REFERENCE: **Application, PDF page 32**

ISSUE: Victoria Gold and Hecla Yukon mine loads

QUOTE: Victoria Gold has significantly reduced its forecast load from what it forecast in its 2017 Power Purchase Agreement.

…

Based on the information provided by Hecla Yukon, the load forecast for 2023 is 15.1 GWh [including January-May actuals] and 21.8 GWh for 2024 reflecting an increase in mine activities starting from mid-2023.

QUESTION:

a) Are there any financial implications to Victoria Gold from reducing its forecast load from that in the 2017 Power Purchase Agreement (PPA)? Please explain.

b) How reliable is the Hecla Yukon industrial forecast? What factors affect the accuracy of the forecast?

ANSWER:

(a)

Yukon Energy is not aware if reducing its forecast load from that in the 2017 Power Purchase Agreement (PPA) level has any financial implications to Victoria Gold.

Revised Response to (a) based on YUB Order 2023-25, Appendix A

Board Order 2023-25, Appendix A, paragraph 5 finds as follows:

> The Board is seeking clarification as to whether there are any take-or-pay provisions in the PPA between Victoria Gold and YEC. Therefore, YEC is directed to confirm if there are any such provisions in the PPA. If there are such provisions, YEC is directed to explain if there are any financial implications to Victoria Gold from reducing its forecast load from that in the PPA.

(a)

There are no minimum energy take-or-pay provisions in the PPA between Victoria Gold and YEC.

(b)

The load forecast for Hecla Yukon was provided by the customer based on information they had at the time. To date, the forecast is aligned with the actuals. For example, the January – September 2023 forecast in the GRA was 10.2 GWh compared to about 10.5 GWh actual sales for the same period.

REFERENCE: **Application, PDF page 89**

ISSUE: Diesel rental business case

PREAMBLE: On PDF page 89, YEC lists three alternatives to the proposed short-term rental of twenty 1.8 MW diesel rental units. The alternatives are the purchase of the diesel rental units, longer term lease of the diesel rental units, and reliance on the addition of new capital facilities that are forecast to be commissioned during the GRA test years.

QUESTION:

a) Why did YEC not consider the purchase of larger diesel units and subsequent resale of those units when not required?

b) Why would YEC consider purchasing rental diesel units which YEC has already described as troublesome in past regulatory proceedings?

c) Why would YEC consider a longer term lease for rental diesel units which YEC has already described as troublesome in past regulatory proceedings?

d) Has YEC evaluated potentially more efficient and lower-cost alternatives than those referred to above? If not, why not?

e) Please provide all internal documents and analyses of the rental diesel units, including all presentations to the YEC and YDC boards of directors, any minutes from those meetings or YEC internal meetings where discussion regarding diesel rental units occurred, and any other discussions pertaining to the rental of diesel generation units.

f) Please provide all correspondence with any consultants, any terms of reference, and all products of any analysis regarding the rental of diesel generation units.

ANSWER:

(a), (b), and (c)

YEC's consideration of the potential purchase and resale of diesel units as outlined in Appendix 3.1 of YEC's Application did include consideration of the possible purchase of new units (which would include "larger" units) alongside the option of purchase and resale of the existing diesel rental units.

The list of three broad alternatives to the proposed short-term rental of twenty 1.8 MW diesel rental units, excluding spares, for the 2023-2024 test years was scoped to address the alternatives raised by the Board in the direction given at paragraph 115 of Appendix A of Board Order 2022-03.

- The "own/resale" and "lease" options were considered in relation to the rental diesel units to ensure that the review covered all of the alternatives noted, notwithstanding past evidence as to why such alternatives were not feasible or attractive for YEC.

- However, YEC's consideration of the "own/resale" option also included the potential purchase of other new diesel units to replace or expand YEC's existing diesel generation facilities. In particular:

    - YEC explains on page 3.1-3 of Appendix 3.1 that the purchase option for new diesels is only available subject to the time needed to complete required prudent planning and implementation activities, and that planning for such a purpose requires considerable time for design, procurement and installation.

    - The issues set out at the end of Appendix 3.1 (on page 3.1-7) relating to the financial risk created by the "own/resale" option also apply broadly across new diesel unit options, regardless of the size of the units. For example, based on current information, the LCOC for new units sold in the 11th year after commissioning is far higher than the rental option unless YEC will be able to sell the units at unrealistically high sales prices. Such a risk is simply not reasonable or prudent.

- YEC's comments in Appendix 3.1 also necessarily distinguish between short-term planning to meet N-1 dependable capacity requirements for the 2023 and 2024 test years (i.e., the business case focus for the current test year diesel rentals), and YEC's longer-term dependable capacity planning options.

- YEC's discussion of the alternative to add new capital facilities that could be commissioned in the test years focuses on specific projects being undertaken, but also describes experience to date on the practical constraints related to timing and planning for committing and commissioning major capital expenditures.

    - These constraints make it impracticable for YEC to plan adding new permanent diesel generation facilities that could be commissioned in the test years beyond the 12.5 MW of diesel replacement facilities at Whitehorse, Faro and Dawson specified in the 10-Year Renewable Electricity Plan and planned for in-service during winter 2023/24; during implementation of this plan, however, YEC was also able to add 4 MW of additional diesel at Dawson City that will result in 6.5 MW of new diesel capacity in that community (the initial planned 2.5 MW replacement unit was replaced by a 3.25 MW unit based on equipment availability, and a second 3.25 MW unit was added as part of the project to support back-up power in that community based on growing demands).

    - These constraints also delayed commissioning of the BESS and the new diesel projects as reviewed in Section 5.1A-1 of Appendix 5.1A, requiring YEC to arrange for additional rental diesels for the test years.

    - These constraints, however, did not prevent YEC from securing new diesel units larger than the 1.8 MW diesel rentals, i.e., all new units were initially planned at 2.5 MW and, due to availability issues, the recent planning adjustment will secure two 3.25 MW new diesel units at Dawson City.

(d)

YEC has reviewed all possible options in its planning work. This has been documented for the Board in recent BESS and Atlin EPA proceedings as well as in YEC's ongoing GRA applications.

YEC continues to evaluate potential options to enhance system reliability, efficiency and affordability, considering Yukon's Our Clean Energy Future strategy (that the Yukon government plans to develop legislation to require at least 93% of the energy generation on the YIS to come from renewable sources every year starting in 2030).

The 2023-2024 GRA updates information on new diesel installations that address the separate requirements of different Yukon communities as well as overall YIS requirements.

In response to the Board's specific question, planning work to date has not identified more efficient or lower cost alternatives that are acceptable and/or implementable for the 2023-2024 GRA test years. Given the factors and considerations reviewed in response to YUB-YEC-1-36, YEC is not aware of any more efficient and lower-cost alternatives for the test years than those considered in Appendix 3.1.

(e) and (f)

These requests are far too broad and lack sufficient definition that would allow YEC to gather and produce relevant information in the time available for YEC to respond to the IRs -- especially given YEC's ongoing work for many years on diesel rentals and other potential resource options. Further, the issue of rental diesels as a resource option has been before the Board on numerous occasions and significant material on this issue has been provided in this and previous proceedings. For example, related information on current diesel rentals relevant to the Application have been provided separately in this proceeding in the following responses: YUB-YEC-1-1; YUB-YEC-1-24; YUB-YEC-1-36; YUB-YEC-1-37; YUB-YEC-1-38; YUB-YEC-1-39; YUB-YEC-1-40; YUB-YEC-1-41; YUB-YEC-1-42; YUB-YEC-1-43; YUB-YEC-1-44; YUB-YEC-1-47; YUB-YEC-1-48; YUB-YEC-1-49; NY-YEC-1-8; NY-YEC-1-9; NY-YEC-1-19; NY-YEC-1-20; NY-YEC-1-21; NY-YEC-1-22; NY-YEC-1-23; NY-YEC-1-24; and JM-YEC-1-3.

The following responses in this proceeding also address updates regarding resource planning; the BESS and the Atlin EPA: JM-YEC-1-5 and NY-YEC-1-5 (provide updates regarding the BESS Project); JM-YEC-1-7; NY-YEC-1-6; NY-YEC-1-7 (provide updates regarding the Atlin EPA; SLESP; MLESP and Tutshi-Moon pumped storage project).

Prior proceedings on the Battery Energy Storage System (BESS), the Atlin EPA and earlier GRAs, as well as other responses in the current proceeding, have also provided significant details on YEC resource planning activities.

- CW-YEC-1-36(a) Attachment 1 from the 2021 GRA provided a copy of YEC's 10-Year Renewable Electricity plan completed during 2020. CW-YEC-2-6 from that proceeding reviewed at a high level the assessment of options to displace reliance on rented diesels; and alternatives considered.

- The Response to YUB-YEC-1-36 (b) and (c) from the Atlin EPA proceeding provided a summary of the relevant record at that time related to the investigation of thermal generation options; and provided a summary of relevant information regarding the following:

    - Rented diesels as a feasible option for near-term capacity shortfall;

    - Renting option is preferrable to possible ownership that assumes subsequent sale.

  This response was reviewed in detail and provided relevant references to both the BESS Proceeding and the 2021 GRA proceeding [including reference to relevant information requests, and transcript reference where these issues are discussed].

It needs to be emphasized that YEC is continually assessing options to reduce the need for rental diesels, and that currently available specifics regarding each non-rental option are discussed in this Application.

YEC also notes that documentation provided to its board (including minutes of board meetings and board resolutions) or to the Yukon Development Corporation's board has never been provided in previous YUB proceedings for many reasons, including most importantly board confidentiality.

Revised Response to (e) and (f) based on YUB Order 2023-25, Appendix A

Board Order 2023-25, Appendix A, paragraphs 9 to 11 direct as follows regarding YEC's response to YUB-YEC-1-35(e) and (f):

9. YEC's response to parts (e) and (f) states that the: "… requests are too broad and lack sufficient definition that would allow YEC to gather and produce relevant information in the time available for YEC to respond to the IRs…".[4] However, the Board notes that YEC had over one month to provide the requested information, but failed to provide any documents. The Board further notes that YEC has cited several IR responses, but did not explain how those references to other IRs directly respond to the questions as asked in the current proceeding.

10. As a result, the Board directs YEC to provide the internal analysis it used in the evaluation of the rented diesel generator option, including the analysis of any and all alternatives. The Board further directs YEC to respond to part (f) of the question and provide the pertinent portions of all correspondence with consultants, terms of reference, and all products of any analysis specific to the rental of diesel generation units.

11. In addition, as YEC stated in its response that the Board questions were too broad, the Board directs YEC to answer the following eight questions in relation to the rented diesel generators to better understand YEC's on-going reliance on rented diesels and to assess the prudency of using rented diesels for such long periods of time.

(e) and (f)

Please note that the information provided below, and in response to the Board's follow-up questions, is intended to supplement YEC's initial response to YUB-YEC-1-35(e) and (f) (as reproduced above).

With respect to the Board's restated request for YEC to provide the internal analysis it used in the evaluation of the rented diesel generator option, YEC notes that it previously provided a more detailed review of factors relevant to the business case review of test year diesel rentals in its response to YUB-YEC-1-36(a), in addition to the information provided in Appendix 3.1 of YEC's Application and in YEC's response to YUB-YEC-1-35(a)-(d). The information provided in those materials, along with the additional information provided in this response and in response to the Board's eight follow-up

[4] YEC Consolidated IR responses, PDF page 321.

questions, is descriptive of the substance of YEC's internal analysis of the diesel rental option implemented in the current GRA test years.

Overall, the diesel rental "option" first emerged in winter of 2017/18 as the only identified feasible way to address forecast dependable capacity shortfalls on a short-term basis pending the development and commissioning of new permanent dependable capacity and/or related DSM measures to meet N-1 dependable capacity requirements. This is reflected in the attached PowerPoint presentation prepared by YEC management dated November 8, 2017, entitled "Thermal Capacity Rental Winter 2017/18" (YUB-YEC-1-35 REVISED, Attachment 1), which summarized YEC's internal analysis of the diesel rental option at that time: i.e., as a short-term solution to meet capacity needs while YEC was in the process of pursuing (among other things) its initial planning and assessment work on the option of a new 20 MW thermal plant that was contemplated by the 2016 Resource Plan.

In addition to addressing the justification for diesel rentals to meet dependable capacity gaps in the short term, the November 8, 2017 presentation also addressed initial assumptions about rental scope (including RFP selection of Finning, and the assumption at the time that the diesel rentals would operate only in an N-1 event), potential permitting issues (including assumed restrictions affecting first year installation), timeline issues, budget and financial implications, and other factors.

The November 8, 2017 presentation also noted (on page 5) that one of the objectives of YEC's review when it was first considering diesel rentals was to "assess prospects for rental as long term solution to meet capacity needs". However, subsequent YEC planning up to and including the current GRA did not identify diesel rentals as something to be proposed on its own as a long-term dependable capacity resource option. Rather, YEC's diesel rental implementation from the winter of 2017/18 up to the current GRA has been informed cumulatively by all of YEC's resource planning and other internal analysis relating to the assessment, selection, development and commissioning of other, non-rental dependable capacity resource options. In that context, YEC has considered diesel rentals as a residual option, to the extent that the combination of other feasible options to be implemented by YEC would be insufficient to meet dependable capacity shortfalls without being supplemented by diesel rentals.

In other words, the internal analysis that YEC has used and considered in evaluating the diesel rental option since its initial implementation in the winter of 2017/18 is a very

expansive body of information that includes all of YEC's related resource planning activities leading to the current GRA.

As such, it is not practically possible to identify, gather and produce as part of an IR response every document in YEC's possession that contains internal analysis concerning resource planning that has been relevant to YEC's ongoing use of diesel rental generation units since the winter of 2017/18, including the use of diesel rentals in the 2023-24 GRA test years.

Similarly, with respect to the Board's request for consultant work product pertaining to the rented diesel generator option, it is important to recognize that YEC receives extensive, ongoing consulting advice and support, including from InterGroup Consultants, to assist with resource planning, including the development of business cases for proposed projects, and the preparation of filings and submissions for proceedings before the Board, including the BESS and Atlin EPA proceedings as well as YEC's prior and current GRAs. Much of this ongoing consulting advice and support is broadly relevant to YEC's resource planning options, including its ongoing use of diesel rental generation units. However, apart from the Colliers engagement referenced below that is currently underway, YEC has not sought or obtained any separate, stand-alone external consultant reports that are specifically focused on the feasibility of the rented diesel generator option, or the basis for selecting that option.

At a high level, when considering what information might be considered responsive to the Board's restated requests in paragraph 10 of Appendix A to Board Order 2023-25, YEC notes that its evaluation and internal analysis relating to rented diesel generation units can generally be grouped into the following two broad sets of activities:

1. YEC Resource Plan updates, typically carried out in approximate five-year intervals to assess 10-20 year grid forecast generation requirements and supply options. Since the 2006 Resource Plan, these periodic updates have re-assessed forecast dependable capacity requirements and supply options, and provided updated resource plans for meeting Yukon Integrated System (YIS) forecast capacity and energy requirements. Diesel rentals were specifically addressed as a resource plan option only in the last such update, i.e., the 10-Year Renewable Electricity Plan completed during 2020, which simply noted the forecast use of diesel rentals to address forecast dependable capacity shortfalls after

implementation of proposed, planned and committed capital projects for new generation and DSM.

2. Internal YEC operational activities to select, contract and operate diesel rental generation units in accordance with current resource plans and YIS dependable capacity requirements (in this instance relevant only to the forecast rentals for the current GRA test years).

YEC's initial response to YUB-YEC-1-35(e) and (f) referenced various specific detailed information and documents that have previously been provided to the Board relating to internal YEC and consultant assessments to date of diesel rental resource planning options.

Moreover, as reviewed in more detail below, information from prior proceedings for the 2017-18 YEC GRA, the BESS, the Atlin EPA, and the 2021 YEC GRA, as well as from the current GRA proceeding, demonstrates how the diesel rental "option" was identified in winter 2017/18 and in subsequent winters as the only feasible way to address forecast dependable capacity shortfalls on a temporary basis pending the development and commissioning of new permanent dependable capacity and/or related DSM measures to meet dependable capacity requirements.

The history of YEC's analysis of the diesel rental "option" over this time period is further summarized as follows:

- **Initial diesel rentals – 2017-18 GRA:** YEC's 2017-18 GRA filed on June 22, 2017 noted a forecast dependable capacity shortfall of 7.6 MW for 2017 and 8.7 MW for 2018, but it did not identify any forecast action to address those shortfalls in the short term (i.e., there was no mention of a diesel rental option) pending the planned installation of 4.4 MW of new LNG generation capacity in Whitehorse in Q1 2019, and subsequent plans at the time (as per the 2016 Resource Plan) to install BESS (4 MW) in 2020 and a 20 MW new diesel plant in 2021.

  Shortly after this GRA filing, YEC addressed the test year dependable capacity shortfall using rented mobile diesels (4 units in 2017 and 6 units in 2018 – see YUB-YEC-1-1 Attachment 1). As discussed above, YEC's internal analysis supporting that decision is summarized in the attached presentation, "Thermal Capacity Rental Winter 2017/18" (YEB-YEC-1-35 REVISED, Attachment 1).

The final Board decision and approved compliance filing for the 2017-18 GRA noted and approved YEC's revenue requirement based on actual costs for the 2017 test year, which included actual additional costs for diesel rentals in 2017; however, for the 2018 test year, the Board's decision retained the initial GRA forecasts that had not considered or included diesel rentals (see Decision 2018-10 in December 2018, paragraphs 138-139, and subsequent compliance filings and Board approvals through November 2019).

- **Dependable capacity planning 2018-2020 – 20 MW New Thermal plant project and emergence of 10-Year Renewable Electricity Plan:** After completion of the 2017-18 GRA proceeding, YEC continued to be focussed on its initial planning and feasibility assessment for the 20 MW diesel plant project contemplated by the 2016 Resource Plan, as well as the proposed BESS project.

  In 2019, however, after completing initial option assessments, planning and engagement activities for the 20 MW thermal plant, YEC's board of directors decided not to proceed with the 20 MW thermal plant project and to proceed instead with the updated resource plan as would subsequently be detailed in the 10-Year Renewable Electricity Plan that was first presented in January 2020, and which included 12.5 MW diesel replacement, the BESS and Atlin Hydro Expansion projects, capacity DSM, and the Moon Lake Pump Storage project.

  In the meantime, YEC still needed to address dependable capacity shortfalls on an ongoing basis, and diesel rentals continued to be the only feasible way to achieve this in the short term, pending the implementation of the projects contemplated by YEC's updated resource plan.

  In this context, diesel rentals to address short-term dependable capacity shortfalls increased to 6 units in the winter of 2018/19 winter and 9 units in the winter of 2019/20, with no spares being rented in those winters. However, in the winter of 2020/21, 15 diesel rental units plus two spare units were needed to address YEC's N-1 dependable capacity shortfall (see YUB-YEC-1-1 Attachment 1).

  YEC has previously provided information to the Board regarding these planning and diesel rental activities, both in the 2021 GRA and in subsequent proceedings (see next bullet below).

The attached presentation dated October 20, 2021, entitled "Diesel Rental Contract Approval" (YUB-YEC-1-35 REVISED, Attachment 2) was also provided to YEC's board of directors, and shows the evolved scope and considerations then applicable to diesel rentals. In particular, this presentation provided a rationale for operating the rental units up to the allowance run times per unit per month provided in YEC's rental contract for the units.

- **2021 GRA, BESS and Atlin EPA proceedings:** YEC filed its 2021 GRA in November 2020, its BESS application in January 2021, and its initial Atlin EPA application in January 2022. Each of these proceedings reviewed then available information and analysis on dependable capacity non-industrial peak MW requirements, committed and planned resources, and forecast diesel rental use to address forecast N-1 dependable capacity shortfalls prior to planned installation of the phase 1 Moon Lake Pump Storage Project's 35 MW of dependable capacity by winter 2028/29, followed by phase 2's additional 10 MW in winter 2031/32. See Figure 4-1 and Table 4-1 in both the BESS and Atlin EPA applications for similar detailed projections to winter 2041/42.

  YEC's filings and submissions in these proceedings included extensive information about YEC's resource planning leading into this period, including but not limited to information about YEC's use of diesel rentals to close the N-1 dependable capacity gap, that might in general terms be considered responsive to the Board's restated requests in paragraph 10 of Appendix A to Board Order 2023-25. The following is a non-exhaustive list of examples of such information:

  - YEC's 10-Year Renewable Electricity Plan Technical Report, a copy of which was filed with the Board as CW-YEC-1-36(a) Attachment 1 in the 2021 GRA, and YEC's response to CW-YEC-2-6 in that proceeding, which also provided a high level review of YEC's assessment of options to displace reliance on rented diesels and alternatives considered. This report was completed in December 2020, and included consultant reports on resource options examined (but there was no stand-alone report on diesel rentals specifically).

  - YEC's response to YUB-YEC-1-36 in the Atlin EPA proceeding, which provided a summary of the relevant record at that time related to the investigation of thermal generation options since the 2017-18 GRA. This

included a review of the analysis done to assess the 20 MW Thermal Plan proposal (the full October 2019 internal/consultant report on public engagement survey related to that project was attached), as well as a summary of relevant information regarding the feasibility of rented diesels as an option to address near-term capacity shortfall, and YEC's evaluation of why diesel rentals were preferable for that purpose over the possible option of purchase and subsequent resale. That response also provided relevant references to both the BESS proceeding and the 2021 GRA proceeding, including references to relevant information requests and transcript references where these issues were discussed.

- YEC's levelized cost of capacity (LCOC) analysis that was provided in the BESS and Atlin EPA proceedings for rented diesel units, new diesel units, and the other capacity options being assessed. In particular, section 4.2 of the BESS submission (page 29) stated that the "status quo" option of continuing to rely on rented diesels "is not a feasible option today" and that "[p]ermanent solutions are needed rather than relying upon temporary options such as rented diesel generators."

- Table 4-1 in the BESS and Atlin EPA proceedings, which forecast 2023/24 winter dependable capacity shortfall to be addressed with diesel rentals (excluding spares) at 13.9 to 14.1 MW, dropping to 8.5 to 8.9 MW for winter 2024/25, having regard to the resource planning described in the 10-Year Renewable Electricity Plan. In contrast, the 2021 GRA forecast a need for 15 diesel rentals (27 MW), excluding spares, to address dependable capacity shortfalls for the winters of 2020/21 and 2021/22.

In summary, during the period after the 2017-18 GRA, YEC's plans for a long-term option to address dependable capacity shortfalls evolved, and YEC's initial plan to proceed with the 20 MW diesel plant proposal as originally contemplated in the 2016 Resource Plan was replaced with the alternative plans described in the 10-Year Renewable Electricity Plan.

This evolution in YEC's long-term planning (and resulting delay in the implementation of longer-term generation options) was not contemplated at the time that YEC first decided to use diesel rentals to address projected capacity shortfalls in the winter of 2017/18. In the meantime, however, YEC still needed to

address dependable capacity shortfalls on ongoing basis, and diesel rentals continued to be the only feasible way to achieve this in the short term, pending the implementation of the projects contemplated by the 10-Year Plan.

- **2023/24 GRA diesel rentals forecast:** The current GRA forecasts the need for 20 diesel rental units (36 MW, excluding spares) to address forecast dependable capacity shortfalls for the 2023-2024 test years.

  The need for more-than-expected diesel rentals for the test years reflects delays in bringing into service the BESS, YEC's planned diesel replacements, capacity DSM and the Atlin EPA, all of which were expected to contribute to closing YEC's N-1 dependable capacity gap.

  In contrast, the forecast dependable capacity shortfall for winter 2025/26, with new diesel and BESS in-service, is reduced to 19.7 MW (11 rental units, excluding spares); and for winter 2026/27, with Atlin EPA also in-service, it is further reduced to 13.5 MW (8 rental units, excluding spares): see Table 1, YUB-YEC-1-1(a)-(c).

  YEC notes that its previous responses to IRs in the current GRA have provided a wide range of additional internal and consultant information on diesel rentals (e.g., rental costs, fuel efficiency, emissions, operation use, maintenance costs, tender processes to date, related infrastructure requirements), new replacement diesels costs and other features (including timing and changes to planned units), and the status of the BESS and Atlin EPA projects.

  The current GRA also reports that YEC is in the early stages of developing an Electricity Supply Plan to identify the resource options that can be implemented in the next 5-10 years to increase the supply of dependable capacity and energy during the winter months and to reduce the use of rental diesels (see YUB-YEC-1-1(a)-(c)). As part of this work, Colliers Project Leaders was retained in 2023 to assess – based on the current realities – the financial feasibility of several thermal generation scenarios (including rental and permanent units), and to complete a comparative analysis to meet the N-1 contingency planning criterion. However, Colliers' work on this is still in progress, and its report has not yet been finalized.

In addition to the above, the substance of YEC's internal analysis of the diesel rental option is further explained below in YEC's responses to the Board's eight follow-up questions referenced in paragraph 11 of Appendix A to Board Order 2023-25.

Follow-up Question #1:

Referring to YEC-YUB-1(a), PDF page 215 *(PDF page references are from YEC Consolidated IR Responses, dated November 29, 2023):

> "YEC started renting diesel units for the 2017/18 winter season with 4 diesel units. YEC expects the diesel rentals will continue until permanent renewable and/or thermal capacity is developed and in place to displace diesel rentals."
>
> "YEC is developing an Electricity Supply Plan to identify the resource options that can be implemented in the next 5-10 years to increase the supply of dependable capacity and energy during the winter months and reduce the use of rental diesels."[5]

The Board requires YEC to explain the reasons why it took over 7 years to determine that it may need a longer-term solution to diesel rentals.

ANSWER:

As was the case with YUB-YEC-1-47, this follow-up question's premise is not correct. YEC has never delayed considering the longer-term context, and it has always recognized the desirability of longer-term alternatives to diesel rentals.

As reviewed in response to YUB-YEC-1-47, throughout the referenced period (since winter 2017/18), YEC resource planning continued to consider, on an ongoing basis, the longer-term 10-20-year context for requirements, options and proposed plans to address N-1 dependable capacity shortfalls on the YIS and to provide optimal long run generation resource solutions for the YIS.

The 2016 Resource Plan proposed several long-term options in this regard, including a new large diesel plant (initial 20 MW, expanding to 30 MW) as well as the BESS and relevant DSM. Diesel rentals were not even identified as an option in this earlier Resource Plan; however, such rentals emerged for winter 2017/18 as the only available option to address the identified dependable capacity shortfall for that winter season.

[5] YEC Consolidated IR responses, PDF page 215.

Following rejection of the large new diesel plant option after extended feasibility assessments and public engagement, diesel rentals were projected in the subsequent 10-Year Renewable Electricity Plan (published in 2020) to be required only until other permanent capacity resources could be in-service. This included phase 1 of the proposed Tutshi-Moon Pumped Storage Hydro project planned to be in-service before 2030, as well as the BESS, the Atlin Hydro Expansion, 12.5 MW of diesel replacements, and dependable capacity DSM.

In this context, the quoted reference from YEC's response to YEC-YUB-1-1(a) is simply intended to reflect that the 10-Year Renewable Electricity Plan is currently being reviewed and updated to take into account ongoing changes, including delays expected in development of the Atlin Hydro Expansion EPA and the fact the YEC does not have full support from First Nation communities to advance the Tutshi-Moon Pumped Storage Project at this time.

In summary, there has been no delay by YEC in "determining that it may need a longer-term solution to diesel rentals." YEC's resource planning throughout the period of diesel rentals has always been focused on identifying long-term dependable capacity solutions that do not include reliance on diesel rentals.

Follow-up Question #2:

All things being equal, YEC indicates a need for diesel rentals at least until the 2028/29 winter season and likely beyond that time. The units are required mostly for N-1 dependable capacity shortfall purposes. YEC stated "YEC is not able to provide useful forecasts on this matter beyond winter 2028/29."[6]

However, as part of YEC's 2017-2018 GRA, YEC included its 2016 Resource Plan: Part 1. Included in that submission, on PDF page 13, is Figure 1: Comparison of Energy Forecast for All Major Industrial Activity Scenarios and Existing System Firm Energy. On PDF page 14 is Figure 2: Comparison of Non-Industrial Peak Demand Forecast for All Major Industrial Activity Scenarios and System Dependable Capacity under single contingency (N-1) criterion. Both figures forecast out to 2035.

Given the above-noted forecast in YEC's 2017-2018 GRA, why is YEC now unable to provide useful forecasts beyond 2028/29?

ANSWER:

The full quote provided below from YEC-YUB-1-1(a)-(c) explains why YEC is not able currently to provide useful forecasts on this matter beyond winter 2028/29:

> "YUB-YEC-1-1 Attachment 1 shows the requested information for the 2017/18 – 2028/29 winter seasons. The forecast years are based on information available today and will be updated when the Electricity Supply Plan and Resource Plan are each developed. Pending completion of the Electricity Supply Plan and the Resource Plan, YEC is not able to provide useful forecasts on this matter beyond winter 2028/29."

The extended forecasts out to 2035 that were provided in YEC's 2017-2018 GRA were part of the comprehensive 2016 Resource Plan. Similar long-term forecasts were provided subsequently in the 10-Year Renewable Electricity Plan, the BESS YUB review application and the Atlin EPA YUB review application.

[6] YEC Consolidated IR responses, PDF page 215.

YEC could provide capacity shortfall forecasts beyond 2028/29 based on information that is available today. However, those forecasts would be of limited value to the Board, as YEC anticipates that are likely to be subject to significant changes when the Electricity Supply Plan and Resource Plan are each developed. YEC expects to be in a position to provide more useful updated forecasts beyond 2028/29 once the next comprehensive resource plan updates are completed.

Follow-up Question #3:

For YEC's 2021 GRA, regarding production expense – diesel rentals, the Board stated:

> Even if some of the generation at issue did not receive a YESAB assessment, as YEC pointed out, Section 49 of the *Yukon Environmental and Socio-economic Assessment Act* provides that no assessment of an activity is required in certain emergency conditions. Subsection 49(1) states:
>
> > Notwithstanding sections 47 [regulations identifying activities] and 48 [declarations], no assessment is required of an activity that is undertaken in response to a national emergency for which special temporary measures are being taken under the *Emergencies Act*, or in response to an emergency when it is in the interest of public welfare, health or safety or of protecting property or the environment that the activity be undertaken immediately.
>
> The Board finds that N-1 emergency conditions described by YEC appear on their face to be consistent with Subsection 49(1) of the *Yukon Environmental and Socio-economic Assessment Act* and with responding to an emergency that is in the interest of public welfare, health, or safety. The Board considers that its own mandate is to ensure just and reasonable rates, as well as ensuring safe and reliable electricity service in Yukon. (Appendix A to Board Order 2022-03, PDF pages 26-27)

Given the above-noted finding, are the rented diesels exempt from an assessment pursuant to section 49 of the *Yukon Environmental and Socio-economic Assessment Act* because they fall within an activity that is required in certain emergency conditions? If yes, what are the on-going emergency conditions and what YEC as [sic] done to resolve the emergency? If no, then please explain YEC's position on this issue.

ANSWER:

As a general principle, YEC's operation of rental diesels is not exempt from assessment under the *Yukon Environmental and Socio-economic Assessment Act* (YESAA). However, no further YESAA assessment is required to enable YEC to operate rental diesels:

- to the extent that such operation is already authorized by YEC's existing Air Emissions Permits (which specify, for each diesel plant site, the maximum diesel generating capacity for normal diesel generating operations); or

- pursuant to section 49(1) of YESAA, if diesel generation beyond the current maximum licensed capacity for a site is required to respond to an emergency when it is in the interest of public welfare, health, or safety that the activity be undertaken immediately.

There is also no requirement for a YESAA assessment to enable YEC to install or have available additional diesel capacity at a site either for backup purposes (to ensure the maximum permitted capacity will always be available) or for the purpose of meeting N-1 dependable capacity requirements, to ensure that sufficient diesel generation capacity will be immediately available in the event it becomes necessary to exceed the site's permitted capacity in order to respond to an emergency covered by subsection 49(1) of YESAA.

In the YIS context, if YEC were to experience a unplanned system outage or temporary failure under circumstances in which it does not have sufficient licensed diesel capacity to address the resulting shortfall in meeting customer demand – a very rare occurrence that likely could only arise during a winter cold weather period – that event would not constitute "normal operations" and would constitute an emergency event covered by subsection 49(1) of YESAA. This issue was explained in detail in the 2021 GRA.

As explained previously in YEC's responses to NY-YEC-1-12, NY-YEC-1-17 and NY-YEC-1-18, in such circumstances, YEC would communicate immediately with the Authority Having Jurisdiction (AHJ) for air emissions (Yukon Government – Environment Department) in case of a requirement or occasion where any particular generating station anticipated exceeding or did in fact exceed its permitted operating capacity, and YEC would address any requirements of the AHJ to the best of its ability.

This process of notifying the AHJ and addressing any requirements communicated by the AHJ in response is consistent with section 113 of the *Environment Act*, which requires the holder of an Air Emissions Permit to notify the AHJ, "as soon as possible in the circumstances", in the event of the release of a "contaminant in an amount, concentration, or level in excess of that … allowed under [the] permit".

This process is also compliant with the "Unauthorized Emissions" provisions in each of YEC's current Air Emissions Permits, which stipulate the following reporting requirement:

1. The permittee shall contact either an environmental protection officer or the 24-hour Yukon Spill Report Centre (867-667-7244) as soon as possible under the circumstances in the event of an unauthorized release or emission, such as fugitive emissions or emissions resulting from burning fuel other than that allowed for under this permit.

For the Board's information, copies of YEC's current Air Emissions Permits for each of its diesel generation sites are attached as follows:

- Permit No. 60-010-01 (Faro): YUB-YEC-1-35 REVISED, Attachment 3
- Permit No. 60-010-02 (Mayo): YUB-YEC-1-35 REVISED, Attachment 4
- Permit No. 60-010-03 (Dawson City): YUB-YEC-1-35 REVISED, Attachment 5
- Permit No: 60-010-04 (Whitehorse): YUB-YEC-1-35 REVISED, Attachment 6
- Permit No. 60-010-05 (Mayo Secondary Thermal): YUB-YEC-1-35 REVISED, Attachment 7

It should be emphasized that such an emergency event would be exceptional. Even during winter months, not every N-1 event would necessarily result in a shortfall requiring YEC to exceed its licensed diesel capacity for "normal operations". If such an exceptional event did occur, however, it would give rise to a significant and immediate risk to public welfare, health and safety, and it is therefore critically important for YEC to have sufficient diesel capacity installed or available to guard against this risk.

One emergency event did, in fact, occur on December 19 and 20, 2022,[1] at a time when YEC was facing very high system/customer demand, with temperatures in the Yukon ranging around -50°C to -40°C. In the circumstances, it became necessary during that

[1] This occurred after the expiry of the special provisions in Part 9 of YEC's former Air Emissions Permit No. 60-010 that previously governed emergency operation of YEC's Whitehorse diesel units. Those special provisions expired on March 31, 2022, and Permit No. 60-010 was entirely replaced by separate Permits No. 60-010-01, 60-010-02, 60-010-03 and 60.010-04 on May 11, 2022. (Permit No. 60-010-05 was subsequently also added on November 21, 2023.) As noted above, emergency operations exceeding normal permitted capacity at all four sites are now governed by the "Unauthorized Emissions" provisions of YEC's current permits, which give effect to the reporting requirement in section 113 of the *Environment Act*.

two-day period for YEC to exceed its licensed diesel generation capacity in Whitehorse for a total duration of approximately 25 hours in order to meet demand and ensure uninterrupted service to customers, thereby avoiding a situation that would otherwise have presented a significant and immediate risk of harm. In accordance with Part 7 of YEC's Whitehorse Air Emissions Permit (No. 60-010-04), YEC promptly notified the AHJ by voice message and followed up on January 9, 2023 with a brief email report. In response, the AHJ acknowledged receipt of YEC's report, and indicated that they would let YEC know if they required any other follow-up; however, the AHJ did not require YEC to take any further action in the circumstances.

A copy of YEC's January 9, 2023 email exchange with Environment Yukon Environmental Compliance Officer Emily Sessford is attached (YUB-YEC-1-35 REVISED, Attachment 8).

See also YEC's response to NY-YEC-1-4 REVISED on stacking order for YEC thermal generation units.

Follow-up Question #4:

YEC BESS project Transcript Volume 1, PDF page 96, starting at line 23, to PDF page 97, ending at line 12. In response to a question from UCG: “And I know that you spoke on this with Mr. Maissan earlier, but I'm wondering why Yukon Energy wouldn't consider replacing the rental diesel units with new diesel engines as part of this plant replacement plan.” YEC responded in part:

> The focus of our board of directors -- and this flows directly from the policy direction that the federal government and the territorial government have taken -- is to, where possible, focus on renewable sources of supply.
>
> So, for example, we're working on the Atlin -- sourcing power from the Atlin Hydro expansion project, and then the big future project that would ultimately close the capacity gap is the Moon Lake pump storage project.
>
> So we have a portfolio that's intended to address the capacity gap, and if you look at the needs over the next 10 to 15 years, you know, rental thermal makes sense if you're working on these other permanent solutions.

Does the above quote encapsulate YEC’s reasoning for pursuing the diesel rentals, that is, that it was seen as a short-term solution with renewable projects expected to replace the rented diesels within 10 to 15 years? If it was seen as a short-term solution, why didn’t YEC pursue a permanent diesel solution?

Did YEC do any analysis showing that, for a 10-to-15-year period, diesel rentals were the most cost-effective route to follow? If so, who undertook that analysis? At a high level, what were the terms of reference for that analysis?

ANSWER:

It is reasonable to describe the above referenced quote as encapsulating YEC’s reasoning for pursuing the diesel rentals – as a short-term solution to meet capacity needs pending the implementation of longer-term plans to develop more permanent sources of supply – especially in light of the governmental policy direction to focus, where possible, on renewable sources.

In that context, YEC did not pursue a permanent diesel solution to meet capacity needs over the next 10 to 15 years in light of the portfolio analysis in the 10-Year Renewable Electricity Plan, which included the planned development of the Moon Lake pump storage hydro project within less than 10 years. The Moon Lake project was intended as a long-term renewable solution which, along with other long-term components of the 10-Year Plan, would provide sufficient forecast dependable capacity to avoid any long-term requirement for diesel rentals or new large permanent diesel plants.

At the time of the 10-Year Renewable Electricity Plan, Moon Lake pump storage was seen as a generational opportunity for Yukon to invest in a critical renewable electricity project that would replace the need for a new large diesel plant.

Under the 10-Year Plan, it was expected that use of rented diesels prior to commissioning of Moon Lake pump storage would avoid the need for YEC to incur capital costs to develop additional short-term diesel units that would cease to be used and useful as soon as Moon Lake pump storage became operational and thereby become stranded assets. Instead, the plan proposed capital spending on long-term generation and DSM resource options that would continue to be used and useful after Moon Lake pump storage became operational.

In light of the portfolio analysis in the 10-Year Plan, YEC did not assume that diesel rentals would continue to be needed after the planned implementation of the Moon Lake pump storage project. In that context, it did not appear to be necessary to give specific consideration to other short-term options as an alternative to rental diesel for the period prior to planned implementation of Moon Lake.

In the circumstances, it did not make sense for YEC to carry out a specific analysis comparing the diesel rental and “own/resale” options over a 10-to-15-year period, to evaluate whether diesel rentals were the “most cost effective route to follow”. That issue was considered more generally, however, in the sense that YEC’s 10-Year Renewable Electricity Plan, its BESS and Atlin EPA applications, and its 2021 GRA included analysis of the proposed Moon Lake project‘s ability to address the N-1 capacity shortfall and remove reliance on rental diesels.

As noted in YEC’s BESS application (at page 29):

> Yukon Energy's 10-Year Renewable Electricity Plan examined a wide range of near-term resource supply options to address forecast energy and capacity shortfalls. Many of these options do not provide dependable capacity; and the new resources that will provide dependable capacity would generally not displace what the BESS option can provide, i.e., the identified permanent resource capacity options are generally all needed to remove reliance on rented diesels for addressing the forecast capacity shortfall reviewed in Table 4-1. Moon Lake pumped storage, when developed, is the only identified resource option aside from default new thermal fossil fuel generation that has the capability to remove the forecast N-1 dependable capacity shortfall.

In its response to BESS IR YUB-YEC-1-37(b), YEC noted further:

> … Yukon Energy has explored (and continues to explore) permanent solutions to the N-1 dependable capacity shortfall. Rented diesel units have been adopted to date as a short-term measure, and the only feasible solution, to current N-1 shortfalls that exist before permanent solutions can be implemented. As demonstrated by the proposed BESS project, permanent solutions have not been "dismissed in favour of rented diesel units" – rented diesels have been implemented until permanent solutions are approved, developed and in-service.

Similarly, in its response to BESS IR UCG-YEC, 1-14, YEC noted its conclusion that "[t]he temporary rental diesel option remains the only feasible near-term alternative that would provide dependable capacity required to address the N-1 shortfall" pending the then-planned implementation of the BESS project, Atlin Hydro Expansion, and Moon Lake.

For the purpose of the current GRA proceeding, Appendix 3.1 of the 2023/24 GRA provides an economic analysis of diesel rentals vs. new permanent diesel comparable capacities that includes consideration of the new diesel "own/resale" option, and that shows that the Levelized Cost of Capacity (LCOC) for new diesel can only compete with rented diesel LCOC over a 10-year operating period if the new permanent diesel can be sold at the end of the 10 years at an unrealistic 10-year sales price (even before considering the further risk that, due to fast-changing environmental requirements, it may

become impracticable within the next 10 years to sell used diesel units[1]). This analysis was reviewed and updated as follows in response to YUB-YEC-1-48(d):

- 10-year operating period - rental option less costly LCOC NPV than new diesel.
    - LCOC for rented diesel at $239/kW-yr, assuming 4%/yr inflation.
    - LCOC for new diesel at $281/kW-yr, assuming unit sold at end of year 10 for price equal to 75% of original capital cost, i.e., the price needed to clear the year-end undepreciated balance after 10 years operation.
- 15-year operating period comparison (see YUB-YEC-1-48(a) and related Attachments 1 and 2) - rental option less costly LCOC NPV than new diesel.
    - LCOC for rented diesel at $250/kW-yr, assuming 4%/yr inflation.
    - LCOC for new diesel at $262/kW-yr, assuming unit sold at end of year 15 for price equal to 62.5% of original capital cost, i.e., the price needed to clear the year-end undepreciated balance after 15 years operation.
    - Annual revenue requirement cost impact is lower with rented diesel versus new diesel during the first six years of operation during the 10-year operating period.

[1] For example, under the proposed Clean Energy Regulations, any unit with ≥25 MW capacity that is connected to a NERC-regulated electricity system and is a net exporter of electricity as of 2035 (or the relevant compliance year) must comply with the 30 t/GWh annual CO_2 emission intensity standard, and it is assumed that entities will undertake investments to meet that standard. Although, YEC is exempt as “not connected to a NERC-regulated electricity system”, this requirement could make it almost impractical to sell the old units as potential purchasers could be subject to those regulations. Output-Based Pricing System Regulations also impose emission intensity standards.

Follow-up Question #5:

In the BESS proceeding and in reference to IR YUB-YEC-1-43 (a-c), from transcript volume 2, YEC was asked about the general feedback of the public and the limited social license for a greenfield diesel project. YEC's response, in part, stated:

> And I think, as outlined in the IR response, the feedback we received was pretty negative in the sense that people, you know, in general did not support us spending a substantial amount of money on a new 20-megawatt permanent diesel plant.
>
> You know, I think that general sentiment has been echoed in a number of subsequent surveys that we've done, where the public in general is very strongly in support of investment in renewable supply options. And, really, that then gets reflected in policy that has been rolled out, subsequently both at the federal level, as I referred to yesterday, and also the territorial through Yukon government's Our Clean Future.
>
> So, really, you know, the feedback we got was there was likely to be a lot of resistance and opposition to construction of a 20-megawatt greenfield diesel plant.
>
> I would also point out that, you know, the conversations with the First Nations probably, you know, led to similar conclusions. You know, they were not in favour of diesel plants necessarily. Their citizens had a number of similar concerns.
>
> So, you know, I think the -- we looked at that situation. And then subsequently what was unfolding from a policy perspective and our board really through the 10-year renewable plan articulated a very different direction in terms of pursuing renewable options; namely Atlin and Moon Lake, and the battery for that matter, as capacity solutions going forward. (BESS transcript Vol 2, PDF page 11, line 11 to PDF page 12, line 15)

Later in reference to public feedback, YEC was asked what reasons its Board of Directors gave YEC to not seek a permanent thermal solution to its capacity shortfall. YEC stated:

> Okay. I'd say there was a couple of reasons. The first was the -- you know, in making that decision the board was taking into account the public and First Nation feedback that we had received. Right?

> So they were taking a look at that – that information and considering what the implications of that would be if and when we went to the assessment and permitting phase of that permanent diesel project. So that was the first factor.
>
> And I would imagine their conclusion was, you know, that there was likely to be significant public opposition during the regulatory phase, which would increase the risk of securing the required approvals for the project from the permitting agencies and YESA [verbatim]. So that would be the first one.
>
> The second one was they, at that time, were beginning to formulate the strategy around the focus on renewable options. In particular, as I said in the transcript, you know, shows the focus on Atlin and Moon Lake. And so the conclusion was, well, if you're -- if you've got a plan that's going to deliver a large step increase in capacity from, say, Moon Lake, that really erodes the justification of building a 20-megawatt diesel plant. There's just no point. Because if Moon Lake is coming along in 10 years, it would essentially make the diesel plant, in some respect, obsolete. (BESS transcript Vol 2, PDF page 16, line 15, to PDF page 17, line 17.)

Regarding public feedback, the Board seeks clarification about the responses YEC received regarding a permanent thermal solution and whether these responses were representative of Yukon as a whole? Were all First Nations opposed to a permanent diesel supply option?

The underlined portion above refers to public surveys. How many surveys were undertaken? How were the participants selected? Did any of the surveys include questions along the lines of: Is there an economic point where you consider thermal energy to be viable?

ANSWER:

YEC's response to YUB-YEC-1-36(d) Attachment 1 in the Atlin EPA proceeding provided the full October 2019 internal/consultant report on YEC's public engagement survey that YEC worked with the Yukon Bureau of Statistics to carry out regarding the 20 MW Thermal Plant project. This includes an overview summary of the survey results in section 3.5 of the report, as well as a full report of the survey results, including a detailed record of responses and comments received from survey participants, in Appendix C of the report.

The following responses to the Board's follow-up questions above are based, where applicable, on the information in the October 2019 report:

1. **Were responses representative of Yukon as a whole?**

   Information about the project was shared territory-wide, and anyone from any community in Yukon could provide feedback about the project.

   The project online survey created with Yukon Bureau of Statistics was available to all Yukoners. There were 447 responses, and approximately 91% of these respondents were from the Whitehorse area (including Mount Lorne and Lake Labarge). Social media, online ads and YEC web site were used to invite participants to take the survey. Household mailers, and print and radio ads were also used to inform Yukoners about the project and to invite people to visit YEC's website or attend an open house to learn more about the project and provide input.

   Organizations with territory-wide interests were invited to be part of the Advisory Committee (including invitations to Yukon College, Yukon Government Energy Branch, Yukon Conservation Society) as well as local interests (including the local First Nations [Kwanlin Dun First Nation, Ta'an Kwäch'än Council], the City of Whitehorse, and neighbourhoods close to the proposed project).

   Specific engagement efforts were made to try and gather feedback from people in close proximity to the proposed project sites, given that these were the people expected to be most affected by construction and operation of the project if it proceeded. Four public open houses were held within the Whitehorse area and approximately 175 visits were made to homes and businesses near the proposed project locations. An additional nine businesses with operations in the broader Takhini area were either visited or called to obtain their input on the project. YEC also distributed household mailers and ran ads on social media, specifically Facebook and Google, which informed people about the project and directed them to the project homepage on the website. Individuals were able to email or call YEC or comment on the ads to provide their feedback.

2. Were all First Nations opposed to a permanent diesel plant solution?

Not all First Nations in Yukon were engaged in the survey/engagement process, and (as explained below) this process did not report that any First Nation opposed a permanent diesel plant solution.

TKC and KDFN were invited to participate on the Advisory Committee based on the project's proposed location in the Whitehorse area. Committee meetings were engaged under Chatham House Rule where participants were free to use information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participants, could be revealed, i.e., there are no Advisory Committee meeting records attributing any specific views to TKC or KDFN.

3. How many surveys were undertaken? How were the participants selected? Did any of the surveys include questions along the lines of: Is there an economic point where you consider thermal energy to be viable?

Only the one survey described in response to #1 above was undertaken specific to the proposed New Thermal project. The earlier response describes how participants were selected.

All of the survey questions are reproduced in the previously referenced October 2019 report. The survey did not include a question along the lines of, "Is there an economic point where you consider thermal energy to be viable?" As part of the survey, respondents were asked open-ended questions regarding location and fuel source. This included survey question 3, which asked: "What is the ONE MOST IMPORTANT thing you would like Yukon Energy to consider regarding the location of a new thermal electricity generation facility/type of fuel to be used to power a new thermal electricity generation facility?" Respondents could add any comments they wished in response to that question, and all of those comments are reproduced in Appendix C to the October 2019 report.

In addition to the referenced survey, feedback about the proposed project was also collected during open houses and household and business visits, from emails, letters and calls, and on our social media channels, and all of that additional feedback is also recorded in detail in Appendices A, A.1, B, D and E to the October 2019 report:

- 655 comments were related to renewables and alternative solutions including demand-side management (e.g., more renewables should be used instead of continued use of fossil fuels; more should be done to help people lower their demand for power and conserve energy).

- 110 comments were related to cost (e.g., impact of project costs on debt cap, ratepayers and taxpayers; lifecycle costs; fuel price stability).

Yukon Energy has also heard Yukoners' desire for renewable options as part of other surveys completed (e.g., the electricity values survey we ran in 2016 and Southern Lakes Enhanced Storage Project Survey in 2019) and in other public engagement forums for other projects.

- In the 2016 Values Survey:

    - Conducted by the Yukon Bureau of Statistics on behalf of YEC.
        - A stratified random sample representing one-third of total eligible Yukon households was selected to complete the phone survey.
        - This survey was referenced in response to UCG-YEC-1-36(b), and a copy of the resulting report was provided as Attachment 2 in YEC's December 12, 2023 response to the motions of UCG and NY.

    - Respondents ranked four major factors in order of importance to YEC's future projects. Environmental Protection was ranked first by 44% of respondents, followed by Cost (23%), Reliability (21%), and Social Responsibility (8%).

    - In ranking three energy sources in order of preference for Yukon's future, 59% of the responding households chose renewable energy as their preferred future energy source. About one-third (31%) preferred energy conservation as a future energy source, while only 5% preferred fossil fuels as a future energy source.

- 78% of respondents said they would support a YEC initiative to reduce GHG emissions in energy production even if it meant a potential increase in electricity rates.

- In the 2019 Southern Lakes Enhanced Storage Project Survey:
  - Conducted by the Yukon Bureau of Statistics on behalf of YEC.
    - Census survey of households in the Southern Lakes region (Carcross, Marsh Lake and Tagish), as well as a sample survey of all other Yukon households.
  - The majority of respondents (82%) agreed that it was important that Yukon Energy find ways to increase the amount of renewable electricity it generates.
  - No questions specific to costs or rates were part of this survey.

Follow-up Question #6:

For YEC's 2023-2024 GRA, YEC recently determined that Moon Lake would not be moving forward in the foreseeable timeframe. As such, is YEC re-evaluating its capacity options?

ANSWER:

Yes.

As noted in YEC's responses to YUB-YEC-1-1(a)-(c) and NY-YEC-1-11, YEC is developing an Electricity Supply Plan to identify the resource options that can be implemented in the next 5-10 years to increase the supply of dependable capacity and energy during the winter months and reduce the use of diesels, as well as a longer-term Resource Plan to determine the Yukon's long-term electricity needs and to identify the resource options that are best suited to meet those needs. As contemplated in various other IR responses, including YUB-YEC-1-46(a) and YUB-YEC-1-47(a), these exercises will necessarily involve a re-evaluation of capacity options in light of the recent determination that the Moon Lake Pumped Storage Project will not be moving forward in the foreseeable timeframe.

Follow-up Question #7:

In the BESS proceeding YEC was asked how it evaluates renewable projects versus the economical basis for thermal projects and stated:

> So what you see there is an assessment of a range of different supply options. And, you know, the left hand -- and so what's presented is the technical attributes. So their capacity, for example, their annual energy production. But the whole right-hand side of the table is very much around costs, not only in terms of upfront capital, operating and maintenance costs. And then two key sort of metrics that we then distill down, which is your levelized cost of energy and levelized cost of capacity.
>
> So, you know, the intent is very much to ground the analysis in economics and, you know, in terms of specifically targeting the renewable options. And I think in particular about Atlin and Moon Lake and the battery, is that there was a recognition that significant federal funding was required to bring the costs of those renewable options in line with thermal alternatives. And so that's -- we were very transparent and clear that we would only move forward with these projects if federal funding was indeed secured. (BESS proceeding, Transcript Volume 2, PDF page 13, line 20, to PDF page 14, line 15.)

What makes the levelized cost of capacity (LCOC) and the levelized cost of energy (LCOE) appropriate metrics rather than the net present value in evaluating the economics of different generation capacity options?

Understanding that government funding is an important component, how does YEC determine which individual renewal projects should proceed and at which time? What other criteria does YEC look at in the selection process?

Later in the BESS proceeding YEC stated:

> Yeah. I think it's important to realize that these plans are -- do evolve over time, no doubt. And, yes. I mean, if circumstances were to change and we were simply not able to secure the required amount of federal funding for Moon Lake, for example, then we may well have no real other option but to reconsider a 20-megawatt diesel plant. (BESS Proceeding, Transcript Volume 2, PDF page 18, lines 6-12.)

Given that the Moon Lake project is on hold, please explain why a larger thermal plant, such as the 20-megawatt plant discussed in the BESS proceeding, was not one of the options considered in YEC's business case in Appendix 3.1 of YEC's 2023-2024 GRA?

ANSWER:

YEC responds as follows to the three separate questions asked above:

1. **LCOC/LCOE vs. NPV –** Both LCOC and LCOE are net present value (NPV) economic assessments of generation options per unit (i.e., capacity and energy, respectively). LCOC focuses on NPV assessment of dependable capacity options (stating results as lifecycle cost per kW-yr) while LCOE focuses on NPV assessment of energy options to supply grid load requirements (stating results as lifecycle cost per kWh). As demonstrated in YEC's filing in the BESS proceeding, options can be assessed as well simply by comparing overall NPV costs without stating results relative to either kW-yr or kWh.

2. **Other criteria in selection process –** In addition to cost considerations and the availability of government grant funding, YEC also generally considers other criteria relevant to the comparative risks and timing requirements for resource project options. This includes time requirements and risks for planning, engagement, regulatory review/permitting, procurement, construction and commissioning; factors affecting any required government grant funding and its related timing and amounts. A decision by YEC to proceed with a project (versus only carrying out feasibility and planning assessments) also requires confirmation that critical preconditions for project implementation will be met, including needed regulatory approvals/permits, any required grant funding, and contracts with final costs and timing commitments for procurement, construction and commissioning.

3. **Why a larger thermal plant was not an option considered in YEC's diesel rental business case in Appendix 3.1 –** Appendix 3.1 provides the following summary of various factors (not limited to the Moon Lake Pumped Storage option) that led to the decision not to consider a larger thermal plant as part of the business case assessment for the diesel rentals that are forecast in YEC's 2023/24 GRA revenue requirement (at page 3.1-5):

> "Dependable capacity shortfalls were forecast in the 2016 Integrated Resource Plan, based on expected future non-industrial peak load growth and the need to replace aging diesel infrastructure. After considerable planning and public review, and based on the Yukon Government's climate change objectives, the option of developing one new large diesel facility was discarded by YEC and replaced by YEC's 10-Year Renewable Electricity Plan (10-Year Plan) that includes new thermal replacement at YEC's different thermal facilities, the Atlin Hydro Expansion project EPA, the BESS project, dependable DSM capacity development, and the review of large renewable dependable capacity and energy options such as Tutshi-Moon Pumped Storage Hydro."

Factors relevant to YEC's business case assessment for the use of diesel rentals in the 2023/24 GRA test years are also further reviewed in YEC's response to YUB-YEC-1-36(a).

In the 2021 GRA the Board accepted the cost of short-term diesel rentals and approved the inclusion of those costs in YEC's revenue requirement for the 2021 test year. Notwithstanding the recent determination that the Moon Lake Pumped Storage Project will not be moving forward in the foreseeable timeframe, there had been no fundamental change to the considerations regarding the larger diesel plant option for the 2021 test year rental diesel business case when YEC was assessing the 2023/24 test year rental diesel business case. Reconsideration of any long-term option on the scale of the previously proposed 20 MW diesel plant will require an updated review of forecast requirements and planning options, followed by the time needed to implement selected options. As a result of those constraints, it was not practically possible to reconsider the possibility of implementing long-term options such as a 20 MW diesel plant in the 2023/2024 test years in light of the Moon Lake postponement; however, such options can and will be considered beyond the current GRA test years.

In particular, Appendix 3.1 in the 2023/24 GRA notes that YEC is currently completing a review and update of the 10-Year Renewable Electricity Plan to take into account ongoing changes. This review and update will necessarily take into account delays expected in development of the Atlin Hydro Expansion EPA and the pause in Tutshi-Moon Pumped Storage Hydro project (as contemplated in YEC's response to follow-up question #6 above).

Follow-up Question #8:

YEC has noted direction from its Board of Directors regarding renewable generation projects. If YEC's Board gives direction not to pursue the least cost alternative, does that mean its Board, rather than ratepayers, will pay for any incremental costs above the least cost generation alternative?

ANSWER:

To date, YEC's Board of Directors has not given any direction for YEC to pursue renewable generation projects that would be expected to impose costs on ratepayers exceeding the estimated least cost generation alternative. Rather, the Board of Directors has consistently directed the selection of options that are most cost-effective for ratepayers, having regard to available forecasts as well as regulatory and other requirements, including climate change objectives imposed by the government. For example, evidence related to YEC's 10-Year Renewable Electricity Plan specifically highlights that development of the proposed YEC renewable pump storage hydro project would be subject to securing adequate federal grant funding to prevent this option from imposing added costs on ratepayers compared to other available options (including thermal generation).

In the final analysis, the YUB alone has jurisdiction, subject to the *Public Utilities Act* and related OIC directions, to determine changes to ratepayer costs for the services provided by YEC. When evaluating least-cost options, the YUB must fully consider all applicable regulatory requirements then in effect, including any regulatory requirements related to use of renewable sources for electricity generation, e.g., section 11(1) of OIC 2021/16.

Thermal Capacity Rental

Winter 2017/18

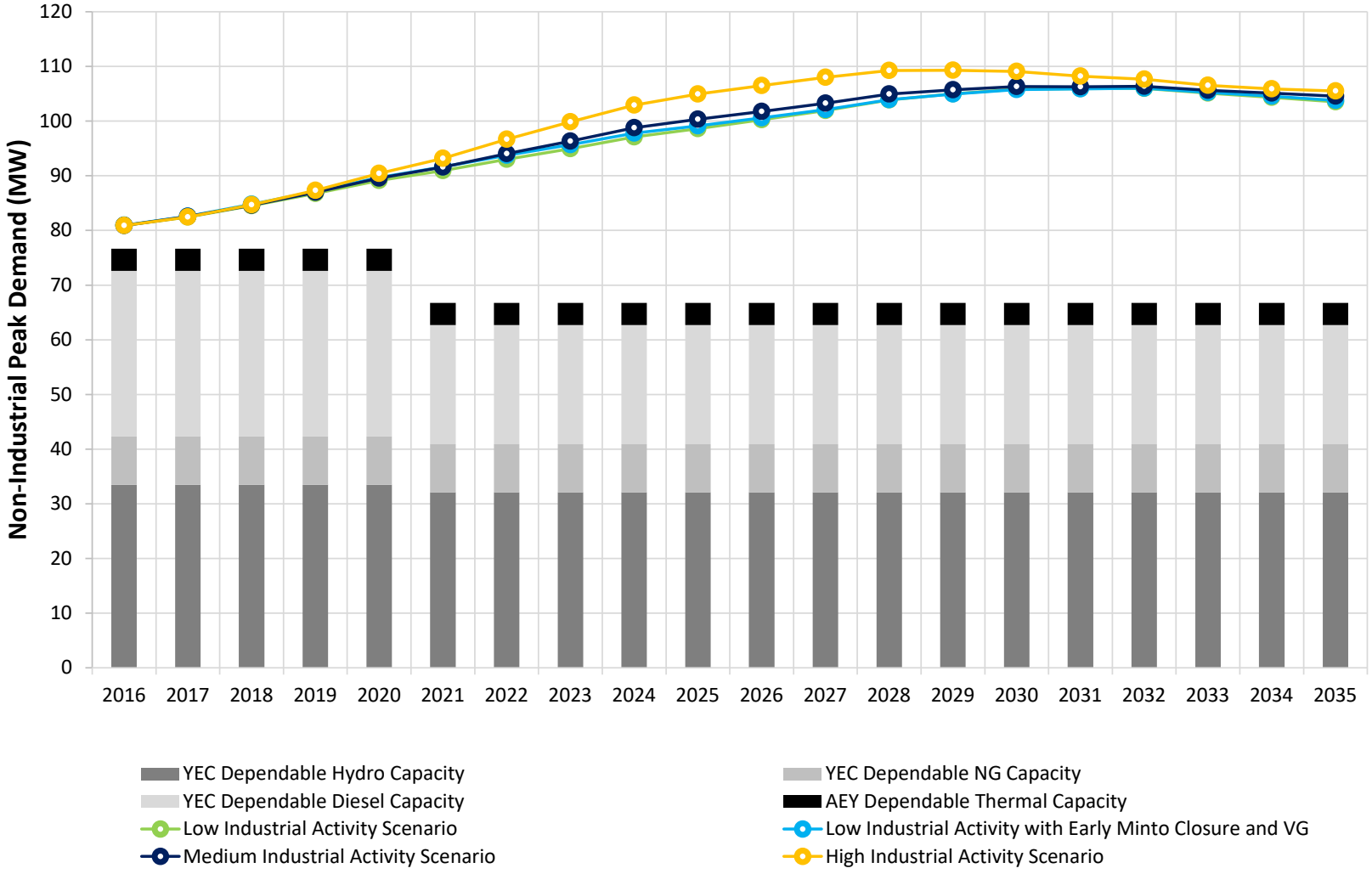
8 November 2017

YUKON ENERGY

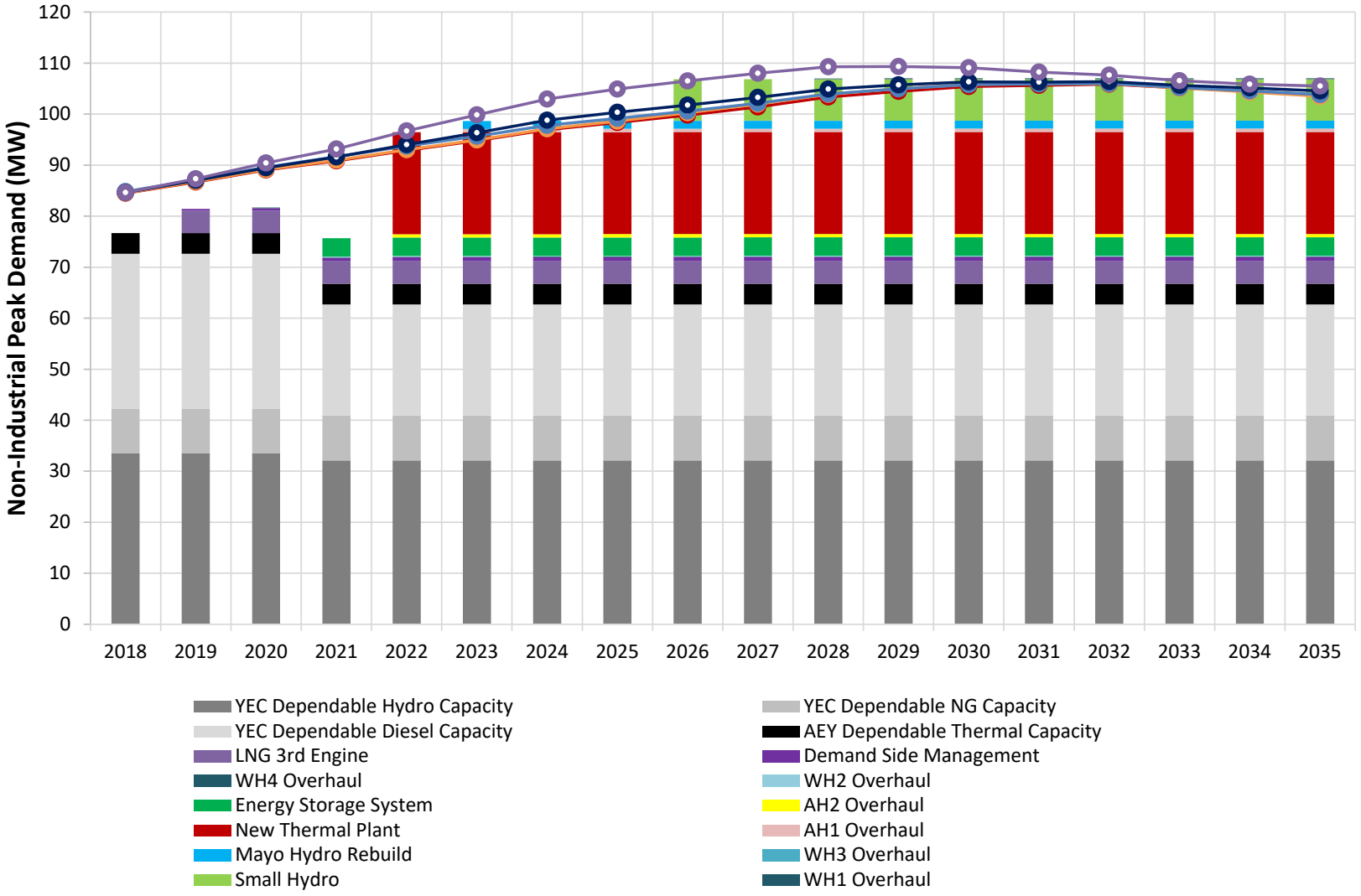
Agenda

1. Justification
2. Rental scope
3. Permitting issues & implications
4. Timeline
5. Budget & Financial Implications
6. Communications
7. Resolution

Capacity Gap (N-1 Criterion)



Business Plan to address Capacity Gap



Project Objectives

- Rent thermal capacity for winter 2017/18 to address existing 8MW capacity shortfall under N-1
- Assess prospects for rental as long term solution to meet capacity needs

Rental Scope

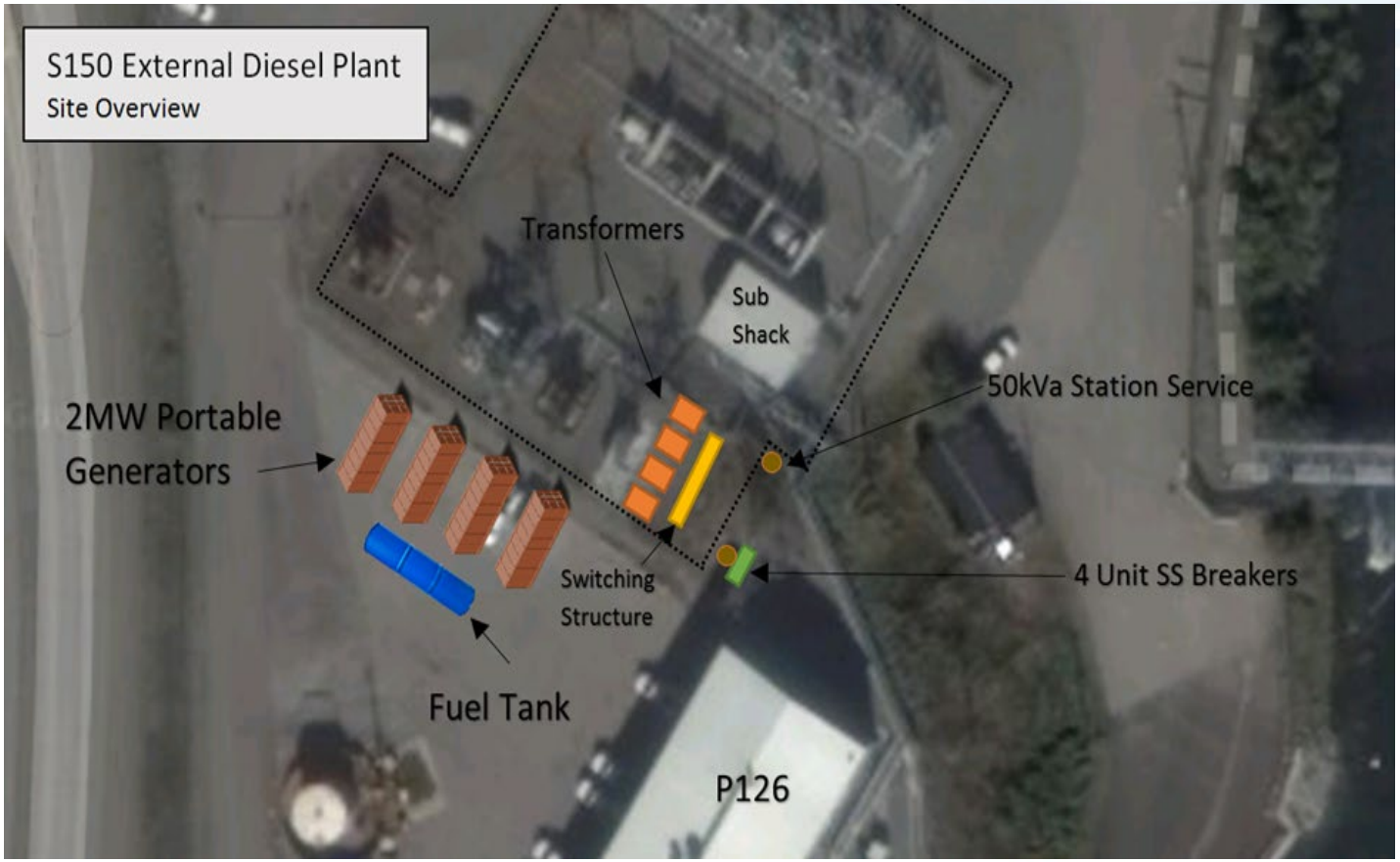
Diesel Engine Rental	• Four 2MW containerized diesel engines • Location in Whitehorse diesel plant parking lot • Connection to grid at S150 substation • Rental transformers installed in S150 • Diesel fuel supply by B-Train
Duration	4 month rental (Nov '17-March '18) to cover cold weather period Unit only operate if N-1 event occurs
Site Work	'Temporary' mechanical & electrical connection Install transformers and cabling to the S150 bus Installation of the generator disconnects

Rental Scope (cont'd)

Procurement

- Invitational bids from 3 suppliers (Finning, Trinity Power, ATCO)
- 2 quotations received (ATCO declined)
- Finning offered best price

Site Layout


S150 External Diesel Plant
Site Overview
Transformers
Sub
Shack
50kVa Station Service
2MW Portable
Generators
Switching
Structure
4 Unit SS Breakers
Fuel Tank
P126

Permitting Issues & Implications

Initial Implementation Plan

- Install engines directly at Whitehorse facility
- Pre-commission units (24 hours run-time)
- N-1 Event: Units available for immediate use
- Minimal rolling blackouts with N-1 event

Permitting Issues

Amendment to Whitehorse air emissions permit required for any operations (incl. commissioning)

YESAB Ex Com screening required for installation of >5MW on fossil fuel generation (even for temporary use)

Permitting Issues & Implications (cont'd)

Recent Example

- ATCO experienced N-1 event in Watson Lake
- Shipped in mobile diesels from Alberta
- Operated without any permits
- Claimed 'emergency event'

Recommended Plan (Winter 2017/18)

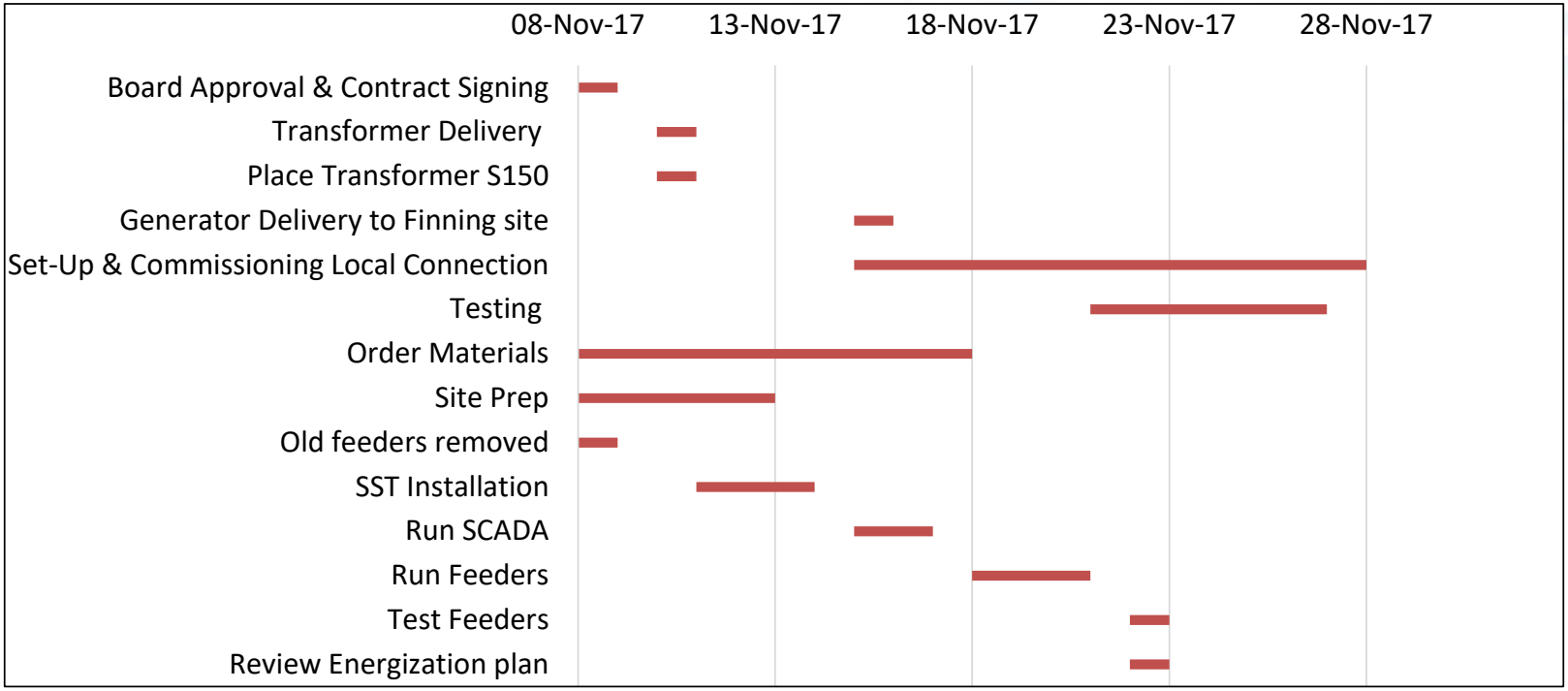
Submit regulatory applications (wont be available in time)
Hold rental diesels in Finning Whitehorse yard
Temporary mech/elec connection hardware
N-1 Event: move to site; commission & run
3-4 day rolling blackouts during commissioning

Permitting Issues & Implications (cont'd)

Medium Term Plan (Winter 2018/19)

- Regulatory approvals in hand
- Install engines directly at Whitehorse facility
- Pre-commission units
- Semi-Permanent mech/elec connection hardware
- N-1 Event: Units available for immediate use
- Minimal rolling blackouts with N-1 event

Timeline – Winter 2017/18



Communications Plan

- Communications plan developed
- Briefing note for Minister
- Proactive communications with key stakeholders & FN's in November:
  - KDFN; TKC
  - City of Whitehorse
  - YCS
  - Riverdale Community Association
- Communications with Public via social media/website
  - Follow up as required

Budget – Winter 2017/18

Date	Initial Charge	Incremental Cost for N-1 Event
1. Finning - Equipment Rental - Engines; transformers; fuel tank; cables	$481,200	
2. Finning - Transportation, Engineering	$127,650	
3. YEC Internal Costs – 'Temporary' Installation Materials	$71,122	
4. YEC Internal Costs - Labor	$31,618	
5. Contingency	$16,287	
3. Finning - Setup & Commissioning		$26,962
4. Finning - Operating Charge (<200 hours in month)		$17,640
5. YEC - Commissioning		$5,000
TOTAL	$727,877	$49,602

Financial Implications

- Initial costs not included in current 2017/18 budgets:
  - $305k in 2017
  - $425 in 2018
  - Base rental only; no assumed run time
- Impact on 2017 & 2018 financials to be assessed
- Approximate impact on ROE:
  - 2017: (0.3%)
  - 2018: (0.4%)

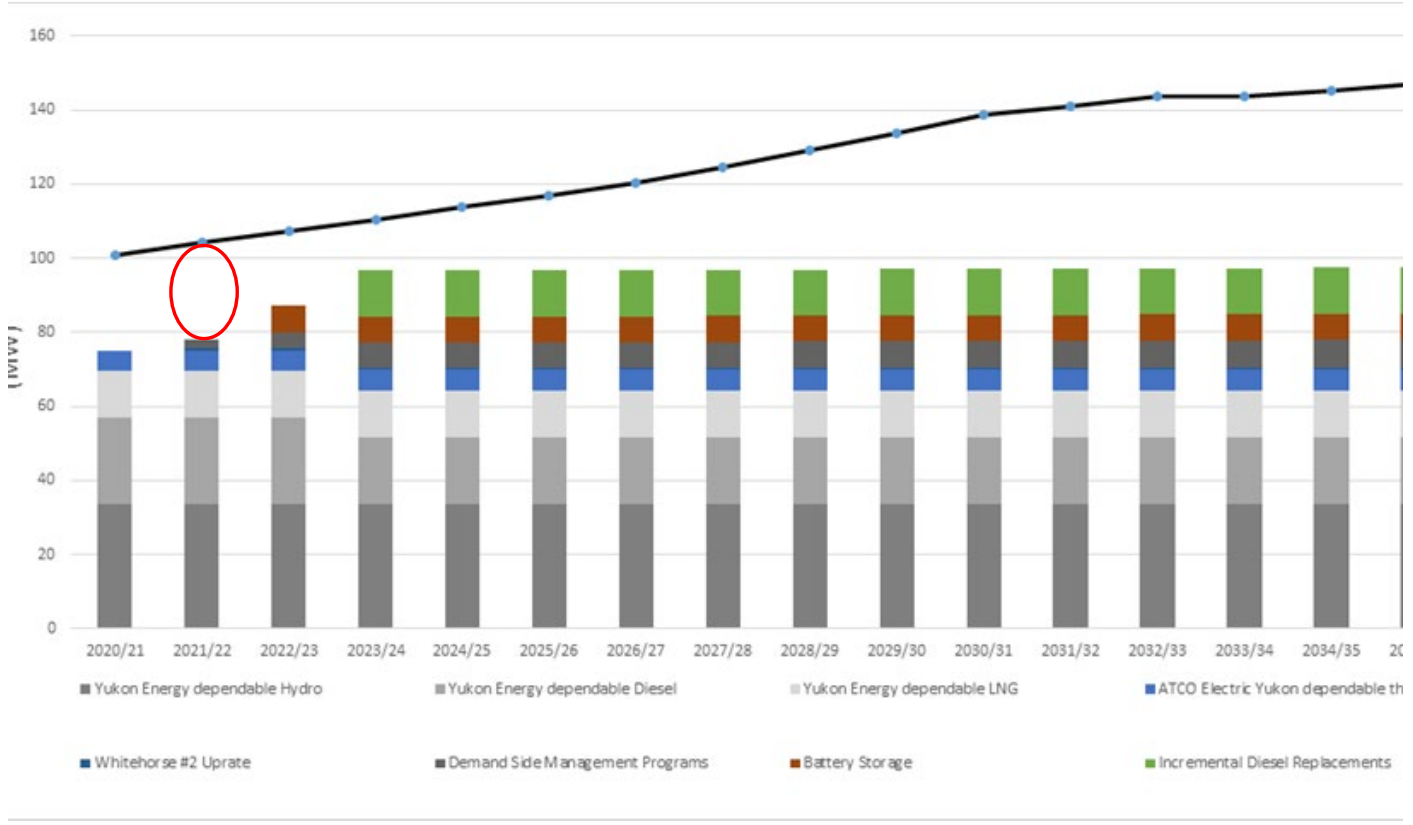
Long Term Rental

- Aim to assess longer term rental (20-30MW) as alternative to permanent new thermal plant
- Concept:
  - Permitted, semi-permanent facility (Takhini sub; Whitehorse landfill)
  - Generators rented for winter period
  - Optionality to turn into permanent facility
- Key issues for assessment
  - Technical feasibility
  - Costs & relative ratepayer impacts
  - Accounting treatment of rental contract & impacts on debt cap
  - Permitting Requirements
  - Timeline

Diesel Rental Contract Approval

20 October 2021

Capacity Gap



2

Historical Mobile Diesel Rental

2017-18 Winter: 4 x 2 MW rentals x 4 cycles($720,525)
2018-19 Winter: 6 x 2 MW rentals x 5 cycles($1.5 million)
2019-20 Winter: 9 x 2 MW rentals x 5 cycles ($2.2 million)
2020-21 Winter: 17 x 2 MW rentals x 5 cycles ($4.1 million)

Rental for Winter 2020-21

- 17 x 2 MW units required; same as last year;
- Costs roughly equal to 20/21 – savings on mobilization
- Unit reliability actions
  - Additional local resources
  - Additional local parts inventory
  - Improved tracking/comms
- Environmental protection
  - Added berms to contain spills;
- Some capital improvements in Faro to address fueling issues;
- Pricing on Whitehorse units consistent with RFP bid; this is the last year of the three year tender
  - Investigating alternatives for next year.

Summary of Contract Commitment

Description	Whitehorse	Faro
# units (1.8 MW each)	10	7
Generator sets	$1,009,500	$961,240
Transformers	$412,350	$288,645
Fuel tanks	$72,475	$100,960
Spill Berms	$3,000	NA
Start-up/commissioning costs	$31,702	$30,600
Mobilization Costs	$40,500	$27,000
Demobilization Costs	$192,398	$280,784
Pro-Rated Maintenance & Louver Install	$67,180	$42,136
Contract Total	$1,829,105	$1,731,365

5

Why Run the Rentals?

- The rental diesel engines are EPA TIER 2 and CARB certified and have lower emissions of air pollutants than the YEC units.
  - Prioritizing the use of the temporary units would emit less pollutants than the permanently installed pre-TIER diesel units
- Fuel efficiency is better than the YEC-owned generators.
- The contact provides up to 100 hours run time per unit per month cumulative over the contract term expected to be at a minimum, five (5) twenty-eight day cycles.
- This allows YEC to minimize run times on our assets and avoid time based preventative maintenance and overhauls.

Proposed Thermal Stacking

Thermal	Order		Rental Diesel (100 hrs per month)	
WG1	3		TD1	4
WG2	2		TD2	5
WG3	1		TD3	6
			TD4	7
WD3	n/a		TD5	8
WD4	21		TD6	9
WD5	22		TD7	10
WD6	23		TD8	11
WD7	24		TD9	12
			TD10	13
DD1	32		TD11	14
DD2	33		TD12	15
DD3	29		TD13	16
DD4	25		TD14	17
DD5	31		TD15	18
			TD16	19
MD1	26		TD17	20
MD2	27			
MD3	28			
FD1	34			
FD7	30			

7

Notes:

1. WG units first
2. Run TD (rental) units up to 100 hours/month (cumulative)
3. Roll-over unused TD hours to following month

Faro Rentals

Yukon
Environment

Permit No: 60-010-01

AIR EMISSIONS PERMIT

Issued Pursuant to
the *Environment Act* and the *Air Emissions Regulations*

Permittee:	Yukon Energy Corporation
Mailing Address:	Box 5920, Whitehorse, YT Y1A 6S7
Site Location:	413 Campbell Street, Faro, YT Y0B 1K0
GPS:	62.233462, -133.361147
Authorized Representative:	Travis Ritchie
Phone/Fax:	(867) 393-5350 / (867) 393-5322
Email:	travis.ritchie@yec.yk.ca
Effective Date:	Date of Director's signature

This permit has been amended and replaces permit #60-010 issued on October 4, 2018.

Expiry Date: December 31, 2031

Scope of Authorization: In accordance with your application, you are authorized to operate electricity generating equipment at the above site location (the "site"), **to a site capacity of 15.5MW** as set out in the terms and conditions of this permit.

Dated this 11th day of May, 2022

_____
Director, Environmental Protection and Assessment
Environment Yukon

PART 1: DEFINITIONS

1. In this permit,

"Act" means the *Environment Act*, R.S.Y. 2002, c. 76, as updated from time to time;

"approved plan" means a plan that is submitted by the permittee and approved by an environmental protection analyst under this permit and includes any terms and conditions specified by the environmental protection analyst in the approval;

"area of influence" refers to that area as determined in the Permittee's Air Dispersion Modelling Assessment for Faro Facility completed by WSP December 17 2020 submitted to the Branch for the Faro Generating Station;

"associated personnel" means all employees, contractors and volunteers involved in the permitted activities;

"Branch" means the Environmental Protection and Assessment Branch, Environment Yukon;

"de-rated capacity" means the lowered operating capacity a generator is run at or below

"emission factor" means the mass emission of a pollutant per unit of energy produced in either grams per kilowatt-hour (g/kWh) or kilograms per megawatt-hour (kg/MWh);

"emission rate" means the average rate in grams per second (g/s) or kilograms/hour (kg/h) at which a pollutant is emitted from a source, determined either:

i) as estimated based on emission factors derived from published literature regarding sources of similar type and age (estimated emission rates); or
ii) as derived from measured data obtained from manual stack testing carried out by the permittee (measured emission rates);

"environmental protection analyst" means an employee of the Branch so designated by the Minister of Environment under the Act;

"environmental protection officer" means an employee of the Government of Yukon so designated by the Minister of Environment under the Act;

"nameplate capacity" means the manufacture's rated power input capacity as shown on a label permanently affixed by the manufacturer to the engine or system;

"Regulations" means the *Air Emissions Regulations*, O.I.C. 1998/207;

"sensitive receptors" include, but are not limited to, hospitals, schools, daycare facilities, elderly housing and convalescent facilities;

"site capacity" means the total of the nameplate capacity and de-rated capacity of generators operated at any given time at the site;

"source" means a fuel-fired electricity generator which has a maximum nameplate capacity equal to or more than 1.0 megavolt-ampere;

"total annual emissions" means the emissions derived by multiplying emission factors or measured emission rates for each source by the previous three-year average total energy production for that source;

2. Any term not defined in this permit that is defined in the Act or the Regulations has the same meaning as in the Act or the Regulations.

PART 2: GENERAL

1. No condition of this permit limits the applicability of any other law or bylaw.

2. The permittee shall ensure that all activities authorized by this permit occur on property that the permittee has the right to enter upon and use for that purpose.

3. The permittee shall ensure that all associated personnel:
   a) have access to a copy of this permit;
   b) are knowledgeable of the terms and conditions of this permit; and
   c) receive the appropriate training for the purposes of carrying out the requirements of this permit.

4. The permittee shall provide notice in writing to an environmental protection analyst prior to any significant change of circumstances at the site, including without limitation:
   a) discontinuation of any regulated activity at the site;
   b) change of ownership of the site or any of the sources; and
   c) change to the mailing address or phone number of the permittee.

5. The permittee shall obtain approval from an environmental protection analyst 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 location of the source(s).

6. Where conflicts exist between this permit, the permit application or any plans, this permit shall prevail.

7. If an inspection reveals that the site or source(s) is in any way not in compliance with this permit, the permittee shall repair the damage or take other actions as required to bring the site or source(s) into compliance.

8. For clarity, all obligations of the permittee under this permit survive the expiry date to the extent that each is not superseded by one or more conditions in a subsequent permit.

9. All conditions of this permit must be met within 90 days of the permit effective date.

PART 3: OPERATION AND MAINTENANCE

1. The permittee is authorized to operate any combination of the two permanent diesel generators and six rental diesel generators to a site capacity of 15.5MW of power at the Faro Generating Station. The permittee must obtain a permit amendment prior to adding generators beyond the currently installed capacity.

2. In accordance with the manufacturer's recommendations and best management practices, the permittee shall inspect, maintain and operate the sources, any stand-alone air pollution control equipment, and testing and monitoring equipment as necessary to provide optimum control of air contaminant emissions during all operating periods.

3. Except for maintenance or test purposes, the permittee shall run the sources at each site in order of highest possible efficiency under the circumstances.

4. The permittee shall ensure that the fuel used by the source(s) conforms to the most recent Canadian federal *Sulphur in Diesel Fuel Regulations* for off-road applications.

PART 4: RELEASE OF CONTAMINANTS

1. The visible emissions from any source shall not exceed an opacity of 20% as measured by an environmental protection officer.

2. In the event that the opacity of emissions from any source exceeds the criterion established in Part 4.1 of this permit, the permittee shall take measures to reduce the opacity of the emissions below that criterion as directed by an environmental protection officer.

3. The permittee shall ensure that particulates collected using emission control equipment are contained so that there is no release of contaminants to the atmosphere or into an open body of water.

4. If ambient air quality monitoring data within the area of influence of the permittee's facility indicates that one or more of Yukon's Ambient Air Quality Standards is being exceeded, and the environmental protection officer is satisfied that the permittee's facility is the cause or a significant contributor to the prevailing ambient air quality condition, the permittee shall follow the direction of the environmental protection officer to improve the ambient air quality condition.

PART 5: MONITORING EMISSIONS

1. A monitoring plan for NO_2 must be submitted to the environmental protection analyst for review and approval which identifies:
    a) location of at least one monitoring station
    b) specifications of equipment used to measure NO_2 concentrations
    c) sampling frequency of either 1-hour or continuous
    d) monitoring plan will be subject to changes following branch review

2. If after one year of monitoring NO_2 concentrations are found to be of concern and the environmental protection officer is satisfied that the permittee's facility is the cause or a significant contributor to the prevailing ambient air quality condition, the permittee shall follow the direction of the environmental protection analyst to improve the ambient air quality condition. This may include additional monitoring requirements and creating an

emissions management plan to be submitted to the environmental protection analyst for review and approval.

3. The permittee shall carry out any commitments in the approved emissions management plan on a schedule that is approved by the environmental protection analyst.

PART 6: COMPLAINT MANAGEMENT SYSTEM

1. The permittee shall submit to an environmental protection analyst a complaint management plan for approval which identifies:
   a) location of signage with contact details for concerns/complaints
   b) process for community engagement;
   c) noise monitoring, mitigation, and control measures;
   d) dispute resolution process;
   e) management plan will be subject to changes following branch review; and
   f) reporting as described in 6.2

2. The complaint management system shall include the following process for reporting sound complaints:
   a) permittee shall notify an environmental protection officer (867) 667-5683 or envprot@yukon.ca within one week upon receipt of any complaints regarding sound.
   b) The permittee shall provide the following information with each notification:
      - first and last name of complainant (if provided);
      - contact phone number and/or email;
      - nature of complaint;
      - time and date of complaint;
      - ambient meteorological conditions during the period of the complaint;
      - list of generators and the duration that the generators were active in the 48hrs prior to the complaint; and
      - record of any adjustment to station to address the complaint.

PART 7: REPORTING

The permittee shall submit to an environmental protection analyst a report by March 31st of each year of this permit for the previous year which identifies:
   a) the total annual operating hours for all sources;
   b) the estimated total annual emissions of SO_2, $PM_{2.5}$, CO, NO_2, and N_2O from each source, including the calculation used to determine those results;
   c) outcomes from the Complaint Management System; and
   d) results of any sound levels measurements.

PART 7: UNAUTHORIZED EMISSIONS

1. The permittee shall contact either an environmental protection officer or the 24-hour Yukon Spill Report Centre (**867-667–7244**) as soon as possible under the circumstances in the event of an unauthorized release or emission, such as fugitive emissions or emissions resulting from burning fuel other than that allowed for under this permit.

PART 8: RECORDS

1. The permittee shall keep all records required under this permit in a format acceptable to an environmental protection officer for a minimum of three years and make them available for inspection by an environmental protection officer upon request.

2. The permittee shall keep the following records:
   a) a copy of each report and approved plans developed under this permit, and any amendments to and approvals (if applicable) of each report and plan;
   b) summaries of all inspections carried out under this permit (including the name of the person conducting the inspection, the date of each inspection, any observations recorded during the inspection, actions taken as a result of those observations, and the date each action was taken);
   c) notes concerning any spills, leaks or unauthorized emissions occurring at the site, including substance involved, estimated quantity, date of observation of the spill or leak, spill reports made and clean-up procedures implemented;
   d) any and all deficiencies remedied in accordance with Part 2.7, and how and when they were remedied; and
   e) notes concerning any instance where the most efficient source was not used in accordance with Part 3.3 and the reason for use of the less efficient source.

Yukon
Environment

Permit No: 60-010-02

AIR EMISSIONS PERMIT

Issued Pursuant to
the *Environment Act* and the *Air Emissions Regulations*

Permittee:	Yukon Energy Corporation
Mailing Address:	Box 5920, Whitehorse, YT, Y1A 6S7
Site Locations:	Mayo Road, Lot 1000, Quad 105 M/12, YT Village of Mayo
GPS:	63.597812, -135.8890285
Authorized Representative:	Travis Ritchie
Phone/Fax:	(867) 393-5350 / (867) 393-5322
Email:	travis.ritchie@yec.yk.ca
Effective Date:	Date of Director's signature

This permit has been amended and replaces permit #60-010 issued on October 4, 2018.

Expiry Date: December 31, 2024

Scope of Authorization: In accordance with your application, you are authorized to operate electricity generating equipment at the above site (the "site"), up **to a site capacity of 3MW from three diesel generators** as set out in the terms and conditions of this permit.

Dated this 11th day of May, 2022

_____
Director, Environmental Protection & Assessment
Environment Yukon

PART 1: DEFINITIONS

1. In this permit,

   "Act" means the *Environment Act*, R.S.Y. 2002, c. 76, as updated from time to time;

   "approved plan" means a plan that is submitted by the permittee and approved by an environmental protection analyst under this permit and includes any terms and conditions specified by the environmental protection analyst in the approval;

   "associated personnel" means all employees, contractors and volunteers involved in the permitted activities;

   "Branch" means the Environmental Programs Branch, Environment Yukon;

   "emission factor" means the mass emission of a pollutant per unit of energy produced in either grams per kilowatt-hour (g/kWh) or kilograms per megawatt-hour (kg/MWh);

   "emission rate" means the average rate in grams per second (g/s) or kilograms/hour (kg/h) at which a pollutant is emitted from a source, determined either:
   i) as estimated based on emission factors derived from published literature regarding sources of similar type and age (estimated emission rates); or
   ii) as derived from measured data obtained from manual stack testing carried out by the permittee (measured emission rates);

   "environmental protection analyst" means an employee of the Branch so designated by the Minister of Environment under the Act;

   "environmental protection officer" means an employee of the Government of Yukon so designated by the Minister of Environment under the Act;

   "Regulations" means the *Air Emissions Regulations*, O.I.C. 1998/207;

   "source" means a fuel-fired electricity generator which has a maximum nameplate capacity equal to or more than 1.0 megavolt-ampere;

   "site capacity" means the total of the nameplate capacity and de-rated capacity of generators operated at any given time at the site;

   "total annual emissions" means the emissions derived by multiplying emission factors or measured emission rates for each source by the previous three-year average total energy production for that source.

2. Any term not defined in this permit that is defined in the Act or the Regulations has the same meaning as in the Act or the Regulations.

PART 2: GENERAL

1. No condition of this permit limits the applicability of any other law or bylaw.

2. The permittee shall ensure that all activities authorized by this permit occur on property that the permittee has the right to enter upon and use for that purpose.

3. The permittee shall ensure that all associated personnel:
   a) have access to a copy of this permit;
   b) are knowledgeable of the terms and conditions of this permit; and
   c) receive the appropriate training for the purposes of carrying out the requirements of this permit.

4. The permittee shall provide notice in writing to an environmental protection analyst prior to any significant change of circumstances at the site, including without limitation:
   a) discontinuation of any regulated activity at the site;
   b) change of ownership of the site or any of the sources; and
   c) change to the mailing address or phone number of the permittee.

5. The permittee shall obtain approval from an environmental protection analyst 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 location of the source(s).

6. Where conflicts exist between this permit, the permit application or any plans, this permit shall prevail.

7. If an inspection reveals that the site or source(s) is in any way not in compliance with this permit, the permittee shall repair the damage or take other actions as required to bring the site or source(s) into compliance.

8. For clarity, all obligations of the permittee under this permit survive the expiry date to the extent that each is not superseded by one or more conditions in a subsequent permit.

PART 3: OPERATION AND MAINTENANCE

1. The permittee is authorized to operate three diesel generators at the Mayo generating station up to a maximum capacity of 3MW. The permittee must obtain a permit amendment prior to installing any additional generators at the site.

2. In accordance with the manufacturer's recommendations and best management practices, the permittee shall inspect, maintain and operate the sources, any stand-alone air pollution control equipment, and testing and monitoring equipment as necessary to provide optimum control of air contaminant emissions during all operating periods.

3. Except for maintenance or test purposes, the permittee shall run the sources at each site in order of highest possible efficiency under the circumstances.

4. The permittee shall ensure that the fuel used by the source(s) conforms to the most recent Canadian federal *Sulphur in Diesel Fuel Regulations* for off-road applications.

PART 4: RELEASE OF CONTAMINANTS

1. The visible emissions from any source shall not exceed an opacity of 20% as measured by an environmental protection officer.

2. In the event that the opacity of emissions from any source exceeds the criterion established in Part 4.1 of this permit, the permittee shall take measures to reduce the opacity of the emissions below that criterion as directed by an environmental protection officer.

3. The permittee shall ensure that particulates collected using emission control equipment are contained so that there is no release of contaminants to the atmosphere or into an open body of water.

4. If ambient air quality monitoring data within the area of influence of the Permittee's facility indicates that one or more of Yukon's Ambient Air Quality Standards is being exceeded, and the environmental protection officer is satisfied that the Permittee's facility is the cause or a significant contributor to the prevailing ambient air quality condition, the Permittee shall undertake such mitigation measures as may be specified by the environmental protection officer to improve the ambient air quality condition.

PART 5: MONITORING EMISSIONS

1. If any diesel generator has exceeded 3% of its annual potential to emit in a calendar year, and, in that same calendar year, if the total operating time of all the generators at that site exceeds 3% of their total annual potential to emit, the permittee shall create a emissions management plan to be submitted to the analyst for approval.

2. The permittee shall carry out any commitments in the approved emissions management plan on a schedule that is approved by the analyst.

PART 6: REPORTING

1. The permittee shall submit to an environmental protection analyst a report which identifies:
   a. the total annual operating hours for all sources at all sites;
   b. the estimated total annual emissions of SO_2, $PM_{2.5}$, CO, NO_2, and N_2O from each source at each of the sites, including the calculation used to determine those results; by March 31st of each year of this permit for the previous calendar year.

PART 7: UNAUTHORIZED EMISSIONS

1. The permittee shall contact either an environmental protection officer or the 24-hour Yukon Spill Report Centre (**867- 667–7244**) as soon as possible under the circumstances in the event of an unauthorized release or emission, such as fugitive emissions or emissions resulting from burning fuel other than that allowed for under this permit.

PART 8: RECORDS

1. The permittee shall keep all records required under this permit in a format acceptable to an environmental protection officer for a minimum of three years and make them available for inspection by an environmental protection officer upon request.

2. The permittee shall keep the following records:
   a) a copy of each report and approved plans developed under this permit, and any amendments to and approvals (if applicable) of each report and plan;
   b) summaries of all inspections carried out under this permit (including the name of the person conducting the inspection, the date of each inspection, any observations recorded during the inspection, actions taken as a result of those observations, and the date each action was taken);
   c) notes concerning any spills, leaks or unauthorized emissions occurring at the site, including substance involved, estimated quantity, date of observation of the spill or leak, spill reports made and clean-up procedures implemented;
   d) any and all deficiencies remedied in accordance with Part 2.7, and how and when they were remedied; and
   e) notes concerning any instance where the most efficient source was not used in accordance with Part 3.3 and the reason for use of the less efficient source.

Yukon
Environment

Permit No: 60-010-03

AIR EMISSIONS PERMIT

Issued Pursuant to
the *Environment Act* and the *Air Emissions Regulations*

Permittee:	Yukon Energy Corporation
Mailing Address:	Box 5920, Whitehorse, Yukon, Y1A 6S7
Site Location:	113th Fifth Avenue, Dawson City, YT Y0B 1G0
GPS:	64.054563, -139.439839
Authorized Representative:	Travis Ritchie
Phone/Fax:	(867) 393-5350 / (867) 393-5322
Email:	travis.ritchie@yec.yk.ca
Effective Date:	Date of Director's signature

This permit has been amended and replaces permit #60-010 issued on October 4, 2018.

Expiry Date:	December 31, 2024
Scope of Authorization:	In accordance with your application, you are authorized to operate electricity generating equipment at the above site location (the "site"), **to a site capacity of 7.1MW from six diesel generators** as set out in the terms and conditions of this permit.

Dated this 11th day of May, 2022

_____
Director, Environmental Protection & Assessment
Environment Yukon

PART 1: DEFINITIONS

1. In this permit,

   "Act" means the *Environment Act*, R.S.Y. 2002, c. 76, as updated from time to time;

   "approved plan" means a plan that is submitted by the permittee and approved by an environmental protection analyst under this permit and includes any terms and conditions specified by the environmental protection analyst in the approval;

   "area of influence" refers to that area as determined in the Permittee's air dispersion modelling submitted to the Branch in 2012 for Dawson City;

   "associated personnel" means all employees, contractors and volunteers involved in the permitted activities;

   "Branch" means the Environmental Programs Branch, Environment Yukon;

   "emission factor" means the mass emission of a pollutant per unit of energy produced in either grams per kilowatt-hour (g/kWh) or kilograms per megawatt-hour (kg/MWh);

   "emission rate" means the average rate in grams per second (g/s) or kilograms/hour (kg/h) at which a pollutant is emitted from a source, determined either:
   i) as estimated based on emission factors derived from published literature regarding sources of similar type and age (estimated emission rates); or
   ii) as derived from measured data obtained from manual stack testing carried out by the permittee (measured emission rates);

   "environmental protection analyst" means an employee of the Branch so designated by the Minister of Environment under the Act;

   "environmental protection officer" means an employee of the Government of Yukon so designated by the Minister of Environment under the Act;

   "Regulations" means the *Air Emissions Regulations*, O.I.C. 1998/207;

   "site capacity" means the total of the nameplate capacity and de-rated capacity of generators operated at any given time at the site;

   "source" means a fuel-fired electricity generator which has a maximum nameplate capacity equal to or more than 1.0 megavolt-ampere;

   "total annual emissions" means the emissions derived by multiplying emission factors or measured emission rates for each source by the previous three-year average total energy production for that source.

2. Any term not defined in this permit that is defined in the Act or the Regulations has the same meaning as in the Act or the Regulations.

PART 2: GENERAL

1. No condition of this permit limits the applicability of any other law or bylaw.

2. The permittee shall ensure that all activities authorized by this permit occur on property that the permittee has the right to enter upon and use for that purpose.

3. The permittee shall ensure that all associated personnel:
   a) have access to a copy of this permit;
   b) are knowledgeable of the terms and conditions of this permit; and
   c) receive the appropriate training for the purposes of carrying out the requirements of this permit.

4. The permittee shall provide notice in writing to an environmental protection analyst prior to any significant change of circumstances at the site, including without limitation:
   a) discontinuation of any regulated activity at the site;
   b) change of ownership of the site or any of the sources; and
   c) change to the mailing address or phone number of the permittee.

5. The permittee shall obtain approval from an environmental protection analyst 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 location of the source(s).

6. Where conflicts exist between this permit, the permit application or any plans, this permit shall prevail.

7. If an inspection reveals that the site or source(s) is in any way not in compliance with this permit, the permittee shall repair the damage or take other actions as required to bring the site or source(s) into compliance.

8. For clarity, all obligations of the permittee under this permit survive the expiry date to the extent that each is not superseded by one or more conditions in a subsequent permit.

PART 3: OPERATION AND MAINTENANCE

1. The permittee is authorized to operate six diesel generators at Dawson Generating Station up to a maximum capacity of 7.1 MW. The permittee must obtain a permit amendment prior to installing any additional generators at the site.

2. In accordance with the manufacturer's recommendations and best management practices, the permittee shall inspect, maintain and operate the sources, any stand-alone air pollution control equipment, and testing and monitoring equipment as necessary to provide optimum control of air contaminant emissions during all operating periods.

3. Except for maintenance or test purposes, the permittee shall run the sources at each site in order of highest possible efficiency under the circumstances.

4. The permittee shall ensure that the fuel used by the source(s) conforms to the most recent Canadian federal *Sulphur in Diesel Fuel Regulations* for off-road applications.

PART 4: RELEASE OF CONTAMINANTS

1. The visible emissions from any source shall not exceed an opacity of 20% as measured by an environmental protection officer.

2. In the event that the opacity of emissions from any source exceeds the criterion established in Part 4.1 of this permit, the permittee shall take measures to reduce the opacity of the emissions below that criterion as directed by an environmental protection officer.

3. The permittee shall ensure that particulates collected using emission control equipment are contained so that there is no release of contaminants to the atmosphere or into an open body of water.

4. If ambient air quality monitoring data within the area of influence of the Permittee's facility indicates that one or more of Yukon's Ambient Air Quality Standards is being exceeded, and the environmental protection officer is satisfied that the Permittee's facility is the cause or a significant contributor to the prevailing ambient air quality condition, the Permittee shall undertake such mitigation measures as may be specified by the environmental protection officer to improve the ambient air quality condition.

PART 5: MONITORING EMISSIONS

1. If any diesel generator has exceeded 3% of its annual potential to emit in a calendar year, and, in that same calendar year, if the total operating time of all the generators at that site exceeds 3% of their total annual potential to emit, the permittee shall create a emissions management plan to be submitted to the analyst for approval.

2. The permittee shall carry out any commitments in the approved emissions management plan on a schedule that is approved by the analyst.

PART 6: REPORTING

1. The permittee shall submit to an environmental protection analyst a report which identifies:
   a. the total annual operating hours for all sources at all sites;
   b. the estimated total annual emissions of SO_2, $PM_{2.5}$, CO, NO_2, and N_2O from each source at each of the sites, including the calculation used to determine those results; by March 31st of each year of this permit for the previous calendar year.

PART 7: UNAUTHORIZED EMISSIONS

1. The permittee shall contact either an environmental protection officer or the 24-hour Yukon Spill Report Centre (**867-667–7244**) as soon as possible under the circumstances in the event of an unauthorized release or emission, such as fugitive emissions or emissions resulting from burning fuel other than that allowed for under this permit.

PART 8: RECORDS

1. The permittee shall keep all records required under this permit in a format acceptable to an environmental protection officer for a minimum of three years and make them available for inspection by an environmental protection officer upon request.

2. The permittee shall keep the following records:
   a) a copy of each report and approved plans developed under this permit, and any amendments to and approvals (if applicable) of each report and plan;
   b) summaries of all inspections carried out under this permit (including the name of the person conducting the inspection, the date of each inspection, any observations recorded during the inspection, actions taken as a result of those observations, and the date each action was taken);
   c) notes concerning any spills, leaks or unauthorized emissions occurring at the site, including substance involved, estimated quantity, date of observation of the spill or leak, spill reports made and clean-up procedures implemented;
   d) any and all deficiencies remedied in accordance with Part 2.7, and how and when they were remedied; and
   e) notes concerning any instance where the most efficient source was not used in accordance with Part 3.3 and the reason for use of the less efficient source.

Yukon
Environment

Permit No: 60-010-04

AIR EMISSIONS PERMIT

Issued Pursuant to
the *Environment Act* and the *Air Emissions Regulations*

Permittee:	Yukon Energy Corporation
Mailing Address:	Box 5920, Whitehorse, YT Y1A 6S7
Site Location:	#2 Miles Canyon Rd, Box 5920, Whitehorse, YT Y1A 6S7
GPS:	60.698441, -135.045368
Authorized Representative:	Travis Ritchie
Phone/Fax:	(867) 393-5350 / (867) 393-5322
Email:	travis.ritchie@yec.yk.ca
Effective Date:	Date of Director's signature

This permit has been amended and replaces permit #60-010 issued on October 4, 2018.

Expiry Date: December 31, 2024

Scope of Authorization: In accordance with your application, you are authorized to operate electricity generating equipment at the above site location (the "site"), **up to a site capacity of 16.15MW from five diesel generators and 13.13MW three LNG generators** as set out in the terms and conditions of this permit.

Dated this 11th day of May, 2022

_____
Director, Environmental Protection & Assessment
Environment Yukon

PART 1: DEFINITIONS

1. In this permit,

   "Act" means the *Environment Act*, R.S.Y. 2002, c. 76, as updated from time to time;

   "approved plan" means a plan that is submitted by the permittee and approved by an environmental protection analyst under this permit and includes any terms and conditions specified by the environmental protection analyst in the approval;

   "associated personnel" means all employees, contractors and volunteers involved in the permitted activities;

   "Branch" means the Environmental Programs Branch, Environment Yukon;

   "emission factor" means the mass emission of a pollutant per unit of energy produced in either grams per kilowatt-hour (g/kWh) or kilograms per megawatt-hour (kg/MWh);

   "emission rate" means the average rate in grams per second (g/s) or kilograms/hour (kg/h) at which a pollutant is emitted from a source, determined either:
   i) as estimated based on emission factors derived from published literature regarding sources of similar type and age (estimated emission rates); or
   ii) as derived from measured data obtained from manual stack testing carried out by the permittee (measured emission rates);

   "environmental protection analyst" means an employee of the Branch so designated by the Minister of Environment under the Act;

   "environmental protection officer" means an employee of the Government of Yukon so designated by the Minister of Environment under the Act;

   "Regulations" means the *Air Emissions Regulations*, O.I.C. 1998/207;

   "site capacity" means the total of the nameplate capacity and de-rated capacity of generators operated at any given time at the site;

   "source" means a fuel-fired electricity generator which has a maximum nameplate capacity equal to or more than 1.0 megavolt-ampere;

   "total annual emissions" means the emissions derived by multiplying emission factors or measured emission rates for each source by the previous three-year average total energy production for that source.

2. Any term not defined in this permit that is defined in the Act or the Regulations has the same meaning as in the Act or the Regulations.

PART 2: GENERAL

1. No condition of this permit limits the applicability of any other law or bylaw.

2. The permittee shall ensure that all activities authorized by this permit occur on property that the permittee has the right to enter upon and use for that purpose.

3. The permittee shall ensure that all associated personnel:
   a) have access to a copy of this permit;
   b) are knowledgeable of the terms and conditions of this permit; and
   c) receive the appropriate training for the purposes of carrying out the requirements of this permit.

4. The permittee shall provide notice in writing to an environmental protection analyst prior to any significant change of circumstances at the site, including without limitation:
   a) discontinuation of any regulated activity at the site;
   b) change of ownership of the site or any of the sources; and
   c) change to the mailing address or phone number of the permittee.

5. The permittee shall obtain approval from an environmental protection analyst 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 location of the source(s).

6. Where conflicts exist between this permit, the permit application or any plans, this permit shall prevail.

7. If an inspection reveals that the site or source(s) is in any way not in compliance with this permit, the permittee shall repair the damage or take other actions as required to bring the site or source(s) into compliance.

8. For clarity, all obligations of the permittee under this permit survive the expiry date to the extent that each is not superseded by one or more conditions in a subsequent permit.

PART 3: OPERATION AND MAINTENANCE

1. The permittee is authorized to operate three liquefied natural gas generators up to a maximum capacity of 13.13MW; and five generators running exclusively on diesel fuel up to a maximum capacity of 16.15MW at the Whitehorse Station. The permittee must obtain a permit amendment prior to installing any additional generators at the site.

2. In accordance with the manufacturer's recommendations and best management practices, the permittee shall inspect, maintain and operate the sources, any stand-alone air pollution control equipment, and testing and monitoring equipment as necessary to provide optimum control of air contaminant emissions during all operating periods.

3. Except for maintenance or test purposes, the permittee shall run the sources at each site in order of highest possible efficiency under the circumstances.

4. The permittee shall ensure that the fuel used by the source(s) conforms to the most recent Canadian federal *Sulphur in Diesel Fuel Regulations* for off-road applications.

PART 4: RELEASE OF CONTAMINANTS

1. The visible emissions from any source shall not exceed an opacity of 20% as measured by an environmental protection officer.

2. In the event that the opacity of emissions from any source exceeds the criterion established in Part 4.1 of this permit, the permittee shall take measures to reduce the opacity of the emissions below that criterion as directed by an environmental protection officer.

3. The permittee shall ensure that particulates collected using emission control equipment are contained so that there is no release of contaminants to the atmosphere or into an open body of water.

4. If ambient air quality monitoring data within the area of influence of the Permittee's facility indicates that one or more of Yukon's Ambient Air Quality Standards is being exceeded, and the environmental protection officer is satisfied that the Permittee's facility is the cause or a significant contributor to the prevailing ambient air quality condition, the Permittee shall undertake such mitigation measures as may be specified by the environmental protection officer to improve the ambient air quality condition.

PART 5: MONITORING EMISSIONS

1. If any diesel generator has exceeded 3% of its annual potential to emit in a calendar year, and, in that same calendar year, if the total operating time of all the generators at that site exceeds 3% of their total annual potential to emit, the permittee shall create a emissions management plan to be submitted to the analyst for approval.

2. The permittee shall carry out any commitments in the approved emissions management plan on a schedule that is approved by the analyst.

3. The permittee shall quantify, through monitoring or calculations based on emissions data and published emissions factors, the levels of volatile organic compounds (VOCs) released in normal operations annually from the liquefied natural gas operations at the Whitehorse station.

4. The permittee shall quantify the fugitive emissions of methane (CH_4) from the point of unloading of the liquefied natural gas into the storage tank to and including any emissions from the generator not emanating from the stack at the Whitehorse station.

PART 6: REPORTING

1. The permittee shall submit to an environmental protection analyst a report which identifies:
   a. the total annual operating hours for all sources at all sites;
   b. the estimated total annual emissions of SO_2, $PM_{2.5}$, CO, NO_2, and N_2O from each source at each of the sites, including the calculation used to determine those results;

c. total annual emissions of volatile organic compounds (VOCs) as required in part 5.3 of this permit; and,
d. a summary of the fugitive CH_4 monitoring program including methodology, data, and total fugitive emissions as required in part 5.4 of this permit;

by March 31st of each year of this permit for the previous calendar year.

PART 7: UNAUTHORIZED EMISSIONS

1. The permittee shall contact either an environmental protection officer or the 24-hour Yukon Spill Report Centre (**867-667–7244**) as soon as possible under the circumstances in the event of an unauthorized release or emission, such as fugitive emissions or emissions resulting from burning fuel other than that allowed for under this permit.

PART 8: RECORDS

1. The permittee shall keep all records required under this permit in a format acceptable to an environmental protection officer for a minimum of three years and make them available for inspection by an environmental protection officer upon request.

2. The permittee shall keep the following records:
   a) a copy of each report and approved plans developed under this permit, and any amendments to and approvals (if applicable) of each report and plan;
   b) summaries of all inspections carried out under this permit (including the name of the person conducting the inspection, the date of each inspection, any observations recorded during the inspection, actions taken as a result of those observations, and the date each action was taken);
   c) notes concerning any spills, leaks or unauthorized emissions occurring at the site, including substance involved, estimated quantity, date of observation of the spill or leak, spill reports made and clean-up procedures implemented;
   d) any and all deficiencies remedied in accordance with Part 2.7, and how and when they were remedied; and
   e) notes concerning any instance where the most efficient source was not used in accordance with Part 3.3 and the reason for use of the less efficient source.

Permit No: 60-010-05

AIR EMISSIONS PERMIT

Issued Pursuant to the *Environment Act* and
the *Air Emissions Regulations*

Permittee:	**Yukon Energy Corporation**
Mailing Address:	**Box 5920, Whitehorse, YT, Y1A 6S7**
Site Location:	**193 Wareham Dam Road** **Lot 91, Group 1004, Quad105M/12**
GPS:	**63.653104, -135.905856**
Authorized Representative:	**Travis Ritchie**
Phone:	**(867) 393-5350**
Email:	**travis.ritchie@yec.yk.ca**
Effective Date:	**Date of Director's signature**
Expiry Date:	**December 31, 2026**

Scope of Authorization: In accordance with your application, you are authorized to operate electricity generating equipment at the above site location (the "site"), **to a maximum production capacity of 4.9MW** as set out in the terms and conditions of this permit.

Dated this 21st day of November, 2023

Bryna Cable
Director, Environmental Protection and Assessment Branch
Department of Environment, Government of Yukon

PART 1: DEFINITIONS

1. In this permit,

"Act" means the *Environment Act*, R.S.Y. 2002, c. 76, as updated from time to time;

"air quality modelling report" means the report prepared by WSP Canada Inc. dated October 12, 2023, titled Yukon Energy Mayo Secondary Thermal Generation Project- Screening Air Quality Assessment;

"approved plan" means a plan that is submitted by the permittee and approved by an environmental protection analyst under this permit and includes any terms and conditions specified by the environmental protection analyst in the approval;

"associated personnel" means all employees, contractors and volunteers involved in the permitted activities;

"Branch" means the following sections within the Environmental Protection and Assessment Branch, Department of Environment, Government of Yukon: Standards & Approvals; the Environmental Compliance & Inspections Section; and/or the Directorate;

"emission factor" means the mass emission of a pollutant per unit of energy produced in either grams per kilowatt-hour (g/kWh) or kilograms per megawatt-hour (kg/MWh);

"emission rate" means the average rate in grams per second (g/s) or kilograms/hour (kg/h) at which a pollutant is emitted from a source, determined either:

i) as estimated based on emission factors derived from published literature regarding sources of similar type and age (estimated emission rates); or
ii) as derived from measured data obtained from manual stack testing carried out by the permittee (measured emission rates);

"environmental protection analyst" means an employee of the Branch so designated by the Minister of Environment under the Act;

"environmental protection officer" means an employee of the Government of Yukon so designated by the Minister of Environment under the Act;

"EPA" means the United States Environmental Protection Agency;

"Regulations" means the *Air Emissions Regulations*, O.I.C. 1998/207;

"source" means a fuel-fired electricity generator which has a maximum nameplate capacity equal to or more than 1.0 megavolt-ampere;

"production capacity" means the capacity assessed under Yukon Environmental and Socio-Economic Assessment Board project 2023-0090; and

"total annual emissions" means the emissions derived by multiplying emission factors or measured emission rates for each source by the previous three-year average total energy production for that source.

2. Any term not defined in this permit that is defined in the Act or the Regulations has the same meaning as in the Act or the Regulations.

PART 2: GENERAL

1. No condition of this permit limits the applicability of any other law or bylaw.

2. The permittee shall ensure that all activities authorized by this permit occur on property that the permittee has the right to enter upon and use for that purpose.

3. The permittee shall ensure that all associated personnel:
   a) have access to a copy of this permit;
   b) are knowledgeable of the terms and conditions of this permit; and
   c) receive the appropriate training for the purposes of carrying out the requirements of this permit.

4. The permittee shall provide notice in writing to an environmental protection analyst prior to any significant change of circumstances at the site, including without limitation:
   a) discontinuation of any regulated activity at the site;
   b) change of ownership of the site or any of the sources; and
   c) change to the mailing address or phone number of the permittee.

5. The permittee shall obtain approval from an environmental protection analyst 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 location of the source(s).

6. Where conflicts exist between this permit, the permit application or any plans, this permit shall prevail.

7. If an inspection reveals that the site or source(s) is in any way not in compliance with this permit, the permittee shall repair the damage or take other actions as required to bring the site or source(s) into compliance.

8. For clarity, all obligations of the permittee under this permit survive the expiry date to the extent that each is not superseded by one or more conditions in a subsequent permit.

PART 3: OPERATION AND MAINTENANCE

1. The permittee is authorized to operate generators at the site up to a maximum production capacity of 4.9MW.

2. All generators in operation must adhere to a minimum of EPA Tier 2 standards.

3. In accordance with the manufacturer's recommendations and best management practices, the permittee shall inspect, maintain and operate the sources, any stand-alone air pollution control equipment, and testing and monitoring equipment as necessary to provide optimum control of air contaminant emissions during all operating periods.

4. Except for maintenance or test purposes, the permittee shall run the sources at each site in order of highest possible efficiency under the circumstances.

5. The permittee shall ensure that the fuel used by the source(s) conforms to the most recent Canadian federal *Sulphur in Diesel Fuel Regulations* for off-road applications.

PART 4: RELEASE OF CONTAMINANTS

1. The visible emissions from any source shall not exceed an opacity of 20% as measured by an environmental protection officer.

2. In the event that the opacity of emissions from any source exceeds the criterion established in Part 4.1 of this permit, the permittee shall take measures to reduce the opacity of the emissions below that criterion as directed by an environmental protection officer.

3. The permittee shall ensure that particulates collected using emission control equipment are contained so that there is no release of contaminants to the atmosphere or into an open body of water.

4. If ambient air quality monitoring data within the area of influence of the permittee's facility indicates that one or more of Yukon's Ambient Air Quality Standards is being exceeded, and the environmental protection officer is satisfied that the permittee's facility is the cause or a significant contributor to the prevailing ambient air quality condition, the permittee shall undertake such mitigation measures as may be specified by the environmental protection officer to improve the ambient air quality condition.

PART 5: MONITORING EMISSIONS

1. If generator operations meet either of the following conditions:
   a) any individual generator exceeds four consecutive days of continuous operation; or
   b) the total annual operating hours of all generators onsite exceed 715 hours in the calendar year,
   the permittee shall update the air quality modelling report to include actual operating hours and meteorological conditions. Based on the results of the updated modelling, an environmental protection analyst may direct the permittee to develop an air emissions management plan.

2. The permittee shall carry out any commitments in the air emissions management plan on a schedule that is approved by an environmental protection analyst.

PART 6: COMPLAINT MANAGEMENT SYSTEM

1. The permittee shall submit to an environmental protection analyst a complaint management plan for approval, within 30 days of permit issuance, which identifies:
   a) location of signage with contact details for concerns/complaints
   b) process for community engagement;
   c) noise monitoring, mitigation, and control measures;
   d) dispute resolution process;
   e) management plan will be subject to changes following branch review; and
   f) reporting as described in Part 6.2 of this permit.

2. The complaint management system shall include the following process for reporting sound complaints:
   a) permittee shall notify an environmental protection officer (867) 667-5683 or envprot@yukon.ca within one week upon receipt of any complaints regarding sound.
   b) The permittee shall provide the following information with each notification:
   - first and last name of complainant (if provided);
   - contact phone number and/or email;
   - nature of complaint;
   - time and date of complaint;
   - ambient meteorological conditions during the period of the complaint;
   - list of generators and the duration that the generators were active in the 48hrs prior to the complaint; and
   - record of any adjustment to station to address the complaint.

PART 7: REPORTING

1. The permittee shall submit to an environmental protection analyst a report which identifies:
   a) the total monthly and annual operating hours for all sources at all sites;
   b) the estimated total annual emissions of SO_2, $PM_{2.5}$, CO, NO_2, and N_2O from each source at each of the sites, including the calculation used to determine those results;
   c) all complaints received under Part 6.2 of this permit; and
   d) results of any noise monitoring,
   by March 31st of each year of this permit for the previous calendar year.

PART 8: UNAUTHORIZED EMISSIONS

1. The permittee shall contact either an environmental protection officer or the 24-hour Yukon Spill Report Centre (**867- 667-7244**) as soon as possible under the circumstances in the event of an unauthorized release or emission, such as fugitive emissions or emissions resulting from burning fuel other than that allowed for under this permit.

PART 9: RECORDS

1. The permittee shall keep all records required under this permit in a format acceptable to an environmental protection officer for a minimum of three years and make them available for inspection by an environmental protection officer upon request.

2. The permittee shall keep the following records:
   a) a copy of each report and approved plans developed under this permit, and any amendments to and approvals (if applicable) of each report and plan;
   b) summaries of all inspections carried out under this permit (including the name of the person conducting the inspection, the date of each inspection, any observations recorded during the inspection, actions taken as a result of those observations, and the date each action was taken);
   c) notes concerning any spills, leaks or unauthorized emissions occurring at the site, including substance involved, estimated quantity, date of observation of the spill or leak, spill reports made and clean-up procedures implemented;
   d) any and all deficiencies remedied in accordance with Part 2.7 of this permit, and how and when they were remedied; and
   e) notes concerning any instance where the most efficient source was not used in accordance with Part 3.4 of this permit and the reason for use of the less efficient source.

From: Emily.Sessford
To: Travis Ritchie
Subject: RE: [EXT] Emissions Exceedance AEP 60.010 Part 7 - Permitted Generating Capacity
Date: January 9, 2023 1:19:18 PM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
image006.png

Hi Travis,
Happy New Year to you too!
Thank you for sending the below report. Much appreciated. Will let you know if we have any other follow-up.

Sincerely,

Emily Sessford
Environmental Compliance Officer
Environment | Environmental Compliance & Inspections
T 867-667-5398 | C 867-332-2945 | Yukon.ca

From: Travis Ritchie <Travis.Ritchie@yec.yk.ca>
Sent: January 9, 2023 11:42 AM
To: Emily.Sessford <Emily.Sessford@yukon.ca>
Cc: Ed Peake <Ed.Peake@yec.yk.ca>; Michael Muller <Michael.Muller@yec.yk.ca>; Shannon Mallory <Shannon.Mallory@yec.yk.ca>; Lisa Wiklund <lisa.wiklund@yec.yk.ca>; Willy McKenna <Willy.McKenna@yec.yk.ca>; Bevon Keefer <Bevon.Keefer@yec.yk.ca>
Subject: [EXT] Emissions Exceedance AEP 60.010 Part 7 - Permitted Generating Capacity

Hi Emily,

Happy New Year!

Further to my voice message notification last month regarding this matter I wanted to provide a written notice of the generating capacity exceedances at the Whitehorse Rapids Generating Station (WRGS) during that cold snap back in late December, per Part 7 of our Air Emissions Permit (AEP 60.010.04).

Background

On December 19 and 20, 2022 Yukon Energy was facing very high system/customer demand, with temperatures in the Yukon ranging around -50°C to -40°C. As a normal course of action the System

Operator looked to balance generation across the various stations on the system to ensure compliance with the requirements of our various permits. Under the harsh conditions, however, we experienced temporary failures of some units on the system to respond to calls for generation. As such, Yukon Energy was forced to utilize some of its back up thermal generating capacity at the WRGS to meet demand. This operational response to ensure continued service to our customers resulted in a few short-term exceedances of the permitted generating capacity at the facility.

Exceedance Summary

The periodic generating capacity exceedances at WRGS during this time is summarized below:

Date	**Start Time** (hh:mm)	**End Time** (hh:mm)	**Capacity Average Exceedance** (MW)	**Duration** (hrs)
December 19, 2022	12:10	12:15	~ 1	0.1
December 19, 2022	18:00	23:00	~ 4	5
December 20, 2022	02:00	05:30	~1	3.5
December 20, 2022	07:10	23:10	~ 4	16
December 20-21, 2022	23:45	00:05	~ 1	0.3

If you have any questions respecting this report or would like to discuss the matter further please let me know.

Thank you.

Regards,

Travis

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

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