 Campbell Street	1.5

150 75 0 150 Metres

CLIENT:
YUKON ENERGY CORPORATION

PROJECT:
NOISE ASSESSMENT
FARO POWER STATION
FARO, YUKON

PROJECT NO:	DATE:
191-02438-01	NOVEMBER 2020

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

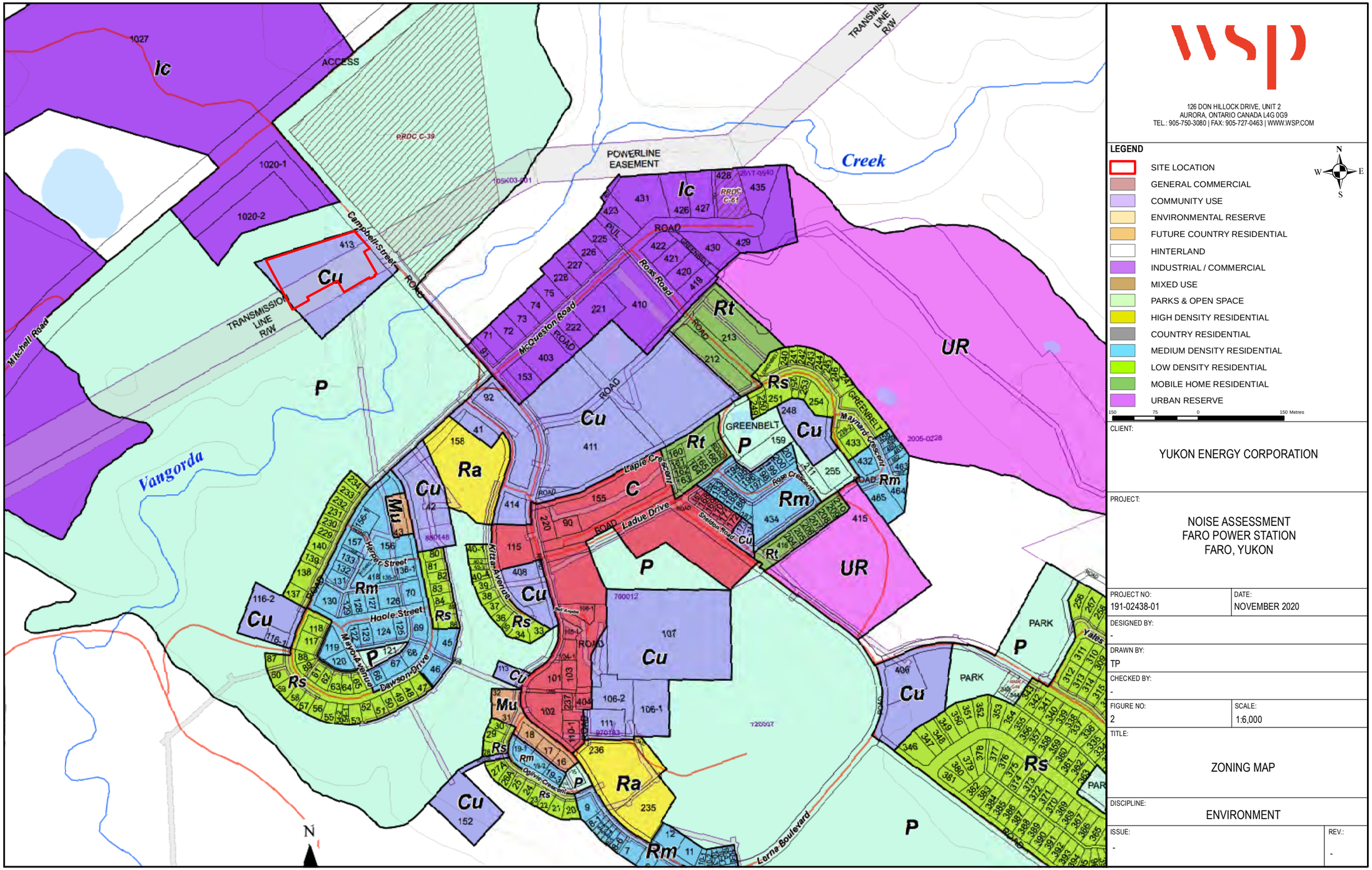
FIGURE NO:	SCALE:
1	1:6,000

TITLE:
AREA MAP SHOWING SITE LOCATION

DISCIPLINE:
ENVIRONMENT

ISSUE:	REV.:
-	-

Document Path: D:\aProjects\191-02438-01\MXD\191-02438-01 Figure 1 Area Map.mxd



126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

- SITE LOCATION
- GENERAL COMMERCIAL
- COMMUNITY USE
- ENVIRONMENTAL RESERVE
- FUTURE COUNTRY RESIDENTIAL
- HINTERLAND
- INDUSTRIAL / COMMERCIAL
- MIXED USE
- PARKS & OPEN SPACE
- HIGH DENSITY RESIDENTIAL
- COUNTRY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- LOW DENSITY RESIDENTIAL
- MOBILE HOME RESIDENTIAL
- URBAN RESERVE

150 75 0 150 Metres

CLIENT:
YUKON ENERGY CORPORATION

PROJECT:
NOISE ASSESSMENT
FARO POWER STATION
FARO, YUKON

PROJECT NO:	DATE:
191-02438-01	NOVEMBER 2020

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

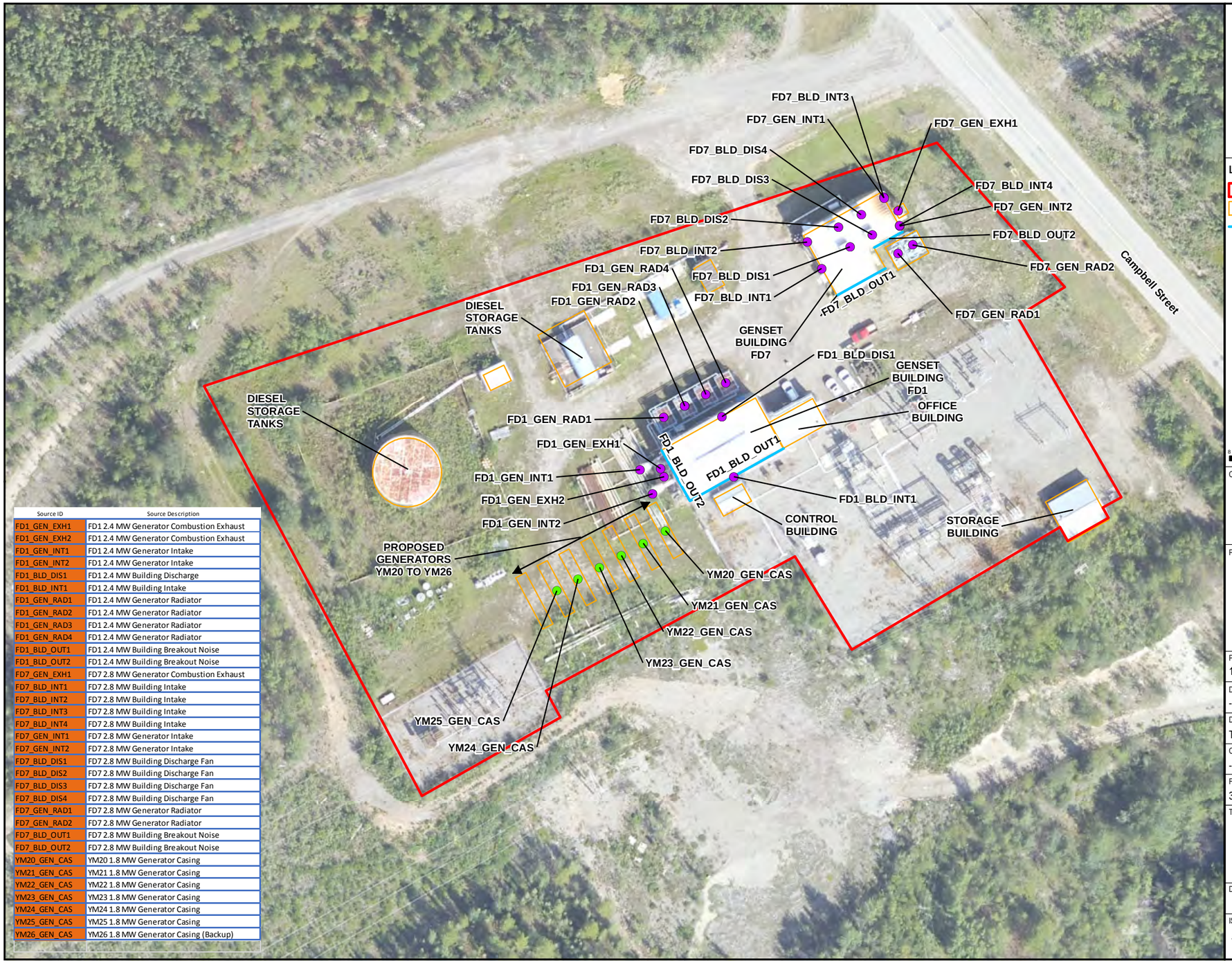
FIGURE NO:	SCALE:
2	1:6,000

TITLE:
ZONING MAP

DISCIPLINE:
ENVIRONMENT

ISSUE:	REV.:
-	-

Document Path: D:\aProjects\191-02438-01\MXD\191-02438-01 Figure 2 Zoning.mxd



Source ID	Source Description
FD1_GEN_EXH1	FD1 2.4 MW Generator Combustion Exhaust
FD1_GEN_EXH2	FD1 2.4 MW Generator Combustion Exhaust
FD1_GEN_INT1	FD1 2.4 MW Generator Intake
FD1_GEN_INT2	FD1 2.4 MW Generator Intake
FD1_BLD_DIS1	FD1 2.4 MW Building Discharge
FD1_BLD_INT1	FD1 2.4 MW Building Intake
FD1_GEN_RAD1	FD1 2.4 MW Generator Radiator
FD1_GEN_RAD2	FD1 2.4 MW Generator Radiator
FD1_GEN_RAD3	FD1 2.4 MW Generator Radiator
FD1_GEN_RAD4	FD1 2.4 MW Generator Radiator
FD1_BLD_OUT1	FD1 2.4 MW Building Breakout Noise
FD1_BLD_OUT2	FD1 2.4 MW Building Breakout Noise
FD7_GEN_EXH1	FD7 2.8 MW Generator Combustion Exhaust
FD7_BLD_INT1	FD7 2.8 MW Building Intake
FD7_BLD_INT2	FD7 2.8 MW Building Intake
FD7_BLD_INT3	FD7 2.8 MW Building Intake
FD7_BLD_INT4	FD7 2.8 MW Building Intake
FD7_GEN_INT1	FD7 2.8 MW Generator Intake
FD7_GEN_INT2	FD7 2.8 MW Generator Intake
FD7_BLD_DIS1	FD7 2.8 MW Building Discharge Fan
FD7_BLD_DIS2	FD7 2.8 MW Building Discharge Fan
FD7_BLD_DIS3	FD7 2.8 MW Building Discharge Fan
FD7_BLD_DIS4	FD7 2.8 MW Building Discharge Fan
FD7_GEN_RAD1	FD7 2.8 MW Generator Radiator
FD7_GEN_RAD2	FD7 2.8 MW Generator Radiator
FD7_BLD_OUT1	FD7 2.8 MW Building Breakout Noise
FD7_BLD_OUT2	FD7 2.8 MW Building Breakout Noise
YM20_GEN_CAS	YM20 1.8 MW Generator Casing
YM21_GEN_CAS	YM21 1.8 MW Generator Casing
YM22_GEN_CAS	YM22 1.8 MW Generator Casing
YM23_GEN_CAS	YM23 1.8 MW Generator Casing
YM24_GEN_CAS	YM24 1.8 MW Generator Casing
YM25_GEN_CAS	YM25 1.8 MW Generator Casing
YM26_GEN_CAS	YM26 1.8 MW Generator Casing (Backup)

Document Path: D:\aProjects\191-02438-01\MXD\191-02438-01 Figure 3 Sources.mxd

wsp
126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

- SITE LOCATION
- BUILDING AND GENERATOR LOCATIONS
- BREAKOUT NOISE SOURCE LOCATION
- EXISTING NOISE SOURCE LOCATION
- FUTURE SOURCES DUE TO ADDITION

N W E S

8 4 0 8 Metres

CLIENT:

YUKON ENERGY CORPORATION

PROJECT:

NOISE ASSESSMENT
FARO POWER STATION
FARO, YUKON

PROJECT NO:	DATE:
191-02438-01	NOVEMBER 2020

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

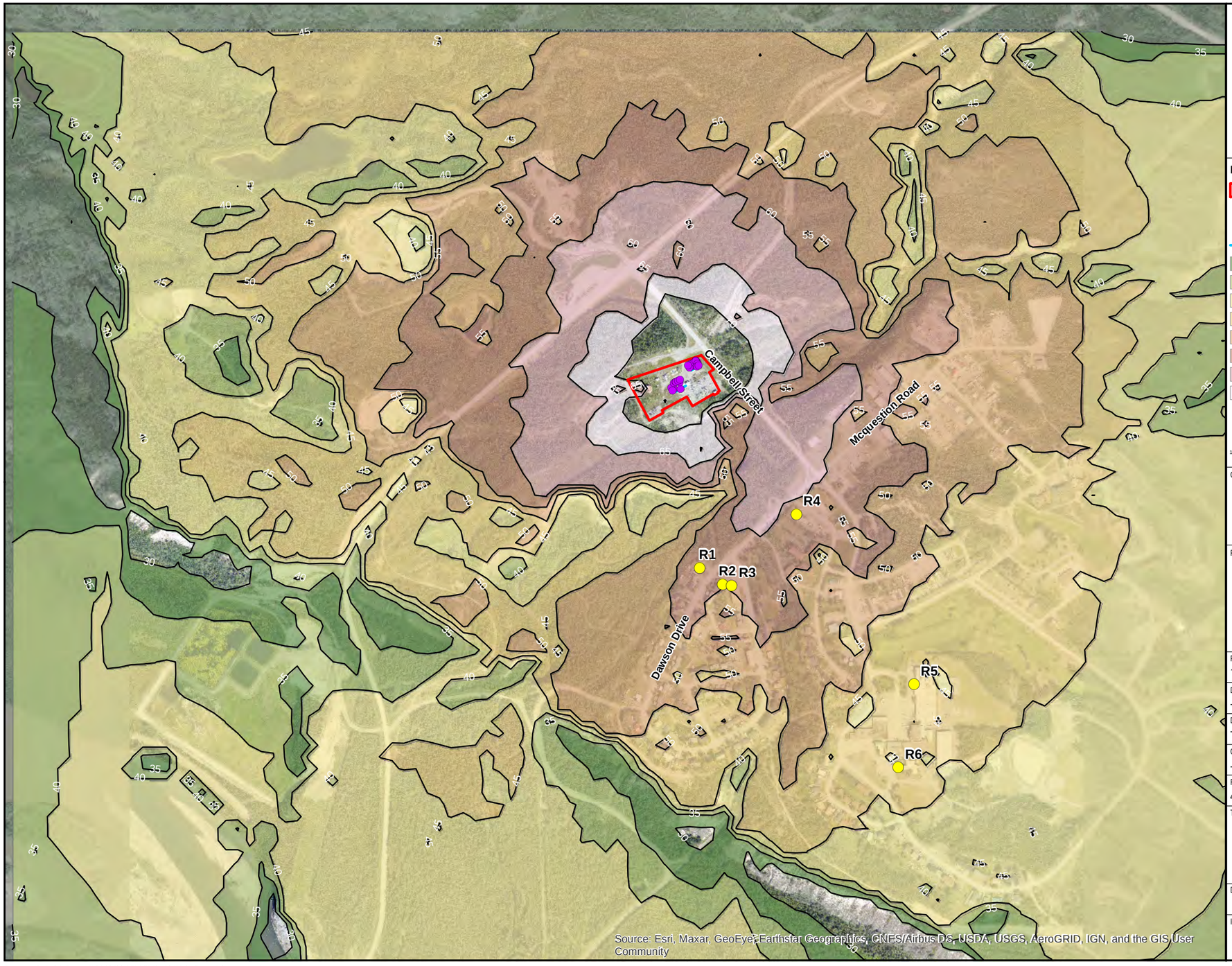
FIGURE NO:	SCALE:
3	1:800

TITLE:

SITE MAP SHOWING EXISTING
FARO FACILITY SOURCES
WITH PROPOSED ADDITIONS

DISCIPLINE: ENVIRONMENT

ISSUE:	REV.:
-	-



126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

- SITE LOCATION
- REPRESENTATIVE RECEPTORS
- EXISTING NOISE SOURCE LOCATION
- BREAKOUT NOISE SOURCE LOCATION
- 30 dB
- 35 dB
- 40 dB
- 45 dB
- 50 dB
- 55 dB
- 60 dB
- 65 dB

N W E S

150 75 0 150 Metres

CLIENT:
YUKON ENERGY CORPORATION

PROJECT:
NOISE ASSESSMENT
FARO POWER STATION
FARO, YUKON

PROJECT NO:	DATE:
191-02438-01	NOVEMBER 2020

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

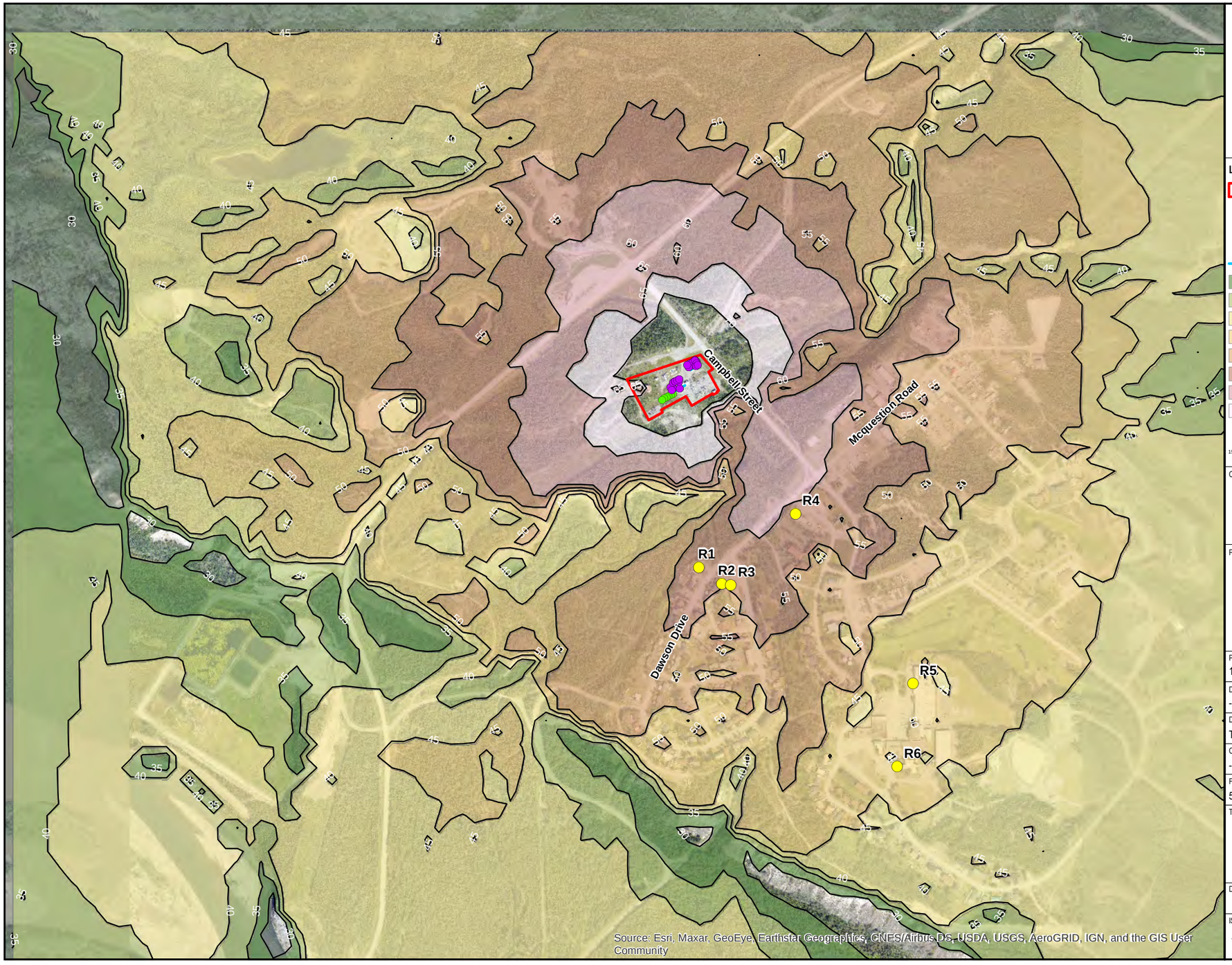
FIGURE NO:	SCALE:
4	1:8,000

TITLE:
EQUVALENT SOUND LEVEL CONTOURS
FOR EXISTING FARO FACILITY

DISCIPLINE:
ENVIRONMENT

ISSUE:	REV.:
-	-

Document Path: D:\aProjects\191-02438-01\MXD\191-02438-01 Figure 4 Contours.mxd



126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

- SITE LOCATION
- REPRESENTATIVE RECEPTORS
- EXISTING NOISE SOURCE LOCATION
- FUTURE SOURCES DUE TO ADDITION
- BREAKOUT NOISE SOURCE LOCATION
- 30 dB
- 35 dB
- 40 dB
- 45 dB
- 50 dB
- 55 dB
- 60 dB
- 65 dB

N, W, E, S

150 75 0 150 Metres

CLIENT:
YUKON ENERGY CORPORATION

PROJECT:
NOISE ASSESSMENT
FARO POWER STATION
FARO, YUKON

PROJECT NO:	DATE:
191-02438-01	NOVEMBER 2020

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

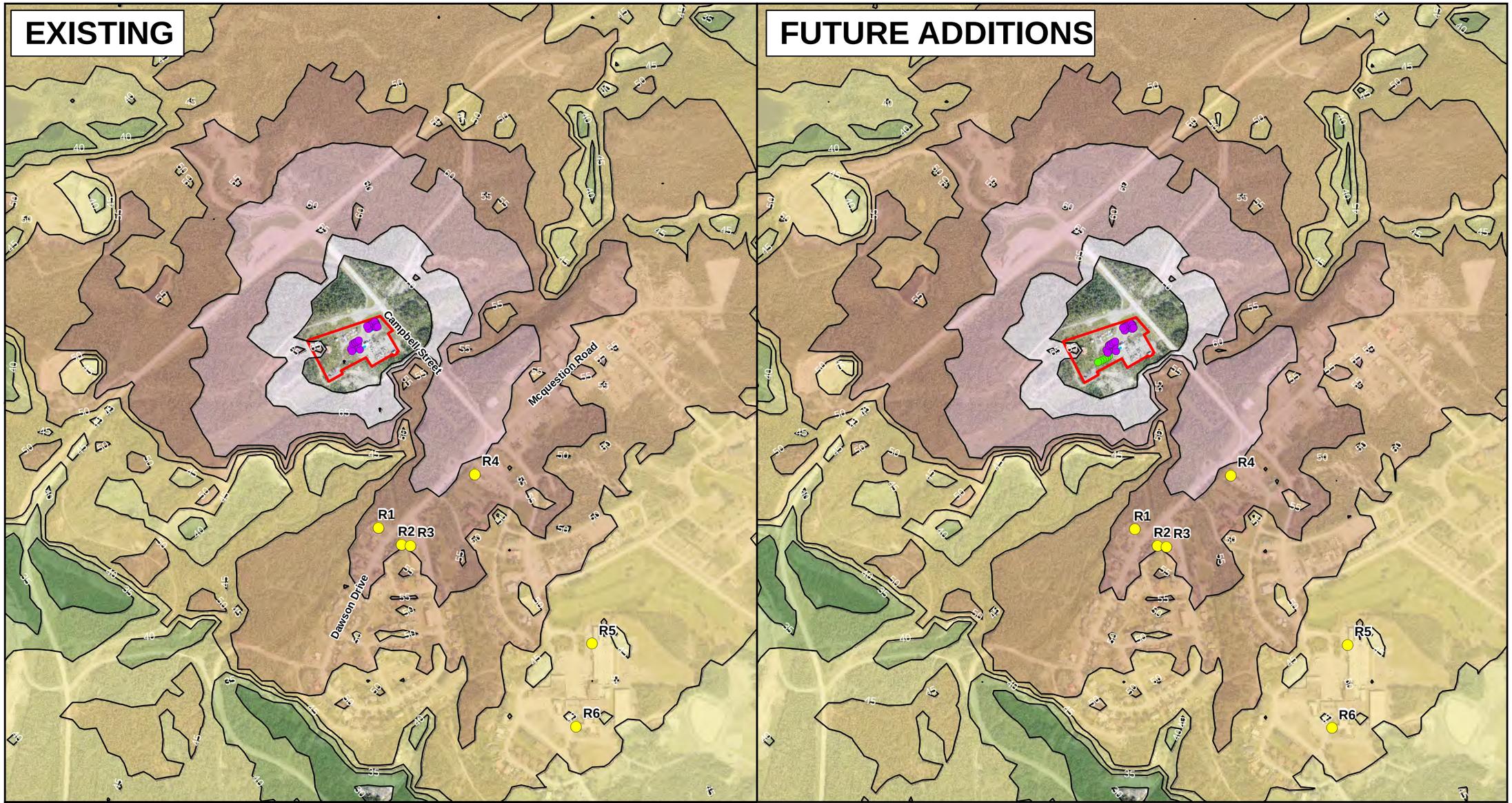
FIGURE NO:	SCALE:
5	1:8,000

TITLE:
EQUVALENT SOUND LEVEL CONTOURS
FOR EXISTING FARO FACILITY
AND FUTURE ADDITIONS

DISCIPLINE:
ENVIRONMENT

ISSUE:	REV.:
-	-

Document Path: D:\aProjects\191-02438-01\MXD\191-02438-01 Figure 5 Contours.mxd



126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

- SITE LOCATION
- REPRESENTATIVE RECEPTORS
- EXISTING NOISE SOURCE LOCATION
- FUTURE SOURCES DUE TO ADDITION
- BREAKOUT NOISE SOURCE LOCATION
- 30 dB
- 35 dB
- 40 dB
- 45 dB
- 50 dB
- 55 dB
- 60 dB
- 65 dB

160 80 0 160 Metres

CLIENT: YUKON ENERGY CORPORATION

PROJECT: NOISE ASSESSMENT
FARO POWER STATION
FARO, YUKON

PROJECT NO: 191-02438-01	DATE: NOVEMBER 2020
DESIGNED BY: -	
DRAWN BY: TP	
CHECKED BY: -	
SCALE: AS SHOWN	

TITLE: EQUVALENT SOUND LEVEL CONTOURS FOR EXISTING FARO FACILITY AND FUTURE ADDITIONS

DISCIPLINE: ENVIRONMENT

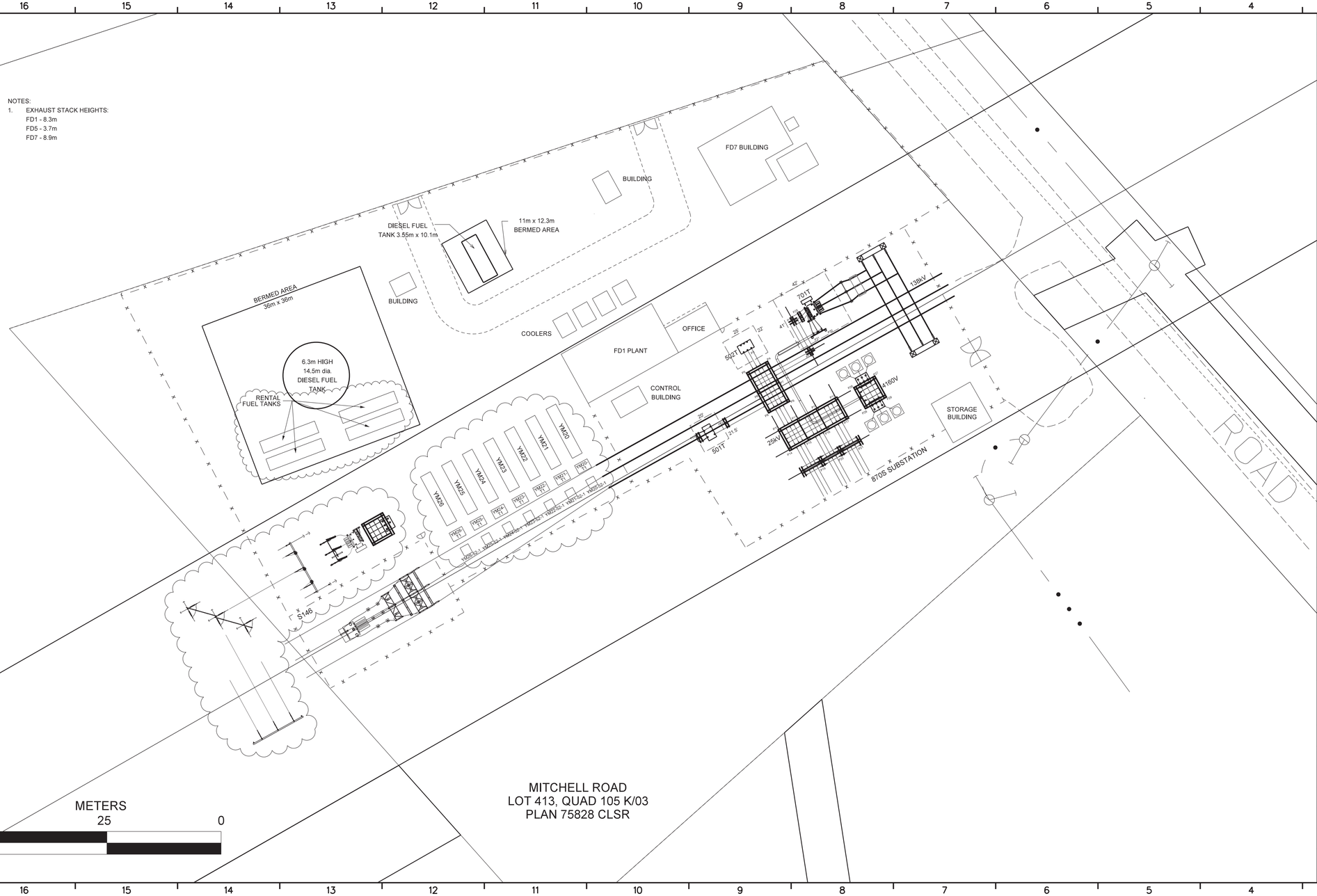
ISSUE: -	FIGURE NO: 6

Document Path: D:\aProjects\191-02438-01\MXD\191-02438-01 Figure 6 Contours.mxd

APPENDIX

A DRAWINGS

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



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 -

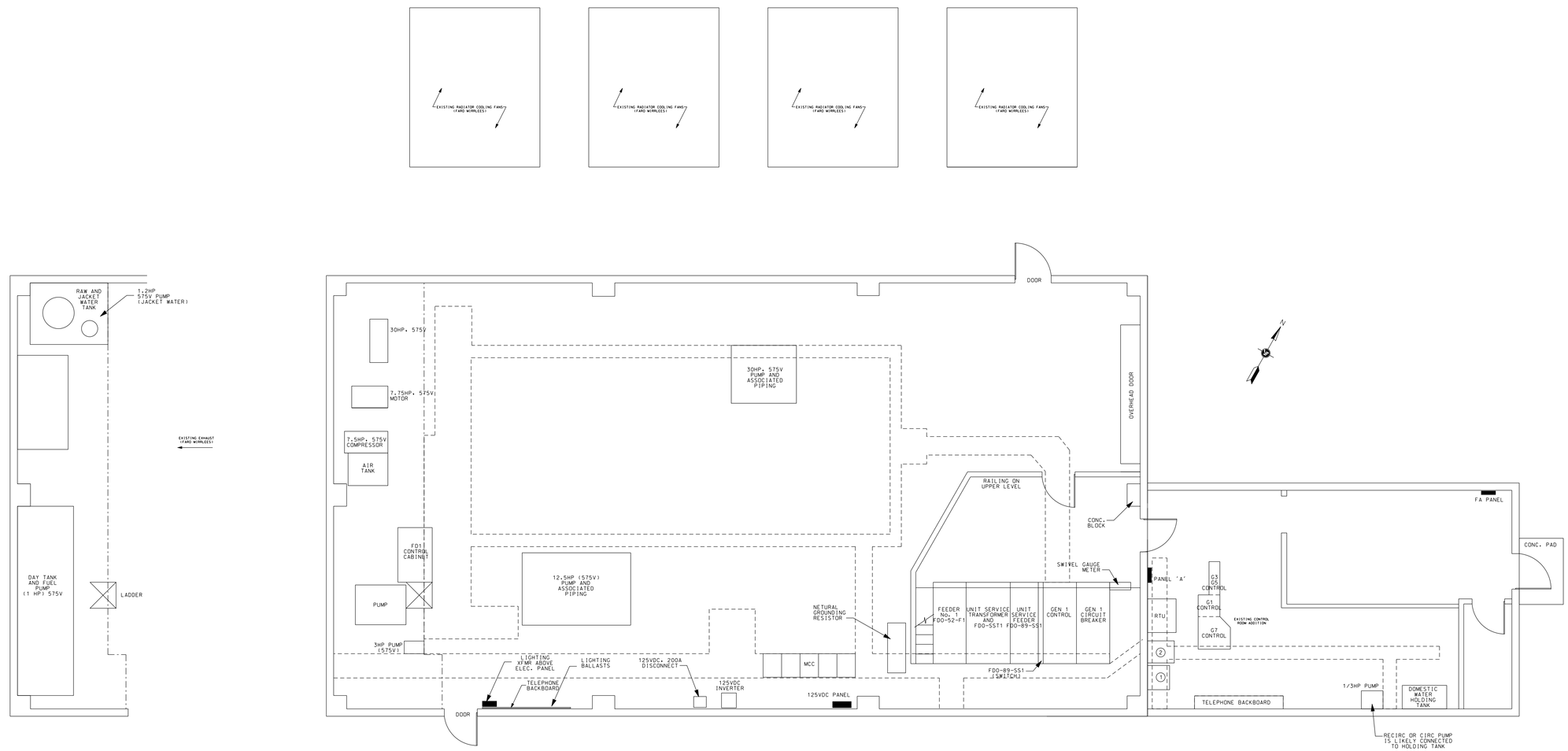
FARO DIESEL & SUBSTATION
SITE PLAN
LOT 413, FARO - YUKON

SCALE A1

farositeplan.dgn

REV. C

THIS DRAWING IS THE PROPERTY OF YUKON ENERGY CORPORATION AND CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION WHICH MUST NOT BE DUPLICATED, USED OR DISCLOSED OTHER THAN AS EXPRESSLY AUTHORIZED BY YUKON ENERGY CORPORATION.



MEZZANINE LAYOUT

MAIN FLOOR LAYOUT

(1) POWERLINE CARRIER FARO-TAKHINI

(2) OLD PLC/MARSHALLING CABINET

FARO FD1 PLANT

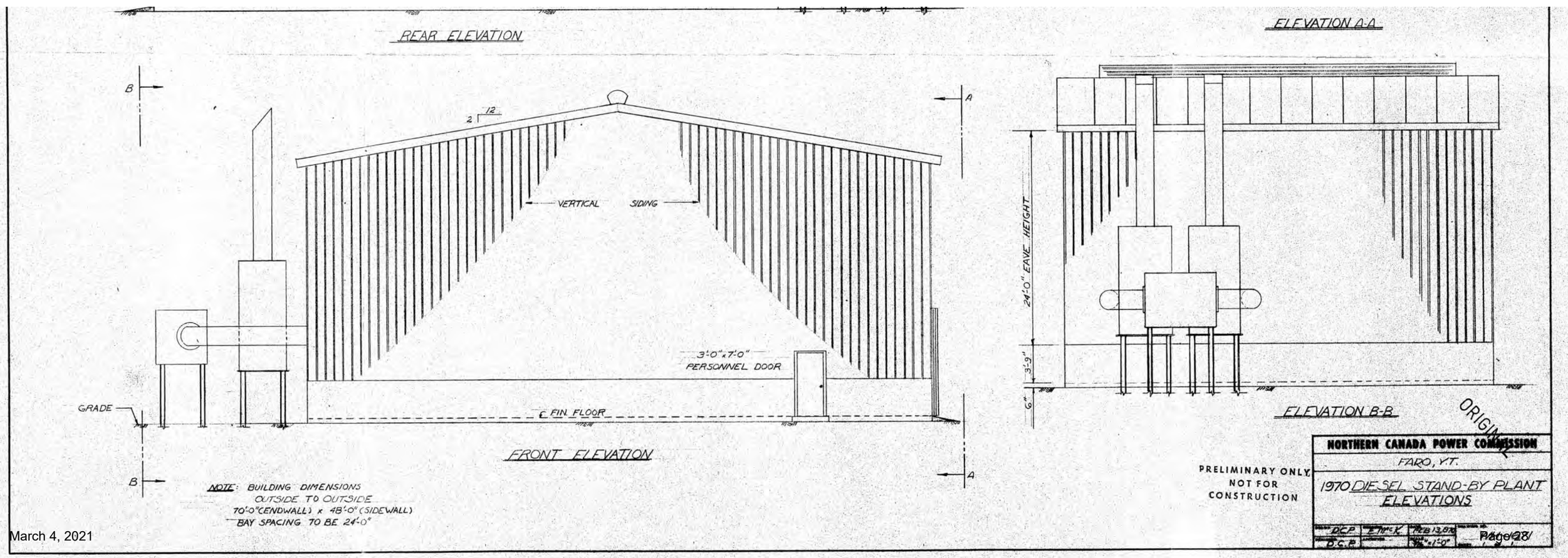
COMPILED FROM P131-1003, P131-608

FOR REFERNCE ONLY

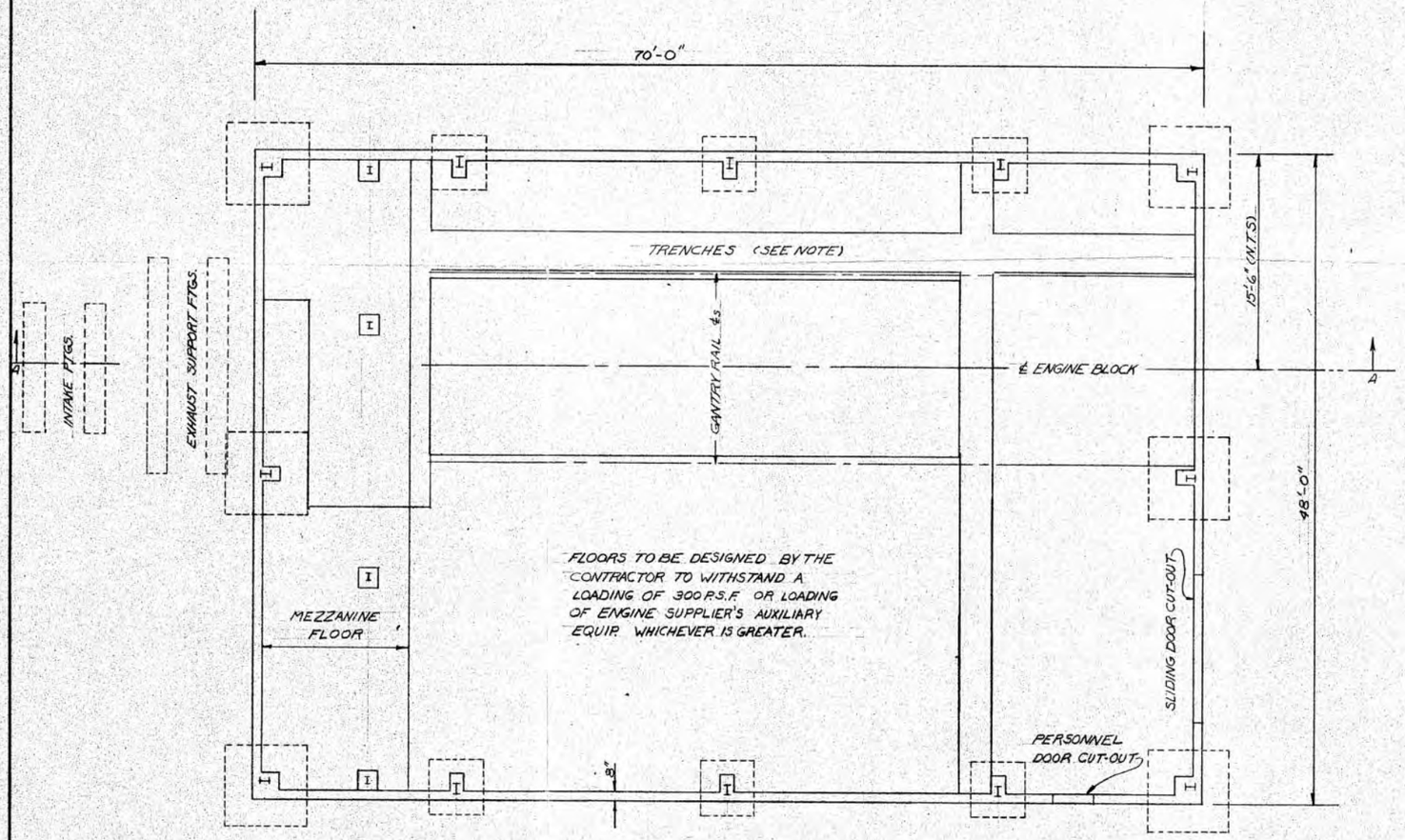
CADD

YUKON ENERGY CORPORATION

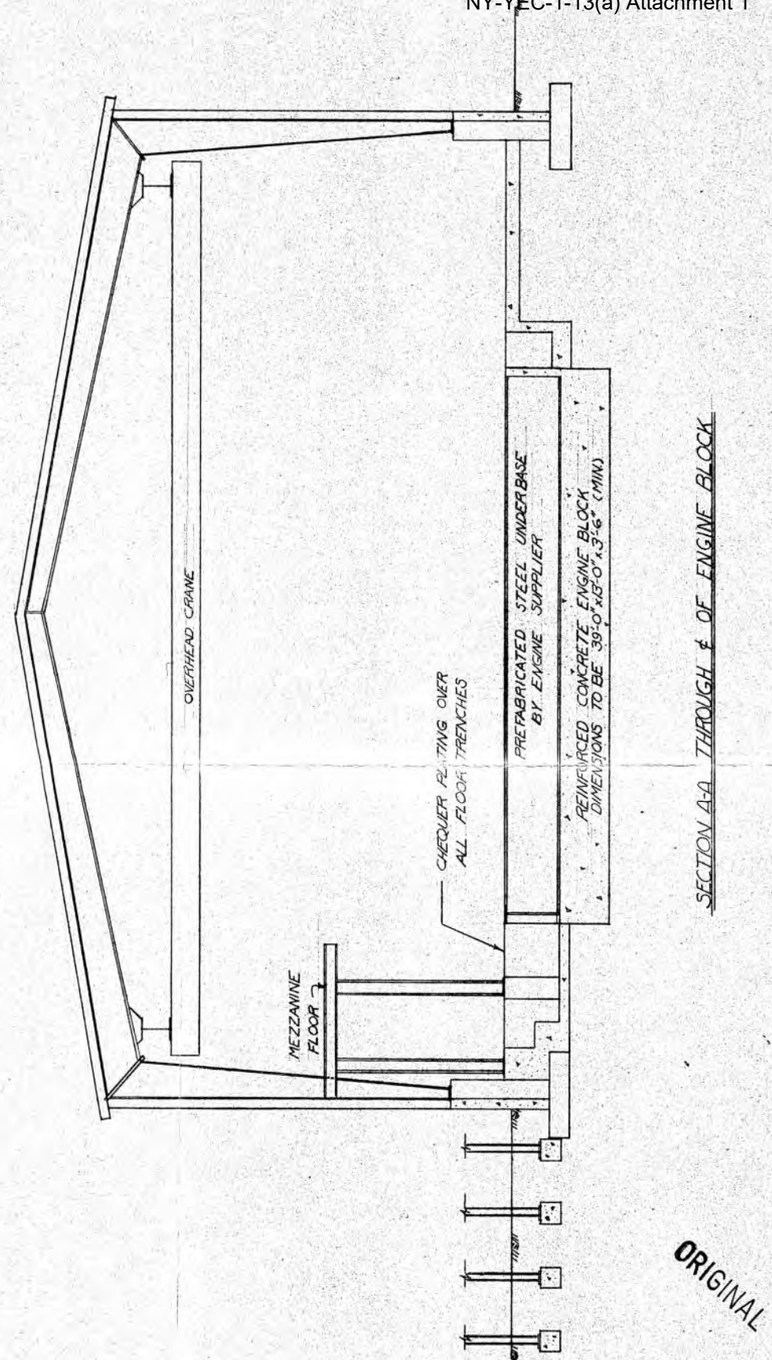
| | | |


REAR ELEVATION
ELEVATION A-A
B
A
2
12
VERTICAL SIDING
3'-0" x 7'-0"
PERSONNEL DOOR
GRADE
℄ FIN FLOOR
FRONT ELEVATION
24'-0" EAVE HEIGHT
3'-9"
6"
ELEVATION B-B
ORIGINAL
NOTE: BUILDING DIMENSIONS
OUTSIDE TO OUTSIDE
70'-0" (ENDWALL) x 48'-0" (SIDEWALL)
BAY SPACING TO BE 24'-0"
PRELIMINARY ONLY
NOT FOR
CONSTRUCTION
NORTHERN CANADA POWER COMMISSION
FARO, Y.T.
1970 DIESEL STAND-BY PLANT
ELEVATIONS
D.C.P.
D.C.P.
FEB 13, 1970
1/8" = 1'-0"

NOTES: 1) FTGS. & COLUMNS SHOWN ARE APPROX. ONLY. CONTRACTOR TO DESIGN SAME IN CO-ORDINATION WITH BUILDING SUPPLIER. ALLOWABLE SOIL BEARING = 2000 P.S.F.
2) FTGS. FOR INTAKE & EXHAUST SUPPORTS AS WELL AS ALL FLOOR TRENCHING SHALL BE DESIGNED BY THE CONTRACTOR IN CO-ORDINATION WITH THE ENGINE SUPPLIER.



FOUNDATION PLAN



SECTION A-A THROUGH ℄ OF ENGINE BLOCK

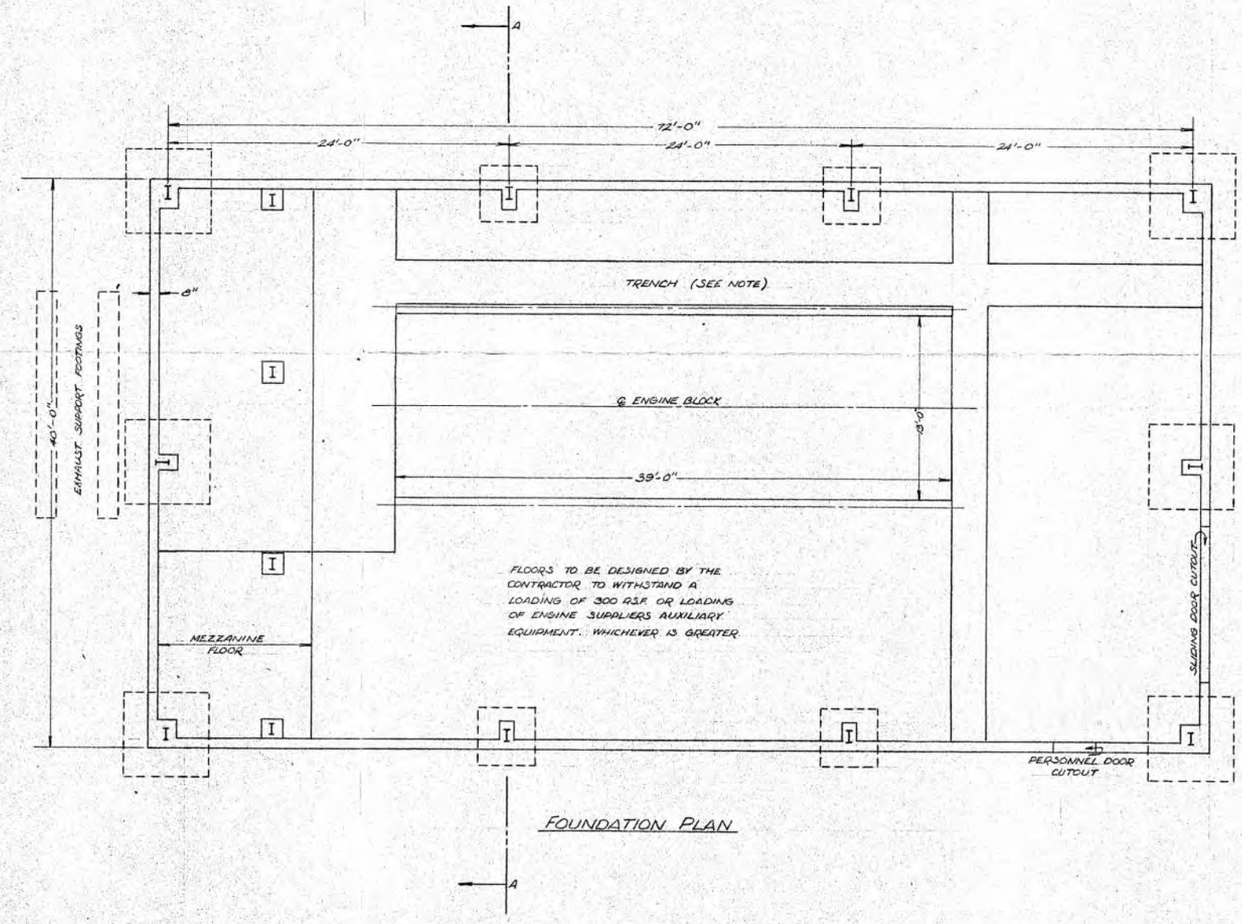
ORIGINAL

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

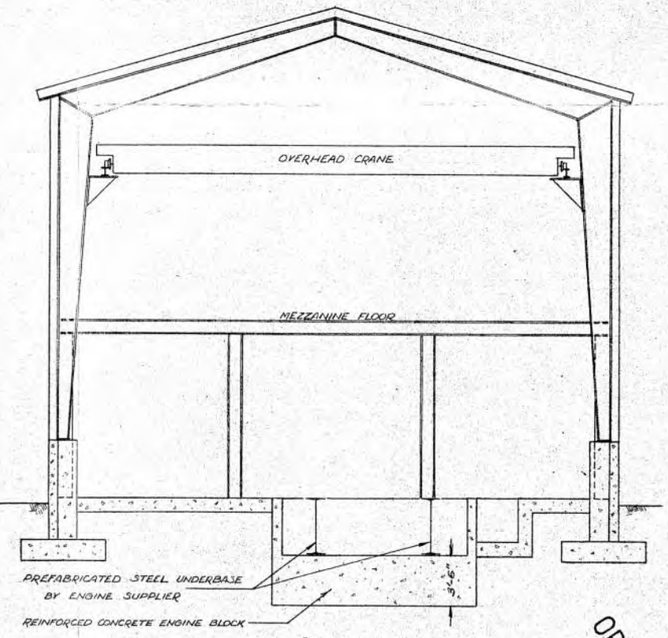
NORTHERN CANADA POWER COMMISSION			
FARO, Y.T.			
1970 DIESEL STANDBY PLANT FOUNDATION PLAN & SECTION			
DRAWN D.C.P	CHECKED K.N.C	DATE FEB 15, 1970	DRAWING WH-1678
REVISED	APPROVED	SCALE 3/16"=1'-0"	SHEET 1 OF 1

NOTE: (1) FTGS. & COLUMNS SHOWN ARE APPROX. ONLY. CONTRACTOR TO DESIGN SAME IN CO-ORDINATION WITH BUILDING SUPPLIER. ALLOWABLE SOIL BEARING = 2000 P.S.F.

(2) FTGS. FOR INTAKE & EXHAUST SUPPORTS AS WELL AS ALL FLOOR TRENCHING SHALL BE DESIGNED BY THE CONTRACTOR IN CO-ORDINATION WITH THE ENGINE SUPPLIER.



FOUNDATION PLAN



SECTION A-A

ORIGINAL

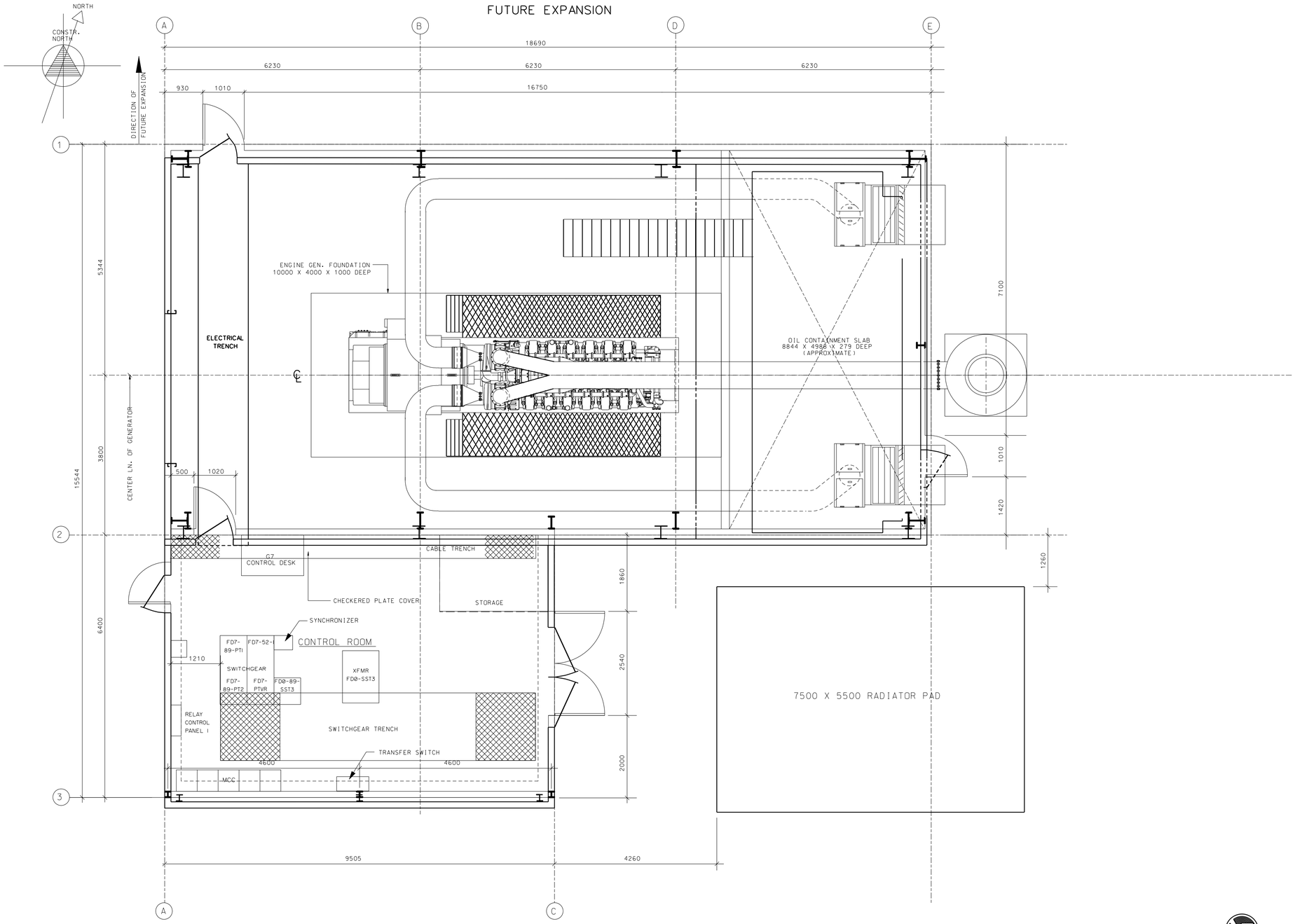
PRELIMINARY ONLY
NOT FOR CONSTRUCTION

NORTHERN CANADA POWER COMMISSION

FARO, Y.T.

1970 DIESEL STAND-BY PLANT
FOUNDATION
PLAN & SECTION (ALTERNATIVE 2)

DRAWN	CHECKED	DATE	DRAWING No.
DR	E. MACK	28 FEB, '70	114-1702
DESIGNED	APPROVED	SCALE 3/16" = 1'-0"	



CADD

MAIN FLOOR LAYOUT

YUKON ENERGY CORPORATION

NO.	DATE	REVISIONS	BY	CIVIL	DESIGN	E.LEC	MECH	PROT	STND	P.ENG	E.MAN
Ø	15-DEC-06	AS BUILT EXISTING EQUIPMENT - M06Ø1Ø	TARA		CC/AL						
C	29-JUL-92	REVISED	S.C.		PGG						
B	11-JUN-92	REVISED	LGP		WDV						
A	19-MAY-92	PRELIMINARY	S.C.		WDV						

NO.	DATE	REVISIONS	BY	CIVIL	DESIGN	E.LEC	MECH	PROT	STND	P.ENG	E.MAN

REF. DWG. NO.	REF. DWG. TITLE
YE03-20200, Rev. C	APL DRAWING - FROM CONSTRUCTION

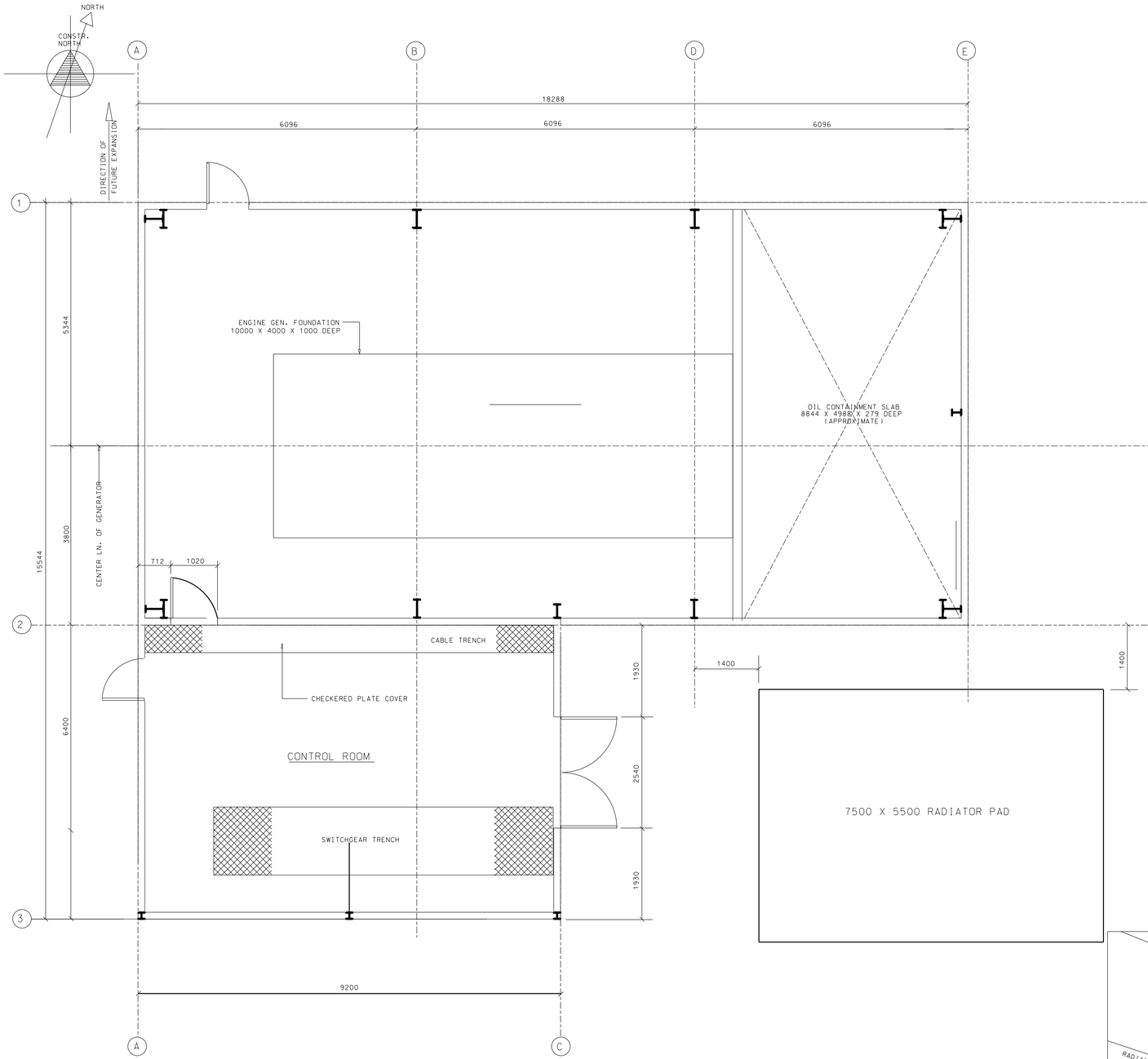
APPROVALS		DATE	APPROVALS		DATE
PROTECTION			MECHANICAL		
STANDARD			CIVIL		
PROJECT ENG.			DESIGN		
ENG. MANAGER			ELECTRICAL		

FARO - FD7 BUILDING
EQUIPMENT LAYOUT
PLAN VIEW
SHEET 1 OF 2

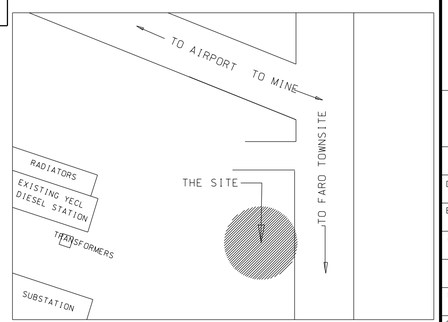
DRAWN	DESIGN BY	SCALE
S. CLARK	D. VERVEDA	NTS

AI DWG. NO. YE03-20200 REV. Ø

THIS DRAWING IS THE PROPERTY OF YUKON ENERGY CORPORATION AND CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION WHICH MUST NOT BE DUPLICATED, USED OR DISCLOSED OTHER THAN AS EXPRESSLY AUTHORIZED BY YUKON ENERGY CORPORATION.



MAIN FLOOR LAYOUT
SCALE 1 : 50 M.



SITE MAP
NOT TO SCALE

REFERENCE DRAWINGS

DWG NO.	DRAWING TITLE
YE03 - 20151	BUILDING PLAN VIEW
YE03 - 20102	PRELIMINARY BUILDING LAYOUT
YE03 - 20608	UNDER SLAB CONDUIT LAYOUT
YE03 - 20700	UNDER SLAB LAYOUT DETAILS

NOTES:

1. FOR PVC PIPES LOCATION SEE ELECTRICAL DWG. NO'S. YE03-50608 & YE03-50700.
2. TOP OF CONCRETE (ASSUMED ELEVATION = 100.00) SHOULD BE AT LEAST 200 MM ABOVE GRADE.

REV.	DATE	DESCRIPTION	BY	DES.	APP.
0	APR 16/93	AS BUILT	LGP	AMV	
6	MAR 08/93	REMOVED ENGINE OUTLINE	LGP	AMV	AMV
5	AUG 17/92	MOVED RADIATOR PAD	S.C.	AMV	AMV
4	AUG 11/92	ADDED MANUAL CHANGES	S.C.	AMV	AMV
3	JULY 20/92	REVISED NOTE 2	CEU	AMV	AMV
2	JULY 09/92	PVC PIPES LOCATION REMOVED. NOTES ADDED. ENGINE GEN. ANCHOR BOLTS REMOVED	CEU	AMV	AMV
1	JUNE 24/92	RADIATOR PAD. SWITCH GEAR PAD CHANGED.	CEU	AMV	AMV

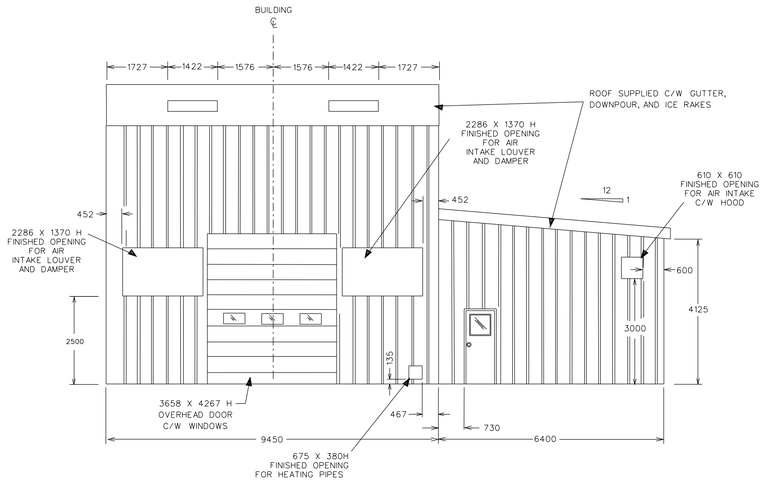
COMPANY PERMIT

ENGINEERS STAMP

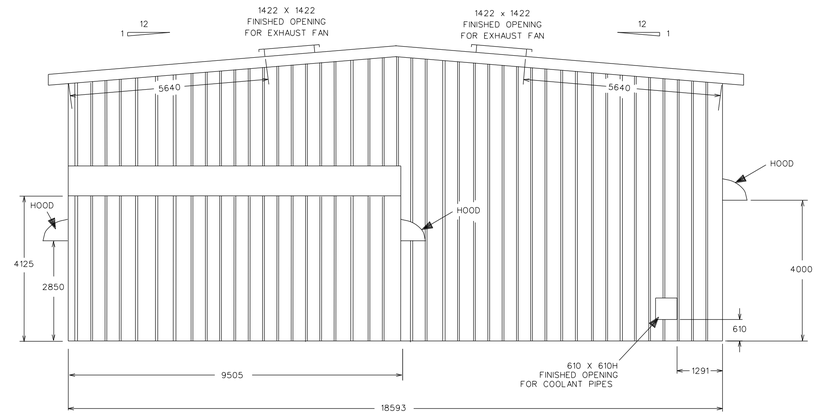
ALBERTA POWER LIMITED

THE YUKON ELECTRICAL CO. LTD.

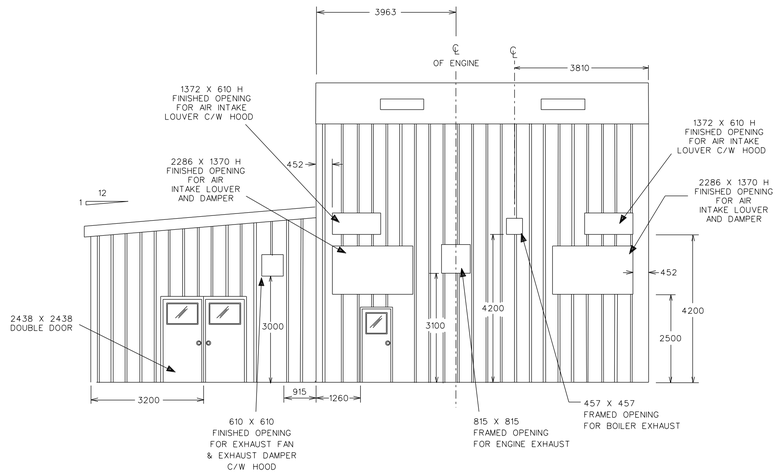
DESIGN A.M.VILLARAZA	1992 FARO ADDITION
ELECTRICAL	
MECHANICAL	
STRUCTURAL A.M.VILLARAZA	MAIN FLOOR LAYOUT SITE MAP
DRAWN C.E.USON	
SCALE AS NOTED	S1 DWG. NO: YE03-20100 RØ
CAD-Y0320100	



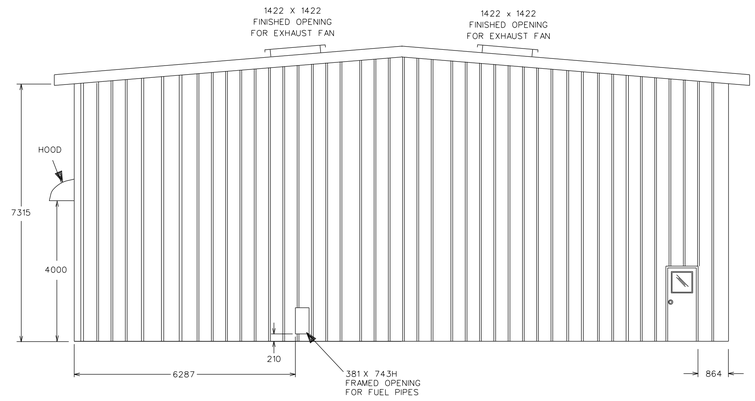
FRONT VIEW



RIGHT SIDE VIEW



REAR VIEW



LEFT SIDE VIEW

REFERENCE DRAWINGS

DWG. NO.	DRAWING TITLE

NOTES:

1. CONTRACTOR SHALL SUPPLY ALL FLASHING AND INSULATION REQUIRED TO COMPLETE ANY PIPE OPENINGS ONCE THE PIPES HAVE BEEN INSTALLED.
2. ALL EXHAUST FANS, LOUVERS, AND DAMPERS SHALL BE PROVIDED BY OTHERS; BUT INSTALLED BY THE BULDING CONTRACTOR. HOODS SUPPLIED BY CONTRACTOR.

REV.	DATE	DESCRIPTION	BY	DES.	APP.
0	APR 19/93	AS BUILT	LGP	PGG	
C	MAR 08/93	REVISED	LGP	PGG	PGG
B	JULY 15/92	REVISED	S.C.	PGG	PGG
A	JUNE 04/92	PRELIMINARY	S.C.	PGG	PGG

COMPANY PERMIT

ENGINEERS STAMP

YUKON ENERGY CORPORATION

YUKON ELECTRICAL CO. LTD.

P. GOGUEN

CHECKED BY P. GOGUEN

DATE

DRAWN BY S.CLARK

SCALE 1 TO 80 | A1

CAD-Y0320150

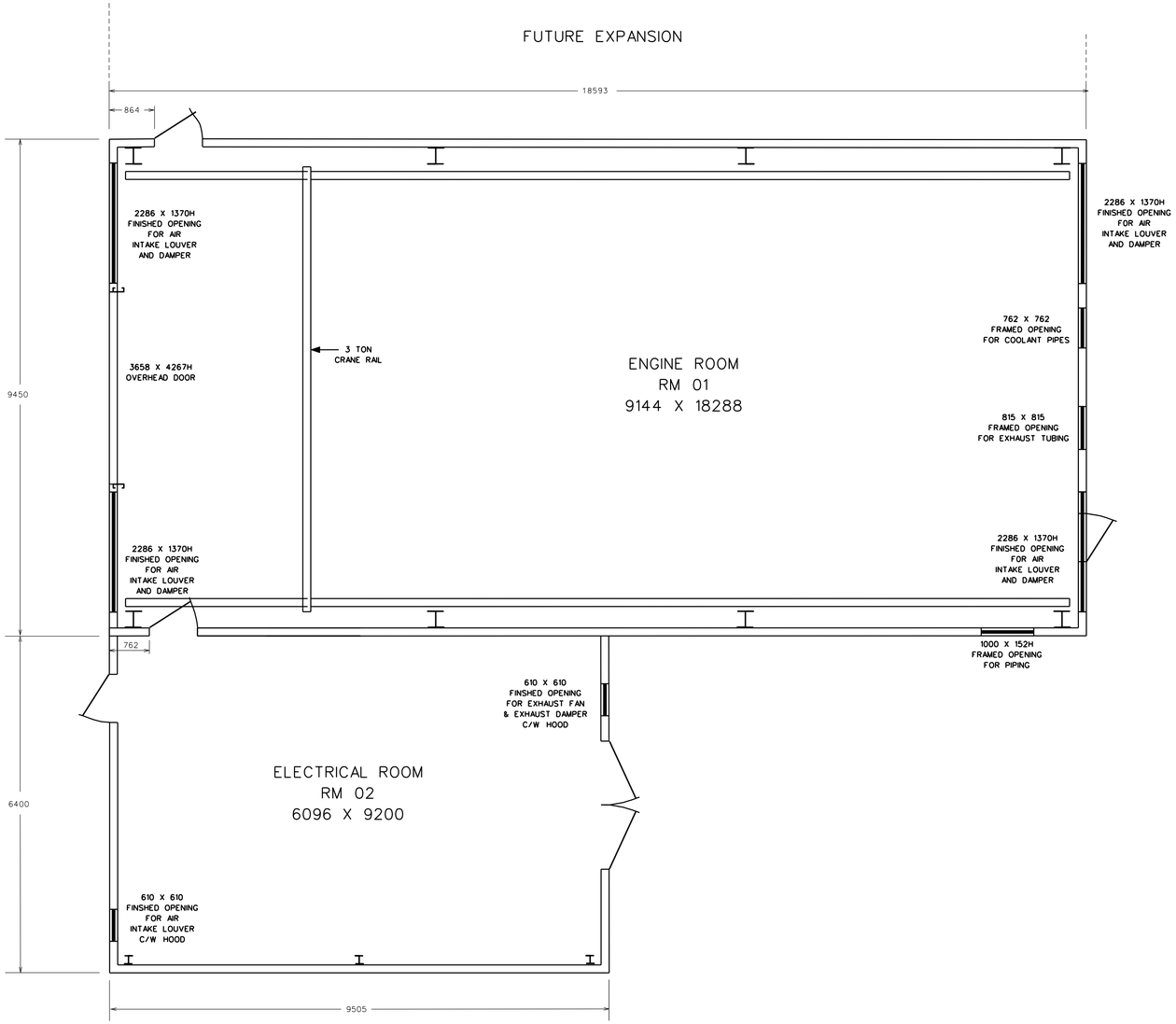
FARO 1992 ADDITION BUILDING EXTERIOR VIEWS

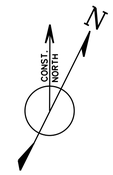
DWG. NO: YE03-20150

REV. 0

THIS DRAWING IS THE PROPERTY OF YUKON ENERGY CORPORATION AND CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION WHICH MUST NOT BE DUPLICATED, USED OR DISCLOSED OTHER THAN AS EXPRESSLY AUTHORIZED BY YUKON ENERGY CORPORATION.

ROOM NAME	ROOM NO.	FLOOR FINISH	WALL FINISHES	CEILING FINISH	EXITS			FRAMED OPENING		FRAMED OPENING APPLICATION	
ENGINE ROOM	01	FINISHED CONCRETE	PREPAINTED WHITE SHEET STEEL	PREPAINTED WHITE SHEET STEEL	2 - 915 X 2135 MANDOOR EXITS TO EXTERIOR	1 - 915 X 2135 MANDOOR EXITS TO ROOM 02	1 - 3658 X 4267H OVERHEAD DOOR EXITS TO EXTERIOR	4 - 2286 X 1370H 2 - 1372 X 610H 1 - 457 X 457 1 - 381 X 743H	1 - 815 X 815 1 - 610 x 610 4 - 1232 X 1232 1 - 675 X 380H	4 - AIR INTAKES 2 - AIR INTAKES 1 - BOILER EXHAUST 1 - FUEL PIPING	1 - ENGINE EXHAUST 1 - COOLANT PIPE OPENING 1 - ROOF TOP FAN 1 - HEATING PIPES
ELECTRICAL ROOM	02	FINISHED CONCRETE	PREPAINTED WHITE SHEET STEEL	PREPAINTED WHITE SHEET STEEL	1 - 2438 X 2438 DOUBLE MANDOOR EXITS TO EXTERIOR	1 - 915 X 2135 MANDOOR EXITS TO EXTERIOR	1 - 915 X 2135 MANDOOR EXITS TO ROOM 02	2 - 610 X 610		1 - AIR INTAKE 1 - AIR EXHAUST	





REFERENCE DRAWINGS

DWG. NO.	DRAWING TITLE

LEGEND

FINISHED OPENING

NOTES:

1. SOME FRAMED OPENINGS ARE NOT SHOWN FOR CLARITY PURPOSES.
2. THE CONTRACTOR SHALL SUPPLY ALL FLASHING AND INSULATION REQUIRED TO COMPLETE ANY PIPE OPENINGS ONCE THE PIPES HAVE BEEN INSTALLED.
3. ALL EXHAUST FANS, LOUVERS, AND DAMPERS SHALL BE PROVIDED BY OTHERS; BUT INSTALLED BY THE BUILDING CONTRACTOR.
4. BUILDING STRUCTURAL SHALL BE DESIGNED TO ACCOMMODATE FUTURE EXPANSION.

REV.	DATE	DESCRIPTION	BY	DES.	APP.
Ø	APR 16/93	AS BUILT	LGP	PGG	
C	MAR 09/93	REVISED	LGP	PGG	PGG
B	JULY 15/92	REVISED	S.C.	PGG	PGG
A	JUNE 04/92	PRELIMINARY	S.C.	PGG	PGG

COMPANY PERMIT

APPROVED FOR CONSTRUCTION

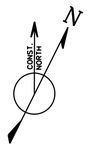
DATE — BRANCH HEAD CIVIL
DATE — BRANCH HEAD ELECTRICAL
DATE — BRANCH HEAD MECHANICAL
DATE — BRANCH HEAD CONSTRUCTION

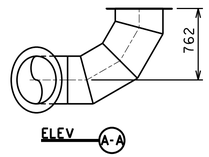
ENGINEERS STAMP

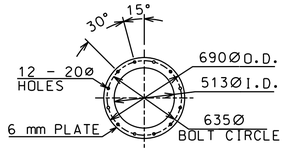
ALBERTA POWER LIMITED

YUKON ELECTRICAL CO. LTD.

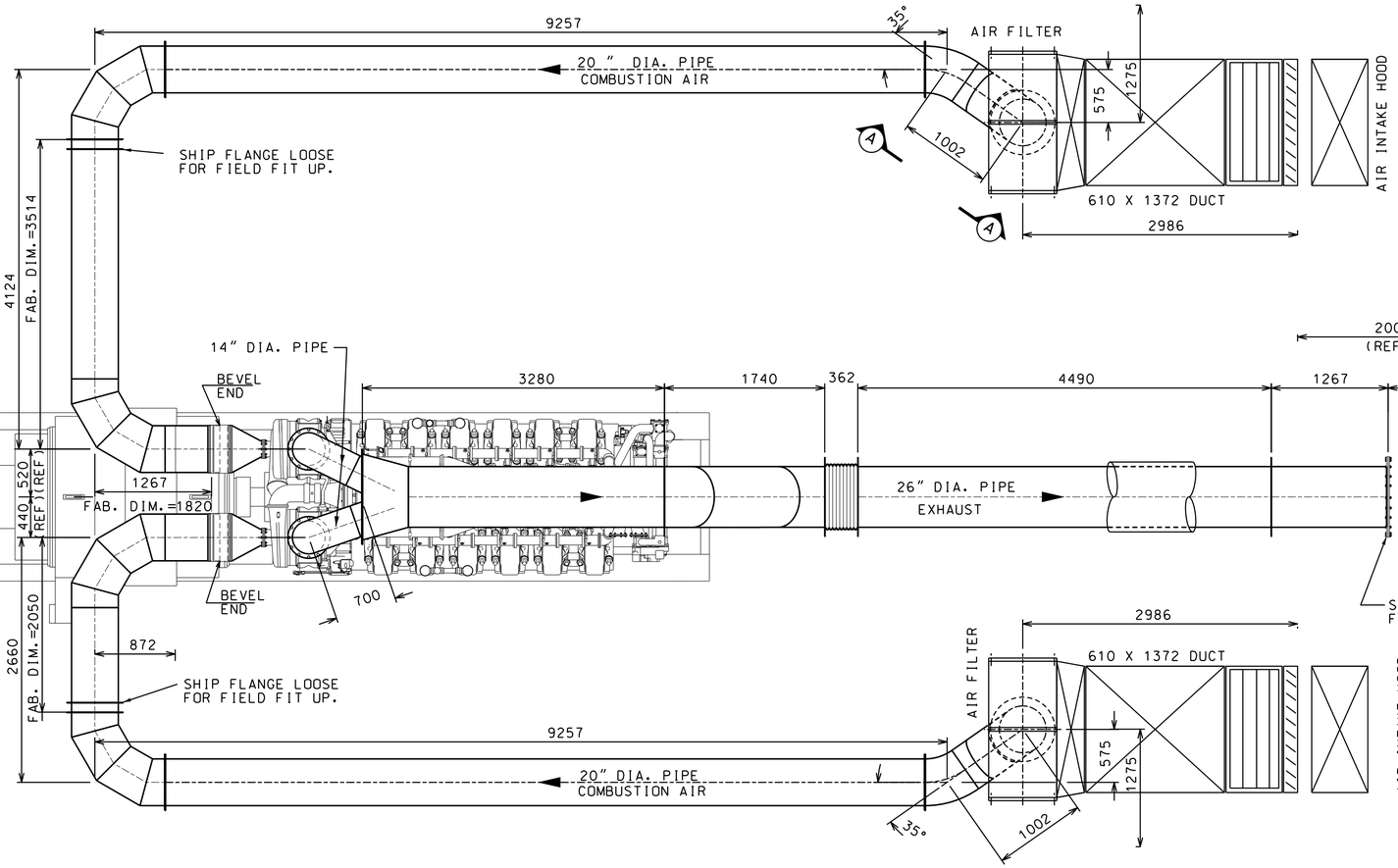
DESIGN P. GOGUEN	FARO 1992 ADDITION BUILDING PLAN VIEW
ELECTRICAL	
MECHANICAL P. GOGUEN	
OTHER	
DRAWN S.CLARK	
SCALE 1 TO 50 A1	DWG. NO: YE03-20151 REV. 0
CAD-Y0320151	







FLANGE DETAIL
SCALE= 1 : 20
QUAN.: 16 REQ'D



REFERENCE DRAWINGS

DWG. NO.	DRAWING TITLE
YE03 - 20502	ENGINE COMBUSTION AIR AND EXHAUST SYSTEM ELEVATION VIEW

REV.	DATE	DESCRIPTION	BY	DES.	APP.
1	MAY 26/93	AS BUILT REVISED	LGP	PGG	
0	APR 19/93	AS BUILT	LGP	PGG	PGG
D	MAR 10/93	PRELIMINARY	LGP	PGG	PGG
C	SEPT. 15/92	ISSUED FOR CONSTRUCTION	GR	E.H.	E.H.
B	SEPT. 01/92	ISSUED FOR BID	GR	I.C.	I.C.
A	JULY 16/92	PRELIMINARY	LGP	WDV	WDV

COMPANY PERMIT

ENGINEERS STAMP

YUKON ENERGY CORPORATION

THE YUKON ELECTRICAL CO. LTD.

D. VERVEDA

CHECKED BY
D. VERVEDA

DATE

DRAWN BY
S. CLARK

FARO 1992 ADDITION ENGINE COMBUSTION AIR AND EXHAUST SYSTEM PLAN VIEW

SCALE
1 : 30
A1

CAD-Y0320501

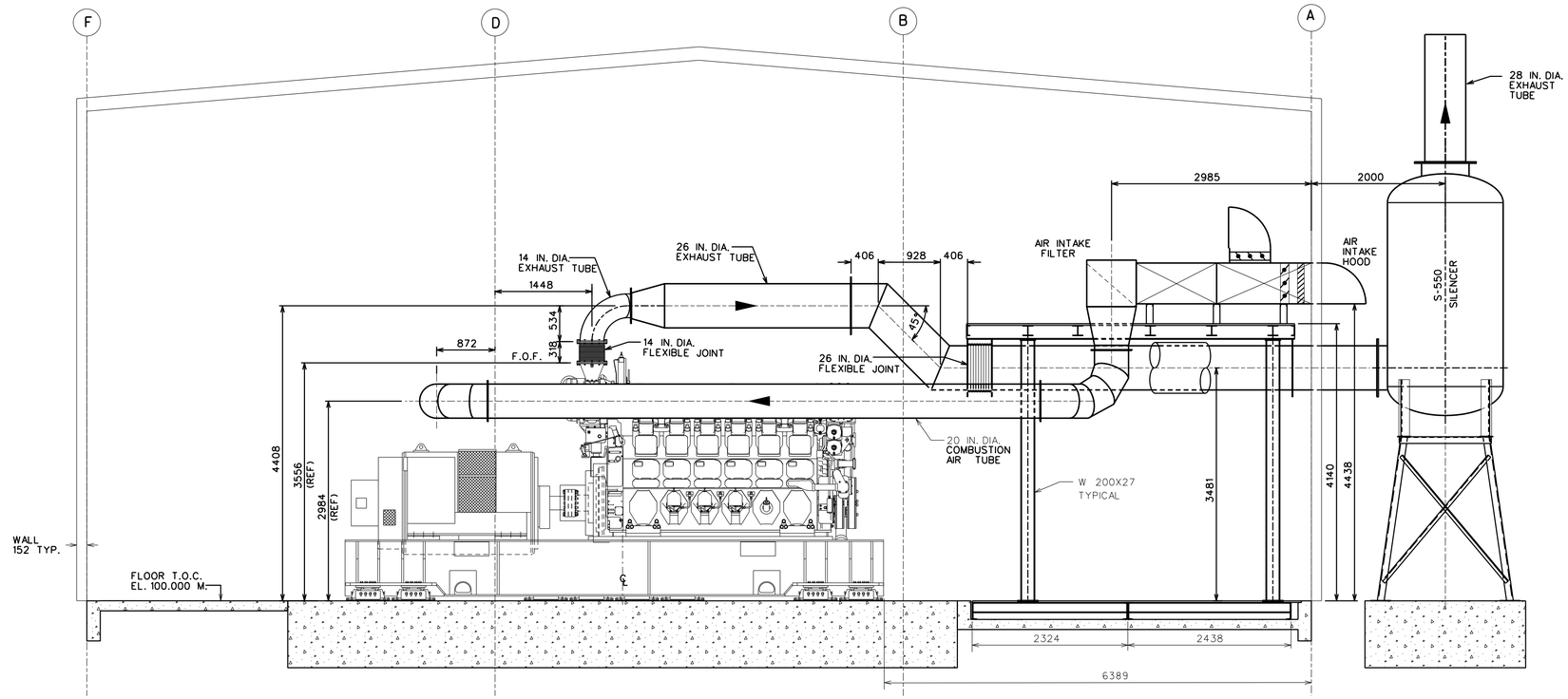
DWG. NO.:YE03-20501

REV.
1

YE03-20501

THIS DRAWING IS THE PROPERTY OF YUKON ENERGY CORPORATION AND CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION WHICH MUST NOT BE DUPLICATED, USED OR DISCLOSED OTHER THAN AS EXPRESSLY AUTHORIZED BY YUKON ENERGY CORPORATION.

REFERENCE DRAWINGS	
DWG. NO.	DRAWING TITLE
YE03 -20501	ENGINE COMBUSTION AIR & EXHAUST SYSTEM PLAN VIEW
YE03 -20556	SILENCER SUPPORT STAND



ELEVATION LOOKING NORTH
@ COLUMN LINE 2

REV.	DATE	DESCRIPTION	BY	DES.	APP.
1	MAY 26/93	AS BUILT REVISED	LGP	PGG	
0	APR 19/93	AS BUILT	SC	PGG	PGG
B	NOV. 12/92	ISSUED FOR CONSTRUCTION	GR	PGG	PGG
A	JULY 21/92	PRELIMINARY	LGP	WDV	WDV

COMPANY PERMIT

ENGINEERS STAMP

YUKON ENERGY CORPORATION

THE YUKON ELECTRICAL CO. LTD

D.VERVEDA

CHECKED BY D.VERVEDA

DATE

DRAWN BY S.CLARK

SCALE 1 TO 40 A1

CAD-Y0320502

FARO 1992 ADDITION ENGINE COMBUSTION AIR AND EXHAUST SYSTEM ELEVATION VIEW

DWG. NO: YE03-20502

REV. 1

YE03-20502

THIS DRAWING IS THE PROPERTY OF YUKON ENERGY CORPORATION AND CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION WHICH MUST NOT BE DUPLICATED, USED OR DISCLOSED OTHER THAN AS EXPRESSLY AUTHORIZED BY YUKON ENERGY CORPORATION.

APPENDIX

B TABLES

Project Name: Noise Assessment
Site Name: FARO Power Station
WSP Job #: 191-02438-01

Table 1: Noise Source Summary Table

Noise Source ID	Source Description	Sound Power Level [1] (dBA)	Source Location [2] (I or O)	Sound Characteristics [3] (S,Q,I,B,T,C)	Noise Control Measures [4] (S,A,B,L,E,O,U)
Existing Sources					
FD1_GEN_EXH1	FD1 2.4 MW Generator Combustion Exhaust	136	O	S	S
FD1_GEN_EXH2	FD1 2.4 MW Generator Combustion Exhaust	136	O	S	S
FD1_GEN_INT1	FD1 2.4 MW Generator Intake	118	O	S	S
FD1_GEN_INT2	FD1 2.4 MW Generator Intake	118	O	S	S
FD1_BLD_DIS1	FD1 2.4 MW Building Discharge	111	O	S	S
FD1_BLD_INT1	FD1 2.4 MW Building Intake	111	O	S	S
FD1_GEN_RAD1	FD1 2.4 MW Generator Radiator	114	O	S	U
FD1_GEN_RAD2	FD1 2.4 MW Generator Radiator	114	O	S	U
FD1_GEN_RAD3	FD1 2.4 MW Generator Radiator	114	O	S	U
FD1_GEN_RAD4	FD1 2.4 MW Generator Radiator	114	O	S	U
FD1_BLD_OUT1	FD1 2.4 MW Building Breakout Noise	116	O	S	U
FD1_BLD_OUT2	FD1 2.4 MW Building Breakout Noise	116	O	S	U
FD7_GEN_EXH1	FD7 2.8 MW Generator Combustion Exhaust	140	O	S	U
FD7_BLD_INT1	FD7 2.8 MW Building Intake	115	O	S	U
FD7_BLD_INT2	FD7 2.8 MW Building Intake	115	O	S	U
FD7_BLD_INT3	FD7 2.8 MW Building Intake	115	O	S	U
FD7_BLD_INT4	FD7 2.8 MW Building Intake	115	O	S	U
FD7_GEN_INT1	FD1 2.8 MW Generator Intake	109	O	S	U
FD7_GEN_INT2	FD1 2.8 MW Generator Intake	109	O	S	U
FD7_BLD_DIS1	FD1 2.8 MW Building Discharge Fan	114	O	S	U
FD7_BLD_DIS2	FD1 2.8 MW Building Discharge Fan	114	O	S	U
FD7_BLD_DIS3	FD1 2.8 MW Building Discharge Fan	114	O	S	U
FD7_BLD_DIS4	FD1 2.8 MW Building Discharge Fan	114	O	S	U
FD7_GEN_RAD1	FD7 2.8 MW Generator Radiator	112	O	S	U
FD7_GEN_RAD2	FD7 2.8 MW Generator Radiator	112	O	S	U
FD7_BLD_OUT1	FD7 2.8 MW Building Breakout Noise	115	O	S	U
FD7_BLD_OUT2	FD7 2.8 MW Building Breakout Noise	115	O	S	U
Future Sourcs due to Addition					
YM20_GEN_CAS	YM20 1.8 MW Generator Casing	103	O	S	E
YM21_GEN_CAS	YM21 1.8 MW Generator Casing	103	O	S	E
YM22_GEN_CAS	YM22 1.8 MW Generator Casing	103	O	S	E
YM23_GEN_CAS	YM23 1.8 MW Generator Casing	103	O	S	E
YM24_GEN_CAS	YM24 1.8 MW Generator Casing	103	O	S	E
YM25_GEN_CAS	YM25 1.8 MW Generator Casing	103	O	S	E
YM26_GEN_CAS	YM26 1.8 MW Generator Casing (Backup)	n/a	O	S	E

Notes:

[1] Sound Power Level of Source, in dBA

[2] Source Location:

O	located/installed outside the building
I	located/installed inside the building

[3] Sound Characteristics:

S	Steady
Q	Quasi Steady Impulsive
I	Impulsive
B	Buzzing
T	Tonal
C	Cyclic
O	Occasional
W	Time Weighted (factor applied)

[4] Noise Control Measures:

S:	silencer, acoustic louver
A:	acoustic lining, plenum
B:	barrier, berm, screening
L:	lagging
E:	acoustic enclosure
O:	other
U:	uncontrolled

Project Name: Environmental Compliance Approval - Air and Noise
Site Name: FARO Power Station
WSP Job #: 191-02438-01

Table 2: Significant Noise Source Summary

Noise Source ID	Noise Source Description	Source Type	Cadna Sound Library ID	Height Above Grade	Source Coordinates		Octave band sound power spectra (dB)								Overall dB	Overall dBA
				(m)	(x)	(y)	63	125	250	500	1K	2K	4K	8K		
Existing Sources																
FD1_GEN_EXH1	FD1 2.4 MW Generator Combustion Exhaust	Point	FD1_GEN_EXH	8.7	585143	6901251	139	145	141	133	127	120	109	102	147	136
FD1_GEN_EXH2	FD1 2.4 MW Generator Combustion Exhaust	Point	FD1_GEN_EXH	8.7	585143	6901249	139	145	141	133	127	120	109	102	147	136
FD1_GEN_INT1	FD1 2.4 MW Generator Intake	Point	FD1_GEN_INT	5.0	585138	6901251	113	116	116	114	113	112	106	100	122	118
FD1_GEN_INT2	FD1 2.4 MW Generator Intake	Point	FD1_GEN_INT	9.4	585141	6901246	113	116	116	114	113	112	106	100	122	118
FD1_BLD_DIS1	FD1 2.4 MW Building Discharge	Point	FD1_BLD_DIS	9.4	585155	6901262	104	108	108	106	106	105	99	92	114	111
FD1_BLD_INT1	FD1 2.4 MW Building Intake	Point	FD1_BLD_INT	9.4	585158	6901249	106	109	109	107	106	105	99	94	115	111
FD1_GEN_RAD1	FD1 2.4 MW Generator Radiator	Point	FD1_GEN_RAD6	2.0	585143	6901262	96.0	122.0	114.0	109.0	108.0	104.0	100.0	95.0	123	114
FD1_GEN_RAD2	FD1 2.4 MW Generator Radiator	Point	FD1_GEN_RAD6	2.0	585148	6901264	96.0	122.0	114.0	109.0	108.0	104.0	100.0	95.0	123	114
FD1_GEN_RAD3	FD1 2.4 MW Generator Radiator	Point	FD1_GEN_RAD6	2.0	585152	6901267	96.0	122.0	114.0	109.0	108.0	104.0	100.0	95.0	123	114
FD1_GEN_RAD4	FD1 2.4 MW Generator Radiator	Point	FD1_GEN_RAD6	2.0	585156	6901269	96.0	122.0	114.0	109.0	108.0	104.0	100.0	95.0	123	114
FD1_BLD_OUT1	FD1 2.4 MW Building Breakout Noise	V.Area	FD1_BLD_OUT	8.9	Varies	Varies	112.0	115.0	115.0	112.0	111.0	110.0	104.0	99.0	121	116
FD1_BLD_OUT2	FD1 2.4 MW Building Breakout Noise	V.Area	FD1_BLD_OUT	8.9	Varies	Varies	112.0	115.0	115.0	112.0	111.0	110.0	104.0	99.0	121	116
FD7_GEN_EXH1	FD7 2.8 MW Generator Combustion Exhaust	Point	FD7_GEN_EXH	7.5	585193	6901305	143.0	149.0	145.0	137.0	132.0	126.0	116.0	109.0	151	140
FD7_BLD_INT1	FD7 2.8 MW Building Intake	Point	FD7_BLD_INT	3.9	585177	6901293	108.0	112.0	112.0	110.0	110.0	109.0	103.0	96.0	118	115
FD7_BLD_INT2	FD7 2.8 MW Building Intake	Point	FD7_BLD_INT	3.9	585173	6901299	108.0	112.0	112.0	110.0	110.0	109.0	103.0	96.0	118	115
FD7_BLD_INT3	FD7 2.8 MW Building Intake	Point	FD7_BLD_INT	3.9	585190	6901308	108.0	112.0	112.0	110.0	110.0	109.0	103.0	96.0	118	115
FD7_BLD_INT4	FD7 2.8 MW Building Intake	Point	FD7_BLD_INT	3.9	585193	6901302	108.0	112.0	112.0	110.0	110.0	109.0	103.0	96.0	118	115
FD7_GEN_INT1	FD1 2.8 MW Generator Intake	Point	FD7_GEN_INT	4.8	585190	6901308	102.0	106.0	106.0	104.0	104.0	103.0	97.0	91.0	112	109
FD7_GEN_INT2	FD1 2.8 MW Generator Intake	Point	FD7_GEN_INT	4.8	585193	6901302	102.0	106.0	106.0	104.0	104.0	103.0	97.0	91.0	112	109
FD7_BLD_DIS1	FD1 2.8 MW Building Discharge Fan	Point	FD7_BLD_DIS	0.5	585182	6901298	107.0	110.0	110.0	109.0	109.0	108.0	102.0	95.0	117	114
FD7_BLD_DIS2	FD1 2.8 MW Building Discharge Fan	Point	FD7_BLD_DIS	0.5	585180	6901302	107.0	110.0	110.0	109.0	109.0	108.0	102.0	95.0	117	114
FD7_BLD_DIS3	FD1 2.8 MW Building Discharge Fan	Point	FD7_BLD_DIS	0.5	585187	6901300	107.0	110.0	110.0	109.0	109.0	108.0	102.0	95.0	117	114
FD7_BLD_DIS4	FD1 2.8 MW Building Discharge Fan	Point	FD7_BLD_DIS	0.5	585185	6901305	107.0	110.0	110.0	109.0	109.0	108.0	102.0	95.0	117	114
FD7_GEN_RAD1	FD7 2.8 MW Generator Radiator	Point	FD7_GEN_RAD4	2.0	585193	6901296	94.0	120.0	112.0	107.0	106.0	102.0	98.0	93.0	121	112
FD7_GEN_RAD2	FD7 2.8 MW Generator Radiator	Point	FD7_GEN_RAD4	2.0	585196	6901298	94.0	120.0	112.0	107.0	106.0	102.0	98.0	93.0	121	112
FD7_BLD_OUT1	FD7 2.8 MW Building Breakout Noise	V.Area	FD7_BLD_OUT	7.3	Varies	Varies	109.0	112.0	112.0	110.0	110.0	109.0	103.0	97.0	118	115
FD7_BLD_OUT2	FD7 2.8 MW Building Breakout Noise	V.Area	FD7_BLD_OUT	7.3	Varies	Varies	109.0	112.0	112.0	110.0	110.0	109.0	103.0	97.0	118	115
Future Sourcs due to Addition																
YM20_GEN_CAS	YM20 1.8 MW Generator Casing	Point	NEW_CAS	4.0	585144	6901238	106	115	106	97	90	89	87	91	116	103
YM21_GEN_CAS	YM21 1.8 MW Generator Casing	Point	NEW_CAS	4.0	585139	6901235	106	115	106	97	90	89	87	91	116	103
YM22_GEN_CAS	YM22 1.8 MW Generator Casing	Point	NEW_CAS	4.0	585134	6901233	106	115	106	97	90	89	87	91	116	103
YM23_GEN_CAS	YM23 1.8 MW Generator Casing	Point	NEW_CAS	4.0	585130	6901230	106	115	106	97	90	89	87	91	116	103
YM24_GEN_CAS	YM24 1.8 MW Generator Casing	Point	NEW_CAS	4.0	585125	6901228	106	115	106	97	90	89	87	91	116	103
YM25_GEN_CAS	YM25 1.8 MW Generator Casing	Point	NEW_CAS	4.0	585121	6901225	106	115	106	97	90	89	87	91	116	103
YM26_GEN_CAS	YM26 1.8 MW Generator Casing (Backup)	Point	NEW_CAS	4.0	585116	6901223	106	115	106	97	90	89	87	91	116	103

Project Name: Environmental Compliance Approval - Air and Noise
Site Name: FARO Power Station
WSP Job #: 191-02438-01

Table 3: Summary of Changes in Sound Levels between Existing and Future Sources due to Addition

Point of Reception ID	Point of Reception Description	Receptor Coordinates			Sound Impact at POR [1], dBA			
		X	Y	Z	Existing	Future	Change	Impact
R1	One Storey Army Barracks on Kitza Avenue	585198	6900873	1.5	58	58	<1	Insignificant
R2	One Storey Residence on Dawson Drive	585246	6900838	4.5	59	60	<1	Insignificant
R3	Three Storey Residence on Dawson Drive	585266	6900836	7.5	59	59	<1	Insignificant
R4	One Storey Army Barracks on Kitza Avenue	585402	6900986	1.5	59	60	<1	Insignificant
R5	One Storey Del Van Gorder School on 100 Bell Avenue	585650	6900629	1.5	48	48	<1	Insignificant
R6	One Storey Faro Health Centre on 447 Campbell Street	585616	6900454	1.5	46	46	<1	Insignificant

Notes:

[1] Worst-case one hour equivalent sound level from all applicable sources operating in dBA as per scenarios listed in noise report.

APPENDIX

C MANUFACTURER SPECIFICATION

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

ATTACHMENT B

EPA APPROVED TIER 2
3516C CATERPILLAR ENGINE
GENERATOR SPECIFICATIONS

September 2020

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.

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)	Weight: 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.

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.

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.

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

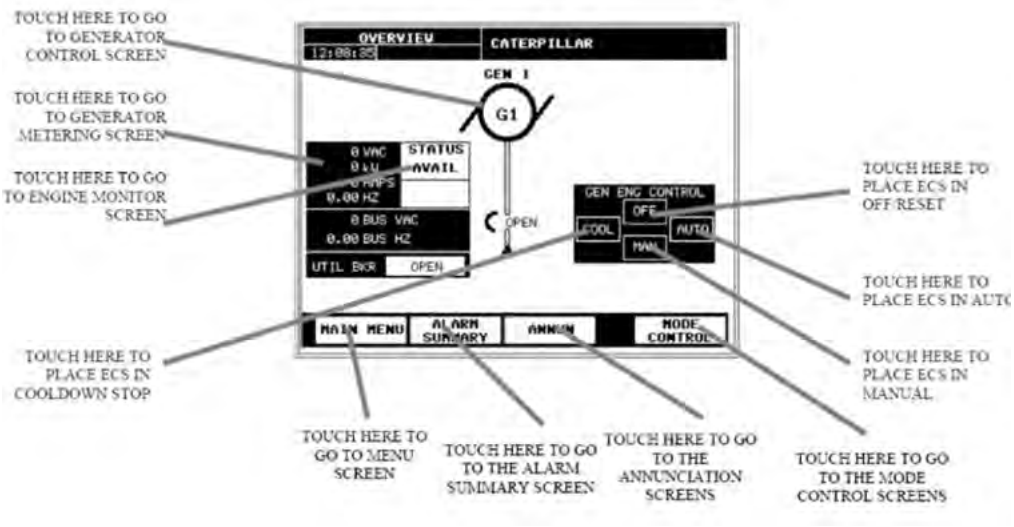
- Automatically synchronizes and parallels the generator with another power source.
- Includes provisions for manual permissive paralleling.

HUMAN MACHINE INTERFACE (HMI) HIGHLIGHTS

- Engine/Generator function is performed thru the 6" HMI touch screen interface.

Overview Screen (Typical)

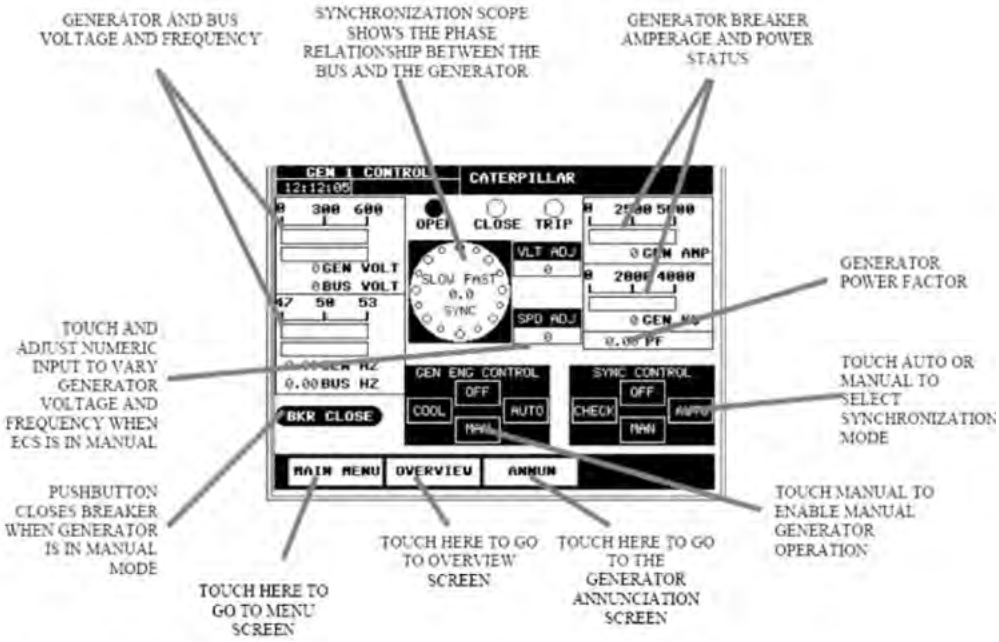
Shows the generator status, generator metering data, bus metering data, ECS position, and generator/utility breaker status.



STANDARD PARALLELING CONTROL (continued)

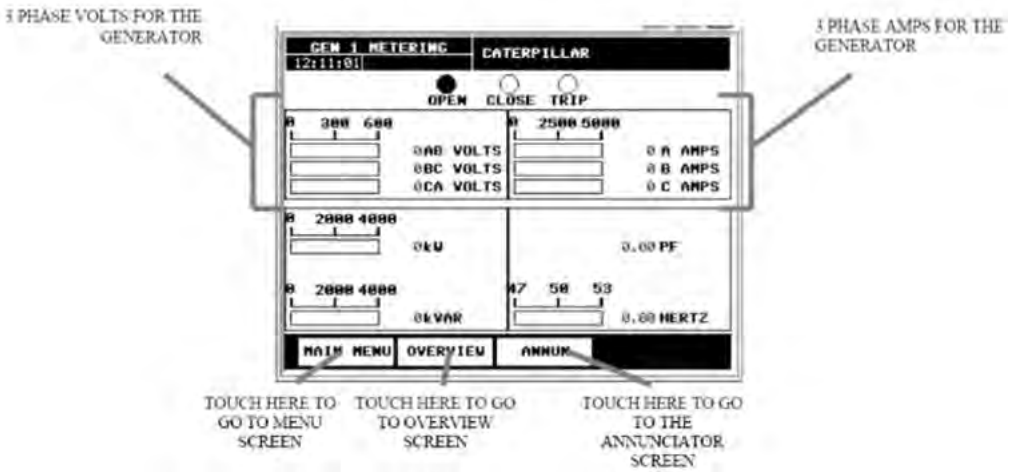
Generator Control Screen (Typical)

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)

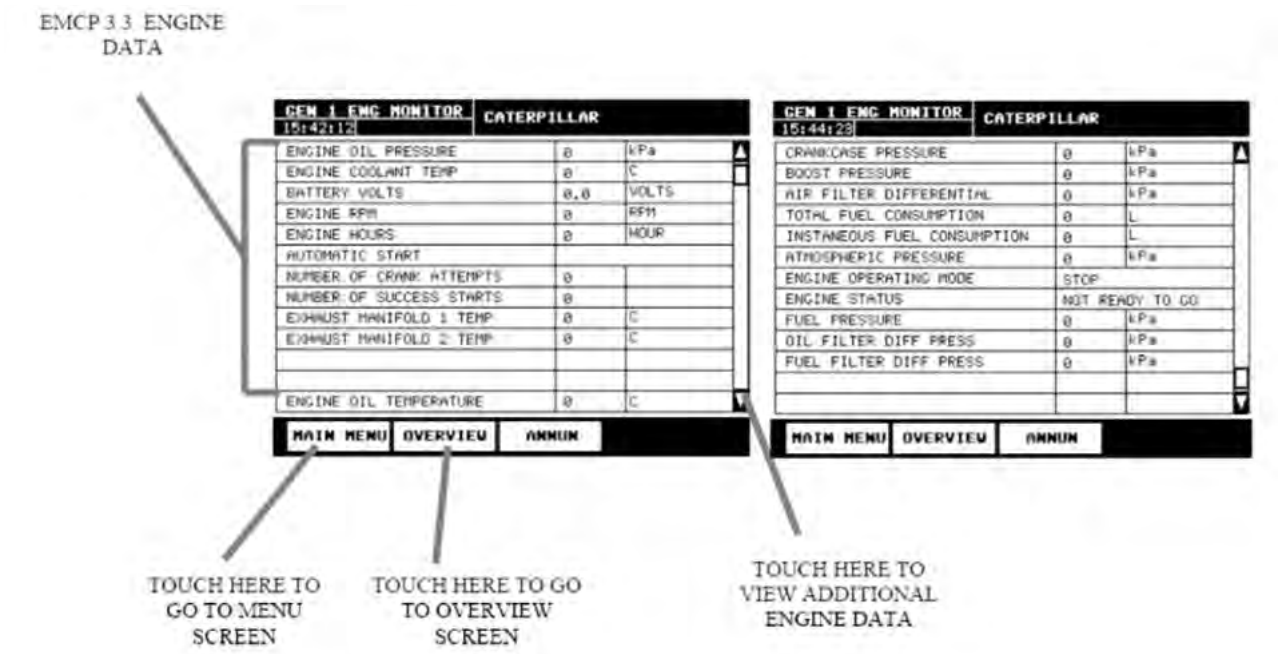
Allows the operator to view three phases of voltage and amperage for the bus and the generator.



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.



Information contained in this publication may be considered confidential.
Discretion is recommended when distributing.
Materials and specifications are subject to change without notice.
CAT, CATERPILLAR, their respective logos, "Caterpillar Yellow," the "Power Edge" trade dress, as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission.

www.Cat-ElectricPower.com

© 2010 Caterpillar
All Rights Reserved.
Printed in U.S.A.

GEN SET PACKAGE PERFORMANCE DATA [DM8266]

Performance Number: DM8266

Sales Model: 3516CDITA	**Combustion:** DI	**Aspr:** TA
Engine Power: 2500 W/F EKW 2593 W/O F EKW 3,622 HP	**Speed:** 1,800 RPM	**After Cooler:** ATAAC
Manifold Type: DRY	**Governor Type:** ADEM3	**After Cooler Temp(F):** 122
Turbo Quantity: 4	**Engine App:** GP	**Turbo Arrangement:** Parallel
Hertz: 60	**Engine Rating:** PGS	**Strategy:**
Rating Type: STANDBY	**Certification:** EPA TIER-2 2006 -	

General Performance Data

GEN W/F EKW	PERCENT LOAD	ENGINE POWER BHP	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
2,500.0	100	3604	333	0.337	173.3	122.0	78.2	6,992.3	1,236.7	921.9	19,048.8
2,250.0	90	3256	301	0.337	156.7	119.3	71.3	6,600.3	1,190.3	889.0	17,516.1
2,000.0	80	2911	269	0.341	141.9	117.0	64.3	6,183.6	1,159.0	871.0	16,167.1
1,875.0	75	2738	253	0.344	134.6	115.9	60.8	5,961.1	1,145.8	864.7	15,506.7
1,750.0	70	2566	237	0.347	127.3	114.6	57.1	5,731.6	1,133.6	859.6	14,846.3
1,500.0	60	2223	205	0.355	112.8	112.8	49.6	5,254.8	1,112.0	853.0	13,522.0
1,250.0	50	1880	174	0.366	98.4	111.0	41.5	4,739.2	1,091.7	848.5	12,144.7
1,000.0	40	1545	143	0.375	82.8	109.4	31.8	4,075.3	1,062.9	848.1	10,439.0
750.0	30	1203	111	0.387	66.5	108.0	22.0	3,404.3	1,012.8	837.9	8,627.4
625.0	25	1029	95	0.396	58.2	107.2	17.4	3,086.5	970.9	818.2	7,702.1
500.0	20	854	79	0.406	49.5	106.3	12.9	2,772.2	905.7	782.2	6,723.9
250.0	10	496	46	0.443	31.4	104.2	4.8	2,193.0	702.9	643.5	4,693.3

Heat Rejection Data

GEN W/F EKW	PERCENT LOAD	REJ TO JW BTU/MN	REJ TO ATMOS BTU/MN	REJ TO EXHAUST BTU/MN	EXH RCOV TO 350F BTU/MN	FROM OIL CLR BTU/MN	FROM AFT CLR BTU/MN	WORK ENERGY BTU/MN	LHV ENERGY BTU/MN	HHV ENERGY BTU/MN
2,500.0	100	47,202	9,156	140,924	75,921	18,596	43,392	152,866	371,872	396,156
2,250.0	90	44,245	8,587	127,047	67,163	16,833	38,046	138,080	336,328	358,280
2,000.0	80	41,458	8,303	115,901	60,566	15,241	33,155	123,408	304,481	324,386
1,875.0	75	40,093	8,189	110,555	57,609	14,445	30,767	116,128	288,899	307,780
1,750.0	70	38,672	8,076	105,266	54,766	13,649	28,321	108,792	273,260	291,117
1,500.0	60	35,885	7,791	94,916	49,420	12,113	23,601	94,233	242,152	257,962
1,250.0	50	32,871	7,564	84,566	44,074	10,578	18,824	79,732	211,101	224,864
1,000.0	40	29,515	7,336	72,566	37,762	8,872	13,478	65,514	177,718	189,320
750.0	30	25,648	6,881	59,258	30,823	7,109	8,474	51,012	142,743	152,070
625.0	25	23,544	6,597	52,150	26,729	6,256	6,426	43,676	124,886	133,019
500.0	20	21,156	6,142	44,245	22,009	5,289	4,550	36,169	106,119	113,057
250.0	10	15,867	5,118	27,525	11,601	3,355	1,763	21,042	67,277	71,656

MECHANICAL Sound Data: 23.0 FEET

GEN W/F EKW	PERCENT LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCJ 8000HZ DB
2,500.0	100	103	107	116	107	98	91	90	88	92
2,250.0	90	103	107	116	107	98	91	90	88	92
2,000.0	80	103	107	116	107	98	91	90	88	92
1,875.0	75	103	107	116	107	98	91	90	88	92
1,750.0	70	103	107	116	107	98	91	90	88	92
1,500.0	60	103	107	116	107	98	91	90	88	92
1,250.0	50	103	107	116	107	98	91	90	88	92
1,000.0	40	103	107	116	107	98	91	90	88	92
750.0	30	103	107	116	107	98	91	90	88	92
625.0	25	103	107	116	107	98	91	90	88	92
500.0	20	103	107	116	107	98	91	90	88	92
250.0	10	103	107	116	107	98	91	90	88	92

MECHANICAL Sound Data: 49.2 FEET

GEN W/F EKW	PERCENT LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
2,500.0	100	97	100	110	100	91	85	85	82	86
2,250.0	90	97	100	110	100	91	85	85	82	86
2,000.0	80	97	100	110	100	91	85	85	82	86
1,875.0	75	97	100	110	100	91	85	85	82	86
1,750.0	70	97	100	110	100	91	85	85	82	86
1,500.0	60	97	100	110	100	91	85	85	82	86
1,250.0	50	97	100	110	100	91	85	85	82	86
1,000.0	40	97	100	110	100	91	85	85	82	86
750.0	30	97	100	110	100	91	85	85	82	86
625.0	25	97	100	110	100	91	85	85	82	86
500.0	20	97	100	110	100	91	85	85	82	86
250.0	10	97	100	110	100	91	85	85	82	86

REFERENCE: **Page 4-10 and others** ***"assuming that rider F approximates zero effective July 1, 2021..."***

QUESTION:

a) Under what conditions would Rider F now not go to zero?

b) Under what conditions will Rider F be non-zero in the future?

c) Please provide a history of the changes to Rider F and corresponding fuel prices for the last 10 years.

ANSWER:

(a) and **(b)**

Rider F is non-zero when there is a requirement to recover added fuel price costs, or to refund fuel price savings, related to the Fuel Price Variance Account.

The Rider F rate is tied to the Fuel Price Variance Account (FPVA) balance that reflects thermal fuel price variances for YEC and AEY (Companies). The FPVA has a threshold of +/-$200,000. When the balance in the FPVA approaches or reaches the +/-$200,000 threshold, the Companies must inform the Board and interested parties of the Companies' intentions to implement a Rider F rate change to address the outstanding balance.

As indicated in response to CW-YEC-1-23 (a), (b) and (d), although, the actual balance of the Fuel Price Variance Account will depend on volume of actual thermal generation and fuel prices for YEC and AEY, the advisory filed by the companies on September 23, 2020 was the best information available for the companies at the time of filing which aimed to get Fuel Price Variance Account balance to zero by July 1, 2021. Rider F would now not go to zero on July 1, 2021 if the balance in the FPVA as forecast at that time is outside the +/- $200,000 threshold.

(c)

Please see table below that shows Rider F rate changes for the last 10 years. The Rider F change is not tied to the specific fuel price change, but it is tied to the balance of FPVA

as noted in response to (a) and (b). The fuel prices variance calculations for both companies are available in FPVA continuity tables provided to the Yukon Utilities Board in quarterly report which are available on YUB's website.

cents/kW.h	Change Date
0.352	01-Jul-11
0.420	01-May-12
0.191	01-Oct-12
0.000	01-Jan-14
-0.286	01-Jul-15
-0.367	01-Aug-15
-0.487	01-Nov-15
-0.560	01-Feb-16
-0.011	01-Aug-17
0.970	01-Jan-20
1.371	01-Nov-20

REFERENCE: **From the YEC website – page announcing the 2021 GRA: *"Our Board of Directors and staff also understand that paying more for power can be hard for some Yukoners, especially during the COVID pandemic. That's why our 2021 rate application outlines a way for our proposed rate increase to have a nearly zero impact on electricity bills."***

$204.72 Dec 2021 Monthly Bill with 2021 GRA (Residential 1000kWh/month consumption – from Page 4-11 Table 4.3)

$178.50 Dec 2021 Monthly Bill without 2021 GRA ($204.72 minus Rider F ($13.64) and 2017/18 GRA true-up ($12.58) from Page 1-2 Figure 1-1).

QUESTION:

a) For a December 2021 bill as outlined above, what is the percentage increase attributable to the 2021 GRA?

b) What is the decrease absent the 2021 GRA?

c) Please explain how this is promoted as "nearly zero impact on electricity bills?"

d) Why is the "No GRA Scenario" from Figure 1-1 not included in any of the tables or figures of Appendix 4.2?

e) While comparisons with NWT, Toronto, and Yukon (Nov-2020), etc. are interesting, none of these are impacted by the 2021 GRA and only serve to obscure the actual impact of the GRA on future bills. The GRA only impacts bills that are subject to the GRA, meaning Jul-21, Dec-21 and beyond. Please provide new versions of all tables and figures from Appendix 4.2 with the addition of "Yukon, No-GRA (July 2021)" and "Yukon, No-GRA (Dec 2021)" for comparison with the already included Yukon - pre-GRA (Nov-2020), Yukon, Interim (July 2021) and Yukon, Proposed (Dec 2021).

f) Please also provide and update of Table 4.3 (Page 4-11) with the addition of No-GRA calculations/columns for Jul-21 and Dec-21.

ANSWER:

(a)

As illustrated in Table 4.2A-3 in Appendix 4.2 of the Application, the increase in Rider J for residential 1,000 kW.h monthly usage is $20.42, increase from $30.37 to $50.78. This is about 10.0% increase (compared with the November 2020 bill of $204.00) which is attributable to the 2021 GRA. However, the overall bill increase from November 2020 to December 2021 is constrained to $0.72 or 0.4% due to offsetting reductions to Rider F and Rider J1 (total reduction of $19.70).

(b)

Absent the 2021 GRA the residential bill for 1,000 kW.h monthly usage would decrease by $13.71/month on July 1, 2021 when Rider F is reduced to approximate 0, and be further reduced by $12.58/month on December 1, 2021 when Rider J1 expires (total reduction of 12.9% compared with November 2020 bill).

(c)

The proposed approach is described as “nearly zero impact on electricity bills” because that is exactly what results from the Application.

As outlined in section 1.1 of the Application, the proposed rate implementation dated for the 2021 GRA is aimed to avoid any material bill change for customers. Delay in rate adjustments or delay of GRA would lead to bill instability (a sharp decline followed by a sharp increase when new rates as required for this GRA are approved) and higher new true-up rate rider requirements.

Please see section 1.1 of the Application for more details of the proposed approach in the 2021 GRA to reduce customer bill volatility.

(d)

Yukon Energy is not proposing “No GRA Scenario” therefore this scenario was not included in Appendix 4.2 tables and figures. However, throughout the Application the tables show “Existing 2021” which shows the “No GRA Scenario” – and Appendix 4.2

provides the information indicating expected changes to existing rates without the GRA (with the exception of Rider F).

(e) and **(f)**

Please see NY-YEC-1-15 Attachment 1 for versions of Appendix 4.2 tables and figures that include "No 2021 GRA" scenario. Please note that for illustration purposes Rider F is estimated for "No 2021 GRA" scenario using the fuel price variance for the 2021 GRA [about $2.129 million as shown in Table 1-2 in Tab 1]. This is only an estimate, the actual Rider F will depend on actual fuel prices and thermal generations for both YEC and AEY.

The version of Table 4.3 with "No 2021 GRA" scenario is provided below.

		No 2021 GRA *		2021 GRA	
	Nov-20	Jul-21	Dec-21	Jul-21	Dec-21
Residential Non-Government, Whitehorse					
850 kWh/month consumption	$176.48	$172.16	$161.26	$176.70	$177.31
change from Nov 2020		*-$4.31*	*-$15.21*	*$0.22*	*$0.84*
1,000 kWh/month consumption	$204.00	$198.93	$186.35	$204.00	$204.72
change from Nov 2020		*-$5.07*	*-$17.66*	*-$0.00*	*$0.71*
Commercial Non-Government, Whitehorse					
2,000 kWh/month consumption [5 kW demand]	$358.84	$348.70	$326.78	$355.30	$356.54
change from Nov 2020		*-$10.15*	*-$32.06*	*-$3.54*	*-$2.30*
3,500 kWh/month consumption [15 kW demand]	$753.00	$735.24	$688.62	$755.81	$758.45
change from Nov 2020		*-$17.76*	*-$64.38*	*$2.81*	*$5.45*

Note:

1. For illustration purposes Rider F is estimated for "No 2021 GRA" scenario using the fuel price variance for the 2021 GRA [about $2.129 million as shown in Table 1-2 in Tab 1]. The actual Rider F will depend on actual fuel prices and thermal generations for both YEC and AEY.

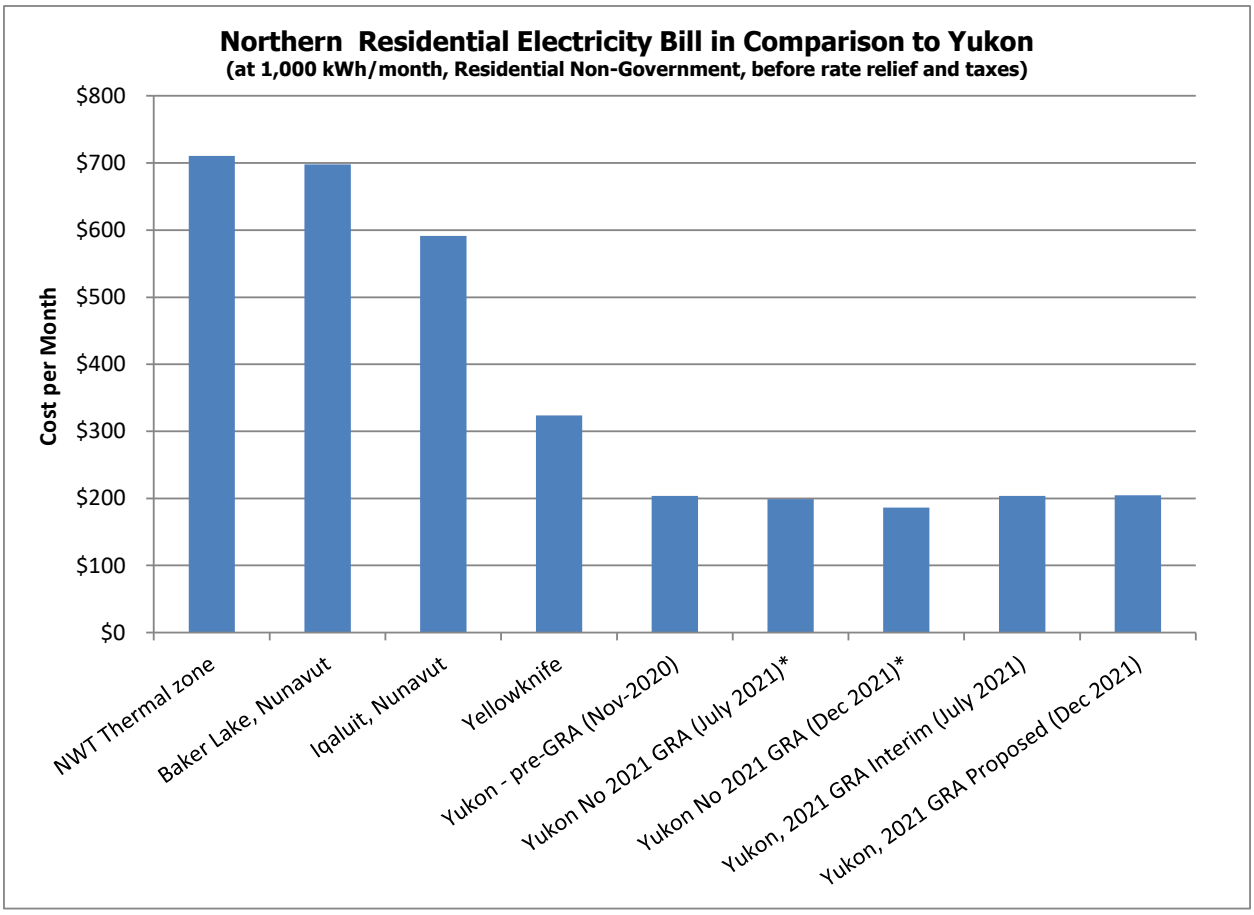
Table 4.2A-1:
Residential Electricity Bills in Comparison to Yukon
(1000 kWh/month consumption, Residential Non-Government, $)

		Monthly Bills before rate relief and taxes
1	NWT Thermal zone	$710.70
2	Baker Lake, Nunavut	$698.00
3	Iqaluit, Nunavut	$591.10
4	Yellowknife	$323.67
5	Yukon - pre-GRA (Nov-2020)	$204.00
6	Yukon No 2021 GRA (July 2021)*	$198.93
7	Yukon No 2021 GRA (Dec 2021)*	$186.35
8	Yukon, 2021 GRA Interim (July 2021)	$204.00
9	Yukon, 2021 GRA Proposed (Dec 2021)	$204.72
10	Toronto, ON	$188.42
11	Ottawa, ON	$173.77
12	Halifax, NS	$168.88
13	Charlottetown, PEI	$168.27
14	Regina, SK	$165.07
15	Calgary, AB	$148.31
16	Edmonton, AB	$142.93
17	St. John's, NL	$135.99
18	Moncton, NB	$134.19
19	Vancouver, BC	$115.13
20	Winnipeg, MB	$96.02
21	Montreal, QB	$72.99

Notes:

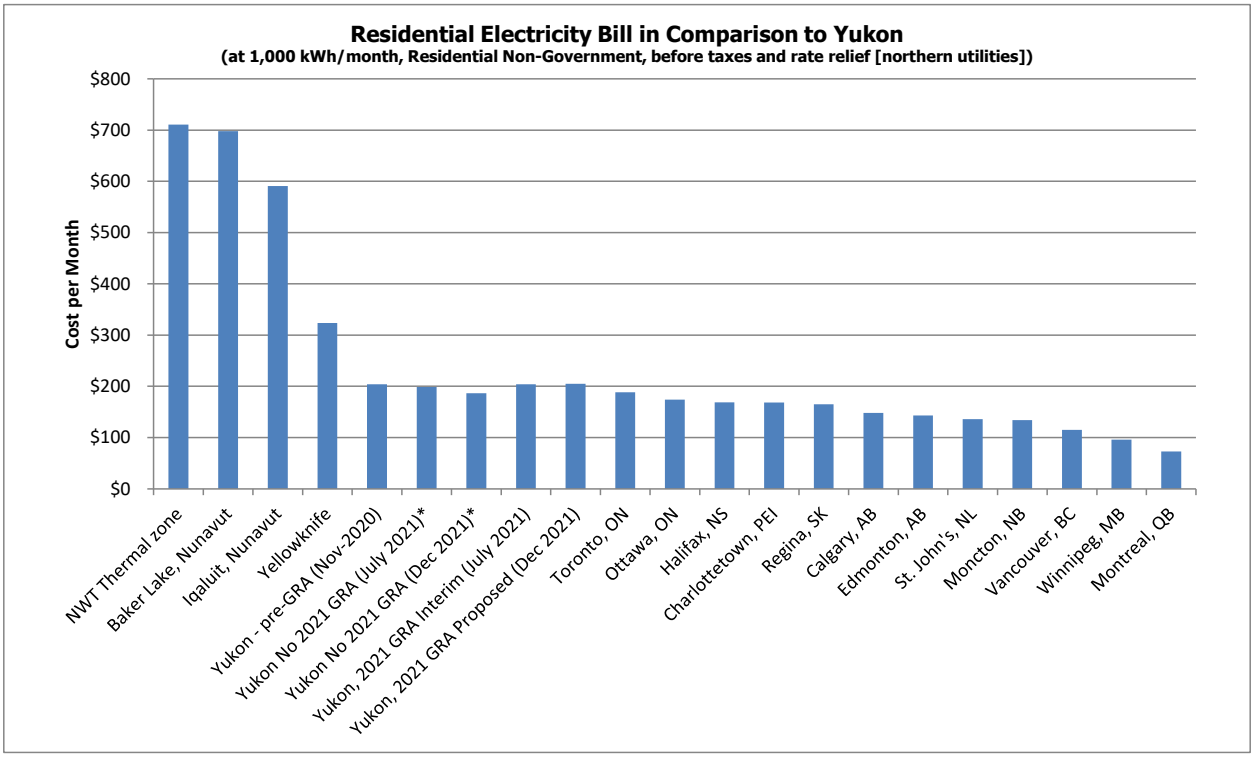
1. Monthly Bills are before taxes and rate relief [Hydro Quebec does not specify if the rate comparison includes rate relief].
2. Yukon existing bills include YEC Rider J [22.32%] and Rider J1 [9.25%], AEY Rider R [8.30%] and Rider F.
3. For illustration purposes Rider F is estimated for "No 2021 GRA" scenario using the fuel price variance for the 2021 GRA [about $2.129 million as shown in Table 1-2 in Tab 1]. The actual Rider F will depend on actual fuel prices and thermal generations for both YEC and AEY.
4. Yukon proposed bills assume interim Rider J increase of 10.08% effective July 1, 2021 and 4.93% Rider J increase effective December 1, 2021.
5. The monthly bills for Yellowknife are calculated using the rates in place in June 2019. Available at https://www.northlandutilities.com/en-ca/customer-billing-rates/bill-calculator/northland-utilities-limited-yellowknife.html [accessed on September 25, 2020].
6. The monthly bills for NWT Thermal Zone are calculated using the rates in place effective September 1, 2020. Available at https://www.ntpc.com/customer-service/residential-service/what-is-my-power-rate [accessed on September 25, 2020].
7. The monthly bills for Iqaluit and Baker Lake are calculated using the rates approved effective April 1, 2019, but also includes fuel rider refund effective October 1, 2020. Available at https://www.qec.nu.ca/customer-care/accounts-and-billing/customer-rates [accessed on September 25, 2020].
8. Bills for Toronto and Ottawa are based on Ontario Energy Board Bill Calculator. Toronto average monthly bill for 1,000 kW.h at $188.42 before taxes and rebates - calculation for Toronto Hydro-Electric System Limited tiered rate that include 12.6 c/kW.h energy rate, $58.15/month delivery charge and $4.27/month Regulatory charges; Ontario Electricity Rebate at $62.56/month is not included. Ottawa average monthly bill for 1,000 kW.h at $173.77 before taxes and rebates - calculation for Ottawa River Power Corporation tiered rate that include 12.6 c/kW.h energy rate, $43.44/month delivery charge and $4.33/month Regulatory charges; Ontario Electricity Rebate at $57.59/month is not included. https://www.oeb.ca/rates-and-your-bill/bill-calculator [accessed on October 21, 2020].
9. The monthly bills for the other cities are from Hydro Quebec's Comparison of Electricity Prices in Major North American Cities, Rates in effect April 1, 2020. Available at http://www.hydroquebec.com/data/documents-donnees/pdf/comparison-electricity-prices.pdf [accessed on October 21, 2020].

Figure 4.2A-1:[1]
Northern Residential Electricity Bill in Comparison to Yukon



[1] Please see notes to Table 4.2A-1.

Figure 4.2A-2:[2]
Residential Electricity Bill in Comparison to Yukon



[2] Please see notes to Table 4.2A-1.

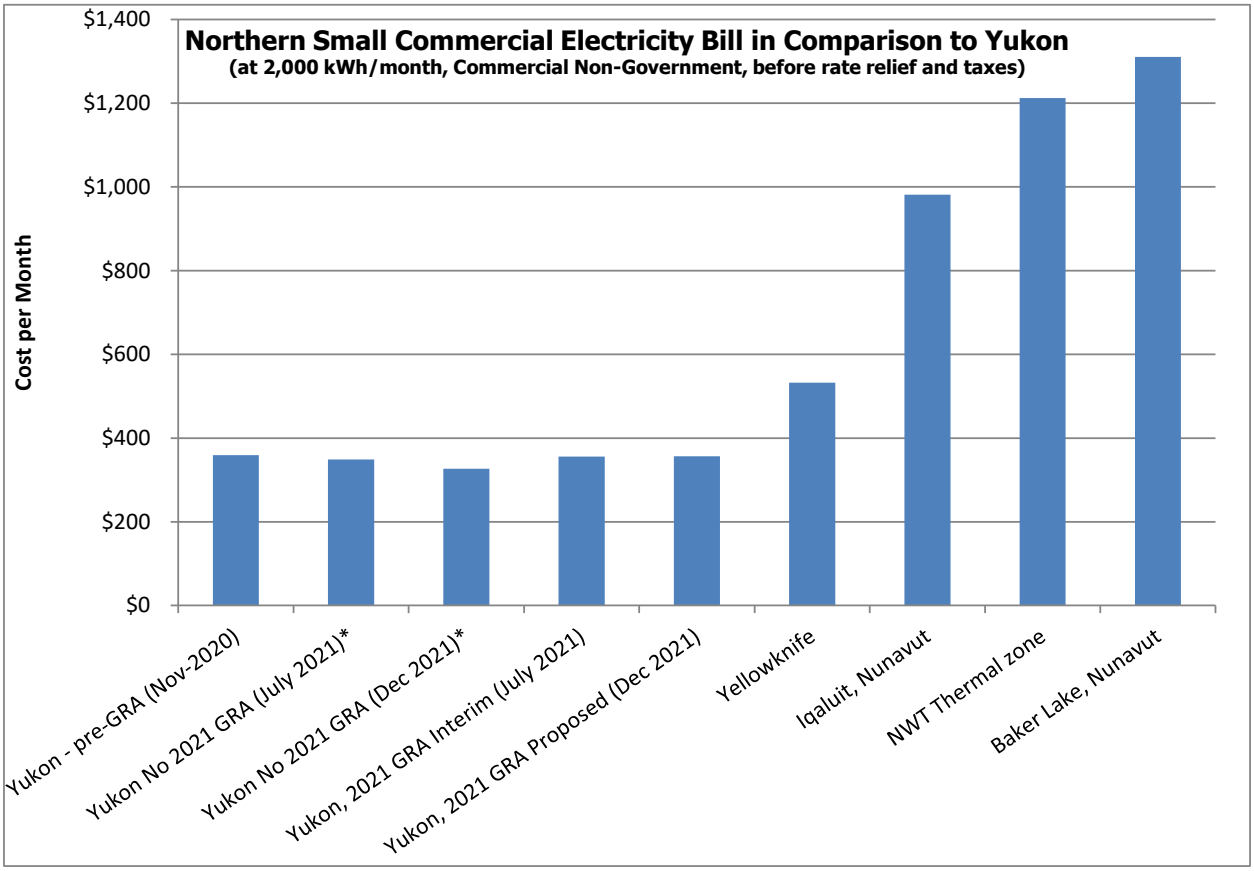
Table 4.2A-2:
Small Commercial Electricity Bills in Comparison to Yukon
(2000 kWh/month consumption, Commercial Non-Government, $)

		Monthly Bills before rate relief and taxes
1	Yukon - pre-GRA (Nov-2020)	$358.84
2	Yukon No 2021 GRA (July 2021)*	$348.70
3	Yukon No 2021 GRA (Dec 2021)*	$326.78
4	Yukon, 2021 GRA Interim (July 2021)	$355.30
5	Yukon, 2021 GRA Proposed (Dec 2021)	$356.54
6	Yellowknife	$532.26
7	Iqaluit, Nunavut	$981.20
8	NWT Thermal zone	$1,212.00
9	Baker Lake, Nunavut	$1,310.00

Notes:

1. Monthly Bills are before Rate Relief and taxes.
2. Yukon existing bills include YEC Rider J [22.32%] and Rider J1 [9.25%], AEY Rider R [8.30%] and Rider F.
3. For illustration purposes Rider F is estimated for "No 2021 GRA" scenario using the fuel price variance for the 2021 GRA [about $2.129 million as shown in Table 1-2 in Tab 1]. The actual Rider F will depend on actual fuel prices and thermal generations for both YEC and AEY.
4. Yukon proposed bills assume interim Rider J increase of 10.08% effective July 1, 2021 and 4.93% Rider J increase effective December 1, 2021.
5. The monthly bills for Yellowknife are calculated using the rates in place in June 2019. Available at https://www.northlandutilities.com/en-ca/customer-billing-rates/bill-calculator/northland-utilities-limited-yellowknife.html [accessed on September 25, 2020].
6. The monthly bills for NWT Thermal Zone are calculated using the rates in place effective April 1, 2019. Available at https://www.ntpc.com/customer-service/business-service/business-rates [accessed on September 25, 2020].
7. The monthly bills for Iqaluit and Baker Lake are calculated using the rates approved effective April 1, 2019, but also includes fuel rider refund effective October 1, 2020. Available at https://www.qec.nu.ca/customer-care/accounts-and-billing/customer-rates [accessed on September 25, 2020].

Figure 4.2A-3[3]
Northern Small Commercial Electricity Bill in Comparison to Yukon



[3] Please see notes to Table 4.2A-2.

Table 4.2A-3
Yukon Bills– Existing vs. Proposed - Non-Government Residential
(prior to consideration of subsidies, rebates and taxes) [4]

Line #	Customer Use per month: 1,000 kWh	Jan-18		Apr-19		Dec-19		Jan-20		Nov-20		No 2021 GRA * Jul-21		No 2021 GRA * Dec-21		YEC's 2021 GRA Jul-21		YEC's 2021 GRA Dec-21	
		Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill
	Base Rates																		
1	Customer Charge (per month)	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65	$14.65
2=KWh*Base rate	First Block Energy (kWh)	$0.1214	$121.40	$0.1214	$121.40	$0.1214	$121.40	$0.1214	$121.40	$0.1214	$121.40	$0.1214	$121.40	$0.1214	$121.40	$0.1214	$121.40	$0.1214	$121.40
3=KWh*Base rate	Second Block Energy (kWh)																		
4=KWh*Rider F rate	Rider F (kW.h)[Fuel Price Rider]	-$0.000110	-$0.11	-$0.000110	-$0.11	-$0.000110	-$0.11	$0.009700	$9.70	$0.013710	$13.71	$0.008637	$8.64	$0.008637	$8.64	$0.0	$0.00	$0.0	$0.00
5=(1+2+3)*Rider J rate	YEC Rider J (%)	16.51%	$22.46	16.51%	$22.46	22.32%	$30.37	22.32%	$30.37	22.32%	$30.37	22.32%	$30.37	22.32%	$30.37	32.40%	$44.08	37.33%	$50.78
6=(1+2+3)*Rider J1 rate	YEC Rider J1 (%)		$0.00		$0.00	9.25%	$12.58	9.25%	$12.58	9.25%	$12.58	9.25%	$12.58	0.00%	$0.00	9.25%	$12.58	4.84%	$6.59
7=KWh*Rider E rate	Rider E (kW.h) [LWRF Rider]	-$0.006800	-$6.80	$0.0	$0.00	$0.0	$0.00	$0.0	$0.00	$0.0	$0.00	$0.0	$0.00	$0.0	$0.00	$0.0	$0.00	$0.0	$0.00
8=(1+2+3)*Rider J rate	AEY Rider J (%)		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00
9=(1+2+3)*Rider R rate	AEY Rider R (%)	8.30%	$11.29	8.30%	$11.29	8.30%	$11.29	8.30%	$11.29	8.30%	$11.29	8.30%	$11.29	8.30%	$11.29	8.30%	$11.29	8.30%	$11.29
10=Sum(1:9)	Total Before Tax Rebate, IER, GST		$162.89		$169.69		$190.18		$199.99		$204.00		$198.93		$186.35		$204.00		$204.72

[4] Please see notes to Table 4.2A-1.

Table 4.2A-4
Yukon Bills– Existing vs. Proposed - Non-Government General Service
(prior to consideration of subsidies, rebates and taxes) [5]

Line #	First Block Energy Use - Customer Use per month:	2,000 kWh	Jan-18		Apr-19		Dec-19		Jan-20		Nov-20		No 2021 GRA * Jul-21		No 2021 GRA * Dec-21		YEC's 2021 GRA Jul-21		YEC's 2021 GRA Dec-21	
		5 kW	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill	Rates	Bill
	Base Rates																			
1	Demand Charge (per kW per month)		$7.39	$36.95	$7.39	$36.95	$7.39	$36.95	$7.39	$36.95	$7.39	$36.95	$7.39	$36.95	$7.39	$36.95	$7.39	$36.95	$7.39	$36.95
2=KWh*Base rate	First Block Energy (kWh)		$0.1000	$200.00	$0.1000	$200.00	$0.1000	$200.00	$0.1000	$200.00	$0.1000	$200.00	$0.1000	$200.00	$0.1000	$200.00	$0.1000	$200.00	$0.1000	$200.00
3=KWh*Rider F rate	Rider F (kW.h)		-$0.00011	-$0.22	-$0.00011	-$0.22	-$0.00011	-$0.22	$0.00970	$19.40	$0.01371	$27.42	$0.008637	$17.27	$0.008637	$17.27	$0.00000	$0.00	$0.00000	$0.00
4=(1+2)*Rider J rate	YEC Rider J (%)		16.51%	$39.12	16.51%	$39.12	22.32%	$52.89	22.32%	$52.89	22.32%	$52.89	22.32%	$52.89	22.32%	$52.89	32.40%	$76.76	37.33%	$88.44
5=(1+2)*Rider J1 rate	YEC Rider J1 (%)						9.25%	$21.92	9.25%	$21.92	9.25%	$21.92	9.25%	$21.92	0.00%	$0.00	9.25%	$21.92	4.84%	$11.48
6=KWh*Rider E rate	Rider E (kW.h) [LWRF Rider]		-$0.00680	-$13.60	$0.00000	$0.00	$0.00000	$0.00	$0.00000	$0.00	$0.00000	$0.00	$0.00000	$0.00	$0.00000	$0.00	$0.00000	$0.00	$0.00000	$0.00
7=(1+2)*Rider J rate	AEY Rider J (%)			$0.00		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00
8=(1+2)*Rider R rate	AEY Rider R (%)		8.30%	$19.67	8.30%	$19.67	8.30%	$19.67	8.30%	$19.67	8.30%	$19.67	8.30%	$19.67	8.30%	$19.67	8.30%	$19.67	8.30%	$19.67
9=Sum(1:8)	Total Before Tax Rebate, GST			$281.92		$295.52		$331.20		$350.82		$358.84		$348.70		$326.78		$355.30		$356.54

[5] Please see notes to Table 4.2A-2.

REFERENCE: **Page 10-28 "We expect COVID-19 impacts to have both positive and negative effects on Yukon Energy's financial position, net income and cash flows."**

PREAMBLE:

QUESTION:

a) What are the expected positive effects of COVID-19 on financial position, net income and cash flows?

b) What are the expected negative effects?

ANSWER:

(a)

The expected positive effects of COVID-19 include increases to Residential revenue (which includes YEC's Residential category as well as residential customers for AEY that are included in YEC's Wholesales category) as well as an expected decrease in YEC travel costs.

(b)

The expected negative effects of COVID-19 include decreases to Commercial revenue (which includes YEC's Commercial category as well as commercial customers for AEY that are included in YEC's Wholesales category) as well as increased contractor costs where required work requires workers to travel to Yukon and self-isolate before performing work.