Tantalum Mining Corporation of Canada – Bernic Lake Mine

Ore Sorting Project

Date:

December 19, 2022

Tantalum Mining Corporation of Canada, Limited
Bernic Lake
Box 2000
Lac du Bonnet, Manitoba
MB R0E 1A0
Canada

December 19, 2022

Ms. Siobhan Burland Ross – Engineering Manager
Industrial and Wastewater, Environmental Approvals Branch
Manitoba Environment, Climate and Parks
1007 Century Street
Winnipeg, MB R3H 0W4
(204) 793-6487

Re: Tantalum Mining Corporation of Canada Bernic Lake Mine – Ore Sorting Project

Dear Ms. Burland Ross:

Tantalum Mining Corporation of Canada (TANCO) is submitting this report describing proposed changes to the manner in which low-grade cesium ore is processed prior to entering the Cesium Processing Facility (CPF) at the Bernic Lake Mine (BLM) so that Environmental Approvals Branch can determine the most appropriate manner to licence the new infrastructure. The proposed alterations include the installation of a portable screening plant and portable ore sorter that would be used to separate cesium-rich pollucite ore from low-grade cesium ores prior to processing in the Mill.

Please find enclosed, the information required for the alteration regulatory process that details TANCO's proposed alterations. Please note the infrastructure that will be used in the sorting process is portable and it is anticipated that the potential environmental effects from these alterations will be insignificant. After reviewing the information within these documents, please advise us whether the infrastructure is best licenced independently as a portable development or as a portable component within our current licence.

If you have any questions, or require further information on the report, please do not hesitate to contact me.

Sincerely,

Date: December 19, 2022

Joey Champagne
Facility General Manager
Tantalum Mining Corporation of Canada Limited

TANCO Bernic Lake Mine
Ore Sorting Project – Project Description

Prepared and reviewed by:

Date: December 19, 2022

Jerry White, M.Sc.
Environmental Specialist
Tantalum Mining Corporation of Canada

Executive Summary

This report is intended to provide the Director a description of proposed changes to the manner in which low-grade cesium ore is processed prior to entering the Cesium Processing Facility (CPF) at the Bernic Lake Mine (BLM) so that Environmental Approvals Branch can determine the most appropriate manner to licence the new infrastructure. This document also contains information for the Director to determine the significance of the environmental effects associated with these proposed changes to better determine the appropriate approval process for the alteration.

Cesium ore bodies with large amounts of low-grade ore are currently considered waste material even though there is some material within the ore that is cesium-rich pollucite. There is also a large amount of ore that is milled that is of lower quality that generates poor returns from the amount of effort expended in its processing. Ore sorting will allow the BLM to recover pollucite (cesium-rich ore) at very high recovery rates from low grade cesium ores. This will provide the BLM with the ability to recover pollucite from ore that would otherwise be considered as waste material due to its low-grade extending returns from the ore body. Implementing an ore sorter into the processing circuit at the BLM will also reduce the amount of ore that needs to be crushed by removing waste material very early in the process and since less ore goes through the milling process, there is a reduction in consumables such as grinding balls and reagents and less tailings will be produced that would need storage in the TMA.

These proposed changes include the installation of a portable dual x-ray ore sorter in an area currently disturbed by mining activities along the southeast corner of the East Tailings Management Area (TMA) and a portable size-screening plant immediately adjacent to the crushing plant inside the Mill.

Environmental effects associated with the physical environment, emissions, water resources and ecological aspects remain virtually unchanged as the proposed changes are contained within the current footprint of the BLM and current measures used at the facility are sufficient to mitigate any additional environmental effects. No anticipated increase in environmental effects will be realized with regard to water usage as neither circuit utilizes any water in their operation. There may be an increase in water transferred to the West Tailings Management Area (TMA) as result of draining surface water run-off from the ore sorter area but the change in effluent volume is expected to be negligible and there should be no change in effluent quality. Effluent quality will continue to be monitored to ensure it remains within regulatory limits outlined in the *Metal and Diamond Mining Effluent Regulations* (Government of Canada 2002) and the Mine's current *Environmental Act* Licence through treatment in the Tailings Management Area at the facility.

The proposed alterations to the processing circuit in the CPF at the TANCO Bernic Lake Mine are believed to be minor in nature because the potential negative environmental effects resulting from the alteration are expected to be insignificant.

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1. Introduction

1.1 Objectives

TANCO's vision is to be a prosperous mining, milling and chemical processing facility through the development of our people, our resources and our community. Site objectives focus on strategic priorities of building strong foundations, striving for operational excellence and development of our site resources. As the North American market demand for cesium products continues to grow, TANCO continues to explore ways to maximize returns from its resources and increase sustainability. TANCO believes the ore sorting project provides a unique opportunity for growth and development that aligns with our company's vision and site objectives.

This report is intended to describe proposed changes to the cesium processing circuit at the TANCO BLM so that the Director can determine the most appropriate manner to licence the new portable infrastructure. This report provides details regarding the installation of a portable size-screening plant and a portable ore sorter that will be installed with current boundaries of the Mine (Figure 3-1). This document also describes any potential environmental effects that are anticipated through the addition of this portable infrastructure.

This report provides supporting information which describes the physical changes at the Mine and changes to process including the type and quantity of raw materials (ore and process water) and chemical reagents as a result of the installation of the new processing circuit. It also quantifies the anticipated change in environmental effects from the Mine as compared to pre-alteration levels which includes an environmental assessment resulting from the alteration on the receiving environment.

1.2 Proposed Alterations

The proposed changes include the installation of a portable dual x-ray ore sorter and a portable size-screening plant in the processing circuit for the CPF. The portable size-screening plant is required to separate the ore into size fractions prior to sorting as requirement for the proper operation of the sorting equipment.

The purpose of the dual x-ray sorter is to recover pollucite (cesium-rich ore) at very high recovery rates from low grade cesium ores. This will provide the BLM with the ability to recover pollucite from ore bodies that would otherwise be considered as waste material due to its low-grade extending returns from the ore body. Implementing an ore sorter into the processing circuit at the BLM reduces the amount of ore that needs to be crushed by removing waste material very early in the process and since less ore goes through the milling process, there is a reduction in consumables such as grinding balls and reagents and less tailings will be produced that would need storage in the TMA.

2. Physical Alterations

The portable dual x-ray ore sorter will be located in an area currently disturbed by mining activities along the southeast corner of the East Tailings Management Area (TMA) and the portable size-screening plant immediately adjacent to the crushing plant inside the Mill (Figure 1). The size-screening plant will mounted on wheels or tracks so it can be relocated as required, while the x-ray sorter is housed in a semi-mobile base which allows for the unit to be easily operated in multiple locations with minimal commissioning and decommissioning time and costs. The semi-mobile base also provides shelter for the sorting equipment without the construction of a permanent building.

3. Process Alterations

The size-screening plant is required to separate material to be sorted by size so that the x-ray ore sorter works efficiently as the material must be properly sized prior to sorting. The hopper of the size screening plant is loaded by a diverter chute from the crushing circuit and the material is screened into four piles based on its size (-12.0 mm; +12.0 mm to -25.0 mm; +25.0 mm to -60 mm and +60 mm). Fines (-12.0 mm) and oversized (+60.0 mm) cannot be sorted but material from the other two piles is loaded onto trucks by front end loader and transported from the screening plant beside the Mill to the ore sorter by truck where it is placed in two stockpiles based on size. A front end loader loads sized material from one stockpile at a time into the feed hopper of the sorter as required maintaining the proper feed rate (Figure 3-2).

Ore from the feed hopper is transported by conveyor belt into a TOMRA COM tertiary XRT sorter where sensors detect the materials to be sorted out and command the control unit to open the appropriate valves in the ejection module to divide the fractions into one of two bins using compressed air (Figure 3-3; Figure 3-4). Conveyors move eject and non-eject material to the appropriate stockpiles on either side of the sorter. A front end loader loads non-eject material onto trucks which deliver the sorted material to the #14 conveyor which brings the material back into the mill for further processing. Reject material will be transported to the feldspar stockpile from the heavy media circuit and disposed of in a similar manner as current feldspar waste.

3.1 Raw Materials

There will no additional increase in ore extracted from underground but the volume of ore classified as waste material will be reduced and the amount of low-grade ore that is processed will also be reduced. This will also result in less waste residue (tailings) being generated that must be stored permanently in the East TMA. There will be no increase in water usage as the x-ray sorting process does not require water to clean the rock surface prior to sorting.

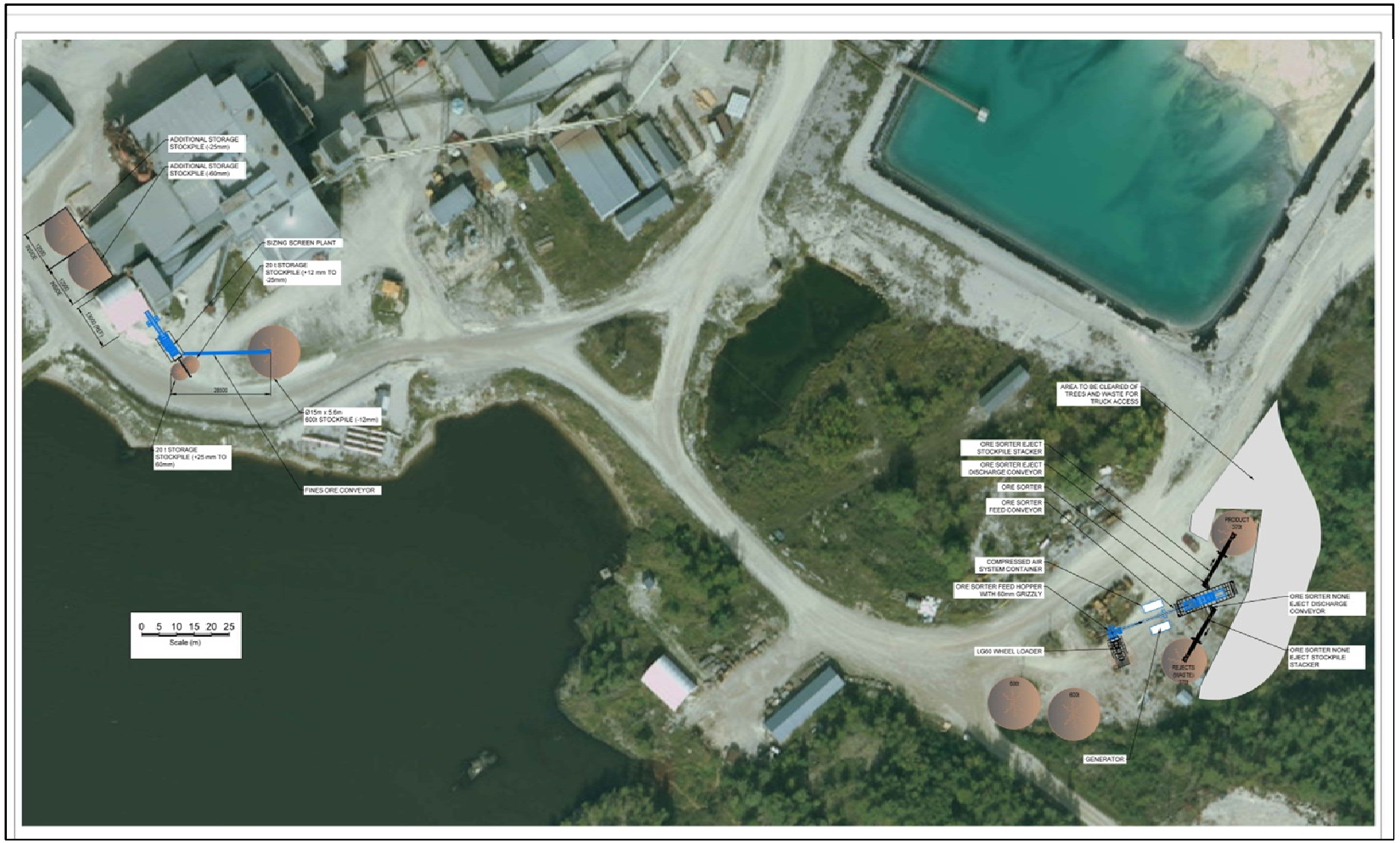

Figure 3-1 Ore screening and sorting circuit site layout (Halyard 2021).

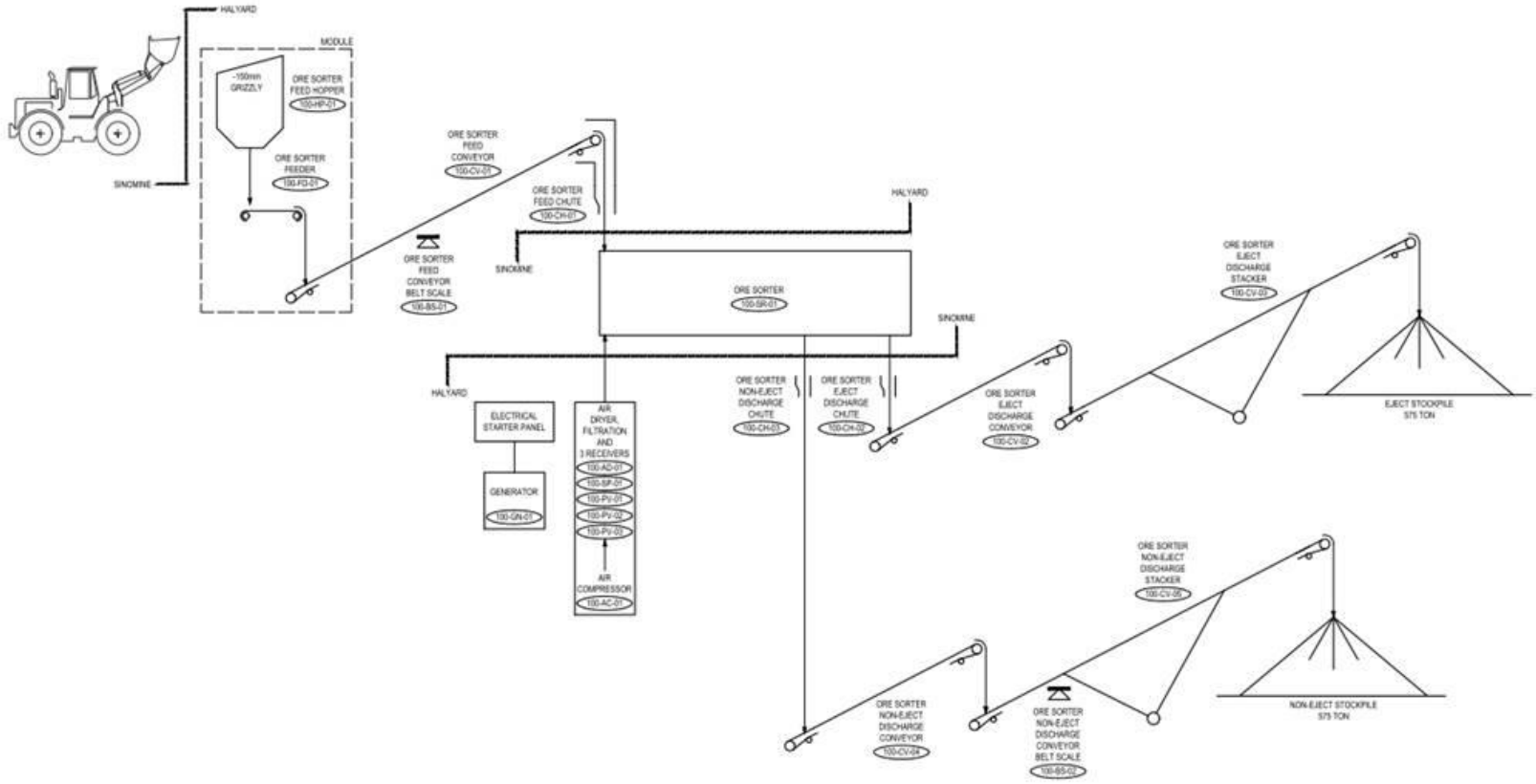

Figure 3-2 Ore sorter process flow diagram.

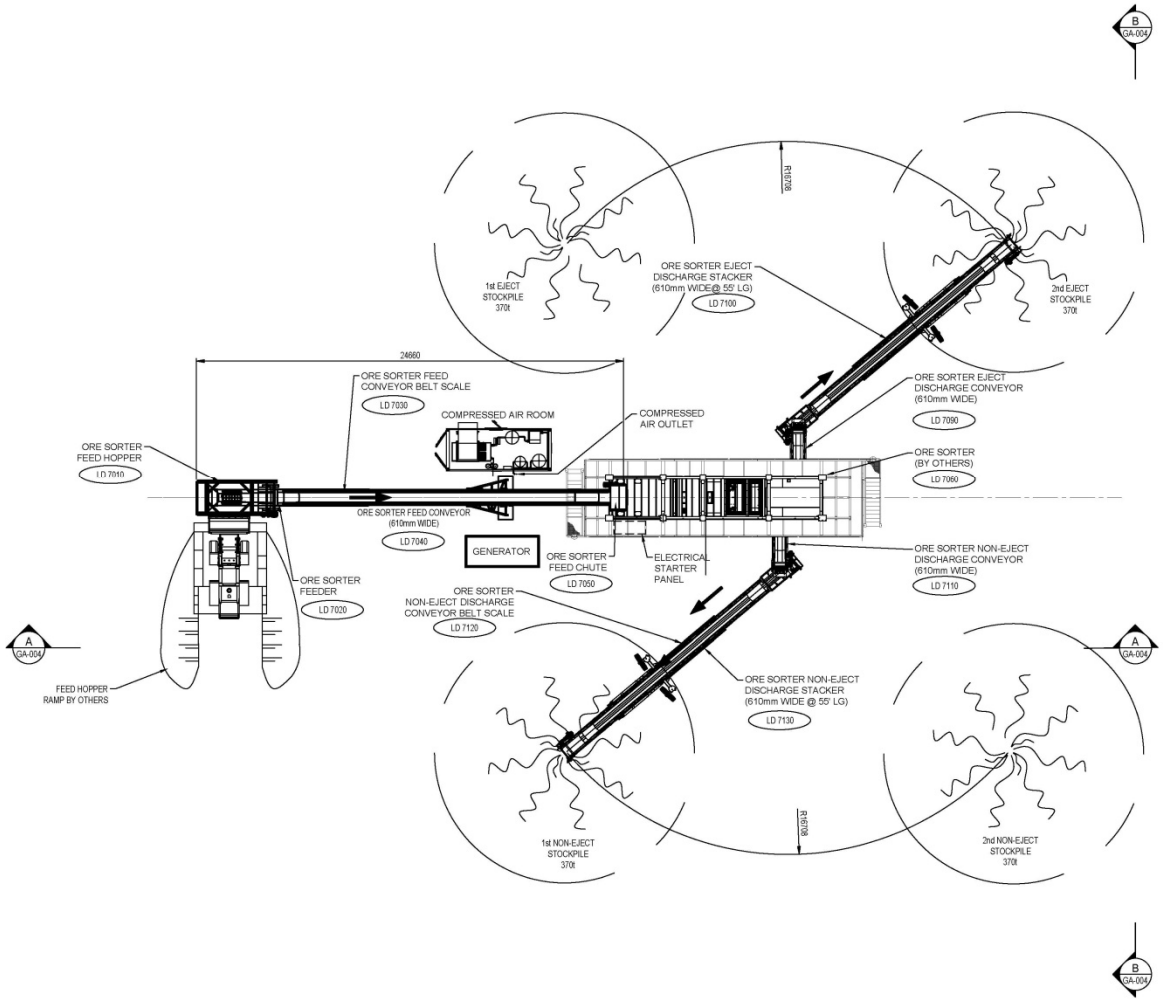

Figure 3-3 Ore sorter site layout (Halyard 2021).

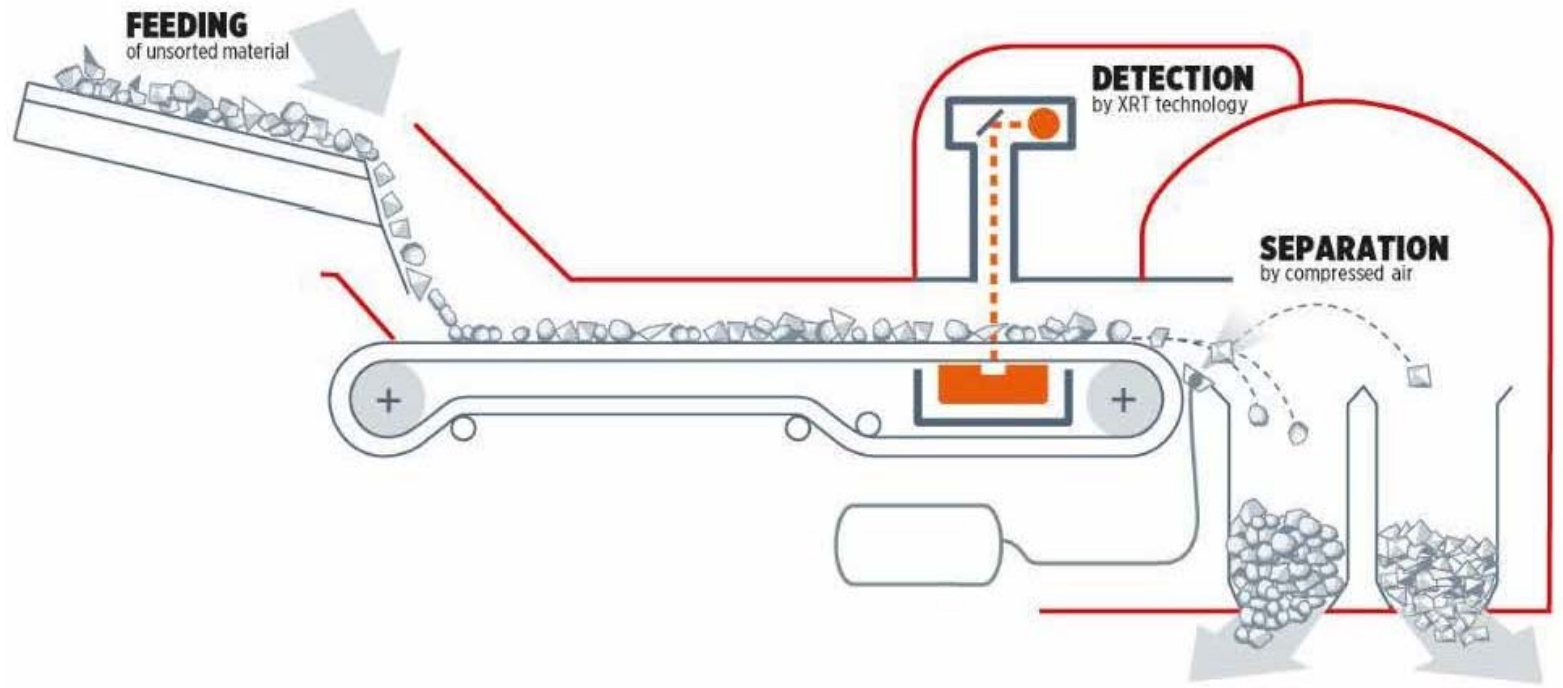

Figure 3-4 Functional principle of TOMRA COM Tertiary XRT (TOMRA 2021).

3.1 Processing Reagents and Consumables

There should be a reduction in the quantity of reagents and consumables (i.e. grinding balls) as the removal of waste material early in the production process will result in a lower quantity of high-grade ore entering the milling process to produce an equivalent amount of end product.

4. Environmental Assessment

Significance is commonly considered in the context of its magnitude, geographic extent, duration, frequency, degree of reversibility and possibility of occurrence or any combination of these factors.

The significance criteria used in this analysis are defined in Table 4-1, as well as a description of the significance level (I to III) for each criterion. Although presented as distinct levels in Table 4-1, significance can be a gradient between not significant (Level I) to potentially significant (Level II) to very significant (Level III).

4.1 Physical Environment

4.1.1 Topography

The proposed alteration will be entirely contained within the current footprint of the Mine in areas already disturbed by mining activities. The portable screening plant will be located adjacent to the Mill and does not require any change in topography as surface water in the area already drains into sumps at the mill which is then transferred to the West TMA for treatment.

The portable x-ray ore sorter will be located adjacent to the East TMA in an area referred to as the “Bone Yard” where old machinery is currently stored. The old equipment will be relocated or disposed of to allow for the positioning of the new infrastructure. This area is located outside the East TMA and will require some grading to control surface water from ponding or flowing towards Bernic Lake. There are some small trees around the perimeter of the ore sorting area that will be removed to allow truck access into the area. Although some minor changes in topography (grading) are required to control water movement within the ore sorting area, the area is currently being used for mining purposes, therefore, no change in environmental effects from current conditions with respect to site topography are associate the proposed portable development (Table 4-2). The level of significance associated with the portable size-screening and ore sorting infrastructure with respect to topography is deemed to be no higher than Level I. Accordingly, the summary evaluation for this potential impact is deemed to be not significant.

Table 4-1 Significance Criteria and Levels of Significance.

Significance Level	Context		Magnitude / Geographic Extent	Duration / Frequency	Likelihood of Occurrence	Reversibility
	Ecological / Biophysical	Socio-Cultural				
I	No meaningful adverse biophysical effects	No meaningful adverse effects to socio-economic interests	Magnitude and/or geographical extent of impact(s) considered to be minor, and primarily or solely confined to Mine site	Construction phase of Mine, or during closure phase(s)	Unlikely to Occur	Readily reversible
II	Adverse effects involve commonplace species or communities	Adverse effects would involve meaningful inconvenience to local residents or land users	Magnitude and/or geographical extent of impact(s) have the potential to meaningfully affect off-property residents, lands or receiving waters	Life of Mine	Could reasonably be expected to occur	Can be reversed with difficulty
III	Adverse effects involve locally or regionally important species or communities	Adverse effects to livelihoods and/or property values	Magnitude and/or geographical extent of impact(s) expected to meaningfully affect off-property residents, lands or receiving waters	Extends beyond life of Mine	Will occur, or is likely to occur	Not reversible

Table 4-2 Summary of potential effects associated with the proposed alteration at the TANCO Bernic Lake Mine.

Classification of Potential Effect	Alteration Phase	Potential Effect	Magnitude of Effect	Direction of Effect	Duration of Effect	Frequency of Effect	Scope of Effect	Mitigation Measures	Residual Effects	Reversibility	Significance
Physical											
Topography	Commissioning/ Operation	Modification in topography	Negligible	Negative	Long-term	Rare	Project Site	Grading limited to the ore sorter area to promote drainage of surface water into the TMA for treatment.	Negligible	Reversible	Not significant
Soils	Commissioning/ Operation	Soil contamination	Negligible	Negative	Long-term	Rare	Project Site	Use current best practices when refueling equipment and appropriate containment measures. Clean up any hydrocarbon spills immediately.	Negligible	Reversible	Not significant
Geology	Commissioning/ Operation	Bedrock excavation	Negligible	Negative	Long-term	None	Project Site	Not applicable – Infrastructure is portable and does not require any excavation during commissioning of equipment	Negligible	Reversible	Not significant
Emissions											
Air Quality	Commissioning/ Operation	Dust	Minor onsite and negligible offsite	Negative	Long-term	Intermittent or continuous	Project Site	Use current Best Management Practices for Control of Fugitive Dust/ Use dust suppression, if required.	Negligible	Reversible	Not significant
	Commissioning/ Operation	Noise	Minor onsite and negligible offsite	Negative	Long-term	Intermittent or continuous	Project Site	Noise levels similar to other equipment currently operated at the Mine/Remote location limits socio-cultural effects.	Negligible	Reversible	Not significant
	Operation	Exhaust Emissions	Minor onsite and negligible offsite	Negative	Long-term	Intermittent or continuous	Project Site	Diesel generators U.S. EPA certified meeting EPA NSPS Stationary Emergency Tier 3 Emission Standards	Negligible	Reversible	Not significant
Water Resources											
Groundwater	Construction	Groundwater Drawdown/Quality	Negligible	Negative	Short-term	None	Project Site	Not applicable – Portable equipment does not require any construction	Negligible	Reversible	Not significant
	Commissioning/ Operation	Groundwater Quality	Negligible	Negative	Long Term	Rare	Project Site	Surface water coming in contact with the new processes will not be allowed to pond and infiltrate into groundwater flows. Use current best practices when refueling equipment and appropriate containment measures. Clean up any hydrocarbon spills immediately to prevent infiltration into groundwater flows.	Negligible	Reversible	Not significant
Surface Water	Commissioning/ Operation	Surface Runoff	Negligible	Negative	Long-term	Intermittent	Project Site	Control surface water runoff during all phases redirecting flows into the TMA for treatment prior to its release into the environment.	Negligible	Reversible	Not significant
	Operation	Surface water usage	Negligible	Negative	Long Term	None	Project Site	Not applicable – No water required in the screening or sorting of ore.	Negligible	Reversible	Not significant
	Operation	Surface water quality	Negligible	Negative	Long Term	Intermittent	Project Site	Surface water run-off will be redirected to the TMA and will be treated to meet guidelines in current licence and the *MDMER.*	Negligible	Reversible	Not significant

Table 5-2(cont'd) **Summary of potential environmental effects associated with the proposed alteration at the TANCO Bernic Lake Mine.**

Classification of Potential Effect	Alteration Phase	Potential Effect	Magnitude of Effect	Direction of Effect	Duration of Effect	Frequency of Effect	Scope of Effect	Mitigation Measures	Residual Effects	Reversibility	Significance
Ecological											
Flora and Fauna	Commissioning/ Operation	Habitat disturbance	Negligible	Negative	Long-term	None	Project Site	All required equipment will be located within the current footprint of the Project.	Negligible	Not applicable	Not significant
	Commissioning/ Operation	Noise	Negligible	Negative	Long-term	Intermittent or continuous	Project Site	Operational noise levels similar to other equipment currently used at the Project	Negligible	Not applicable	Not significant
	Transportation	Habitat disturbance	Negligible to Major	Negative	Long-term	None	Project Site/Local Highways	No additional increase in the quantity of final products anticipated. A reduction in reagents may be realized by processing only high-grade ore.	Negligible	Reversible depending on incident	Not significant
Sociological											
Employment	Commissioning/ Operation	Increased Employment and Job Stability	Minor	Positive	Long Term	Continuous	Project Site	May require additional workers for operation of the new infrastructure. Increased work levels will provide greater job security for current employees at the Mine.	Minor	Not applicable	Significant
Health and Safety	Commissioning/ Operation	Safety of workers	Negligible to Major	Negative	Long-term	Rare	Project Site	All work conducted in accordance to Manitoba's *Workplace Safety and Health Act*/ All workers receive appropriate training/ Workers must wear appropriate PPE at all times and follow all TANCO Health and Safety guidelines associated with proposed alteration during commissioning and operation of the new infrastructure..	Negligible to Major	Reversible depending on incident	Not significant
	Transportation	Safety of workers and community	Negligible to Major	Negative	Long-term	None	Project Site/Local Highways	No additional increase in the quantity of final products anticipated. A reduction in reagents may be realized by processing only high-grade ore.	Negligible to Major	Reversible depending on incident	Not significant

4.1.1 Soils

The risk of soil contamination during the commissioning, operation and decommissioning of the portable size-screening plant and ore sorter is negligible and equal to the current level of risk associated with the Project. The diesel generator has a UL142 compliant 1,420 gallon dual-wall fuel tank will need to be fueled remotely every 2-3 days. Existing Spill Response Protocols and Best Management Practices for Materials Handling at the facility are sufficient mitigation measures for dealing with the potential environmental effects (Table 4-2). Therefore, a Level I level of significance (not significant) is assigned to the potential environmental effects on soil associated with the proposed alterations.

4.1.1 Geology

All infrastructure associated with the alteration is portable and no construction activity will occur that could affect bedrock in the area. Therefore, a Level I significance is assigned to the potential environmental effects on bedrock and is deemed not significant (Table 5-2).

4.2 Emissions

4.2.1 Air Quality

Long-term intermittent to continuous increases in dust, noise and exhaust emissions may be observed during commissioning and operation of the additional processing circuits; however, these emissions will be limited to the area immediately adjacent to the new infrastructure. These increases will also be limited to 180 days each year with the circuit only in operation 10 hours per day, 7 days per week throughout the summer. TANCO will employ Best Management Practices for Control of Fugitive Dust, minimize the size of disturbed areas and use dust suppression, if necessary, as mitigation measures. Noise emissions will increase due to the use of diesel powered generators and operation of the size-screener and ore sorter but levels should be comparable to equipment used in other areas of the Mine (Appendix A). Exhaust emissions will increase above current levels through the operation of diesel generators used to power the size-screening plant and ore sorter but TANCO has acquired generators with engines certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 3 exhaust emission levels to minimize the effect their operation will have on the environment (Appendix B; Appendix C). Because the facility is remotely located, increased dust, noise and exhaust emissions are not anticipated to have any socio-cultural effects on residents or land users and ecological effects would be limited to the area already influenced by mine operations. Staff working in the size-screening and ore sorting areas will be required to wear the appropriate personal protective equipment as mandated by the TANCO Health and Safety Department.

Although dust, noise and exhaust emissions are anticipated to increase during the commissioning and operation of the new infrastructure, the effects are expected to be comparable to other operations at the Mine and will be localized to the immediate area around the new processing circuits. Therefore, it is deemed that the alterations are insignificant with respect to air quality and assigned Level I significance (Table 4-2).

4.3 Water Resources

4.3.1 Groundwater

Because the location of the additional processing circuits are contained within the boundaries of the Mine, no additional effects on groundwater from commissioning and the operation of the proposed alteration are expected. Existing Spill Response Protocols and Best Management Practices for Materials Handling at the facility are sufficient mitigation measures for dealing with the potential environmental effects related to groundwater contamination during the process of refueling the generators used to power the additional infrastructure.

As there is no change in the risk to groundwater sources above current levels during commissioning or operation of the size-screening plant and ore sorter, a significance Level I is assigned with respect to potential environmental effects to groundwater and has been deemed not significant (Table 4-2).

4.3.2 Surface Water

No potential environmental effects are anticipated with respect to surface water runoff in the area the size-screening plant is located beside the crushing plant as the topography in the area will remain relatively unchanged and site runoff should continue to follow current drainage paths on the Property.

The area around the location of the ore sorter will be properly graded to ensure that surface water does not pond and infiltrate into the ground. Surface water coming in contact with sorting operations will be directed along designated drainage pathways back into the East TMA where it will be transferred for treatment in the West TMA prior to its release into the environment through the Mine's only compliance point, the West Discharge. If the topography in the ore sorting area does not allow for passive drainage of surface run-off then a collection pond and pump lift station will be installed to actively move water back into the TMAs for treatment.

The Mine's existing Spill Response Protocols and Best Management Practices for Materials Handling should be sufficient mitigation measures for dealing with the potential environmental effects related to surface water contamination during the process of refueling the generators used to power the additional infrastructure.

Effluent quality and quantity are expected to remain relatively unchanged as only approximately 0.65 ha of surface area will be added to area currently drained and treated in the TMAs. No process water is used by the size-screening plant or ore sorter that would require treatment.

Because potential environmental affects to surface water runoff, water usage and effluent discharge are expected to be negligible with respect to the proposed alterations, a Level I significance has been assigned and the potential effects have been deemed not significant (Table 4-2).

4.4 Ecological

Environmental effects with regard to flora and fauna due to habitat disturbance are not expected as commissioning and operation of the proposed alteration will occur within the current footprint of the Mine. There will be an increase in noise above pre-alteration levels in the ore sorting area but the noise will be localized and mostly limited to the current footprint of the development.

Because there is no anticipated increase in habitat disturbance and noise levels will be comparable to other areas of the Mine, it is deemed that the alterations are insignificant with respect to ecological environmental effects and assigned Level I significance (Table 4-2).

4.5 Sociological

4.5.1 Employment

Positive potential environmental effects related to employment opportunities will be associated with the operations phase of the alteration (Table 5-2). The circuit will require 5 workers plus a supervisor to oversee the work. This will include 2 employees to operate loaders, 1 to operate a dump truck, 1 size-screening plant operator and 1 ore sorter operator. These positions are likely to be filled by current staff but may require additional hires. Although, there are potentially no new positions being created by the additional processing circuit increase work levels should provide increased job stability for the current workforce.

Both these potential effects are positive and significant possibly creating new employment positions and increased job security during the operational phase.

4.5.2 Health and Safety

There is a potential for negative effects to worker safety during the commissioning and operation of additional processing circuits. These effects can range from negligible to major depending on the severity of the incident; however, the potential for these effects to occur are minimal as Health and Safety Guidelines at the TANCO Bernic Lake Mine are strictly adhered to and enforced. These guidelines include:

- All construction and operational activities will be carried out in accordance with the *Workplace Safety and Health Act*,
- All workers associated with the commissioning and operation of the new processing circuit will receive appropriate training for the activities being undertaken including activities undertaken by outside contractors,
- TANCO's Best Management Practice for the Control of Fugitive Dust will be followed to limit worker exposure to dust emissions,
- Appropriate personal protective equipment will be worn by workers during all phases of the project to limit exposure to noise and dust of or any additional negative effects.

Continued use of TANCO's Health and Safety Guidelines should result in no increased risk of negative effects regarding worker safety above pre-alteration levels. For this reason, the change in environmental effects associated with health and safety is deemed not significant (Table 4-2).

5. Conclusions

A detailed review of physical and process alterations to the processing circuit at the TANCO BLM CPF indicated that the proposed changes have been deemed as not significant when compared to the level of development as currently licensed for all components except employment related sociological effects. It should be noted that positive sociological effects are anticipated through possible increases in employment and greater job security during the operational phase for the project.

Effects associated with the physical environment, emissions, water resources and ecological and sociological (health and safety) aspects remain virtually unchanged as the proposed development is contained within the current footprint of the CPF and measures currently used at the facility are sufficient to mitigate any additional adverse effects. No anticipated increase in environmental effects are expected with regard to water usage or surface water quality in the receiving environment and only a negligible change in the volume of effluent discharged from the tailings facility is anticipated. Effluent quality will continue to remain within regulatory limits outlined in the Mine's current *Environmental Act* Licence and the *MDMER* (Government of Canada 2002) through treatment in the Tailings Management Area at the facility and therefore, possess no additional potential environmental effects to the receiving environment.

The proposed alterations to the processing circuit in the CPF at the TANCO Bernic Lake Mine are believed to be minor in nature because the potential negative environmental effects resulting from the alteration are expected to be insignificant when compared to pre-alteration levels.

6. References

Government of Canada. 2002. *Metal and Diamond Mining Effluent Regulations*. Retrieved March 2, 2021 from https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html.

Halyard Inc. 2021. Proposal – Sinomine – TOMRA ore sorting plant.

TOMRA. 2021. TOMRA Sorting Solutions COM Tertiary XRT 1200/B – Semi Mobile Goods Description.

Appendix A

Diesel Generator Sound Data (Form MSP-1030)

Sound data
300DQDAC 60 Hz

Sound pressure level @ 7 meters, dB(A)

See notes 1-8 listed below

Configuration		Measurement location number								Average
		1	2	3	4	5	6	7	8	
Standard – unhoused	Infinite exhaust	87	91	89	93	89	95	91	90	91
F183 – skin tight weather	Mounted muffler	88	91	91	94	90	95	91	92	92
F201 – quiet site II first stage	Mounted muffler	80	81	83	91	91	92	84	83	88
F202 – quiet site II second stage	Mounted muffler	73	75	74	72	74	73	70	71	73

Sound power level, dB(A)

See notes 2-6, 9, 10 listed below

Configuration		Octave band center frequency (Hz)								Overall sound power level
		63	125	250	500	1000	2000	4000	8000	
Standard – unhoused	Infinite exhaust	80	94	108	111	113	111	107	108	118
F183 – skin tight weather	Mounted muffler	96	105	112	113	114	113	109	104	120
F201 – quiet site II first stage	Mounted muffler	105	112	108	110	110	108	104	98	117
F202 – quiet site II second stage	Mounted muffler	85	94	93	96	98	98	94	87	104

Exhaust sound pressure level @ 1 meter, dB(A)

Open exhaust (no muffler) @ rated load	Octave band center frequency (Hz)								Sound pressure level
	63	125	250	500	1000	2000	4000	8000	
	99	110	119	122	125	127	127	126	133.1

Note:

1. Position 1 faces the engine front. The positions proceed around the generator set in a counter-clockwise direction in 45° increments. All positions are at 7 m (23 ft) from the surface of the generator set and 1.2 m (48 in.) from floor level.
2. Sound levels are subject to instrumentation, measurement, installation and manufacturing variability.
3. Sound data with remote-cooled generator sets are based on rated loads without cooling fan noise.
4. Sound levels for aluminum enclosures are approximately 2 dB(A)s higher than listed sound levels for steel enclosures.
5. Sound data for generator set with infinite exhaust do not include exhaust noise.
6. Data is based on full rated load with standard radiator-cooling fan package.
7. Sound pressure levels are measured per ANSI S1.13 and ANSI S12.18, as applicable.
8. Reference sound pressure is 20 µPa.
9. Sound power levels per ISO 3744 and ISO 8528-10, as applicable.
10. Reference power = 1 pw (10^{-12} W).
11. Exhaust sound power levels are per ISO 6798, as applicable.

Appendix B

Diesel Generator Emissions Data Sheet (Form EDS-1056)

Exhaust emission data sheet 300DQDAC

60 Hz Diesel generator set
EPA NSPS Stationary emergency

Engine information:

Model:	Cummins Inc. QSL9-G7 NR3	Bore:	4.49 in. (114 mm)
Type:	4 cycle, in-line, 6 cylinder diesel	Stroke:	5.69 in. (145 mm)
Aspiration:	Turbocharged and CAC	Displacement:	543 cu. in. (8.9 liters)
Compression ratio:	16.1:1		
Emission control device:	Turbocharger and CAC		

Performance data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime
Engine HP @ Stated load (1800 RPM)	113.75	227.5	341.25	455	407
Fuel consumption (gal/Hr)	6.82	12.23	17.65	23.07	20.78
Exhaust gas flow (CFM)	1099.6	1714.8	2118.6	2279.4	N/A
Exhaust gas temperature (°F)	678	785	915	990	945
Exhaust emission data					
HC (Total unburned hydrocarbons)	0.25	0.129	0.052	0.046	0.042
NOx (Oxides of nitrogen as NO2)	1.60	1.70	2.65	5.25	3.98
CO (Carbon monoxide)	3.20	3.17	0.73	0.30	N/A
PM (Particular Matter)	0.20	0.14	0.04	0.03	N/A
SO2 (Sulfur dioxide)	0.14	0.13	0.12	0.11	0.119
Smoke (Bosch)	0.396	0.462	0.299	0.399	0.160

All values are Grams per HP-Hour

Test conditions

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (± 2%). Pressures, temperatures, and emission rates were stabilized.

Fuel specification:	46.5 Cetane Number, 0.035 Wt.% Sulfur; Reference ISO8178-5, 40 CFR86. 1313-98 Type 2-D and ASTM D975 No. 2-D.
Fuel temperature	99 ± 9 °F (at fuel pump inlet)
Intake air temperature:	77 ± 9 °F
Barometric pressure:	29.6 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may results in elevated emission levels.

Appendix C

Diesel Generator Exhaust Emissions Compliance Statement (Form EPA-1177n)

2023 EPA Tier 3 Exhaust Emission Compliance Statement 300DQDAC Stationary Emergency

60 Hz Diesel Generator Set

Compliance Information:

The engine used in this generator set complies with Tier 3 emissions limit of U.S. EPA New Source Performance Standards for stationary emergency engines under the provisions of 40 CFR 60 Subpart IIII.

Engine Manufacturer:	Cummins Inc.
EPA Certificate Number:	PCEXL0540AAB-007
Effective Date:	05/04/2022
Date Issued:	05/04/2022
EPA Engine Family (Cummins Emissions Family):	PCEXL0540AAB

Engine Information:

Model:	QSL/QSL9/QSL9-G7 NR3	Bore:	4.49 in. (114 mm)
Engine Nameplate HP:	464	Stroke:	5.69 in. (145 mm)
Type:	4 Cycle, In-line, 6 Cylinder Diesel	Displacement:	543 cu. in. (8.9 liters)
Aspiration:	Turbocharged and CAC	Compression ratio:	16.1:1
Emission Control Device:		Exhaust stack diameter:	6 in. (152 mm)

Diesel Fuel Emission Limits

D2 Cycle Exhaust Emissions

	Grams per BHP-hr			Grams per kWm-hr		
	NO_X + NMHC	CO	PM	NO_X + NMHC	CO	PM
EPA Emissions Limit	3.0	2.6	0.15	4.0	3.5	0.20

Test methods: EPA emissions recorded per 40 CFR Part 60, 89, 1039, 1065 and weighted at load points prescribed in the regulations for constant speed engines.

Diesel fuel specifications: Cetane number: 40-50, Reference: ASTM D975 No. 2-D, 300-500 ppm Sulfur

Reference conditions: Air Inlet Temperature: 25 °C (77 °F), Fuel Inlet Temperature: 40 °C (104 °F). Barometric Pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H2O/lb) of dry air; required for NOx correction, Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit..

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.