FCNQ PETRO INC.

AUPALUK TANK FARM

Reference: File 3215-22-022

Responses to questions and comments Rev.0

NOVEMBER 14, 2023

Sacré-Davey

In order to continue the analysis of our file, we submit to you the responses to the questions and comments received by email on March 21, 2023, for your analysis.

QUESTIONS/COMMENTS AND RESPONSES

The promoter mentions that the official resolutions from the Northern Village of Aupaluk authorizing FCNQ Petro to proceed with the expansion work have been received.

QC-1 – The promoter must provide these resolutions.

RESPONSE:

The authorization request process is always done in parallel with the request for exemption. As mentioned in the exemption request document, we have received the verbal authorizations. Since submitting our request, we have only received the Aupaluk Landholding Corporation resolution which is attached as an appendix, we are still waiting for the Municipality's resolution, upon receipt of this, it will be sent to you in an addendum.

***See appendix 1** – Aupaluk Landholding Corporation resolution*

The identified lifespan for the new tanks that will be installed is 15 years.

QC-2 – Considering that the current tanks that will be preserved have been in place since 1988, and in the interest of sustainability of the infrastructure, the promoter must explain why the lifespan of the new tanks is only 15 years and specify whether there is a possibility that they are in service for an extended period.

RESPONSE:

In the introduction to the document submitted in support of the request for exemption, it is mentioned that the required storage volumes were calculated over a period of 15 years. This mention of the calculation period has no link with the lifespan of a tank.

For information, given the low rate of corrosion encountered in the Far North and the stability of the soil, all tanks have a lifespan exceeding 50 years.

QC-3 – Considering its involvement with the company Les Énergies Tarquti, which aims to develop renewable energies in Nunavik, the promoter must further justify the reason for its project in the medium and long term by taking into account the possibility of developing renewable energies in Aupaluk. The promoter must also present projections of increased hydrocarbon needs for the northern village of Aupaluk for the next 20 years.

RESPONSE:

The project submitted in this application concerns an increase in diesel storage. Since the population of Nunavik is increasing rapidly (the population roughly doubles every twenty years), this results in a substantial increase in energy consumption.

The main energy consumers in Aupaluk are Hydro-Québec, the KMHB, the Kativik School Board and other institutional organizations.

These customers provide services to this growing population and increase the consumption of petroleum products at a rate greater than that of population growth. For example, the recent construction of a new hospital by the Ministry of Health creates additional demand with a substantial effect on per capita consumption.

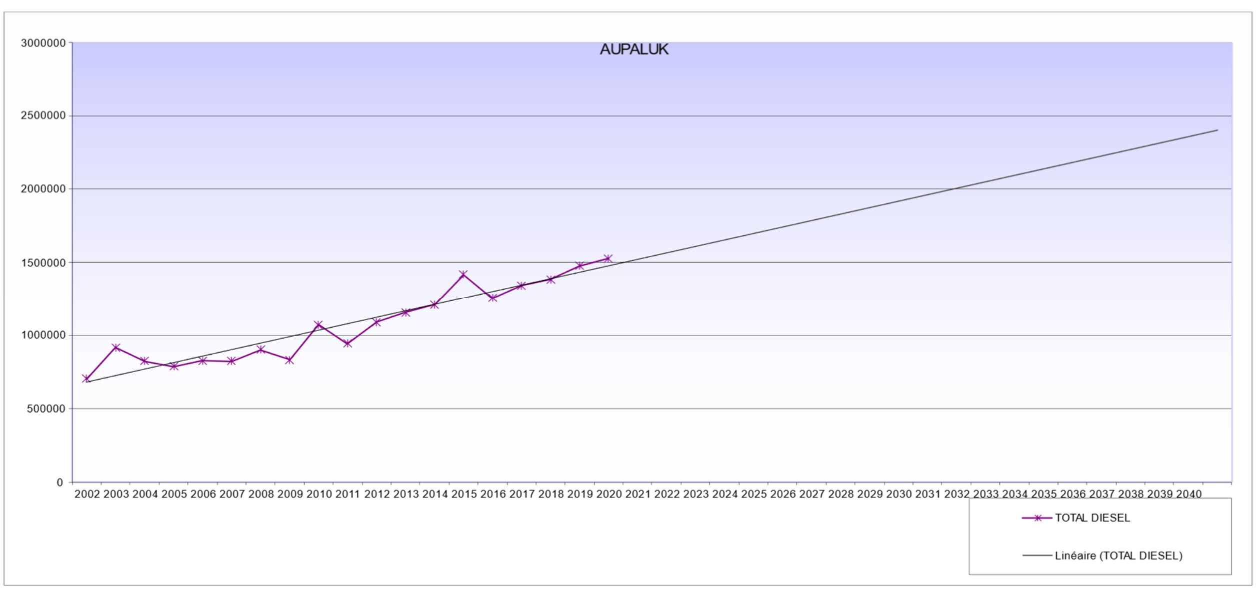
The same goes for housing. The homes, most of which are state property, are overcrowded. If the occupancy rate were reduced to an acceptable rate, we would see an even greater increase in hydrocarbon consumption than that noted.

Since the only source of energy remains hydrocarbons, the need for storage becomes essential.

As for Tarquti, the company is working on a multitude of green energy production projects; however, these initiatives are at the feasibility and demonstration stage. The logistical and field constraints are such that their deployment will only take place in the medium term at best.

Tank farm expansion projects are generally planned for a longer period than the 15-year period considered in the Aupaluk project. The expectation generated by this era of energy transition led FCNQ to choose 15 years as the design period. This choice demonstrates in some way the anticipation and importance given to the emergence of new sources of green energy and the need to reduce dependence on petroleum products.

The following graph shows the years on the abscissa and on the ordinate, the amount of diesel sold to Aupaluk. We can note a linear increase in consumption of around 3.5%. In contrast to the population variation (of the order of 2%), the increase in energy needs appears significant and is typical of Nunavik communities.



QC-4 – The promoter must identify sensitive elements of the environment that could be affected during an accident, in such a way that the consequences could be significant or increased (e.g. residences, schools, daycares, hospitals, natural sites of particular interest, etc.).

RESPONSE:

Elements of technological accidents were analyzed as part of the Salluit impact study. It was determined that the consequences of such a disaster, fire and explosion, were limited to a radius of 100 m from the tank walls. There are no sensitive elements within a 100 m radius of the tank walls.

Spill incidents are covered by the requirements of the Quebec construction code. A major spill would be contained in the waterproof retention basin required by regulation.

The new 35,214-liter compartmentalized diesel and gasoline tank No. 11, included in drawings AU001 and AU003 of Appendix 5 – Plans, is not presented in the report submitted by the proponent.

QC-5 – The promoter must provide details concerning tank no. 11 in relation to construction standards and the planned work.

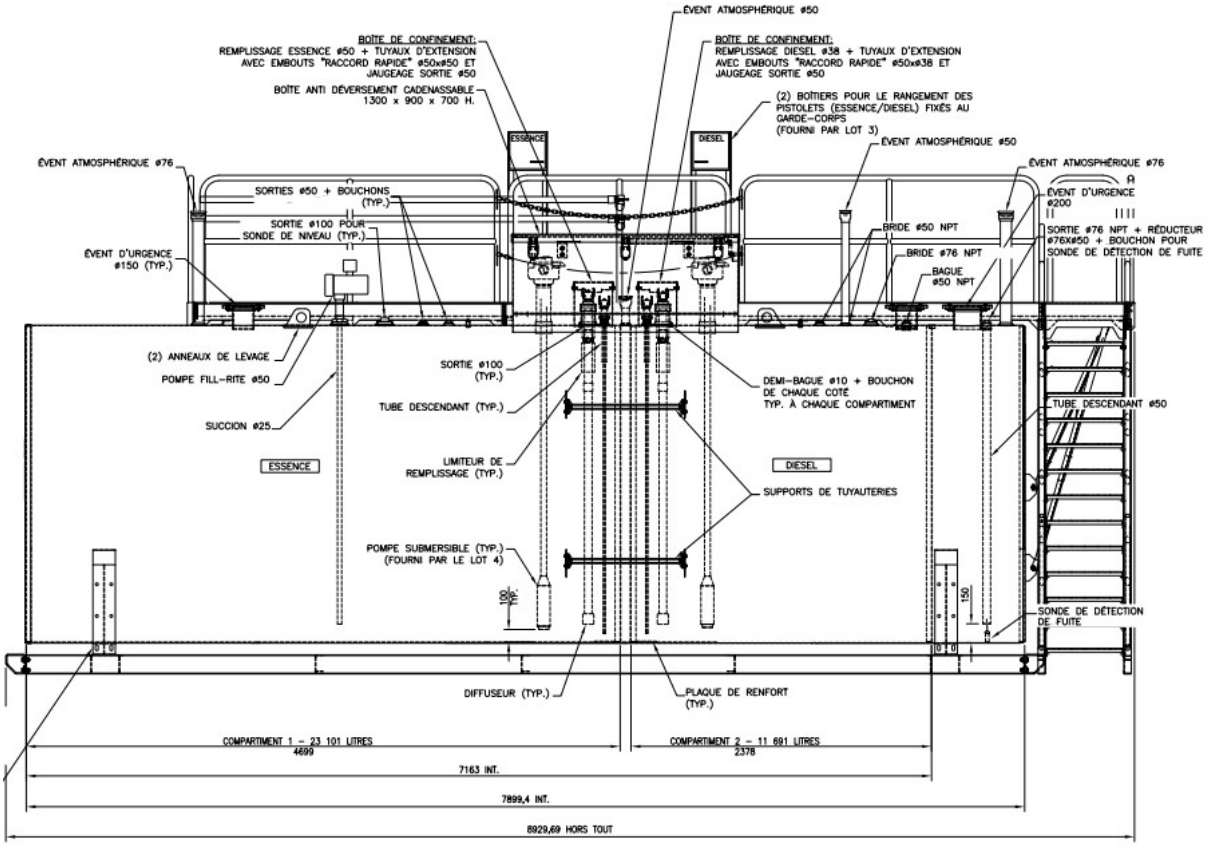
RESPONSE:

Tank no.11 is shown on the plans, it is part of a gas station. The design standards of the existing tank farm ensured that the gas station could be supplied directly from the stored volumes of the tank farm. Today's regulations require an intermediate tank. Tank no. 11 is this compartmentalized intermediate tank that can store gasoline and diesel.

Such a tank has been part of the renovation projects since the modification of the regulations relating to petroleum equipment in 2007.

The vapors produced when filling this tank are evaluated in the modeling.

The detail produced in the construction plans:



16 M-002 RÉSERVOIR COMPARTIMENTÉ ESSENCE/DIESEL
Détail Échelle 1:25

QC-6 – The promoter must present the security measures planned as part of the project, in particular with regard to access limitations to the installations, security systems and prevention measures (e.g. monitoring systems, emergency stop , fire fighting, automatic fire extinguishers, presence of emergency generators, leak detectors, high level alarms, retention basin, safety distance, etc.) in addition to taking stock of past accidents (since approximately five years) for current installations and for other similar projects.

RESPONSE:

As with all construction work in Quebec and in compliance with current regulations, a notice of construction site opening and a prevention program are prepared and registered with the CNESST. The program is distributed to subcontractors and awareness sessions are given before the opening of the site and at the opening of the site and when new workers arrive at the site.

The site coordinator ensures that the program is applied to all work; he sees that work authorizations are completed and documented as the work progresses. Daily awareness reminders are given and when necessary, safety warnings are given throughout the work.

The prevention program incorporates all aspects of the renovation of a tank farm, including in particular, elements relating to handling and work near petroleum products. A significant part of the content of the program comes from the contractor specializing in petroleum work.

The work will take place inside the land dedicated to the tank farm. Outside of working hours, the site is closed and access is prohibited in the same way as during normal tank farm operations. Access to valves, pumps, controls or tanks is within the fenced area. All operable elements are padlocked during the work.

Over the past five years, the FCNQ has not reported any work accidents or spills during renovation work on its facilities.

QC-7 – The promoter must clarify its intentions regarding the submission of its emergency measures plan (EMP) and commit to transmitting it to the northern village of Aupaluk and the Kativik Regional Administration.

RESPONSE:

The emergency measures plan is currently shared with the civil security department of the Kativik Regional Administration. The role of civil security is to promote the importance of emergency preparedness within communities and to support related activities. Currently, the emergency measure plan is not directly shared with the municipality since this is already shared with the KRG civil security. Before the start of the project, FCNQ undertakes to share the emergency plan with the municipality.

Each year, practical exercises are organized for employees and local responders to ensure adequate preparation for a spill. These exercises include a theoretical exercise (incident management) and a practical exercise with the ship. There was an incident management exercise at Aupaluk in spring 2022 and an equipment deployment exercise in summer 2023.

Certain operations, notably filling tanks and cleaning them, are likely to generate emissions of atmospheric contaminants. Thus, passive emissions could occur.

QC-8 – Considering the presence of residences nearby (less than one kilometer) and the fact that several petroleum compounds are covered by a standard or criterion, the promoter must submit atmospheric dispersion modeling in order to demonstrate compliance with the standards and criteria of quality of the atmosphere. To do this, the requirements set out in Appendix H of the Clean Air Regulation (RAA) must be respected. To ensure the validity of the approach, it is recommended that the promoter submit a modeling estimate to the Ministry of the Environment, the Fight against Climate Change, Wildlife and Parks (MELCCFP) before carrying out modeling.

RESPONSE:

A modeling estimate was prepared by the firm Tétra Tech and commented on by the Ministry.

***See appendix 2** – Atmospheric Dispersion Modeling Study – Aupaluk Tank Farm*

The Clean Air Regulation (RAA) defines requirements relating to certain types of tanks (sections 44 and 45), in particular storage tanks for volatile organic compounds (VOCs) having a certain vapor pressure at the conditions of storage. The RAA also defines atmospheric quality standards (article 197).

QC-9 – The promoter must demonstrate that it will comply with the requirements of sections 44 and 45, based on the vapor pressure data of the products stored in tank No. 1 (existing) as well as tanks No. 9 and No. 10 (projected). It must also demonstrate that contaminant emissions from product storage activities in tanks No. 1, 2, 9 and 10 (e.g. transemptying) comply with the limits prescribed in Appendix K of the RAA. This demonstration could be carried out by modeling atmospheric emissions (article 197 of the RAA) or by any other valid method.

RESPONSE:

Only tanks containing gasoline are subject to sections 44 and 45. These are tank no. 2 with a capacity of 333,500 L and tank no. 11, compartmentalized, containing a volume of 23,100 L of gasoline.

Tank no. 2 is subject to sections 44 and 45 while the gasoline part of tank no. 11 is only subject to section 44.

As for emissions under article 197, a quote has been submitted for this purpose and a modeling report has been produced.

***See appendix 2** – Atmospheric Dispersion Modeling Study – Aupaluk Tank Farm*

QC-10 – The promoter must demonstrate that he will comply with section 44 of the RAA, namely the use of submerged filling lines in the gasoline tank, for tank no. 2. To this end, the promoter must demonstrate, with proof support (e.g. plans and specifications, photographs) that the filling pipes will be submerged or that they are if this provision is already in place.

RESPONSE:

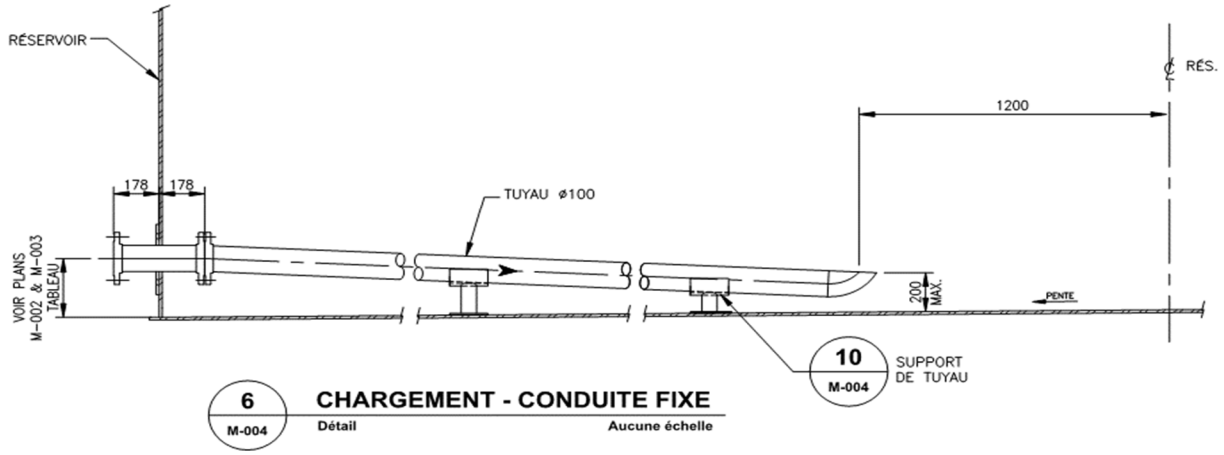
The pipe is submerged as with all tank farms in Nunavik.

Oil industry standards dictate that filling must be done from the bottom.

The regulations regarding petroleum products (Chapter VIII of the Quebec Construction Code) read as follows:

***8.129.** A fill pipe installed on a tank that is to store motor fuel must extend to not more than 200 mm from the bottom of the tank and be fixed in such a way as to minimize vibration. O.C. 220-2007, s. 1; O.C. 87-2018, s. 48.*

The detail produced in the construction plans is such that:



Gasoline from the ship is introduced into the tank 200 mm from the floor.

The height of 200 mm corresponds approximately to the dead volume of the tank, i.e. the portion which cannot be withdrawn. Thus when filling the tank the top of the elbow will be just submerged when the tank has been emptied until the loss of suction (which is not desirable in the Nordic context since such a situation would correspond to a stock shortage).

In addition, the filling procedure requires a gradual increase in flow rate for safe operation.

Article 8.129 is part of the inspection protocol leading to obtaining the operating permit from the RBQ. The existing tank farm is under permit.

See answer to question number 5 for details of submerged filling of tank no. 11.

QC-11 – Although the promoter plans to fill tank trucks from the bottom in order to reduce the risk of spills, it is strongly recommended that the promoter install spill prevention devices on all tank trucks, regardless of the petroleum products involved, in order to minimize the risk of spills.

RESPONSE:

The system used for filling the tanks is a so-called "bottom" system. This system is equipped with an automatic filling stop to avoid overflows. The "top" system is maintained for reasons of security of supply. Therefore, in the event of a system failure from below, it is possible to fill tanks with this emergency system.

The top system is simpler and less prone to breakage. It is also equipped with security features. It can only be used with the operator present at the filling port.

The filling systems comply with current construction and safety code regulations.

QC-12 – As a reminder, in the event of a fortuitous discovery of contaminated soil, the promoter must present for authorization the decontamination and rehabilitation project for the site if he wishes to treat the soil in situ.

RESPONSE:

The commitment has already been made in the request for exemption.

New construction does not require mass excavation. Therefore, FCNQ Petro does not anticipate encountering contaminated soil during the basin expansion work.

However, if contaminated soils were encountered, they would be treated in accordance with the Intervention Guide – Soil Protection and Rehabilitation of Contaminated Land. of the Ministry of the Environment and the Fight against Climate Change or the regulations applicable at the time of the work.

QC-13 – It was noted that the promoter in his report did not address the impacts of climate change. In addition to the risk of avalanches, described as non-existent, the promoter must demonstrate that he has taken into account all the risks and potential impacts of climate change, both on his project, but also on the integration environment, and this, for the entire lifespan of the planned infrastructure. To this end, the promoter can consult the *Guide for project initiators: Climate change and environmental assessment as well as the report Regional climate portrait in reference and future climate to support impact analysis and adaptation to climate change in the Eeyou lstchee Baie-James territory, northern Abitibi-Témiscamingue and Nunavik.*

RESPONSE:

We have reviewed the two references mentioned in QC-13. It appears that few elements relating to the risks linked to climate change would apply in the case of the Aupaluk tank farm.

Among the risks mentioned, we include the risks linked to the thawing of permafrost, the risks linked to ice and the risks linked to winds (the risks linked to the thawing of permafrost are dealt with in QC-15).

We also verified, in a brief literature search, the risks linked specifically to tank farms. Among the 10 Canadian provinces and 3 territories, only Nova Scotia has published information relating to the protection of tank farms in the context of climate change (https://novascotia.ca/nse/water/docs/CC_petrol_storage_aboveground.pdf). In addition, a few dozen articles consulted mainly focus on the effect of hurricanes and floods on these installations. However, we did not come across any article specifically relating to installations in the Arctic or northern areas.

The risk of flooding or extreme tidal effects or erosion does not seem problematic to us given the elevation of the tank farm (the tank farm is at an elevation of 21m).

Two Ouranos reports (http://www.bv.transports.gouv.qc.ca/mono/1256974.pdf and https://mffp.gouv.qc.ca/documents/forets/entreprises/Portrait_climatique_regional_Nunavik.pdf), mention that the strength of the winds, although little documented, shows a downward trend, by 2040. The frequency of high winds could however increase.

Petroleum product tanks, both new and existing tanks, are designed according to the API 650 standard. This American standard provides conservative wind loads to take into account all conditions encountered on American territory. Alternatively, the design engineer can use the local loads provided for in the National Building Code. Winds therefore do not represent a risk in this context since they are adequately evaluated by the standard and the studies do not foresee any major change in the loads to be considered.

Regarding the risks linked to ice. Ice does not constitute a significant risk; adjustments are made to protect the various instruments on the ground against falling ice. The vents are lined to prevent problems with ice blocking.

Water management in the containment basin represents a problem somewhat increased by an increase in precipitation in liquid form. The answer to this problem mainly involves regular emptying of the pool. A procedure is in place to ensure the quality of the water discharged and the frequency of discharges.

The issue of permafrost is addressed in question 15.

Table 1 summarizes mitigation measures due to climate change.

See appendix 3 – *Table 1*

QC-14 – The promoter must identify the components of the project likely to be affected by each hazard and identify the possible consequences of each hazard for the project and its environment of integration. If relevant, the promoter must also propose climate change adaptation measures appropriate to the design of its project and/or the maintenance of infrastructure.

RESPONSE:

See appendix 3 – *Table 1*

QC-15 – The promoter must take into account the risks linked to the thawing of permafrost, which could compromise the stability of the infrastructure. The promoter must briefly assess these risks by first examining the stability of the existing infrastructure on the tank farm site and providing the results of this examination. To this end, he can refer to the report Geotechnical characterization and improved mapping of permafrost in the northern communities of Nunavik: Aupaluk. This report suggests that the current tank farm site is located on thawing-stable deposits and suggests that the risks to infrastructure associated with thawing permafrost are low. However,

given the importance of the infrastructure, its essential nature for the northern village and the impacts of a failure, it is important to take the necessary precautions to ensure its future stability. Depending on the summary examination that it will carry out and its conclusions, the promoter may choose, if necessary, to call on an expert to carry out a geotechnical analysis and obtain recommendations to ensure the stability of the infrastructure according to present conditions at the project site.

RESPONSE:

The Sacré-Davey firm carries out the construction plans for the Aupaluk tank farm. The engineers and technicians who prepare these plans and specifications have extensive experience in the construction of tank farms in the Arctic. Denis Thibodeau, the engineer in charge, has carried out, over the last thirty-five years, a large number of projects in the Arctic in zones of continuous and discontinuous permafrost. He has also carried out several thermal modeling studies, notably for the Dalton Highway in Alaska and for the installation of a thermosiphon at the Canadian Royalties mine. He knows the geotechnical conditions of Aupaluk well, having carried out the drinking water supply project there in the early 1990s. The project involved drilling and surveying all along the raw water supply line, crossing the village from one end to the other. He worked on the last renovation of the tank farm in the early 2000s.

The Aupaluk tank farm is built on a sand and gravel deposit. The latest inspections for the 2023 and 2021 permit renewal show stable tanks.

Each of the vertical tanks is connected to the supply/withdrawal piping. At each connection of this piping to the tank, a flexible joint is installed.

The deformation of the joint makes it possible to evaluate the settlement. When we compare the photos (see below), the deformation of the joint is similar between 2023 and 2019. Furthermore, the deformation observed in the two photos is considered acceptable, as it is low. It is due to the different loading regime between the tank and the piping.

Diesel tank Spring 2019

Diesel tank Spring 2023

Unlike certain buildings, the problems of settlement of petroleum tanks due to thawing of permafrost have not been observed in Nunavik. The stability of tanks is mainly due to the particular thermal regime of petroleum product tanks. Thus, the tanks are filled in the hot season with products that are transported by tanker ship. The temperature of the product therefore approaches that of the Arctic Ocean. The temperature of the product stored in this way decreases as winter progresses. It is therefore not uncommon to encounter ice at the bottom of the tanks during cleaning in July.

Thus, petroleum product tanks, unlike buildings, transfer little or no heat to the underlying ground. The active zone of petroleum tank farms is therefore shallower than the surrounding area. The effects of thawing permafrost are thus delayed compared to other structures in the village.

Another important aspect of the location of the tank farm in Aupaluk is that there are two vehicle maintenance garages very close to the tank farm, a few hundred meters away. The floors of these garages are built directly on the ground. Such a construction approach is normally problematic in

areas of thawing-sensitive permafrost. A slab on ground will necessarily cause permafrost to thaw.

Inspection of both buildings in spring 2023 showed no signs of subsidence or cracking of the slab. This therefore means that the thawing of the ground does not cause subsidence and that it is a deposit of soil without a lens of ice.

The stability of the tank farm therefore appears to be ensured by the fact that a petroleum tank farm does not heat the underlying soil very much and that, in addition, this soil remains stable when it thaws.

The washing and filling operations of the tanks, as well as more generally, the use of hydrocarbons on the site, will generate greenhouse gas (GHG) emissions.

QC-16 – The promoter must present a quantification of the greenhouse gas emissions that will be emitted as part of the project. To do this, the proponent is invited to consult the Guide to Quantifying Greenhouse Gas Emissions in which the detailed approach is presented (Appendix A); including the sources of GHG emissions to take into consideration and the formulas for proposed calculation.

RESPONSE:

As requested in the preliminary information form, in article 6, the sources were identified in the exemption request document.

Here are the sources identified:

- *Maritime transport of materials and equipment Montreal/Aupaluk round trip;*
- *Air Transport of labor to Aupaluk;*
- *Production of crushed stone;*
- *Generator for temporary power during work ;*
- *Vehicles for transporting labor between the camp and the tank farm;*
- *Civil works – Mechanical excavator, loader and compactor roller;*
- *Mechanical work and tank cleaning - Diesel compressor for degassing, welding machine and Diecie (Forklift);*
- *Erection work of new tank – Crane, generator.*

Regarding the quantification of greenhouse gas emissions that will be emitted as part of the project, we used the following formula;

Greenhouse gas emissions = ∑ (Quantity of fuel consumed x Emission factor)

The emission factors used are:

Tableau 3. Facteurs d'émission des carburants ou des combustibles, en équivalents CO_2					
Carburants et combustibles liquides	gCO_2/litre	gCH_4/litre	gN_2O/litre	gCO_2e/litre	Référence
Essence pour automobile	2 307	0,14	0,022	2 317	*
Carburants diesel	2 681	0,11	0,151	2 729	*
Propane	1 515	0,64	0,028	1 539	*
Véhicules hors route à essence	2 307	10,61	0,013	2 576	*
Véhicules hors route au diesel	2 681	0,073	0,022	2 689	*
Véhicules au gaz naturel	1,9	0,009	0,00006	2 143	*, ***
Essence d'aviation	2 365	2,2	0,23	2 489	*
Carburéacteur	2 560	0,029	0,071	2 582	*
Trains alimentés au diesel	2 681	0,15	1	2 983	"
Bateaux à essence	2 307	0,22	0,063	2 331	*
Navires à moteur diesel	2 681	0,25	0,072	2 709	*
Navires au mazout léger	2 753	0,26	0,073	2 781	*
Navires au mazout lourd	3 156	0,29	0,082	3 188	*

*A quantification was made from this data, we calculated the total emissions for the project and we arrived at **41.38 tCO2e**.*

See details in the tables below.

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FCNQ PETRO INC.

Maritime transport of materials and equipment from Montreal/Aupaluk (round trip)		
Parametre	**Value/Quantity**	**Unit**
GHG emission factor for heavy fuel oil vessels	0.003188	tCO_2e/litre heavy oil
Average fuel consumption	23	MT/day
Travel days between Ste-Catherine and Aupaluk (round trip)	48	days
Number of trips	1	
Associated GHG emissions	**3.52**	**tCO2e**

GHGs associated with crushed production		
Parametre	**Value/Quantity**	**Unit**
Quantity of diesel consumed	550	litres
GHG emission factor diesel	0.002729	tCO_2e/litre diesel
Associated GHG emissions	**1.50**	**tCO2e**

Land transport of crushed stone to the site		
Parametre	**Value/Quantity**	**Unit**
KM between quarry and construction site	3	km
KM round trip	6	km
GHG emission factor diesel	0.002729	tCO2e/litre diesel
Diesel consumption each round trip	1.92	litres
Number of round trips	210	
Associated GHG emissions	**1.10**	**tCO2e**

Temporary power during work with generator		
Parametre	**Value/Quantity**	**Unit**
Diesel generator (elect.) 100 kw	600	litres diesel
Diesel GHG emission factor (fixed)	0.002663	tCO2e/litre diesel
Associated GHG emissions	**1.60**	**tCO2e**

Lot 1 & 2 - Civil works		
Parametre	**Value/Quantity**	**Unit**
Mechanical excavator	1000	litres diesel
Loader	1000	litres diesel
Compactor roller	50	litres diesel
2 Vehicles	800	litres gasoline
9 plane tickets	18810	km
GHG emission factor diesel	0.002729	tCO_2e/litre diesel
GHG emission factor gasoline	0.002317	tCO2e/litre gasoline
GHG emission factor Jet-A1	0.000145	tCO2e/km-passenger
Associated GHG emissions diesel	5.59445	tCO2e
Associated GHG emissions gasoline	1.8536	tCO2e
Associated GHG emissions Jet-A1	2.72745	tCO2e
Total associated GHG emissions	**10.18**	**tCO2e**

Lot 4 - Mechanics and transfer and tank cleaning

Parametre	Value/Quantity	Unit
1 Diesel compressor for degassing	200	litres diesel
2 Welding machines	1800	litres diesel
Diecie	1120	litres diesel
Vehicles	280	litres gasoline
7 plane tickets	14630	km
GHG emission factor diesel	0.002729	tCO_2e/litre diesel
GHG emission factor gasoline	0.002317	tCO2e/litre gasoline
GHG emission factor Jet-A1	0.000145	tCO2e/km-passenger
Associated GHG emissions diesel	8.51448	tCO2e
Associated GHG emissions gasoline	0.64876	tCO2e
Associated GHG emissions Jet-A1	2.12135	tCO2e
Total associated GHG emissions	**11.28**	**tCO2e**

Lot 5 - Electricity and Controls

Parametre	Value/Quantity	Unit
Vehicles	230	litres gasoline
GHG emission factor gasoline	0.002317	tCO2e/litre gasoline
5 plane tickets	10450	tickets
GHG emission factor Jet-A1	0.000145	tCO2e/km-passenger
Associated GHG emissions gasoline	0.53291	tCO2e
Associated GHG emissions Jet-A1	1.51525	tCO2e
Total associated GHG emissions	**2.05**	**tCO2e**

Lot 7 - Erection of new tanks and modifications of existing tanks

Parametre	Value/Quantity	Unit
80 ton crane	830	litres diesel
2 generators	1300	litres diesel
2 vehicles	600	litres gasoline
10 plane tickets	20900	km
GHG emission factor (crane)	0.002729	tCO_2e/litre diesel
GHG emission factor (generator)	0.0026663	tCO2e/litre diesel
GHG emission factor (vehicles)	0.002317	tCO2e/litre gasoline
GHG emission factor Jet-A1	0.000145	tCO2e/km-passenger
Associated GHG emissions diesel	5.73126	tCO2e
Associated GHG emissions gasoline	1.3902	tCO2e
Associated GHG emissions Jet-A1	3.0305	tCO2e
Total associated GHG emissions	**10.15**	**tCO2e**

Total for the project: **41.38 tCO2e**

APPENDIX 1

Resolution

NUNAVIK LANDHOLDING CORPORATION OF AUPALUK
P.O. Box 29
Aupaluk, Québec
J0M 1X0
Telephone: (819) 491-7045 **Telecopier: (819) 491-7045**

FORM 001P

Permit No. 2023-04

CONSTRUCTION PERMIT FOR NEW DEVELOPMENT PROJECT OVER AUPALUK CATEGORY I LAND

The present Construction Permit covers the construction aspects of the New Development Project; it does not grant occupancy right of use and occupation over Aupaluk Category I Land once the construction is completed. A distinct "Long Term Land Lease Agreement" has to be entered into between the owner and the Landholding Corporation upon the construction is terminated.

SECTION 1
CONSTRUCTION PERMIT FOR NEW DEVELOPMENT PROJECT ISSUED TO:

Name of Permit Holder	FCNQ Petro			
Address	19950 Clarck Graham			
	Baie-Urfe (Quebec)			
	H9X 3R8			
Telephone No.	514-457-9375	Ext: 425	Telecopier No.	514-457-8017
Contact Person	Karol Ibrahim			
	Title: Project plan coor		Email Address: Karol.Ibrahim@fcnq.ca	

SECTION 2
DESCRIPTION OF THE NEW DEVELOPMENT PROJECT

Nature of Development	New Building ☐ New Municipal Infrastructure ☐ Renovation ☐ Extension ☒ Demolition ☐ Changing Lot ☐ Other (specify) ☐	Residential ☐ Commercial ☐ Industrial ☒ Other ☐	Specify: Aupaluk Tank farm expansion to increase fuel storage capacity. Civic Number issued by the Municipality (*mandatory*)

SECTION 3
PARCEL(s) OF LAND ALLOCATED TO THE PERMIT HOLDER FOR THE CONSTRUCTION

Quantity of parcel(s) of land allocated to the Permit Holder over which shall be built the new development project	Approximate Land area allocated (s.f.)	Deadline date given in the event no construction work begins on the lot(s) allocated to the Permit Holder, at which date the lot(s) shall be again made available for selection by any other interested party
one (1)	637.5 m2 maximum	December 31, 2024
Extract of plan of the community of Aupaluk identifying the parcel (s) of land		Yes ☒ (Annex 1)

SECTION 4
AUTHORIZATIONS AND CONDITIONS

Authorization granted to the Permit Holder to use and occupy the allocated parcel (s) of Aupaluk Category I land during the period of construction of the New Development Project..	Yes: ☒ (see Annex 1)
Authorization granted to the Permit Holder to use and occupy parcel(s) of land adjacent to the Aupaluk municipal quarry and gravel pit in order to extract natural granular material required for the construction of the new Development Project	Yes: ☐ (see Annex 1)
Construction Year(s) during which the New Development Project shall be performed by the Permit Holder	2023

SECTION 5
LONG TERM LAND LEASE AGREEMENT TO BE SIGNED WITH THE LANDHOLDING CORPORATION OF AUPALUK FROM THE DATE OF COMPLETION OF THE NEW DEVELOPMENT PROJECT

Long Term Land Lease Agreement for Use and Occupation of Aupaluk Category I land required	Yes: ☒ No ☐ (existing current Land Lease Agreement) No ☐ (specify if for other reason)

Term period of the NEW Long Term Land Lease Agreement to be signed with the LHC	☐ 1 year	☐ 2 years	☐ 3 years	☐ 4 years	☒ 5 years	Other (specify)

In the event no pre-land survey data is transmitted to the LHC within 45 days from the completion of the Project, the yearly rental to be included in the land lease agreement shall be calculated based on a minimum area of land as follows:	15,000 s.f. ☐ 35,000 s.f. ☐ 20,000 s.f. ☐ 40,000 s.f. ☐ 25,000 s.f. ☐ 45,000 s.f. ☐ 30,000 s.f. ☐ 50,000 s.f. ☐ Other: s.f.

Yearly land rental for the use and occupation of Aupaluk Category I land over which shall be located the new development project	s.f./1st year	s.f./2nd year	s.f./3rd year	s.f./4th year	s.f./5th year	Other (specify)

LHC's comments: (if any)	Official land survey to be performed on said parcel of land Civic number to be identified on all land survey data/documents A land lease agreement be signed between the Promoter and Nunavik LHC at the the latest thirty (30) days upon completion of the Project, after which date, a daily rental of $500/day shall apply for unauthorized use and occupation of Aupaluk Cat. I Land until signature of the lease.

Administration fee for the preparation, disbursement and execution of the Long Term Land Lease Agreement	$350.00: ☐ No Fee: ☐

SECTION 6
NUNAVIK LANDHOLDING CORPORATION OF AUPALUK

2023-04		2023-04-06	
Resolution No. adopted by the Board of Directors		Date Adoption Resolution	
Has the Application for Construction for New Development Project been received 60 days prior anticipated date of beginning of construction work?	Yes: ☒ No: ☐ (If not received within the delay, specify the date of reception of the Application):		
Is a $500.00 Late Fee for Reception of Construction Permit Applicable?	Yes: ☐ No: ☒	If Yes, add $500. in the right column:	$00
Construction equipment and/or material occupying Aupaluk Category I land prior to the issuance of the Construction Permit (Unauthorized use and occupation fee of $350.00/day)	No ☒ Yes ☐ since:		$00
		Amount due by the Permit Holder for unauthorized use and occupation of Aupaluk Cat. I land	
	Total of days for unauthorized use and occupation of Aupaluk Cat. I land		
Construction Permit Fee paid ($300) ?: Yes ☒ No ☐			$300
TOTAL AMOUNT DUE by the Permit Holder upon issuance of the ***Construction Permit*** ***The total amount is to be paid in full within 30 days of issuance of the present Construction Permit or all authorizations may be revoked by the Landholding Corporation.***			$300
Additional special conditions from the Board of Directors, if any	Any crushed rocks for the new pad is $125/m3		

2023-04-06	Lizzie A. Gordon	**Lizzie A. Gordon**	**P-2023-04**
Date Issuance of Construction Permit	**Authorized Signature Secretary-Treasurer**	**Name in Block Letters**	**Permit No.** **(Use the same No. as Resolution adopted)**

Enclosure: (Important to be attached to the present)
***Annex** 1: Extract of plan identifying the location of the piece(s) of Aupaluk Category I land allocated to the Permit Holder and over which shall be performed the new Development Project, and over which natural granular material may be extracted for the construction of the New Development Project.*

NUNAVIK LANDHOLDING CORPORATION OF AUPALUK
Board of Directors meeting
Resolution 2023-04

Re: Promoter: FCNQ Petro: New Development Project 2023 : Aupaluk Tank Farm Expansion

WHEREAS Nunavik Landholding Corporation (Nunavik LHC) is the owner of Aupaluk Category I lands;

WHEREAS pursuant to the *Act Respecting the Land Regime in the James Bay and Northern Québec Territories* (R.S.Q. c. R-13.1), the Nunavik LHC may grant usage and occupation rights within its Category I lands;

WHEREAS pursuant to section 145 of the *Act Respecting the Land Regime in the James Bay and New Quebec Territories* (R.S.Q. c. R-13.1), no minerals or mineral or other subsurface rights may be obtained, extracted, mined or exercised from or with respect to any Category I lands without the consent of the interested landholding corporation and without payment of compensation agreed upon for the use of rights over such lands;

WHEREAS Nunavik LHC received duly completed and signed by the Kativik Regional Government Municipal Public Works Department, the Promoter, an Application for Permit for conducting a new development project over Aupaluk Category I Land, as follows:

Promoter:	La Federation des cooperatives du Nouveau-Quebec
Project:	To Expand the tank farm of fuel storage
Total parcel of Aupaluk Cat. I land required:	Add a tank near the tank farm
Approximate lot size required	637.5 s.m. (10,000s.f.)
Quantity granular required	Not identified
Construction Season	2023 - 2024
Duration of Project:	2 months – 2 ½ months (July 15 – Oct. 31, 2024)
Hereafter the "Project"	

WHEREAS One (1) piece of Aupaluk Category I land has been identified as the future location for the Project;

WHEREAS it is necessary for Nunavik Board of Directors to duly allocate the identified said piece of Category I land and to authorize the Promoter the performance of the Project over Aupaluk Category I Land.

THEREFORE, UPON MOTION DULY MOVED AND SECONDED, IT IS HEREBY RESOLVED:

THAT: the preamble is an integral part of the present resolution;

THAT: Nunavik LHC hereby allocates to the Promoter the following identified said piece of Category I land and authorizes the Promoter the performance of the Project over Aupaluk Category I Land, as follows:

For the Project:	One (1) parcel of land
Approximate size lot allocated to the Promoter	Maximum 10,000 s.f.
For storage of construction material/equipment:	Same parcel of land as described hereabove
The whole as identified on an **extract of plan attached to the present resolution.**	

THAT: in the event no construction begins on the lot allocated to the Promoter by Nunavik LHC and identified on the extract of plan attached hereto before December 31, 2024, the lot shall be again made available for selection by any other interested party.

THAT: Nunavik LHC hereby issues to the Promoter, specifically for the performance of the Project herein stipulated, the following Permit:

- Construction Permit for New Development Project over Aupaluk Category I Land;

THAT: the above-mentioned Permit issued by the Nunavik LHC to the Promoter specifically for the present Project is conditional that all the Terms and Conditions contained in the Application for Permit duly completed and signed by the Promoter, a copy of which is attached hereto, be fully respected by the Promoter as if contained in a separate agreement signed between the Promoter and the Nunavik LHC.

THAT: in addition to the Terms and Conditions contained in the Application for Permit duly completed and signed by the Promoter, the following terms and conditions shall apply and be added to the Permit to be issued to the Promoter:

- Official land survey to be performed on said parcel of land;
- Civic number to be identified on all land survey data/documents;
- A land lease agreement be signed between the Promoter and Nunavik LHC at the latest thirty (30) days upon completion of the Project, after which date, a daily rental of $500/day shall apply for unauthorized use and occupation of Aupaluk Cat. I Land until signature of the lease.

THAT: at all times during the performance of the Project, Nunavik LHC reserves the right to refuse the usage and occupation by the Promoter on the piece(s) of land hereby allocated for the performance of the Project.

THAT: a copy of the present Resolution be sent to:

Karol Ibrahim FCNQ Karol.Ibrahim@fcnq.ca	Hélène Orlando NLHCA horlando@nlhca.ca

THAT: the President be and is hereby authorized to execute any and all documents to give effect to the present resolution;

Moved by: Charlie
In favor: 3
Absent: _____

Seconded by: Eva
Against: _____
Abstention: _____

CERTIFICATION

I, the undersigned, Secretary-Treasurer of Nunavik Landholding Corporation of Aupaluk, certify that this is a true copy of a resolution duly adopted at a duly called meeting of the Board of Directors of the Corporation, held in Aupaluk, on this 6th day of April, 2023

Aupaluk, this 6th day of April, 2023

Lizzie A. Gordon, Secretary-Treasurer

INSERT MAP:
LOCATION OF THE LOT ALLOCATED

APPENDIX 2

Atmospheric Dispersion Modeling Study – Aupaluk Tank Farm

FCNQ Petro – Oil Depot Aupaluk

Atmospheric Dispersion Modeling Study

TETRA TECH

Emitted for: Delivered to the MELCCFP

2023-11-07

Tetra Tech Ref.: 711-46982TT

Revision: 0

Atmospheric Dispersion Modeling Study

Tetra Tech Ref: 711-46982TT

2023-11-07

DELIVERED TO:

FCNQ Petro – Oil Depot Aupaluk
Monsieur Jean-Luc Malette Directeur
19950, avenue Clark Graham, Baie-d'Urfé
QC H9X 3R8

PREPARED BY:

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Prepared by:

2023-11-07

Eduardo Leon, B. Ing., M. Ing. — Date
Environmental analyst

2023-11-07

Guillaume Nachin, ing., M. Ing. — Date
Modeling project manager
N° OIQ: 5023119

Reviewed by:

2023-11-07

Georges Côté, ing. — Date
GHG and air quality team leader
No OIQ: 140706

« Version for MELCCFP »

REVISIONS

Revision	Date	Description	Prepared by
0	November 7, 2023	Final version for MELCCFP	EL/GC/$_{LM}$

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APPENDICES

1 INTRODUCTION

Tetra Tech QI Inc. (hereinafter referred to as Tetra Tech) was mandated by FCNQ Petro to carry out an atmospheric dispersion study of the current and planned activities of an oil depot located in Aupaluk, a northern Nunavik village of the Kativik regional administration located in the Nord-du-Québec administrative region in Quebec. The Oil Depot is essential for this remote region to meet the need for fossil fuels for its day-to-day operations as this is the only energy source available. Note that Tetra Tech has already collaborated with FCNQ Petro for a modeling project for a similar site in Salluit which was evaluated by experts from the Ministry of the Environment, the Fight against Climate Change, Wildlife and Parks (MELCCFP).

This atmospheric dispersion study (Study) is part of a request for an exemption from the MELCCFP from the *Fédération des Coopératives du Nouveau-Québec - Petroleum Service* (FCNQ Petro) for its installation located at latitude 59°18 '24.49"N and longitude 69°36'7.17"W. FCNQ Petro wishes to increase in the storage capacity of its Aupaluk petroleum product distribution park.

The project aims to expand the oil depot to increase the hydrocarbon storage capacity from 2,196.9 m³ (2,196,900 liters) to approximately 4,360 m³ (4,360,000 liters). The following works are planned:

- Expansion of the current retention basin to contain and construct two new diesel tanks;
- Addition of a 35,214 L diesel/gasoline compartmentalized tank to serve a service station;
- Redevelopment of the maneuvering area; and
- Construction of a new distribution island.

Following these modifications, FCNQ Petro must carry out and submit an atmospheric dispersion modeling study in accordance with the methodology recommended by the MELCCFP. Note that particular attention was paid to the emissions of specific volatile organic compounds (VOCs) associated with the filling operations of all products which cause the highest emission rates for all ingredients. An Expert Opinion from the Department of Atmospheric Quality was sent to FCNQ Petro following submission of the modeling estimate for the project and requested modifications to the rate calculations and the criteria for certain ingredients in gasoline and diesel. All modification requests and the use of criteria have been applied in this Study.

1.1 Scope of Work

Tetra Tech was commissioned to conduct the atmospheric dispersion study under Article 197 of the Environment Quality Act's Clean Air Regulation. The objective of this study consists of verifying compliance with the threshold values mentioned in Appendix K of the *Clean Air Regulation*, and listed in the MELCCFP's reference document titled *Normes et criterès québécois de qualité de l'atmosphère* (Quebec atmospheric quality standards and criteria) even though they are not subjected to regulation.

1.2 Reference Documents

Tetra Tech reviewed the documents listed below:

- Detailed project plans;
- Fuel safety data sheets;
- Gouvernement du Québec. *Clean Air Regulation, Environment Quality Act* (chapter Q-2, r. 4,1). Updated on January 1, 2023;
- MELCCFP. 2023. *Normes et critères québécois de qualité de l'atmosphère* (Quebec atmospheric quality standards and criteria), version 8;
- MDDEP. 2005. *Guide de la modélisation de la dispersion atmosphérique* or GMDA (atmospheric dispersion modeling guide).

1.3 Description of Activities

FCNQ Petro carries out activities that can emit pollutants into the atmosphere during storage throughout the year and occasional fillings on various Aupaluk tanks. The calculations of emissions rates and atmospheric dispersion modeling are specifically tailored to account for activities that unfold within a single year. This includes fugitive emissions resulting from storage activities during one whole year, as well as the transshipment of products between storage tanks and compartmentalized tanks at service stations or into tank trucks, depending on the situation. Additionally, emissions arising from the annual filling of tanks by a ship are included in the modeling calculations. This ship-based tank filling operation occurs from the beginning of July to mid-October. Note that transfer and transshipment activities cannot take place simultaneously since a rest period is necessary following the filling of the storage tanks. These activities are, in the case of filling and transshipment, the most significant in terms of the operational impact, they are of shorter duration and can occur during normal operations and must be analyzed for compounds having standards, criteria or Preliminary Risk Assessment (SEPR) thresholds for periods of up to one year. Thus, the worst scenarios for all periods to be modeled are covered and are calculated at maximum operating conditions.

It should be noted that cleaning of the tanks at the facilities (once every 10 years) is not considered in this study and more information on the standard operating procedures for these activities is available in Section 3 dealing with emission sources.

2 DISPERSION MODEL

This section reviews the different aspects of the Level 2 dispersion model.

The output files for estimating annual emission rates calculated by the TANKS 4.09d model are attached as Appendix D and the calculation sheet of instantaneous emission rates and total annual balances prepared for this study is attached as Appendix E.

Note that all recommendations stipulated in the opinion of the MELCCFP experts following the submission of the modeling estimate were applied.

2.1 AERMOD Model and Options

Compliance of limit values was assessed using the most recent version of the Environmental Protection Agency (EPA) Regulatory Model AERMOD. All default options of the model were selected. The designated modeling approach was based on the use of the AERMET weather diagnostics software (version 22112) and the AERMOD dispersion model (version 22112). Both software packages are recommended by the MELCCFP (Guide de modélisation, MDDEP 2005, Section 8.2.3).

Tetra Tech employs Lakes Environmental™ software interface to carry out modeling and to follow all the hypotheses retained by the MELCCFP modeling guide. The mathematical model integrates the topography of the site, the characteristics of the emitting sources, meteorological data taken from a meteorological tour near the site, as well as the wind wash effects caused by the buildings.

The project site is located in a rural area. In a 3 km radius, less than 50% of the land use is of the dense (more than 750 residents per km^2) industrial, commercial, and residential types. A low-density residential area is located near the site.

2.1.1 Description of the AERMOD Model

The AERMOD model allows second-level studies (MDDEP 2005). This type of study is required when one of the conditions below applies:

- Project located in an industrial area;
- Presence of multiple emission sources;
- Simulated and ambient concentrations (background noise) equal to or higher than 80% of the applicable norm;
- Site located near a water body; or
- Sources emitting toxic or dangerous pollutants.

The AERMOD software is a gaussian dispersion model that calculates gas compounds or particles from discrete sources, surface sources, or high-volume sources in urban or rural areas. The software's features and capabilities are as follows:

- Hourly weather data;
- Identification of the mechanical height or convective mixing based on temperature, wind, and turbulence profiles;
- Distribution of probabilities adapting to atmospheric stability conditions;
- Use of ground surface characteristics, such as ruggedness, albedo and Bowen ratio;
- Points-calculation grid (receptor and sensitive receptor grid); and
- Incorporation of adjustment terms to take physicochemical properties that could affect the behaviour of some components.

AERMOD uses hourly weather data to estimate particle or gas loads in the ambient air at various points-calculation points for various periods of time (hourly, 8 hour, 24 hours and annual basis, and time ranges). The Building Profile Input Program (BPIP PRIME) module is also integrated in AERMOD to take the wash effect (turbulence caused by the presence of buildings) into account. This feature is especially useful when structures will likely modify the wind stream as they are located near the discrete emission sources.

2.1.2 Estimation of Concentrations for a Period Under One Hour

Although the dispersion model's time step is one hour, the standards and criteria for some contaminants have been defined for shorter time periods. When such threshold values are established, Appendix H of the *Clean Air Regulation* requires the use of the formula below to estimate the concentration for the desired period based on the modeled hourly concentration:

$$C(T) = C_{max\ h} * 0.97T^{-0.25}$$

Where:

T = The time period expressed in hours.

$C_{max\ h}$ = Maximum hourly concentration modeled.

This formula was used in this Study to estimate some contaminant loads during the 4-minute and 15-minute periods and to make a comparison with the related standards.

2.2 Modeling Domain and Applicable Limit

The study area extends over a distance of 10 km x 10 km centered on the centroid of the site (Latitude 59.306833°, Longitude -69.601964°). It thus covers a sufficient area to include all inhabited areas which are likely to be exposed to atmospheric emissions emitted by the site's activities.

Figure presents an aerial view of the area under study.

Figure 1: Aerial View of The Study Area (10 km x 10 km)

After an analysis of the City of Aupaluk map presented on **Figure 1**, it appears that the site is located in an industrial zone and that the property limit of the installations is entirely included in the industrial zone. However, please note that the Aupaluk City map does not show the new section dedicated to the future tanks. Thus, the applicable area in the City map has been extended to include these new tanks and equipment and the City map must be modified to represent this modification.

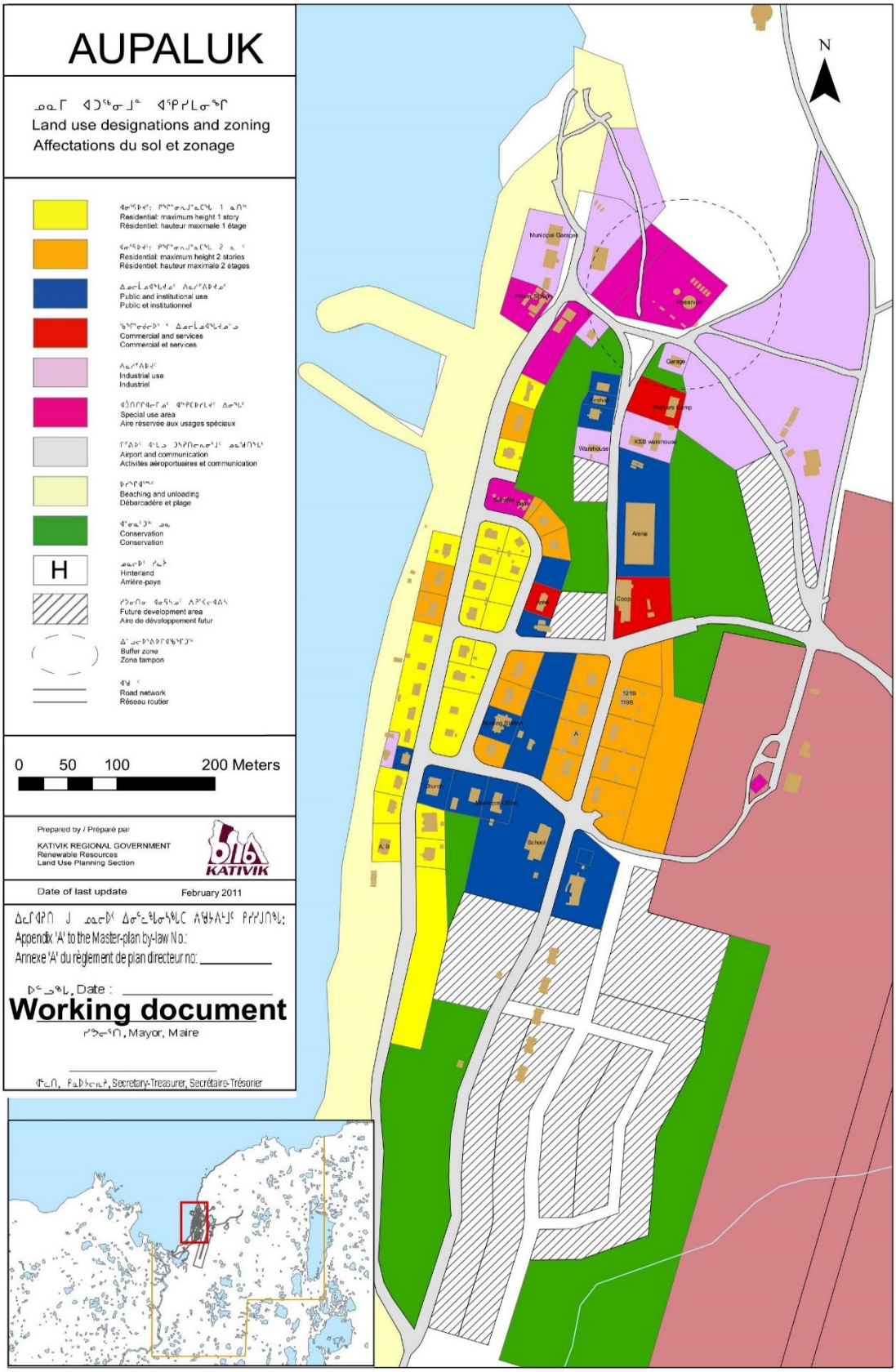


Figure 1: Aupaluk City Map

Article 202 of the Environment Quality Act's *Clean Air Regulation* states:

> « For the purposes of sections 75, 77, 91, 92, 97 and 153 and Title IV, the concentration of contaminants must be calculated for a point off the limits of the property occupied by the source of contamination and off a sector zoned for industrial purposes or in a buffer zone adjacent to such a sector, as established by the competent municipal authorities. If the territory thus zoned includes one or more permanent residences, the contaminant concentration must also be calculated for a point within the property limits of each of those residences ».

Concentrations in ambient air are therefore, evaluated outside the boundaries of the industrial area, as illustrated on Figure 2.

Figure 2: Boundaries of the Industrial Area

2.3 Building Effects

The plume's downwash was calculated due to the proximity of some discrete emission sources to various high structures. The sources are located on these structures. To make the calculation, the Building Profile Input Program (BPIP) feature was used to identify the effects of these structures. The results were incorporated in the AERMOD model which makes the corrections required to estimate the contaminant concentrations in the ambient air using the PRIME module.

To calculate the plume's downwash, the site's projected infrastructures were modeled. The geographic coordinates, the elevation of the structures and the position of the emission sources were identified based on the technical plans provided by FCNQ Petro and Google Earth. **Figure 3** shows the modeled structures, and **Table 1** presents its characteristics.

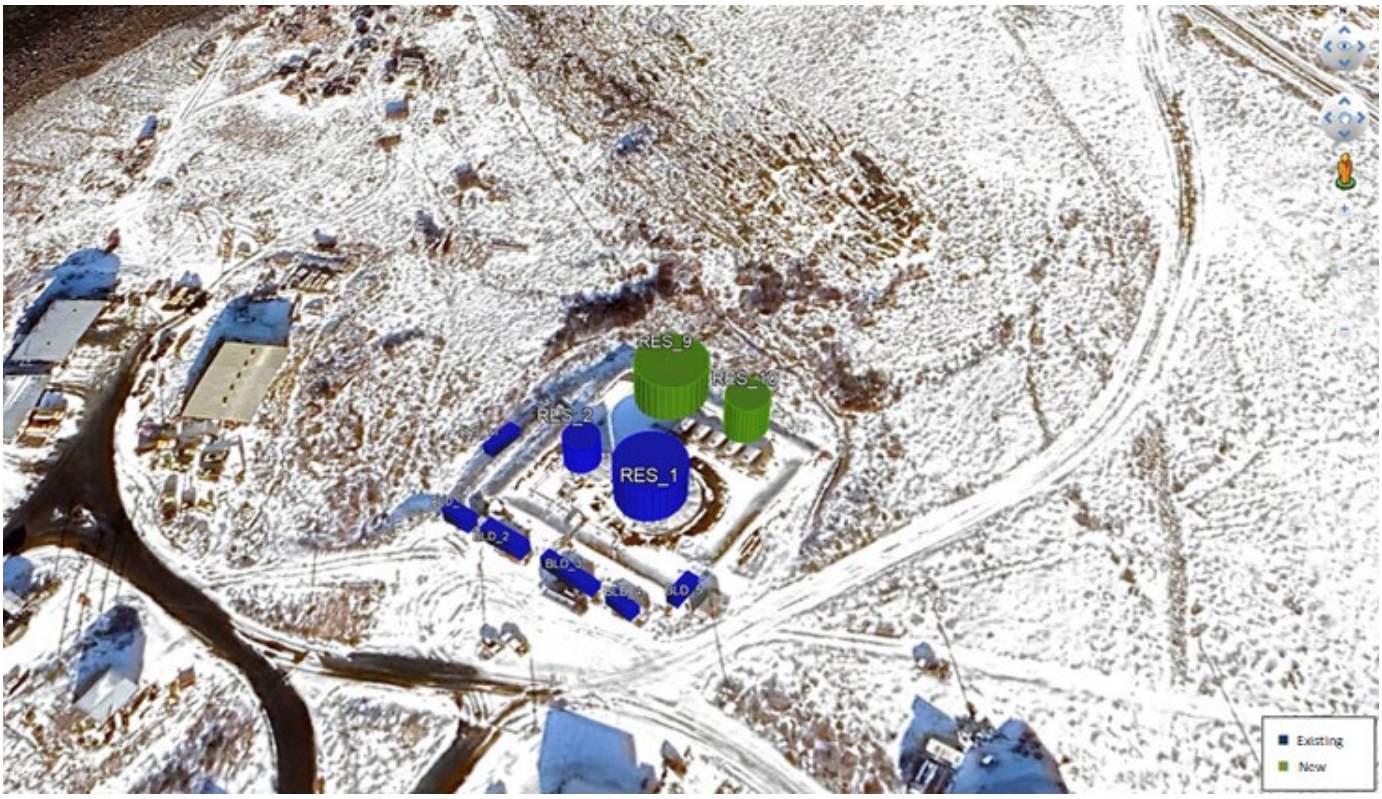


Figure 3: Modeled Buildings

Table 1: List of Buildings

MOD ID	Description	Height	Diameter	Width	Length	Elevation Vs. Sea Level	UTM Coordinates	
		[m]	[m]	[m]	[m]	[m]	East [m]	North [m]
RES_1	Tank #1 - Diesel	9.75	14.63	-	-	25.0	465,725	6,574,361
RES_2	Tank #2 - Gasoline	7.32	7.62	-	-	24.0	465,712	6,574,371
RES_9	Tank #9 - Diesel	9.75	15.50	-	-		465,730	6,574,388
RES_10	Tank #10 - Diesel	9.75	9.00	-	-	26.0	465,742	6,574,377
RES_11	Tank #11 - Diesel	2.80	-	2.6	8.0	20.0	465,692	6,574,376
BLD_1	Operator Station	3.95	-	2.9	6.0	20.8	465,688	6,574,357
BLD_2	Electric Room	3.95	-	2.9	9.5	20.8	465,695	6,574,352
BLD_3	Pumping Station	3.30	-	2.5	12.2	20.8	465,707	6,574,344
BLD_4	Mechanical Warehouse	2.85	-	2.5	6.1	21.6	465,717	6,574,337
BLD_5	Environmental Warehouse	3.35	-	2.5	6.1	22.0	465,730	6,574,336

2.4 Receptors

The calculation points (receptors) have been divided into three categories:

- Receptor grid;
- Receptors within the application boundaries; and
- Discrete sensitive receptors.

The elevations of the receptors were established by taking the topography of the land into consideration (see Section 2.6) using the AERMAP preprocessor.

2.4.1 Receptor Grid

The receptor grid includes a total of 3,352 calculation points. The density of this receptor grid generates enough modeled values to ensure the representativeness of the estimated contaminant loads (spatial distribution) in the ambient air. **Figure 4** shows the receptor grid.

The receptor grid is meshed as follows:

- 50 meters spacing for distance from the site under 1,000 m;
- 100 meters spacing for distance from the site under 2,000 m; and
- 500 meters spacing for distance from the site under 5,000 m.

2.4.2 Receptors at the Application's Boundary

The zoning plan specifying the demarcated areas has been reviewed. The FCNQ Petro site is part of one of the industrial zones in the area.

As specified in Section 202 of the *Règlement sur l'assainissement de l'atmosphère* (RAA), the concentration of contaminants must be calculated based on a point that is located outside the boundaries of the property occupied by the source of contamination as well as outside any sector zoned for industrial purposes and any buffer zone adjacent to such a sector, as established by the municipal authorities. The comparison with the standards is therefore, made according to the maximum concentration modeled from the industrial zone, as well as the receptor grid, which was built outside, as well as at the limit of the latter.

In order to meet the MELCCFP's requirements, a sequence of point receptors, spaced 20 m apart, was placed along the defined application limit. A total of 146 receivers were thus added, including the receivers used to trace the industrial zone. The receptors on the application boundary are shown on **Figure 4**.

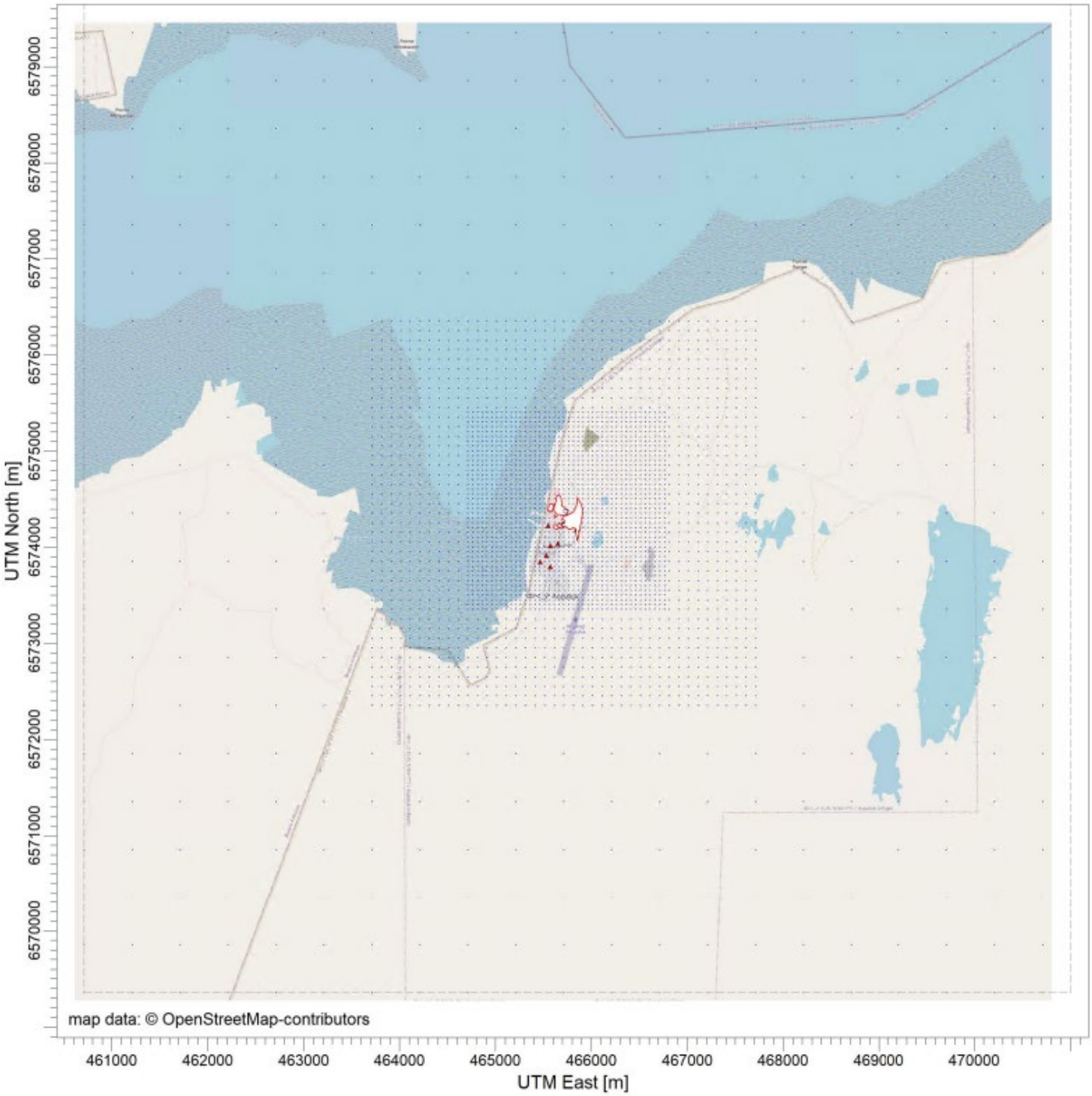


Figure 4: Receptor Grid

2.4.3 Discrete Sensitive Receptors

A total of six sensitive point receptors, identified by the symbol Δ, have been added in a targeted manner to cover more critical receptors (hospitals, early childhood centers, schools, residences for the elderly, local community service centers, daycares, private residences, etc.). **Figure 5** shows the location of the different sensitive point receptors selected. Table **2** presents the location as well as the description of the sensitive receptors identified within the study area.

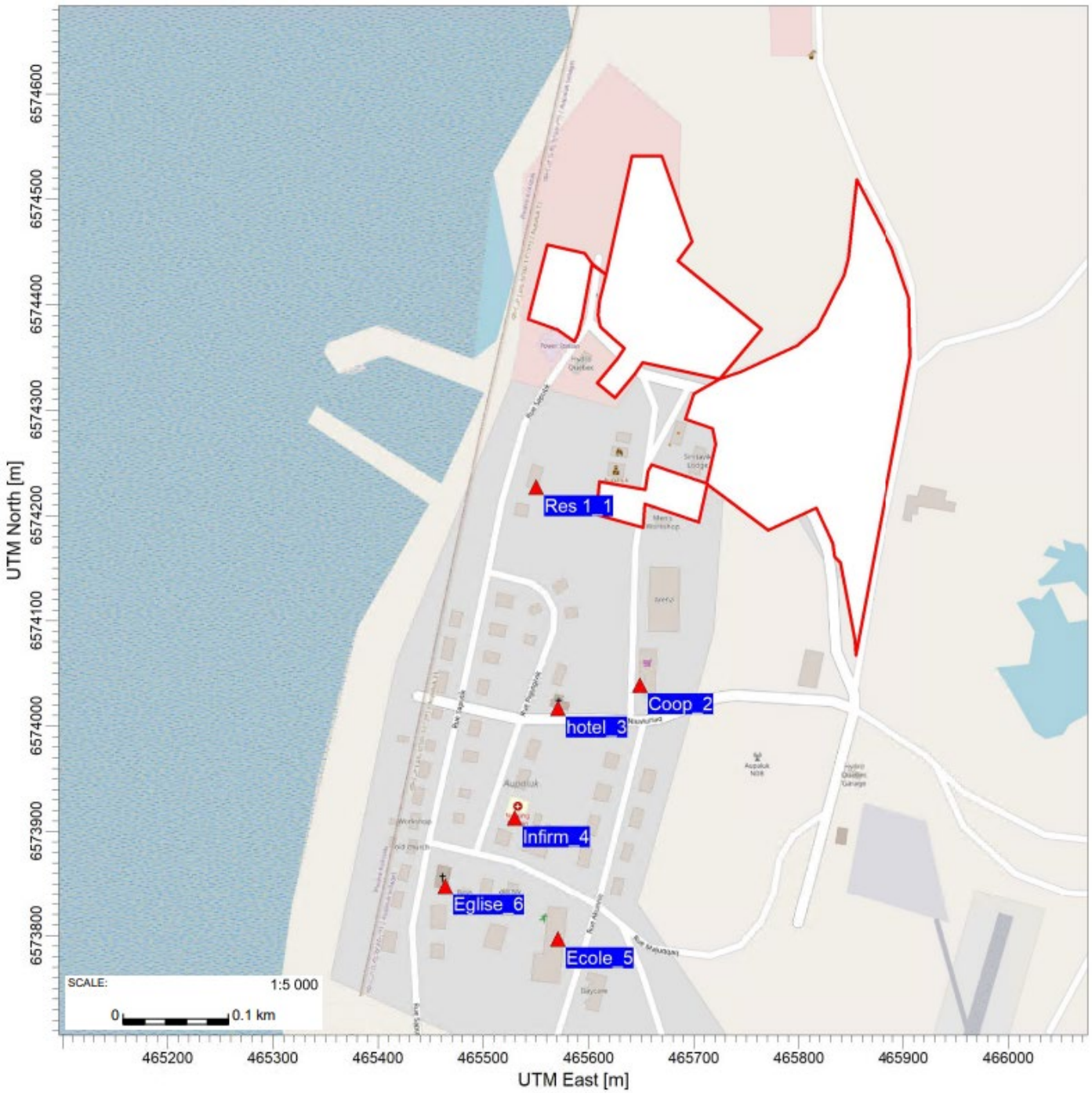


Figure 5: Location of Sensitive Receptors

Table 2: Discrete Sensitive Receptors

MOD ID	Description	UTM Coordinates 19N		Elevation Vs. Sea Level
		East (m)	North (m)	(m)
Res 1	Residence	465,550	6,574,227	15.58
Coop	Coop	465,649	6,574,039	28.48
Hotel	Hotel	465,571	6,574,017	18.93
Infirm	Nursing station	465,530	6,573,913	14.62
Ecole	School	465,571	6,573,797	19.09
Eglise	Church	465,464	6,573,848	7.07

2.4.4 Application Domain Receptors

The receptors of the application domain include those in the grid (Section 2.4.1), those outside of the application boundaries, those located on said boundaries (Section 2.4.2), and the sensitive receptors (Section 2.4.3). The other receptors, (i.e., those of the grid inside the application boundaries), were not taken into consideration to assess the compliance of the modeled contaminant loads in terms of quality standards and criteria. In total, 3,504 receptors are considered in the modeling domain.

2.5 Meteorological Data

The meteorological data used for modeling with the AERMOD program (version 22112) were prepared using the AERMET module (version 22112) from the U.S. EPA. Lakes Environmental has put the meteorological data in a pre-processed format ready to be integrated into the AERMOD model (*.pfl and *.sfc files). The AERMET module allows you to create an hourly weather file format compatible with the execution of the AERMOD program by combining weather data with land use characterization.

The closest representative weather station to the study site is Aupaluk Airport (YPJ), located approximately 1 km from the site. However, a review of Environment and Climate Change Canada data available at Aupaluk airport shows that there would be too much missing data to produce a dataset of sufficient quality for modeling. The other available stations are not representative with regard to local effects influencing atmospheric dispersion, because they are located too far away and therefore, present a different geographical portrait than that of the study site. Meteorological data from Weather Research and Forecast (WRF) were therefore, used.

2.5.1 Surface and Upper Air Data

The WRF model was used to provide a meteorological data sample equivalent to the observations. The WRF model uses re-analysis results to create a descending spatial-dynamic scale to mimic weather conditions on a small scale, i.e., 4 km (for this study), taking into account the topography of the land and surface characteristics at a high horizontal resolution. The WRF model outputs weather fields, such as temperature, wind, and relative humidity, for surface and various vertical levels.

2.5.2 Surface Meteorological Data

The surface meteorological parameters used in this study are as follows:

- Wind speed and direction;
- Temperature;
- Dew point;
- Relative humidity; and
- Surface pressure.

These parameters were extracted from WRF prognostic data at grid points 465,721 m W, 6,574,392 m N UTM 19 (59.307 N 69.602 W) for the period 2018 to 2022 inclusive. The hourly meteorological data was provided by Lakes Environmental in a format compatible with the AERMET module.

2.5.3 Net Radiation Data and Cloud Cover

The turbulence parameters of the planetary boundary layer were calculated by the AERMET module from the net radiation under convective planetary boundary layer conditions (generally in daytime) and the cloud cover under stable planetary boundary layer conditions (generally at night) (US EPA 2004).

In the context of this study, the hourly net radiation and cloud cover data came from WRF. Lakes Environmental extracted the data at the grid point nearest to the site.

2.5.4 Upper Air Data

Lakes Environmental extracted the WRF model's air data output at the same grid point as the surface data and reformatted it using the US EPA's **Mesoscale Model Interface** (MMIF) tool, v3.3, creating a radiosonde FSL file compatible with the AERMET module. The altitude meteorological variables considered for modeling were the elevation from the ground, atmospheric pressure, and temperature.

2.5.5 Terrain Classification and Land Use

The AERMET module uses three input parameters linked with soil characteristics: roughness, the Bowen ratio, and the albedo. The latter is the proportion of the incident light or radiation that is reflected by the ground, whereas the Bowen ratio measures the humidity available for evaporation. Roughness relates to the variation of surface elevation and the unevenness of the landform on a small scale.

The AERMOD implementation guide (US EPA August 2015) recommends:

- The assessment of the roughness is based on a geometric mean weighed by the inverse of the distance for a zone with a 1 km radius around the measuring site. This zone is delineated in several sectors, the width of which is never under 30 degrees. Roughness therefore varies from one sector to the other to take the variations of the land cover into consideration.
- The Bowen ratio and albedo are assessed in a square with 10-kilometer sides, centered on the meteorological data measuring site. An arithmetic mean is used for the albedo, whereas an unweighted geometric mean (separate from direction or distance) is used for the Bowen ratio.

For each season and type of cover, roughness, albedo, and Bowen ratio values come from the AERSURFACE guide (US EPA January 2013).

Surface characteristics are therefore, around the meteorological data's point of extraction. **Table 3** lists the values estimated by Lakes Environmental for the various parameters.

Table 3: Land Use Parameters Around the Surface Data Grid Point

Month	Albedo	Bowen Ratio	Roughness
1	0.8	6.54	0.01
2	0.8	5.39	0.01
3	0.8	3.67	0.01
4	0.77	2.29	0.037
5	0.5	2.19	0.06
6	0.17	5.71	0.06
7	0.13	4.93	0.06
8	0.13	4.63	0.06
9	0.14	3.11	0.06
10	0.27	2.13	0.032
11	0.74	3.61	0.01
12	0.8	5.67	0.01

2.5.6 AERMET Configuration

All the default parameters of the AERMET model were used. The ADJ_U* option of the AERMET model was activated and it was integrated for this study. This option adjusts the surface friction speed (u*) for light wind under stable conditions.

2.5.7 Meteorological Sample

In accordance with the requirements of the MELCCFP in the context of Level 2 atmospheric dispersion modeling (MDDEP 2005), a weather sample covering the most recent five years representative of the region was considered. In that context, the meteorological years 2018 to 2022 were selected and deemed recent enough.

shows the wind rose of the selected weather sample. Dominant winds blow mainly from the southwest. The average wind speed is 4.47 m/s (16 km/h), and the average percentage of light wind (<0.5 m/s) is 0.65%. **Figure 7** presents the direction of the wind in relation to the village. **Figure 8** presents the wind roses for the four months during which the ship can unload the products to the storage tanks, and this for the five years of modeling.

Finally, it is important to mention that topography is not taken into consideration by the AERMET meteorological model and that the meteorological parameters are considered identical at all points inside the modeling domain.

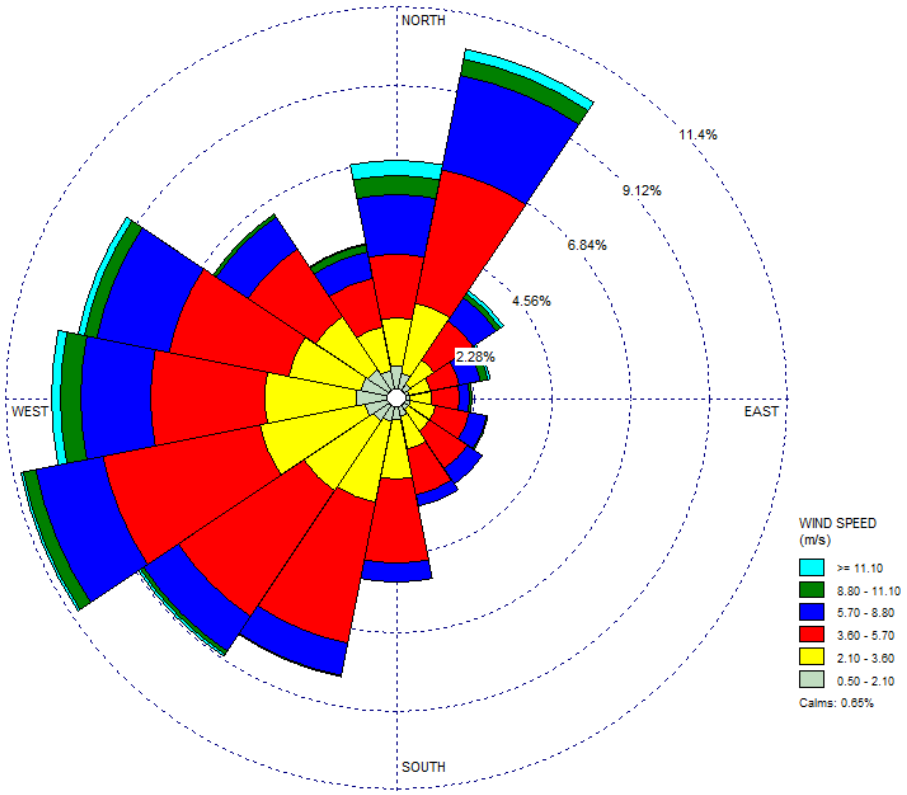


Figure 6: Wind Rose Over Five Years

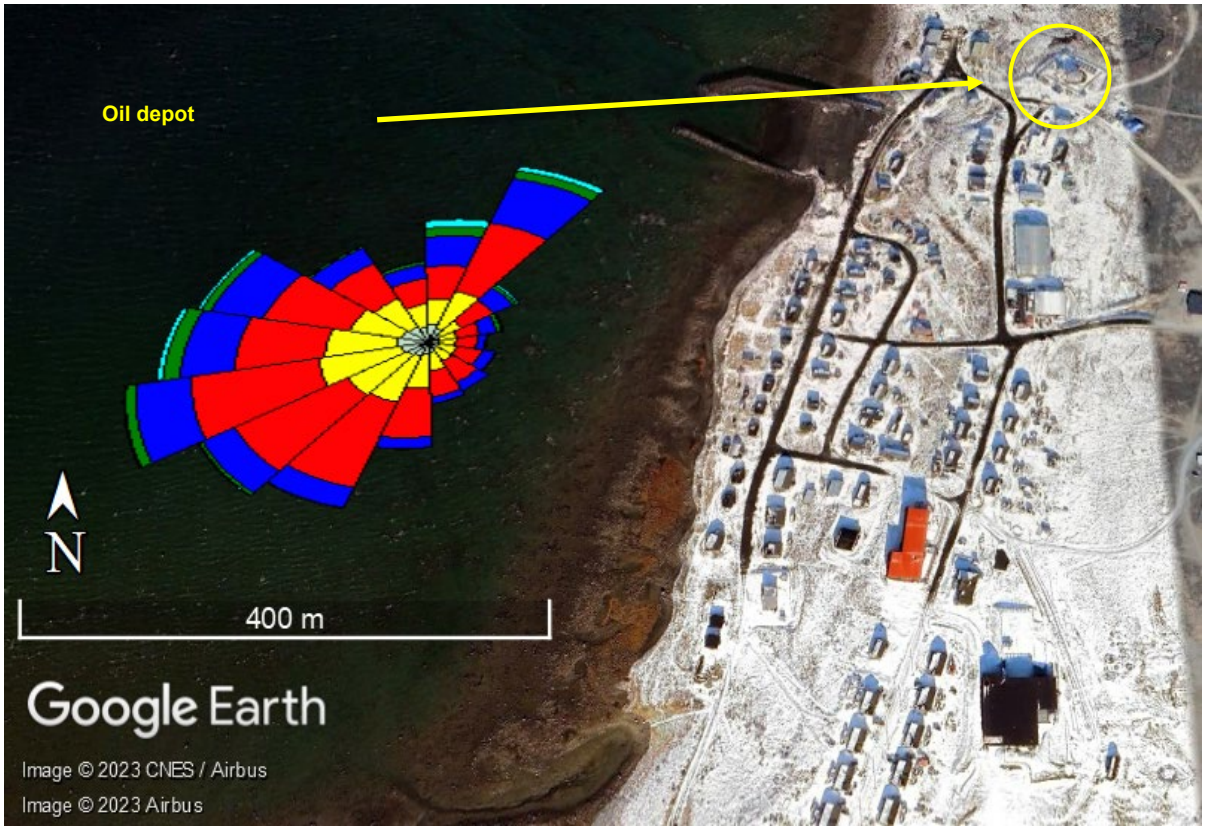


Figure 7: Wind Direction Relative to the Village

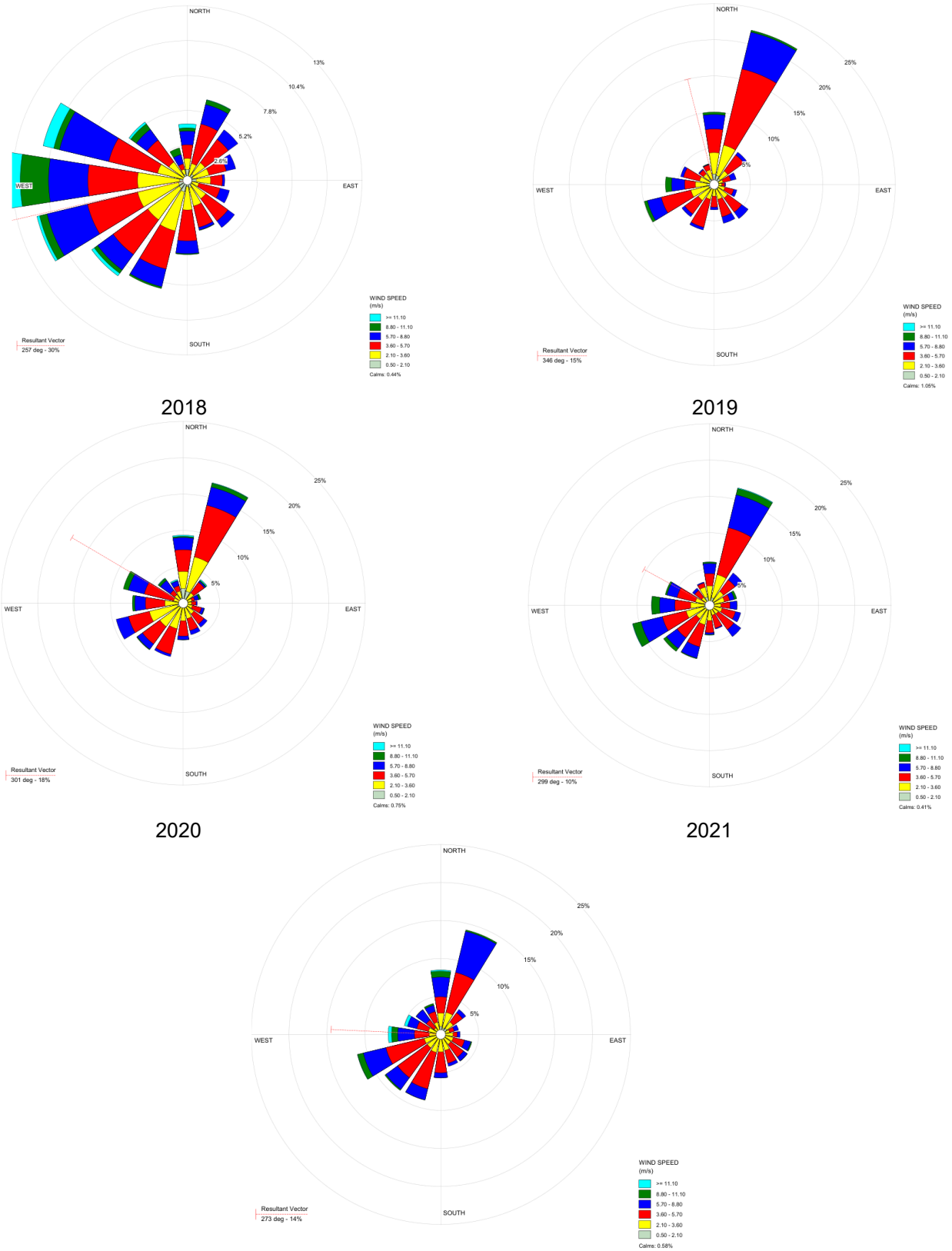


Figure 8: Wind Rose for the Five Years of Modeling from July to October

2.6 Topography

The study area extends over a distance of 10 km by 10 km centered on the site. It thus covers a sufficient area to include all inhabited areas which are likely to be exposed to atmospheric emissions emitted by the operations of the project installations.

The topography of the terrain can affect atmospheric dispersion. Although the terrain is relatively flat, the unevenness of the terrain in the study area is more than 10 m and must therefore, be incorporated into the model. Topographic data constitutes the input for the AERMAP preprocessor which is integrated into the AERMOD View interface. The terrain elevation of each receptor in the study area is automatically determined by AERMAP. The average land elevation, estimated by AERMAP for buildings and emission sources, is approximately 24.0 meters.

The Digital Elevation Model of Canada (DEM) is derived from the Digital Elevation Data of Canada (DECD) made available by Natural Resources Canada at a scale of 1:50,000 for a resolution of 15 arc minutes (~23 meters). The height reference system is the Canadian Height Reference System of 1928 (CGVD28). This data was converted to a UTM WGS84 (18N) projection and imported into the AERMOD View interface for use in AERMAP. The topography of the study region is presented on **Figure 9**.

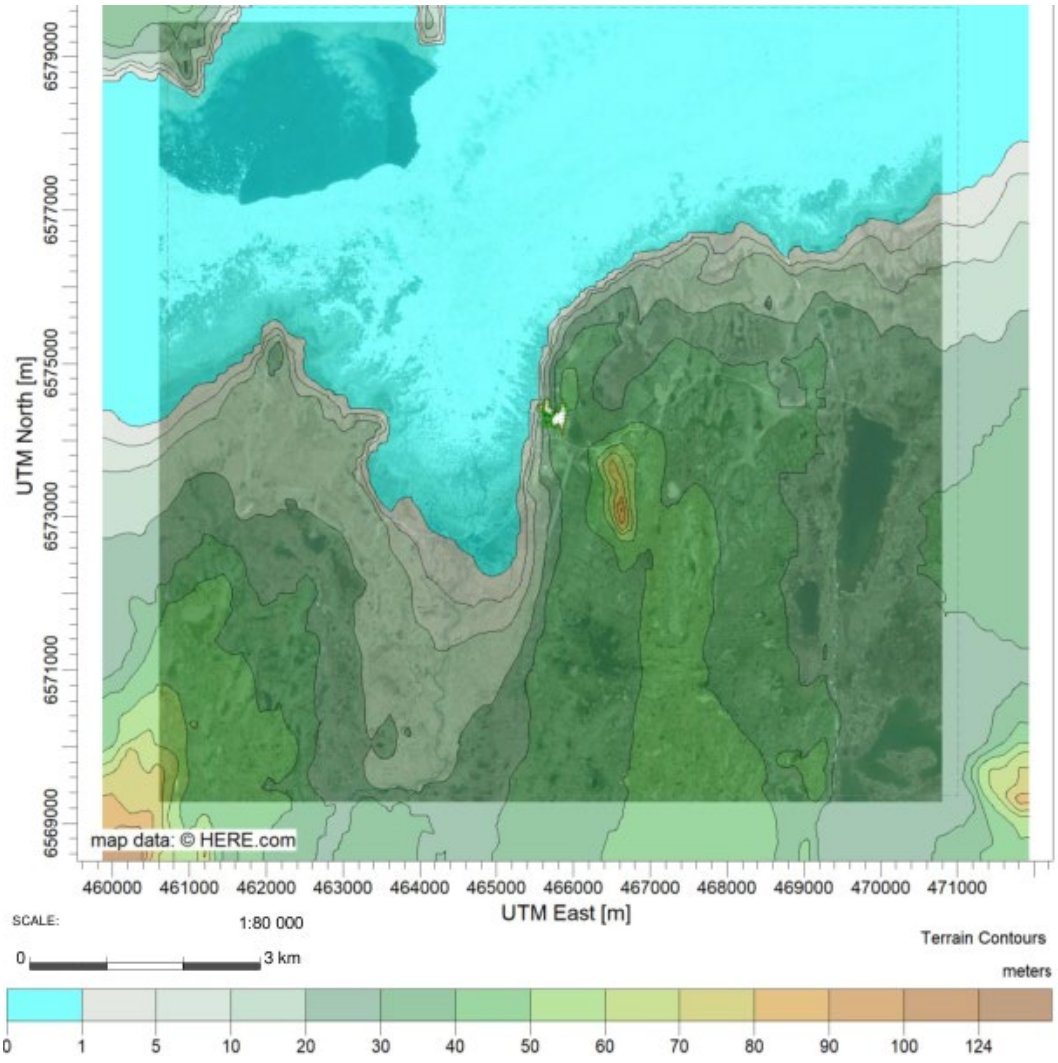


Figure 9: Topography of the Study Area

3 EMISSION SOURCES

3.1 Activities Releasing Contaminants in the Atmosphere

Plans of current and future facilities including a plan view (Plan: 211-001856-00-M002A-2-C), a profile view (Plan: 6940-C-004), and technical drawings of a tank truck are attached as Appendix A.

Atmospheric emissions of contaminants are likely to occur at several points on the site from the vents of the storage tanks, the compartmentalized tank of the service station and a tank truck. After analysis of the plan and the activities carried out on the site, it was considered that atmospheric emissions could occur for all tanks during these operations:

- Loading of tanks by the tank (displacement of air saturated with VOCs);
- Transfer of products to the compartmentalized tank of the service station (displacement of air saturated with VOCs);
- Loading a tank truck with diesel only (displacement of VOC-saturated air); and
- Storage of products in storage tanks and the compartmentalized tank for a full year (fugitive emissions).

Details on the operating parameters of these activities are available in Section 4 of the emission rate calculations. The other activities excluded from the study are presented below.

3.1.1 Periodic Tank Cleaning

Periodic tank cleaning is a common task taking place on a regular basis which release amounts of contaminants smaller than during tank filling, carried out via a pumping station transferring the products at higher rates. FCNQ Petro implemented a procedure for the cleaning of the petroleum tanks. It is described below.

As the tanks are integrated to the repository's maintenance program, they are cleaned periodically. The volume of sludge removed from the tanks is therefore small. The sludge consists of the petroleum product remaining at the bottom of the tank and eventually metallic residues.

Each tank is cleaned in the repository's enclosure, after the stored product is transferred to another tank. The removed sludge is placed in "Wrangler WW3"-type bins for that very purpose or in metal barrels with removable covers provided by FCNQ Petro. These barrels which comply with the regulation on the transportation of hazardous waste are then sent by ship to Montreal where they will be disposed of at an authorized site.

Before cleaning takes place, the product's material safety data sheets are reviewed to comply with the Workplace Hazardous Materials Information System (WHMIS). All the required fire protection material must be anticipated and installed to ensure quick use. Before work begins, the tank and all the equipment required are grounded and the pipeline connected to the tank is disconnected and isolated.

Each tank is inspected before any refill.

During cleaning, the contractor must ensure constant supervision by a foreman or qualified technician and qualified rescue workers must be in attendance. The contractor also provides qualified labour to execute the work and must make sure that they know and understand the safety procedures, the working methods, the risks inherent to tank cleaning in confined spaces, and the rescue techniques.

The contractor provides all the personal protective equipment to ensure the health and safety of all the workers. In addition, they must make sure that the testing material is calibrated correctly, including gas detectors. The latter must monitor vapours continuously and be equipped with an alarm audible inside the tank.

The flammable sources are controlled and restricted to a minimum. Adequate ventilation is implemented and access to the tanks is permitted only when all safety conditions are met.

All these measures are reassessed at the beginning of every workday and after each work interruption.

Although vapour emissions during maintenance work or modifications are deemed minor in the life of such facilities, the actions listed below are taken, nevertheless.

Planning takes place several months in advance to minimize the volumes to be transferred. This planning may relate to various elements of inventory management, (e.g., product procurement) the year before cleaning may be reduced to minimize the volume of product during the year when cleaning is to take place or procurement may take place twice during the shipping season.

During the year when cleaning is scheduled, the filling of client tanks will take place just before the transfers.

Cloudy and cold days are favored for transfers. Such operations are avoided during hot days and when the sun is at its highest.

At the end of the transfer, the tank is left to settle before degassing and ventilation begins to favor the condensation of vapours.

3.2 Modeled Contaminants

Table 4 summarizes the contaminants listed in the material safety data sheets of the three products stored at the site, namely gasoline and diesel, targeted for modeling. All components of the product were modeled, except for butane which is specifically excluded from the MELCCFP's list of standards and criteria.

Table 4: Modeled Contaminants

Product	CAS Number	Norm or Criteria	Mass Fraction Maximum According to DS	
			Gasoline	Diesel
Gasoline (Gasoline (>C3))	86290-81-5	Criteria [1]	100%	
Toluene	108-88-3	Norm	25%	1%
Xylene	1330-20-7	Norm	20%	1%
Butane	106-97-8	Excluded	20%	
Octane	111-65-9	Criteria	18%	2%
2-methylbutane	78-78-4	Criteria	15%	
Ethanol	64-17-5	Norm	10%	
Heptane	142-82-5	Criteria	5%	
n-Hexane	110-54-3	Norm	5%	
1,2,4-trimethylbenzene	95-63-6	Criteria	5%	
Ethylbenzene	100-41-4	Norm	4%	1%
Cyclohexane	110-82-7	Criteria	3%	
Benzene	71-43-2	Norm	1.50%	
Diesel fuels	68334-30-5	Criteria [1]		100%
Diesel fuel C9-C18 branched and linear alkanes	1159170-26-6	Criteria [1]		30%
Nonane	111-84-2	Criteria		3%
Total			**231.50%**	**138.00%**

Note 1: According to the expert opinion of the Atmospheric Quality Department received following the modeling estimate.

The sum of the mass fractions exceeds 100% since the material safety data sheets indicate the maximum possible concentration in the product.

3.3 Limit Values and Initial Concentrations

The guide to Quebec standards and criteria for atmospheric quality specifies that the standards and criteria were designed for the evaluation of air quality measurements and for the study of projects generating emissions of atmospheric contaminants which are submitted for authorization to the MELCCFP.

The compounds emitted into the atmosphere by the installations under study are mentioned in the atmospheric quality standards and criteria (Version 8 2023). They represent the limit concentrations according to the periods 4 minutes, 15 minutes, 1 hour, 8 hours, 24 hours and 1 year in ambient air for a contaminant established at a negligible or acceptable risk level. These concentrations are based on concentrations without harmful effects on health. The four main types are: effects by direct exposure, by indirect exposure, nuisances, and ecotoxicological effects.

The concentrations from modeling with AERMOD must be added to the initial concentrations, which is to say the ambient levels of each contaminant already present in the modeled region. These concentrations are then compared

to the limit values for the different periods. These average values must be respected outside the limits set by the regulation.

The MELCCFP has established initial “background noise” concentrations so that they are very conservative (equivalent to high-density industrial or urban environments). For example, 20 µg/m^3 is used for total fine particles ($PM_{2.5}$). However, for some less dense areas, it may be appropriate to use a more representative background noise.

The limit values and initial concentrations of contaminants modeled according to the periods concerned are presented in the table in Appendix B. These values are taken from the latest available version of the MELCCFP Quebec Atmosphere Quality Standards and Criteria (2023) document.

All substances which have the same mode of action and whose concentrations must be added are considered according to the indications in Table 2 of the standards and criteria[1].

3.4 Regional Sources

Based on the information available in the *National Pollutant Release Inventory* (NPRI), none of the sources releasing contaminants cited in this study is located within a 5 km radius of the oil depot.

3.5 Discharge Point Characteristics

Nine potential emission sources have been identified and are located on the site's storage tanks, on a compartmentalized tank supplying a service station and a diesel loading dock for tank trucks. All atmospheric emissions of VOC vapors are directed towards these different sources during loading operations and for annual fugitive losses. As a result, the emission rates and volume flow rates (point sources) applicable for the different tanks are divided by the number of sources present on the latter varying between 1 and 2 vents. The physical characteristics of the different discharge points are presented in **Table 5** and

Table 6. Their location is illustrated on **Figure** 11.

It is important to specify that ten emission sources had initially been presented to the MELCCFP in the modeling estimate, however following the operator's desire to reduce the impacts of the transfer of gasoline from the storage tank # 2 (R_2) towards transhipment tank #11 (R_11) and to not modify the current situation of gasoline activities, the vent of tank #11 (R_11_EV_ESS) will be connected to tank #2 which supplies it with essence. In this way, the vapors caused by the gradual filling of tank #11 by tank #2 will be redirected towards the latter and the vapors will take the place of the volume of liquid displaced, thus creating a closed loop. Only the emissions from breathing losses from tank #11 evaluated with the US EPA model are added to those from tank #2, but these remain negligible as we can see in the following section dealing with emission rates.

The gooseneck sources shown on **Figure** 10 which are located on certain tanks must be modeled as volumetric. To do this, the parameters for each of these sources were determined as follows:

- The height of the volume source corresponds to the height of the building (tank), to which we add half the distance separating the outlet of the swan neck from the roof;
- The lateral dimension corresponds to the dimension of the swan neck (side of a square with the same surface area as that of the swan neck); and
- The σ_y is calculated as the lateral dimension divided by a factor of 4.3 while the σ_z is calculated as the height of the building divided by a factor of 2.15.

[1] https://www.environnement.gouv.qc.ca/air/criteres/index.htm

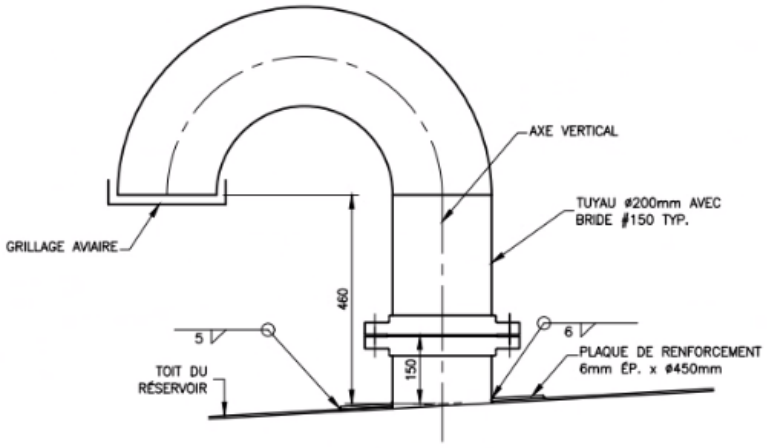


Figure 10: Gooseneck-type Vent

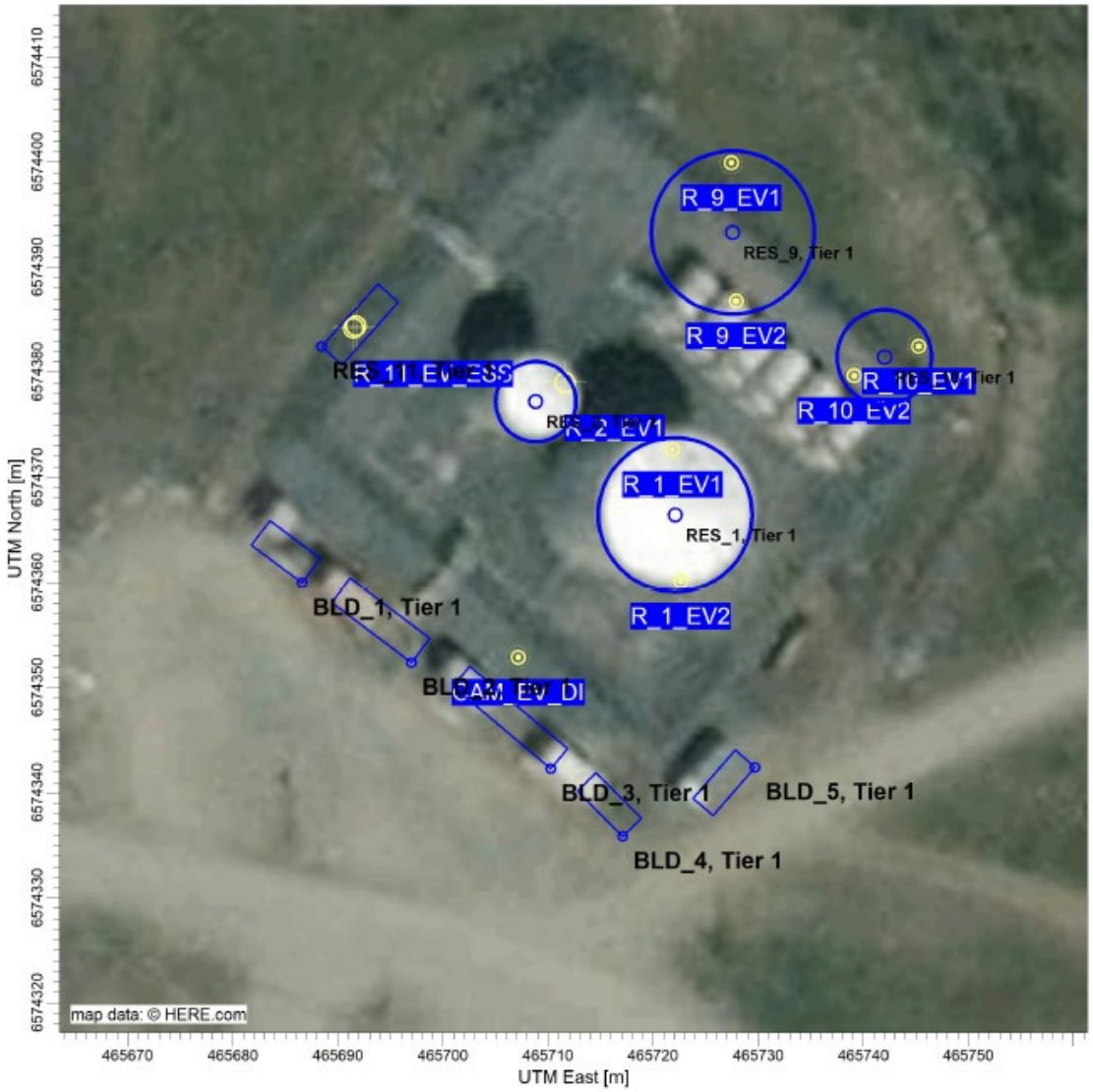


Figure 11: Discharge Point Locations

Table 5: Vertical Type Point Source

Modeling ID	Corresponding Tank	Description	Central Coordinates (UTM)		Elevation Vs. Sea Level	Height Vs. Ground	Diameter	Output Temperature	Current Rate per Releasing Vent	Output Speed	Source Type *
			East [m]	North [m]	[m]	[m]	[m]	[K]	m^3/s	[m/s]	
R_2_EV	Tank #2 - Gasoline	Pressure vent (pressure-vacuum) ±0.03 psi	465,712	6,574,379	24.0	7.62	0.20	Ambient	0.021	0.66	Vertical
R_11_EV_ESS	Tank #11 - Gasoline	Vent connected to tank #2 closed loop	N/A								
R_11_EV_DI	Tank #11 - Diesel	Straight vents	465,692	6,574,384	20.0	3.50	0.05	Ambient	0.006	3.23	Vertical

Note: * Vertical, Horizontal, or Capped

Table 6: Volume Source

Modeling ID	Corresponding Tank	Description	Central Coordinates (UTM)		Elevation Vs. Sea Level	Height Vs. Ground [1]	Lateral Dimension [2]	σ_y [3]	σ_z [4]
			East [m]	North [m]	[m]	[m]	[m]	[m]	[m]
R_1_EV1	Tank #1 - Diesel	Gooseneck vents tanks 1, 9 and 10	465,722	6,574,373	25.0	10.05	0.09	0.021	4.53
R_1_EV2			465,723	6,574,360			0.18	0.041	4.53
R_9_EV1	Tank #9 - Diesel		465,727	6,574,400	24.0		0.18	0.041	4.53
R_9_EV2			465,728	6,574,387			0.18	0.041	4.53
R_10_EV1	Tank #10 - Diesel		465,745	6,574,382	26.0		0.18	0.041	4.53
R_10_EV2			465,739	6,574,378			0.18	0.041	4.53
CAM_EV_DI	Tank truck - Filling	2-inch gooseneck vent	465,707	6,574,353	24.0	2.46	0.04	0.010	1.36

Notes:

1: The height of the volume source corresponds to the height of the building (tank or truck), to which we add half the distance separating the outlet of the swan neck from the roof.

2: The lateral dimension corresponds to the dimension of the swan neck (side of a square with the same surface area as that of the swan neck).

3: The σ_y is calculated as the lateral dimension divided by a factor of 4.3 while the σ_z is calculated as the height of the building divided by a factor of 2.15.

4: The σ_z is calculated as the height of the building divided by a factor of 2.15.

4 EMISSION FACTORS AND EMISSION RATES

4.1 Product Composition

The petroleum products transferred and stored in the tanks contain several substances subjected to limit thresholds established by the MELCCFP. Product composition was identified based on information from material safety data sheets (included in Appendix C).

In several cases, the material safety data sheet indicates a range of concentrations for each substance (e.g., between 0% and 25% for toluene content in gasoline). The maximum concentration of each substance in the product was retained for this study. The total maximum concentrations exceed 100%. The mass fraction of each substance was adjusted in the model to obtain a total of 100 %.

4.2 Atmospheric Emissions of Contaminants

The storage tanks release VOCs into the atmosphere in two ways:

- Through tank breathing, i.e., vapours released by vents at varying rates depending on environmental conditions (temperature, sunlight, atmospheric pressure, etc.);
- During tank filling, the vapour space (volume inside the tank saturated with product vapour) is pushed out and released into the atmosphere at the same rate that the liquid product fills the tank.

Diesel tank truck loading operations are responsible for atmospheric emissions of VOCs, according to this phenomenon:

- When filling a tank truck, it is estimated that the vapor space (internal volume of the tank, saturated with product vapors) is expelled towards the atmosphere, at the same rate as that of transfer of the liquid product. Note that annual fugitive emissions are not considered for this source which moves following its filling.

Annual VOC emissions via tank breathing were estimated using a model commonly used in industry, namely the TANKS model, version 4.09d [2] (U.S. EPA 2005).

Instantaneous emissions occurring during tank filling were calculated using a spreadsheet created by Tetra Tech.

4.2.1 Annual Emissions from Tank Breathing

The TANKS 4.09d model was used to identify the annual fugitive emissions (pounds/year), i.e., from tank breathing, for each substance in the stored products.

The maximum and minimum daily temperatures, the average wind speeds, the insolation factors (detailed monthly), the atmospheric pressure, and the average annual temperature were identified for the project site. Lakes Environmental (WRF model, 2018-2022) provided the meteorological data.

Tank characteristics were provided by the client (**Table 5** and **Table 6**). The composition of the products were entered into the model as described in Section 4.1. In addition, the maximum annual filling volumes for all the products were entered and considered for each tank based on the rates calculated in Section 4.2.2.

The input parameters in the TANKS model, as well as the simulation results (annual emissions per tank and per contaminant in pounds/year) are documented in Appendix D.

The annual emission rates for each tank in pounds/year were then converted into g/s for use in AERMOD.

[2] https://www3.epa.gov/ttnchie1/software/tanks/

4.2.2 Instantaneous Emissions During Tank Filling or Tank Truck Filling

When a product is stored in a tank, a balance is established between the product's liquid state and its vapour state. This is a dynamic balance that depends on temperature and the composition of the project (nature and concentration of the substances).

When a tank is almost empty, all the space inside is filled with air saturated with VOC vapours. The scenario created to simulate instantaneous contaminant emissions during filling consists of the emissions in the atmosphere from a volume of air saturated with VOCs that is equal to the volume of product transferred to the tank. The emission rate (m³/hour) is identical to the transfer rate.

Based on the characteristics of each substance (concentration in the product, vapour pressure, molar mass), Raoult's law was applied to calculate a partial vapour pressure in the tank's vapour space. The density and composition of the VOC vapours released in the atmosphere could then be calculated. Based on the known volume and transfer rate during tank filling, an emission rate in g/s was identified for each substance in the products.

It is to be noted that a temperature of 10°C was used to calculate the emissions from tank filling. This is the maximum temperature possible for products transferred from ship to tank. This temperature is higher than the ambient temperature at the project site.

Calculation example for **toluene content in gasoline**:

- Volume to be transferred = 265,0 m³;
- Transfer rate = 75 m³/h;
- Duration of transfer = 3.5 h;
- Ideal gas constant: R = 8.314 J/mol. K;
- Mass fraction = 25.0 %;
- Molar fraction = 21.9 %;
- Vapour pressure at 10°C = 0.25 psi;
- Partial pressure = 21.9 % x 0.25 psi = 0.055 psi = 0.377 kPa;
- Emission during filling = 0.377 kPa x 265 m³ x 1,000 l/m³/8.314 J/mol. K/283.15 °K x 92.14 g/mol = 3,910 g; and
- Emission rate = 3,910 g/3.5 h/3,600 s/h = **0.308 g/s**.

Product storage during an entire year and tank filling once a year, from the beginning of July to the end of October, were considered for the calculation of the emission rates and modeling. Operation hours are from Monday to Sunday, 24 hours. The model was configured to consider tank filling hours. Storage was excluded from the modeling of contaminants in the atmosphere because emissions released as a result of this activity are very small compared to that of tank filling. Emissions from tank breathing throughout the year are small, with a ratio of 1/100 versus filling rates. The maximum and overestimated results were compared with the standards, criteria or thresholds with a ratio of 1/100, and exceedance is not expected.

As part of this study, two filling scenarios with projected tanks and an optional scenario with a floating roof on the fuel tank are considered. **Table 7** presents the different modeled scenarios and tanks parameters. The scenarios are carried out one at a time since the filling of the tanks is also done one at a time. The gasoline scenario presents only one possible tank.

As for the diesel scenario, there can be three tanks on site, however, **only tank #9** was considered as it represents the worst case for the diesel filling scenario due to its proximity to the property line and the fact that it is the tank that will receive the most diesel when filling. According to these scenarios, all the worst cases for all products are considered, continuously for the period of the year when filling operations can take place.

Finally, a final scenario with a floating roof on the gas tank only will be evaluated. The addition of a floating roof on this tank reduces the emission rates of this source by 93.41% according to a study by the operator.

Table 7: Different Atmospheric Modeling Scenarios

Scenario	Tank	Modeling ID
Filling the fuel tank with and without floating roof	Tank #2	R_2_EV
Filling the diesel tank	Tank #9	R_9_EV1 &
		R_9_EV2
Filling the storage tanks gas station tank	Tank #11	R_11_EV_DI
Filling a tank truck with diesel	Tank truck	CAM_EV_DI

Tables 8, 9, and 10 present the parameters used to calculate the emission rates. Filling takes place at a constant temperature of 283.15 K (Maximum temperature observed according to climatic normals). Filling times for gasoline and diesel are 3.5 and 20.0 hours, respectively. The filling time is calculated based on the tank volume and the transfer rate (constant which depends on the scenario). These parameters are the maximums that can be had during a year.

Remember that the gray cells in **Table 10** are no longer to be considered in the dispersion, because the emission source for gasoline from tank #11 no longer releases into the atmosphere. The information is for reference.

Table 8: General Settings for Calculations of Emission Rates When Filling

Parameter	Unit	Value	Note
Ideal gas constant R	J/mol. K	8.314	Max Tank
Temperature	°C	10	
	°F	50	
	°K	283.15	

Table 9: Tank Parameters for Filling Emission Rate Calculations

Parameter	Unit	Tanks Storage			
		Tank #1	Tank #2	Tank #9	Tank #10
Fuel	-	Diesel	Gasoline	Diesel	Diesel
Tank Capacity	m³	1,600	333.5	1,816	620
Annual volume transferred	m³/an	1,600	265	1,800	620
Transfer rate	m³/h	90	75	90	90
Transfer duration	h/an	17.8	3.5	20.0	6.9
Number of emission points into the atmosphere	-	2	1	2	2
	-	Gooseneck vents	Valve with straight vent	Gooseneck vents	Gooseneck vents

Table 10: Compartmented Tank and Tank Parameters for Transshipment Emission Rate Calculations

Parameter	Unit	Tank #11		Tank truck
		Tank #11 Gasoline	Tank #11 Diesel	
Fuel		Gasoline	Diesel	Diesel
Tank Capacity	m³	23.101	11.691	18.000
Annual volume transferred	m³/an	265.0	73.3	1 362.1
Transfer rate	m³/h	9.0	22.8	48.0
Duration of a filling	h	2.57	0.51	0.38
Annual transfer duration	h/an	29.4	3.2	28.4
Number of emission points into the atmosphere	-	0	1	1
	-	Directed towards Tank #2 in closed loop	Straight vent	Gooseneck vents

Detailed calculations of emission rates are presented in Appendix E. All parameters used in the calculations are documented.

The calculated instantaneous emission rates correspond to the emission of saturated vapors during transfer to a Tank. The daily rates correspond to these same transfer emissions, weighted over 24 hours by considering the actual duration of filling.

5 MODELING RESULTS

The atmospheric dispersion modeling results allowed the assessment of the maximum contaminant loads under study in the ambient air for periods of 1 hour, 8 hours, 24 hours and of the average annual concentration. The contaminant dispersion results are provided in the form of concentration isolines in Appendix F. The 50 highest concentrations for periods of 1 hour, 8 hours, 24 hours and one year are listed in table form in Appendix G.

5.1 AERMOD Model and Source Types

The AERMOD model was designed to be conservative and overestimates contaminant concentrations. This characteristic of the AERMOD software is well documented in technical literature. Fugitive emissions, modeled as volume and/or capped vertical sources, are especially overestimated by AERMOD due to the absence of ascending speed. Under the current modeling conditions for this project, in which the number of volume sources is high, the maximum concentrations were obtained in a light wind condition (approximately 1 m/s).

Analyzing the results in light wind further was essential because the acceptability of the project was at stake. The maximum values obtained with 99th percentile values are presented below to show the considerable difference between values under overestimated conditions.

5.2 Comprehensive Results and 99th Percentile

The following tables present the values for all products transferred to the site and the 99th percentile values for compounds that showed exceedances. According to FCNQ Petro's operating procedures for filling Tanks, this 1% of the highest values represents a possibility of approximately 29 hours (4 months*30 days*24 hours*1%). As the total filling times of the Tanks are 17.8, 3.5, 20 and 6.9 hours for a total of 48 hours out of the 2,880 hours (1.7% of the time) of the four months possible for these operations, the probabilities of unloading during an hour showing unfavorable metrological conditions are even lower. Let us also remember that the possible 48 hours of unloading from the ship to the Tanks represent 0.5% of the time annually. Regarding transshipments between the storage tanks and the compartmentalized tank of the service station or in a tank truck, these show lower emission rates due to their lower transfer rates and can be carried out at any time during the year, when the operator decides. Thus, these activities can be controlled and carried out at convenient times to minimize the impact.

According to Table 12, diesel transfers always meet all associated standards and criteria. Standards have been exceeded in the transfer of Gasoline for toluene, xylene, isopentane, ethanol, n-heptane, n-hexane, ethylbenzene, cyclohexane, benzene, and gasoline (>C3). Gasoline transfer results are shown in **Table 13** and **Table 14** for sensitive receptors. For this reason, mitigation options depending on wind speed and direction are considered in Section 6.

In summary, Table 11 shows exceedances of the thresholds (standards and criteria) for the transfer of Gasoline, values meeting or near the 99th percentile thresholds at the property line and meeting the 99th percentile thresholds at the receptors sensitive. There is no excess for diesel transfer.

Table 11: Respect of Thresholds for the Transfer of Gasoline

Contaminant	CAS	Norm or Criteria	Application Limit		Sensitive Receptors	
			At all times	99th centile	At all times	99th centile
Toluene	108-88-3	Norm				
Xylene (o,m,p)	1330-20-7	Norm (see note)				
Octane	111-65-9	Criteria (see note)	✓	✓	✓	✓
Isopentane	78-78-4	Criteria (see note)				✓
Ethanol	64-17-5	Norm				✓
n-Heptane	142-82-5	Criteria		✓	✓	✓
n-Hexane	110-54-3	Norm		✓	✓	✓
1,2,4-Trimethylbenzene	95-63-6	Criteria (see note)	✓	✓	✓	✓
Ethylbenzene	100-41-4	Norm		✓	✓	✓
Cyclohexane	110-82-7	Criteria		✓	✓	✓
Benzene	71-43-2	Norm			✓	✓
Gasoline (>C3)	86290-81-5	Criteria				

Table 12: Diesel Transfer Results

Contaminant	CAS	Norm or Criteria	Results [µg/m³]				Results: Percentage of Limit Value (including initial concentration)			
			4 min	1h	24h	1 an	4 min	1h	24h	1 an
Toluene	108-88-3	Norm	184.1	96.4	-	-	74.0%	-	-	-
Xylene (o,m,p)	1330-20-7	Norm (see note)	51.5	27.0	-	0.067	57.6%	-	-	40.3%
Octane	111-65-9	Criteria (see note)	-	92.6	-	0.226	-	2.6%	-	0.06%
Ethylbenzene	100-41-4	Norm	58.9	30.9	-	0.034	26.9%	-	-	1.5%
Diesel Fuel C9-C18 Branched and Linear Alkanes	1159170-26-9	Criteria	275.2	144.2	-	0.068	-	13.7%	-	-
Nonane	111-84-2	Criteria	110.4	57.9	-	0.071	1.4%	-	-	0.0%
Diesel fuels	68334-30-5	Criteria	-	480.6	-	0.361	-	48.1%	-	9.02%

Table 13: Gasoline Transfer Results

Contaminant	CAS	Norm or Criteria	Results [µg/m³]				Results: Percentage of Limit Value (including initial concentration)			
			4 min	1h	24h	1 an	4 min	1h	24h	1 an
Toluene	108-88-3	Norm	19,030.2	9,968.9	-	-	3,215.0%	-	-	-
Xylene (o,m,p)	1330-20-7	Norm (see note)	4,262.8	2,233.0	-	0.067	1,260.8%	-	-	40.3%
Butane	106-97-8	NA	-	-	-	-	-	-	-	-
Octane	111-65-9	Criteria (see note)	-	3,445.3	-	0.226	-	98.4%	-	0.1%
Isopentane	78-78-4	Criteria (see note)	372,687.6	195,231.7	-	6.936	9,813.1%	-	-	6.6%
Ethanol	64-17-5	Norm	14,615.2	7,656.1	-	-	4,298.6%	-	-	-
n-Heptane	142-82-5	Criteria	7,155.4	3,748.3	-	-	263.3%	-	-	-
n-Hexane	110-54-3	Norm	23,140.7	12,122.2	-	0.324	439.3%	-	-	2.4%
1,2,4-Trimethylbenzene	95-63-6	Criteria (see note)	152.2	79.8	-	0.002	49.5%	-	-	20.0%
Ethylbenzene	100-41-4	Norm	974.3	510.4	-	0.034	150.6%	-	-	1.5%
Cyclohexane	110-82-7	Criteria	8,677.8	4,545.8	-	-	607.5%	-	-	-
Benzene	71-43-2	Norm	-	-	18.9	-	-	-	218.8%	-
Gasoline (>C3)	86290-81-5	Criteria	1,351,176.6	707,811.4	-	-	180,156.9%	-	-	-
Results at the 99th percentile of ambient concentrations										
Toluene	108-88-3	Norm	1,655.8	867.4	-		319.3%	-	-	-
Xylene (o,m,p)	1330-20-7	Norm (see note)	370.9	194.3	-		148.8%	-	-	-
Isopentane	78-78-4	Criteria (see note)	32,428.0	16,987.4	-		858.9%	-	-	-
Ethanol	64-17-5	Norm	1,271.7	666.2	-		374.0%	-	-	-
n-Heptane	142-82-5	Criteria	622.6	326.1	-		24.9%	-	-	-
n-Hexane	110-54-3	Norm	2,013.5	1,054.8	-		40.6%	-	-	-
Ethylbenzene	100-41-4	Norm	84.8	44.4			30.4%			
Cyclohexane	110-82-7	Criteria	755.1	395.5	-		55.4%	-	-	-
Benzene	71-43-2	Norm	-	-	13.2		-	-	162.3%	-
Gasoline (>C3)	86290-81-5	Criteria	117,567.6	61,587.6	-		15,675.7%	-	-	-

Table 14: Gasoline Transfer Results at Sensitive Receptor Residence 1

Contaminant	CAS	Norm or Criteria	Results [µg/m³]				Results: Percentage of Limit Value (including initial concentration)			
			4 min	1h	24h	1 an	4 min	1h	24h	1 an
Toluene	108-88-3	Norm	1,703.1	892.2	-	-	327.2%	-	-	-
Xylene (o,m,p)	1330-20-7	Norm (see note)	381.5	199.8	-	8.00E-03	151.9%	-	-	40.0%
Octane	111-65-9	Criteria (see note)	-	308.3	-	3.42E-02	-	8.8%	-	0.0%
Isopentane	78-78-4	Criteria (see note)	33,353.3	17,472.1	-	4.81E-01	883.2%	-	-	4.0%
Ethanol	64-17-5	Norm	1,308.0	685.2	-	-	384.7%	-	-	-
n-Heptane	142-82-5	Criteria	640.4	335.5	-	-	25.6%	-	-	-
n-Hexane	110-54-3	Norm	2,071.0	1,084.9	-	2.26E-02	41.7%	-	-	2.2%
1,2,4-Trimethylbenzene	95-63-6	Criteria (see note)	13.6	7.1	-	1.46E-04	26.0%	-	-	20.0%
Ethylbenzene	100-41-4	Norm	87.2	45.7	-	6.28E-03	30.7%	-	-	1.5%
Cyclohexane	110-82-7	Criteria	776.6	406.8	-	-	56.9%	-	-	-
Benzene	71-43-2	Norm	-	-	2.2	-	-	-	52.2%	-
Gasoline (>C3)	86290-81-5	Criteria	120,922.2	63,344.9	-	-	16,123.0%	-	-	-
Results at the 99th percentile of ambient concentrations										
Toluene	108-88-3	Norm	111.3	58.3	-		61.9%	-	-	-
Xylene (o,m,p)	1330-20-7	Norm (see note)	24.9	13.1	-		50.0%	-	-	-
Isopentane	78-78-4	Criteria (see note)	2,178.8	1,141.4	-		62.9%	-	-	-
Ethanol	64-17-5	Norm	85.4	44.8	-		25.1%	-	-	-
Gasoline (>C3)	86290-81-5	Criteria	7,899.2	4,138.0	-		1,053.2%	-	-	-

5.3 Concentration Contour Curves Analysis

The hourly concentration contour curves generated by the model show the maximum modeled concentrations for all receptors individually, for all hours of the modeled period. The Results obtained therefore do not necessarily occur at the same times across the entire meteorological dataset. Curves that connect points of the same concentrations are drawn with the Results, thus forming what are called concentration or iso-concentration isoline curves. To obtain concentration contour curves over periods greater than one hour, the rolling averages of the hourly concentrations for the calculation points are estimated for the modeled period, and the maximums retained are used to draw the curves. Finally, the annual curves are produced based on the averages of all Hourly Results for the years separately and the corresponding maxima over the entire modeling domain are plotted. Concentration contour maps are a visual tool for assessing the extent and effectiveness of atmospheric dispersion from emission sources individually or in groups.

Figure 12 presents the concentration contour curves over the hourly period with a cut-off of the hourly limit value minus the background adjusted proportionally according to the adjustment factor over 4 minutes for toluene and **Figure** 13 shows the concentration contour curves over the 24-hour period for benzene. Curves for toluene, isopentane and benzene are available in Appendix F.

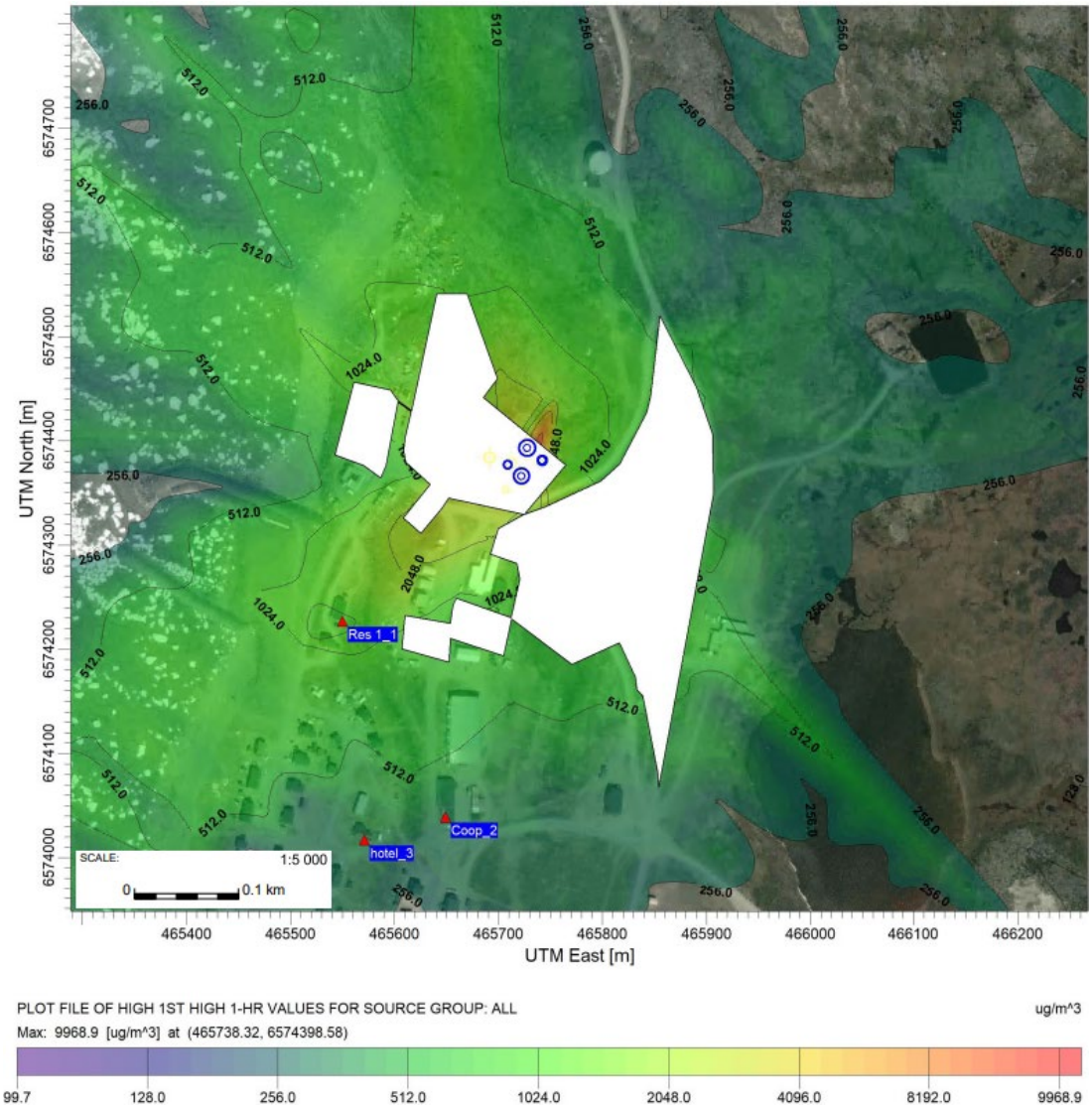


Figure 12: Concentration Isolines for Toluene Over the Hourly Period

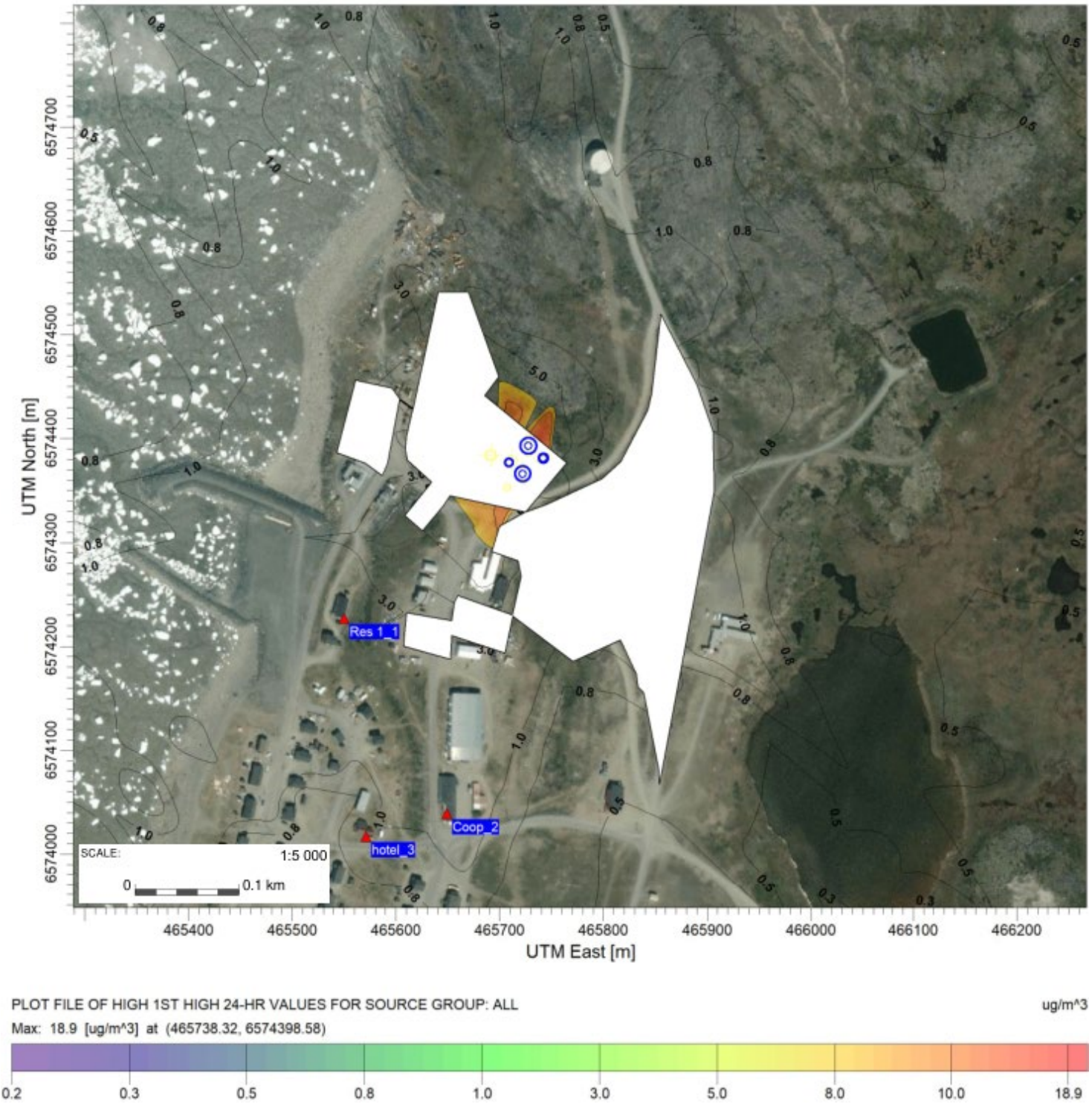


Figure 13: Concentration Isolines for Benzene Over the 24-Hour Period

6 MITIGATION MEASURES AND REVISED RESULTS

As noted in Section 5.2, Modeling Results indicate exceedance of standards for toluene, xylene, isopentane, ethanol, n-heptane, n-hexane, ethylbenzene, cyclohexane, benzene, and gasoline (>C3). Exceeding standards also impacts sensitive receptors. These exceedances of norms only occur during the transfer of Gasoline. For this reason, mitigation measures are only proposed for the transfer of Gasoline.

6.1 Proposed Mitigation Measures

The Results show that exceedances of the norms at sensitive receptors occur when the wind speed is less than 3 m/s and in the direction of the sensitive receptors. To avoid these exceedances of the norm, the parameters of the AERMOD model have been modified. The transfer of the Gasoline will now be carried out if the wind speed is greater than 3 m/s with winds coming from the South, East and West. **Figure 7** shows the direction of the prevailing winds relative to the village. Unloading for Gasoline should be carried out with such wind speed and/or if possible, considering the wind direction. According to the wind rose, winds towards the village and/or below 3 m/s are uncommon. The weather data to be taken into consideration during the transfer of the Gasoline will come from the Weather Network and the ship's weather station.

6.2 Revision of the Atmospheric Dispersion

The atmospheric dispersion with AERMOD was taken up considering that the transfer of Gasoline takes place provided that the wind speed is greater than 3 m/s (Variable Emissions – By Wind Speed). Table 15 presents the exceedances of the thresholds for toluene, xylene, isopentane, ethanol, benzene, and gasoline (>C3) beyond the property limit. Sensitive receptor results comply with the standard except for toluene, isopentane, ethanol and gasoline (>C3). The AERMOD model options do not allow you to select a transfer condition for a given wind direction. If we consider that the transfer of Gasoline occurs if the wind is not in the direction of the sensitive receptors and greater than 3 m/s, the thresholds would probably be respected at the sensitive receptors except for isopentane and gasoline (> C3).

It should also be noted that some Results show exceedances of standards outside the property line, however these occur nearby and in uninhabited areas. Table 16 shows that there are no thresholds exceeded at the 99th percentile for sensitive receptors, except for gasoline (>C3). The results of the dispersion of toluene, isopentane and benzene with these mitigation measures are available as concentration contour maps in Appendix F.

Finally, in order to put the values obtained in context, Appendix C presenting the Gasoline safety data sheet shows the workplace exposure limits (TLV-TWA and TLV-STEL) of different Canadian provinces and American. The concentrations in ppm or mg/m^3 of the limits that can be observed, instead of the µg/m^3 of the modeling, show that despite high concentrations in the modeling, the latter are always much lower than the suggested limits.

6.3 Attenuated Complete Results and 99th Percentile

Attenuated Gasoline transfer results at the 99th percentile for compounds that showed exceedances in Section 5.2 are presented in Table 15 and Table 16 for sensitive receptors. Only gasoline (>C3) presents exceedances at the 99th percentile for the sensitive receptor “Residence 1”.

Table 15: Attenuated Results for Gasoline Transfer

Contaminant	CAS	Norm or Criteria	Results [µg/m³]				Results: Percentage of Limit Value (including initial concentration)			
			4 min	1h	24h	1 an	4 min	1h	24h	1 an
Toluene	108-88-3	Norm	1,596.9	836.5	-	-	309.5%	-	-	-
Xylene (o,m,p)	1330-20-7	Norm (see note)	357.7	187.4	-	0.067	145.1%	-	-	40.3%
Butane	106-97-8	NA	-	-	-	-	-	-	-	-
Octane	111-65-9	Criteria (see note)	-	289.1	-	0.226	-	8.3%	-	0.1%
Isopentane	78-78-4	Criteria (see note)	31,273.2	16,382.4	-	6.936	828.5%	-	-	6.6%
Ethanol	64-17-5	Norm	1,226.4	642.4	-	-	360.7%	-	-	-
n-Heptane	142-82-5	Criteria	600.4	314.5	-	-	24.1%	-	-	-
n-Hexane	110-54-3	Norm	1,941.8	1,017.2	-	0.324	39.3%	-	-	2.4%
1,2,4-Trimethylbenzene	95-63-6	Criteria (see note)	12.8	6.7	-	0.002	25.9%	-	-	20.0%
Ethylbenzene	100-41-4	Norm	81.8	42.8	-	0.034	30.0%	-	-	1.5%
Cyclohexane	110-82-7	Criteria	728.2	381.5	-	-	53.5%	-	-	-
Benzene	71-43-2	Norm	-	-	9.1	-	-	-	121.0%	-
Gasoline (>C3)	86290-81-5	Criteria	113,380.8	59,394.3	-	-	15,117.4%	-	-	-
Results at the 99th percentile of ambient concentrations										
Toluene	108-88-3	Norm	808.2	423.4	-	-	178.0%	-	-	-
Xylene (o,m,p)	1330-20-7	Norm (see note)	181.0	94.8	-	-	94.6%	-	-	-
Isopentane	78-78-4	Criteria (see note)	15,828.5	8,291.7	-	-	422.1%	-	-	-
Ethanol	64-17-5	Norm	620.7	325.2	-	-	182.6%	-	-	-
Gasoline (>C3)	86290-81-5	Criteria	57,386.2	30,061.7	-	-	7,651.5%	-	-	-

Table 16: Attenuated Results for Gasoline Transfer at Sensitive Receptor Residence 1

Contaminant	CAS	Norm or Criteria	Results (µg/m³)				Results: Percentage of Limit Value (including initial concentration)			
			4 min	1h	24h	1 an	4 min	1h	24h	1 an
Toluene	108-88-3	Norm	524.1	274.6	-	-	130.7%	-	-	-
Xylene (o,m,p)	1330-20-7	Norm (see note)	117.4	61.5	-	8.00E-03	76.4%	-	-	40.0%
Butane	111-65-9	Criteria (see note)	-	94.9	-	3.42E-02	-	2.7%	-	0.0%
Octane	78-78-4	Criteria (see note)	10,264.4	5,377.0	-	4.81E-01	275.6%	-	-	4.0%
Isopentane	64-17-5	Norm	402.5	210.9	-	-	118.4%	-	-	-
Ethanol	142-82-5	Criteria	197.1	103.2	-	-	9.4%	-	-	-
n-Heptane	110-54-3	Norm	637.3	333.9	-	2.26E-02	14.7%	-	-	2.2%
n-Hexane	95-63-6	Criteria (see note)	4.2	2.2	-	1.46E-04	24.4%	-	-	20.0%
1,2,4-Trimethylbenzene	100-41-4	Norm	26.8	14.1	-	6.28E-03	22.5%	-	-	1.5%
Ethylbenzene	110-82-7	Criteria	239.0	125.2	-	-	19.4%	-	-	-
Cyclohexane	71-43-2	Norm	-	-	1.2	-	-	-	41.6%	-
Benzene	86290-81-5	Criteria	37,213.5	19,494.2	-	-	4,961.8%	-	-	-
Results at the 99th percentile of ambient concentrations										
Toluene	108-88-3	Norm	48.9	25.6	-	-	51.5%	-	-	-
Xylene (o,m,p)	1330-20-7	Norm (see note)	10.9	5.7	-	-	46.0%	-	-	-
Isopentane	78-78-4	Criteria (see note)	957.1	501.4	-	-	30.7%	-	-	-
Ethanol	64-17-5	Norm	37.5	19.7	-	-	11.0%	-	-	-
Gasoline (>C3)	86290-81-5	Criteria	3,469.8	1,817.6	-	-	462.6%	-	-	-

6.4 Concentration Contour Curves Analysis of Attenuated Results

Figure 14 shows the concentration contours over the 4-minute period for toluene and **Figure 15** shows the concentration contours over the 24-hour period for benzene. Curves for attenuated toluene, isopentane and benzene are available in Appendix F.

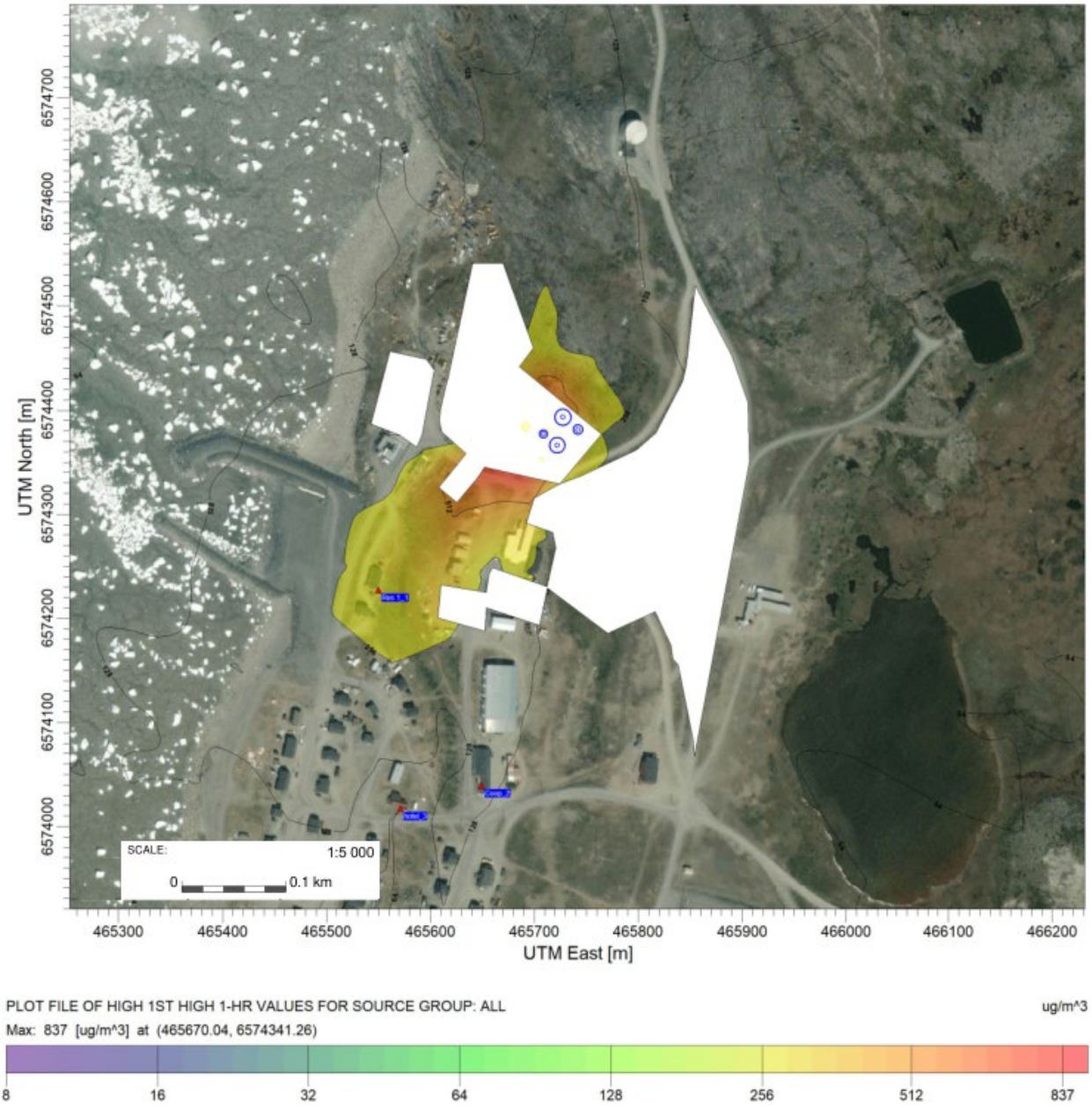


Figure 14: Concentration Isolines for Attenuated Toluene Over the Hourly Period

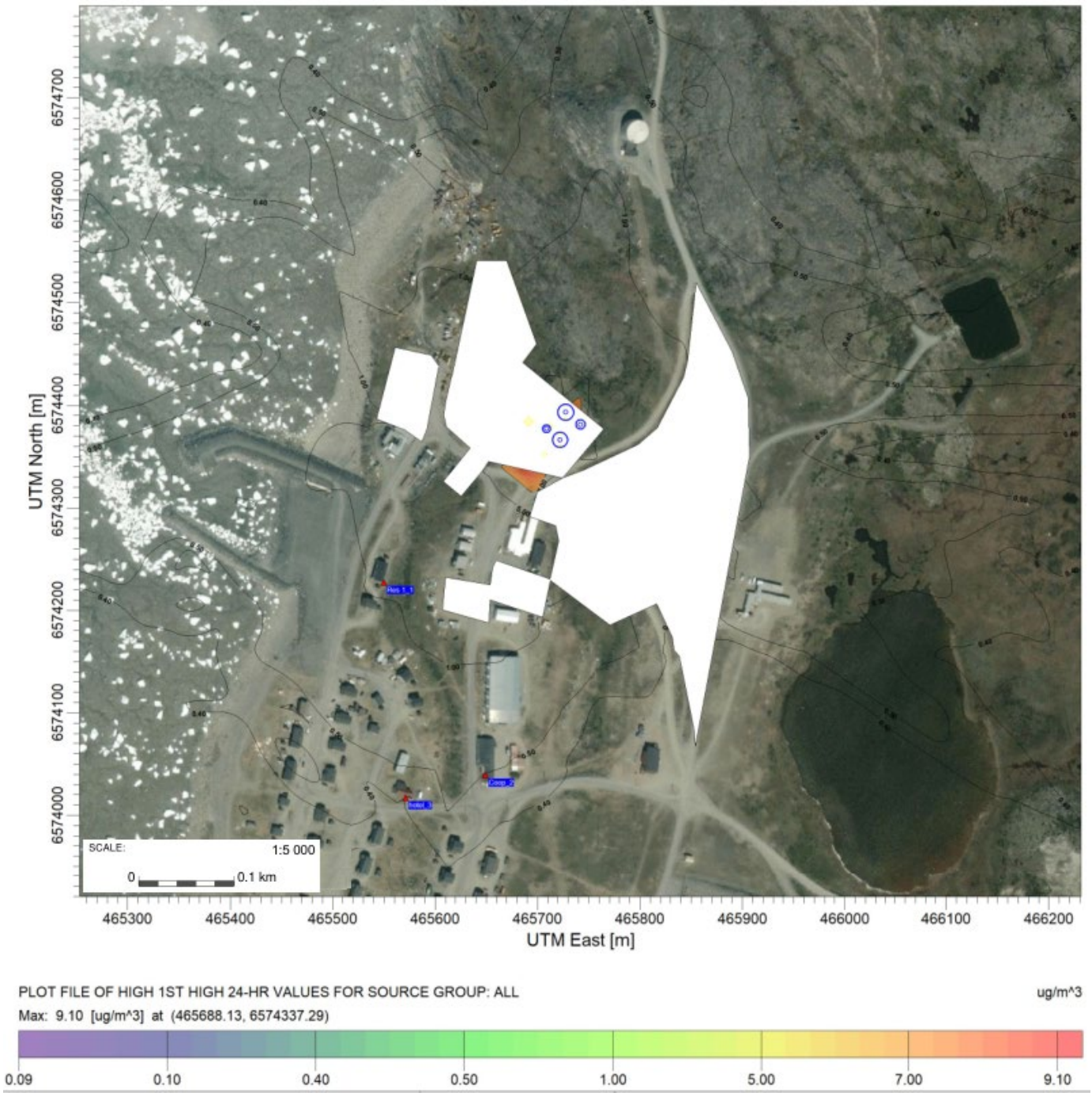


Figure 15: Concentration Isolines for Attenuated Benzene Over the 24-Hour Period

The proposed mitigation measures significantly reduce the maximum ambient concentrations of problematic contaminants: toluene, xylene, isopentane, ethanol, n-heptane, n-hexane, ethylbenzene, cyclohexane, benzene, and gasoline (>C3) beyond the industrial limit. Only an excess for gasoline (>C3) is observed at sensitive receptors at the 99th percentile as presented in **Table 16.**

6.5 Other Possible Mitigation Measures

Unlike fixed roof tanks, floating roof tanks have an internal roof that rests on the surface of the stored liquid. The floating roof rises and falls with the liquid level, reducing the empty space above the liquid. Floating roof tanks have

several environmental advantages compared to fixed roof tanks. Their design reduces harmful vapor emissions by limiting the evaporation of volatile compounds, thus improving air quality. Additionally, they minimize the risk of spills and explosions by reducing the formation of flammable vapors, thereby enhancing environmental safety.

Thus, the installation of floating roof tanks would allow reductions of approximately 93.41% in maximum concentrations in the ambient air. The following tables present the Modeled Results of problematic contaminants with Floating Roof Tanks for scenarios with and without mitigation (wind speed and direction).

It should be noted that the Gasoline ingredient (>C3) with the new ambient air criteria requested for the project analysis shows values above the limit with and without attenuation for wind speed with a floating roof. In order to assess the real dangerousness of the ingredient which is in itself the combination of all the other ingredients, we analyzed the product safety data sheet provided by the manufacturer. The sheet shows for the ingredient Gasoline (>C3) a short-term exposure limit (STEL) of 500 ppm and a time-weighted exposure limit value (TLV-TWA) of 300 ppm. Assuming a molar mass of 110 g/mol and using the law conversion from ppm to mg/m^3 for an ideal gas at reference parameters we obtain 1,349.7 mg/m^3 and 2,249.5 mg/m^3.

By comparing the values obtained for all scenarios with mitigation measures, it appears that the values are well below these limit values. Note that the other exposure limit values in the safety data sheets are clearly respected for the other ingredients. Finally, considering that the highest emission rates will occur for a maximum of 3.5 hours per year during the filling of the Gasoline Tank, we can claim that emissions will at least respect the limits imposed by occupational safety organizations.

Table 17: Results for Transferring Gasoline with a Floating Roof Tank

Contaminant	CAS	Norm or Criteria	Results [µg/m³]				Results: Percentage of Limit Value (including initial concentration)			
			4 min	1h	24h	1 an	4 min	1h	24h	1 an
Toluene	108-88-3	Norm	1,254.1	657.0	-		252.3%	-	-	-
Xylene (o.m.p)	1330-20-7	Norm (see note)	280.9	147.2	-	0.067	123.1%	-	-	40.3%
Isopentane	78-78-4	Criteria (see note)	24,560.1	12,865.8	-	6.936	651.8%	-	-	6.6%
Ethanol	64-17-5	Norm	963.1	504.5	-		283.3%	-	-	-
Gasoline (>C3)	86290-81-5	Criteria	89,042.5	46,644.8	-		11,872.3%	-	-	-
Results at the 99th percentile of ambient concentrations										
Gasoline (>C3)	86290-81-5	Criteria	7,747.7	4,058.6	-		1,033.0%	-	-	-
Maximum concentrations observed at sensitive receptors (Residence 1)										
Gasoline (>C3)	86290-81-5	Criteria	7,968.8	4,174.4	-	-	1,062.5%	-	-	-
Results at the 99th percentile of ambient concentrations										
Gasoline (>C3)	86290-81-5	Criteria	520.6	272.7	-		69.4%	-	-	-

Table 18: Results for Attenuated Fuel Transfer (Wind > 3m/S) with a Floating Roof Tank

Contaminant	CAS	Norm or Criteria	Results [µg/m³]				Results: Percentage of Limit Value (including initial concentration)			
			4 min	1h	24h	1 an	4 min	1h	24h	1 an
Gasoline (>C3)	86290-81-5	Criteria	7,471.8	3,914.1	-		996.2%	-	-	-
Results at the 99th percentile of ambient concentrations										
Gasoline (>C3)	86290-81-5	Criteria	3,781.8	1,981.1	-		504.2%	-	-	-
Maximum concentrations observed at sensitive receptors (Residence 1)										
Gasoline (>C3)	86290-81-5	Criteria	2,452.4	1,284.7	-		327.0%	-	-	-
Results at the 99th percentile of ambient concentrations										
Gasoline (>C3)	86290-81-5	Criteria	228.7	119.8	-		30.5%	-	-	-

7 CONCLUSION

Atmospheric dispersion modeling made it possible to assess the ambient air quality in the vicinity for its installation located at latitude 59°18'24.49"N and longitude 69°36'7.17"W of FCNQ Petro. The fuel distributor wishes to increase its storage capacity at its Aupaluk petroleum product distribution park. Atmospheric modeling with AERMOD considers all site transfer activities. Diesel and Gasoline transfer scenarios are considered in atmospheric dispersion modeling.

Atmospheric dispersion modeling has revealed that several limit values for standards and criteria are not respected in the worst case under certain very specific and infrequent conditions due to the low number of hours of operations which can cause exceedances.

The results of the study also show that all standards are respected for the transfer of diesel. Atmospheric dispersion modeling has highlighted air quality issues associated with the transfer of Gasoline for the standards and criteria of toluene, xylene, isopentane, ethanol, n- heptane, n-hexane, ethylbenzene, cyclohexane, benzene and gasoline (>C3). Exceedances of standards and criteria are observable outside the property boundary and at the location of sensitive receptors, for these contaminants in the case of the transfer of Gasoline.

Following the analysis of the results, mitigation measures can be proposed to reduce the impact of Gasoline transfer activities on ambient air quality and respect the limit concentrations of ingredients having a standard:

- Transfer of the Gasoline provided that a weak wind (<3 m/s) does not blow from the site towards the residences. The wind should not come from the north since the sensitive receptors are located to the south of the site.

These measures make it possible to significantly lower the maximum ambient concentrations of problematic contaminants. There are exceedances of the thresholds for toluene, xylene, isopentane, ethanol, benzene and gasoline (>C3) beyond the property limit and only one exceedance for gasoline (>C3) to sensitive receptors.

The proposed mitigation measures make it possible to meet the limit values for sensitive receptors at the 99th percentile, with the exception of gasoline (>C3). The limit value of gasoline (>C3) would be respected at the location of sensitive receptors only in the scenario of a floating roof with attenuation at the 99th percentile as presented in **Table** 18.

Despite these recommendations, it must however be remembered that the current situation which has remained unchanged since 2007 for Gasoline management activities will in no way be impacted by the project for diesel, because only sources of emissions for diesel are added.

Finally, it is our opinion that the very low probability of obtaining exceedances at sensitive receptors, taking into account the short periods of exposure and operation, as well as the exposure limits in the workplace must be taken into account in the interpretation of the Results in order to determine the real risk of periodic filling operations.

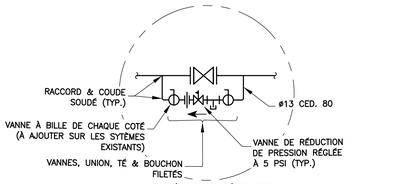
APPENDIX A - FACILITY PLAN

LÉGENDE

VOIR DESSIN M–001

NOTES

1. TOUS LES ÉQUIPEMENTS EXISTANTS, LES QUANTITÉS ET LES LOCALISATIONS INDIQUÉES AUX PLANS SONT APPROXIMATIFS ET DEVRONT ÊTRE VÉRIFIÉS SUR LE SITE.
2. AVANT LA PERFORATION DES RÉSERVOIRS EXISTANTS, LA LOCALISATION DES NOUVEAUX ÉQUIPEMENTS DEVRA ÊTRE DÉTERMINÉE AVEC LE SURVEILLANT DU CHANTIER ET L'ENTREPRENEUR DEVRA S'ASSURER D'AVOIR L'ESPACE REQUIS ENTRE LES SORTIES EXISTANTES ET LES NOUVELLES SORTIES AFIN D'ÊTRE CONFORME AUX NORMES API 650 & 653 DERNIÈRES ÉDITIONS.
3. LES NOUVEAUX RÉSERVOIRS AINSI QUE LES AJOUTS D'ÉQUIPEMENTS AUX RÉSERVOIRS EXISTANTS DEVRONT ÊTRE CONFORMES AUX NORMES API 650 & 653 DERNIÈRES ÉDITIONS.
4. LE PLANCHER DES NOUVEAUX RÉSERVOIRS DEVRA ÊTRE DE FORME CONVEXE.
5. LES TROTTOIRS DEVRONT ÊTRE EN MÉTAL DÉPLOYÉ, SOUDÉS AU RÉSERVOIR.
6. LA TUYAUTERIE DEVRA AVOIR UNE PENTE CONSTANTE VERS LA STATION DE POMPAGE.
7. SCHÉMA DE PRINCIPE & LÉGENDE (TUYAUTERIE) **VOIR DESSIN M–001A**
8. TABLEAUX DES RÉSERVOIRS **VOIR DESSIN M–003**
9. AJOUTS DE TROTTOIRS & DE GARDE–CORPS AUX RÉSERVOIRS EXISTANTS **VOIR STRUCTURE**
10. À CHACUN DES SUPPORTS, LE DESSOUS DE LA TUYAUTERIE DEVRA ÊTRE PEINTE DE 2 COUCHES DE PEINTURE COROTHANE MIO–ALUMINIUM PAR SHERWIN–WILLIAMS.



SYSTÈME DE DÉTENTE (TYP.)

NOUVELLE SECTION DU PIPELINE MARIN ø100, SUPPORTS AUX 2,5M **VOIR DÉTAIL/M–005 & NOTE 10**

BUTÉE DE BÉTON EXIST. À RELOCALISER & À MODIFIER **VOIR PHOTO M–002B, DÉTAIL/M–005 & NOTE 10**

PIPELINE MARIN ø100, BRIDE À INSTALLER À L'ENTRÉE PRÈS DE LA DIGUE

NOUVEAU RÉS. #9 DIESEL ø15,50 x 9,750 H. 1 816 000 L.

NOUVEAU RÉS. #10 DIESEL ø9,00 x 9,750 H. 620 000 L.

REMPLACEMENT DE L'INDICATEUR D'ÉCOULEMENT

RELOCALISATION DU COLLECTEUR À CET ENDROIT

DRAIN ø25 TYP. VOIR NOTE 4 SUR PLAN M–001

NOUVELLE PASSERELLE DE TUYAUTERIE **VOIR STRUCTURE**

SUPPORT DE TUYAUTERIE AUX 2,5m (TYP.) **VOIR DÉTAIL/M–005 & NOTE 10**

POINT DE RACCORDEMENT

REMPLISSAGE/SUCCION & RACCORD POUR SYSTÈME DE DÉTENTE (TYP.) **VOIR DÉTAIL/M–006**

MODIFIER LES SUPPORTS EXISTANTS POUR (2) CONDUITES

RÉS. EX. #2 ESSENCE ø7.620 x 7.315 H. 333 560 L.

RÉS. EX. #1 DIESEL 14.630 x 9.750 H. 1 591 000 L.

RÉSERVOIR HORS–SOL COMPARTIMENTÉ **VOIR DÉTAIL/M–007**

SUPPORT DE TUYAUTERIE AU RÉSERVOIR **VOIR DÉTAIL/M–005 & NOTE 10**

REMPLISSAGES DU RÉSERVOIR ESSENCE/DIESEL **VOIR DÉTAIL/M–006**

SUPPORT DE TUYAUTERIE AU RÉSERVOIR **VOIR DÉTAIL/M–005 & NOTE 10**

BOÎTE DE TRANSITION **VOIR DÉTAIL/M–007**

ANCIENNE LOCALISATION DU COLLECTEUR

POINTS DE RACCORDEMENT

LOCALISATION AU CHANTIER

REMPLACEMENT DU RACCORD FLEXIBLE

REMPLACEMENT DE L'ACTUATEUR

REMPLACEMENT DU RACCORD FLEXIBLE

SUPPORT DE TUYAUTERIE SUR LA DIGUE **VOIR DÉTAIL/M–005 & NOTE 10**

SUPPORT DE TUYAUTERIE (1) CONDUITE ø100 **VOIR DÉTAIL/M–005 & NOTE 10**

SUPPORT DE TUYAUTERIE AUX 1m c/c À L'EXTÉRIEUR DE LA CUVETTE **VOIR DÉTAIL/M–005 & NOTE 10**

SYSTÈME DE DÉTENTE (TYP.) **VOIR AGRANDI**

POINTS DE RACCORDEMENT

SECTION DE TUYAUTERIE À DÉMANTELER

POINT DE RACCORDEMENT

POSTE OPÉRATEUR

CHAMBRE ÉLECTRIQUE

STATION DE POMPAGE

ENTREPÔT MÉCANIQUE

ENTREPÔT ENVIRONNEMENT

POUR CONTINUITÉ VOIR M–002B

NE PAS UTILISER POUR CONSTRUCTION

RÉV.	ÉMIS.	DESCRIPTION	DATE	DESS.	VÉRIF.
	C	ÉMIS POUR ADDENDA #1	2023-02-01	GC	ML
2		TRACÉ DE LA TUYAUTERIE & SUPPORTS AJUSTÉS, PLAN M-002 DEVIENT PLANS M-002A & M-002B	2023-02-01	GC	ML
	B	ÉMIS POUR SOUMISSION (PLAN M-002)	2023.01.17	GC	ML
1		TUYAUTERIE MODIFIÉE, ÉQUIPEMENTS RÉSERVOIRS	2022-12-19	GC	ML
	A	ÉMIS POUR SOUMISSION - RÉSERVOIRS (PLAN M-002)	2022-12-09	GC	ML

CLIENT

FCNQ PETRO
19950 Avenue Clark Graham
Baie-d'Urfé, QC Canada H9X 3R8
+1.514.457.9371

SACRÉ DAVEY
#200 - 486 Salnte-Catherlne O.,
Montréal, QC, H3B 1A6
+1.514.789.9330
WWW.SACRE-DAVEY.COM

CONÇU	DATE	VÉRIFIÉ	DATE
M. LAPIERRE	2021.08.24		
DESSINÉ	DATE	ING. DE PROJET	DATE
G. CORNUT	2021.07.14	D. THIBODEAU, ing.	2021.07.14
VÉRIFIÉ	DATE	ÉCHELLE	FORMAT
M. LAPIERRE	2021.07.14	1:200	D

PROJET

VILLAGE D'AUPALUK

AGRANDISSEMENT/MODERNISATION DU DÉPÔT PÉTROLIER

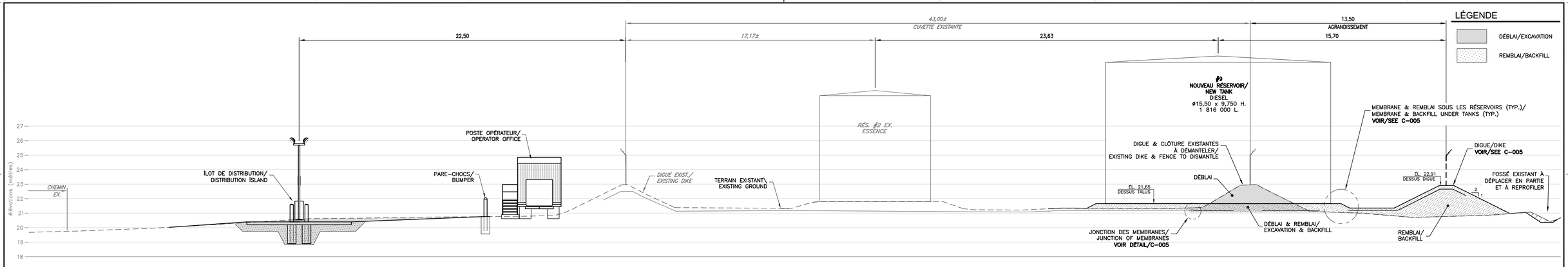
TITRE

MÉCANIQUE
TRACÉ DES TUYAUTERIES

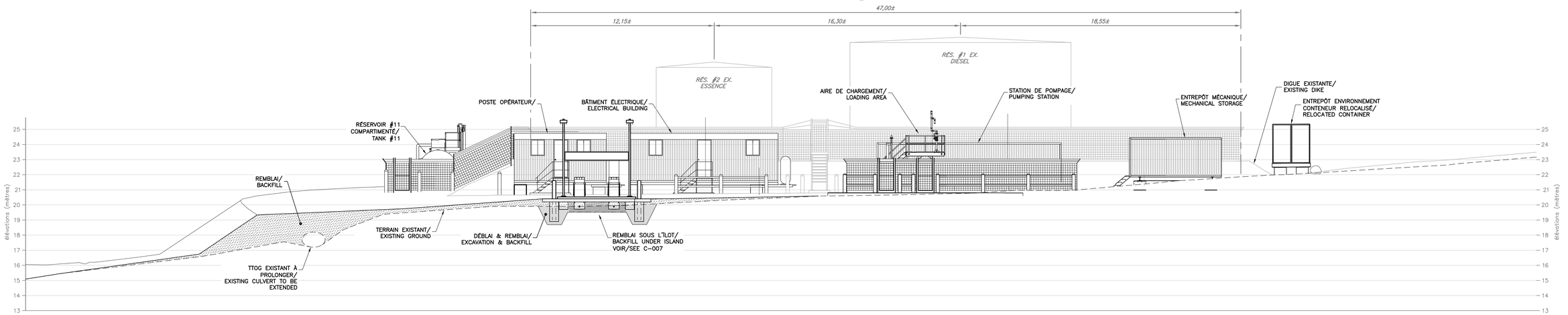
DESSIN 6940-M-002A

RÉV. 2

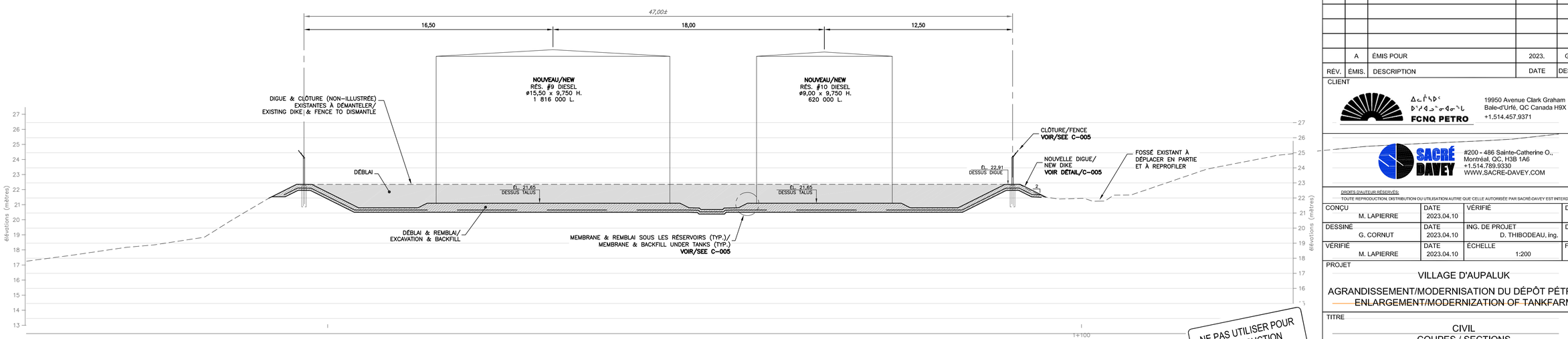
arch-D (36"x24")



A C-003 DÉPÔT
Coupe longitudinale



C C-003 DÉPÔT
Coupe transversale



B C-003 DÉPÔT
Coupe transversale

NE PAS UTILISER POUR CONSTRUCTION

RÉV.	ÉMIS.	DESCRIPTION	DATE	DESS.	VÉRIF.
	A	ÉMIS POUR	2023.	GC	ML

CLIENT

FCNQ PETRO
19950 Avenue Clark Graham
Baie-d'Urfé, QC Canada H9X 3R8
+1.514.457.9371

SACRÉ DAVEY
#200 - 486 Sainte-Catherine O.,
Montréal, QC, H3B 1A6
+1.514.789.9330
WWW.SACRE-DAVEY.COM

CONÇU	DATE	VÉRIFIÉ	DATE
M. LAPIERRE	2023.04.10		
DESSINÉ	DATE	ING. DE PROJET	DATE
G. CORNUT	2023.04.10	D. THIBODEAU, ing.	2023.04.10
VÉRIFIÉ	DATE	ÉCHELLE	FORMAT
M. LAPIERRE	2023.04.10	1:200	D

PROJET

VILLAGE D'AUPALUK

AGRANDISSEMENT/MODERNISATION DU DÉPÔT PÉTROLIER
ENLARGEMENT/MODERNIZATION OF TANKFARM

TITRE

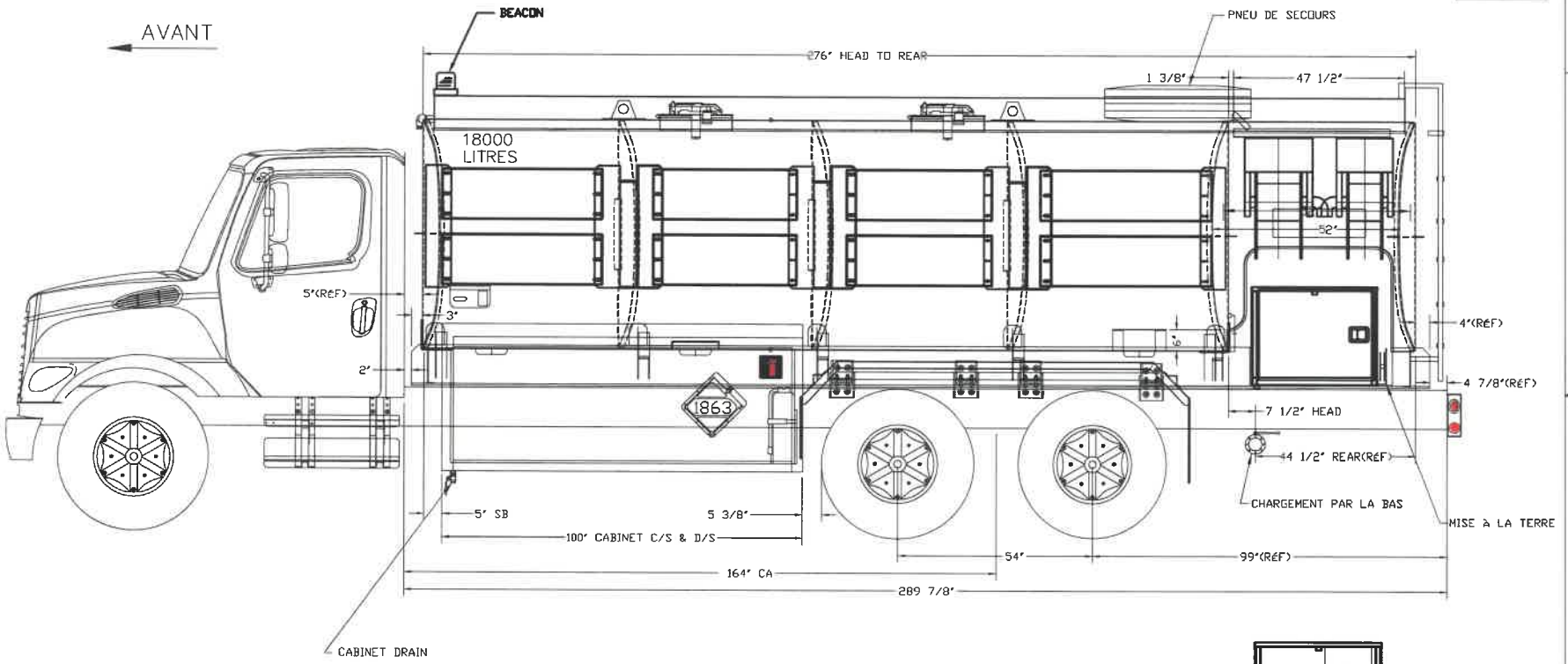
CIVIL
COUPES / SECTIONS

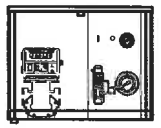
# DESSIN	RÉV.
6940-C-004	0

arch-D (36"x24")

VUE CÔTÉ GAUCHE

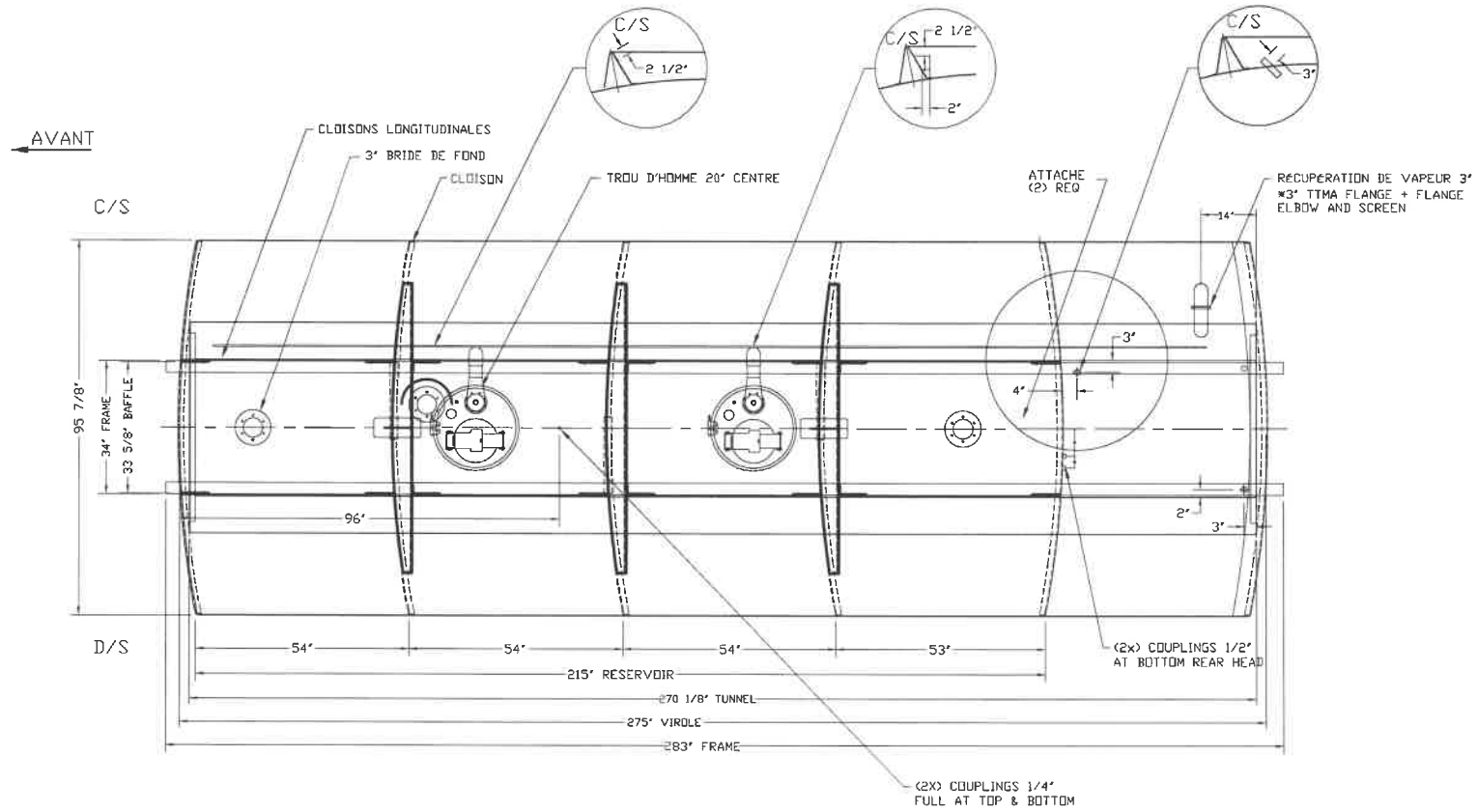
CLIENT APPROBATION:
28-FEV-2018





DESCRIPTION: 18000 LITRES AU MÂT ET PEINTE (VUE DESSUS)				INNOCAR		
CLIENT: FCNQ				DESSINÉ PAR: D.L.	DATE: 2018/02/27	MDIN: RC140C	TOLERANCE: 0.01 1° 1/16 DEC ANG FRA
DESSIN: 11825	REV	DATE	DESCRIPTION PAR	D.E. APPR. :	DATE:	ÉCHELLE: N/A	PAGE 1 / 6

CLIENT APPROBATION:
28-FEV-2018



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CLIENT: FCNQ					
DESSIN: 11825	REV	DATE	DESCRIPTION	PAR	

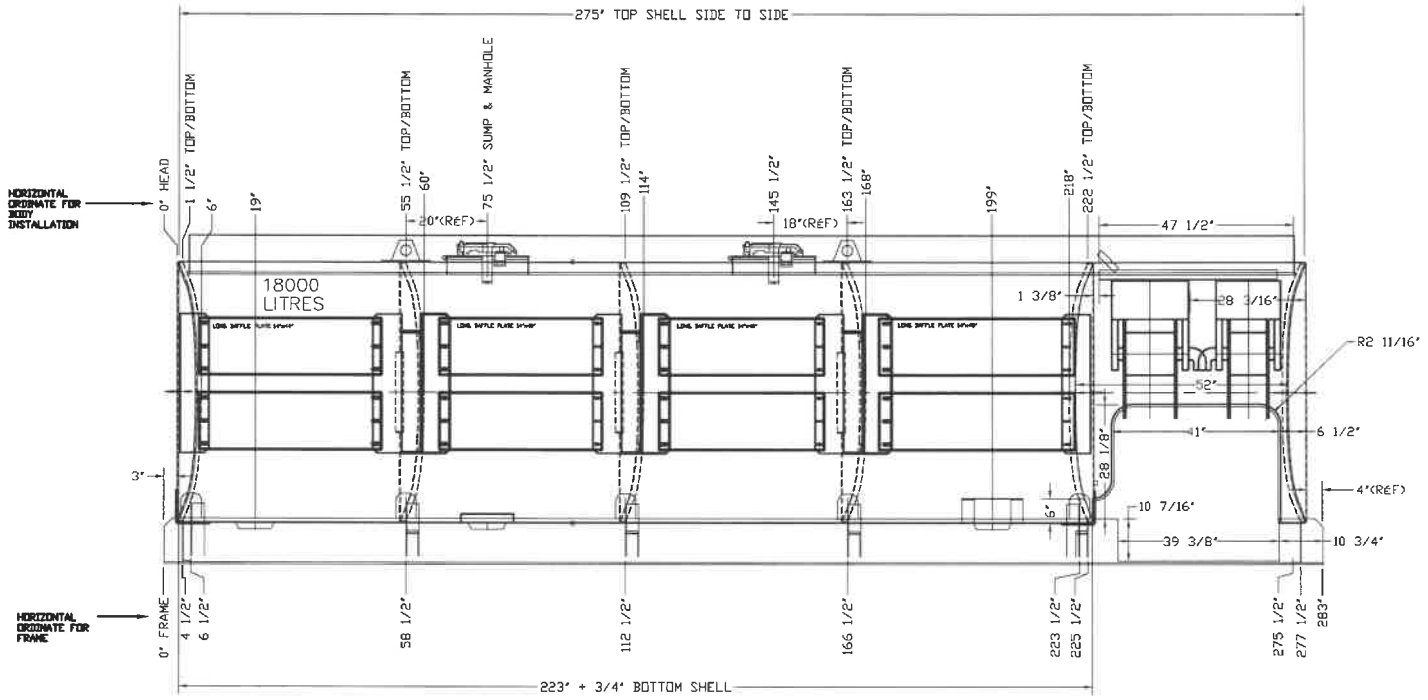
INNOCAR

DESSINÉ PAR:	DATE:	MDIN:	TOLERANCE:
D.L.	2018/02/27	RC140C	0.01 1° 1/16 DEC ANG FRA
D.E. APPR.	DATE	ÉCHELLE:	
		N/A	PAGE 2 / 6

VUE GAUCHE

APPROBATION:
28-FEV-2018

AVANT



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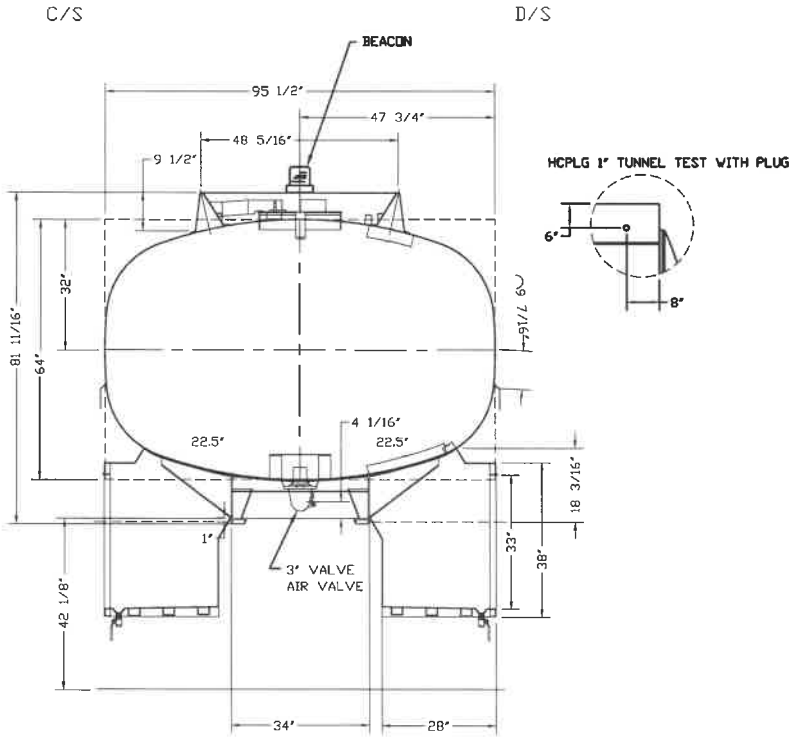
CLIENT: FCNQ				DESSINÉ PAR: D.L.	DATE: 2018/02/27	MDIN: RC140C	TOLERANCE: 0.01 1° 1/16 DEC ANG FRA
DESSIN: 11825	REV	DATE	DESCRIPTION	PAR	D.E. APPR. :	DATE:	ÉCHELLE: N/A	PAGE 3 / 6

VUE GAUCHE

CLIENT APPROBATION:
28-FEV-2018

VUE AVANT



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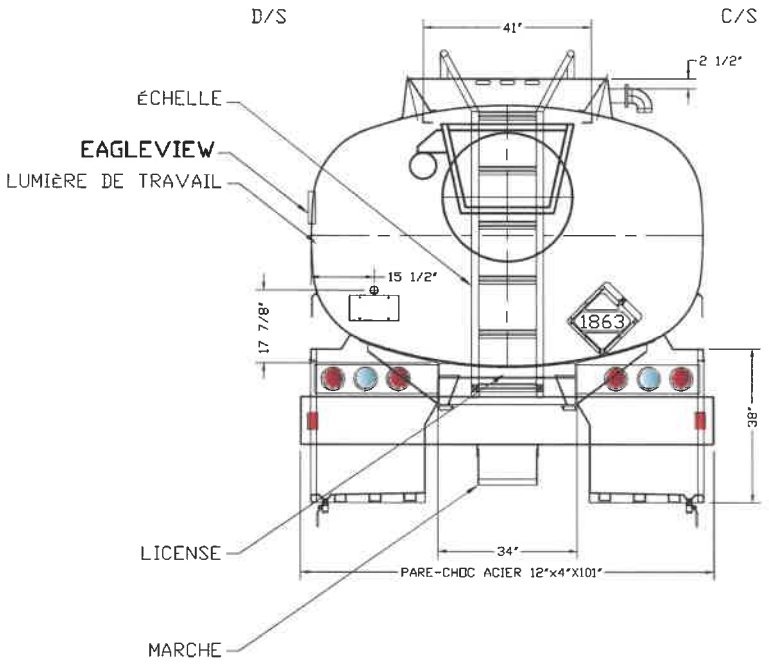
CLIENT: FCNQ			DESSINÉ PAR: D.L.	DATE: 2018/02/27	MDIN: RC140C	TOLERANCE: 0.01 1° 1/16 DEC ANG FRA
DESSIN: 11889	REV	DATE / DESCRIPTION / PAR	D.E. APPR. :	DATE:	ÉCHELLE: N/A	PAGE 4 / 6

CLIENT APPROBATION:
28-FEV-2018

VUE ARRIÈRE



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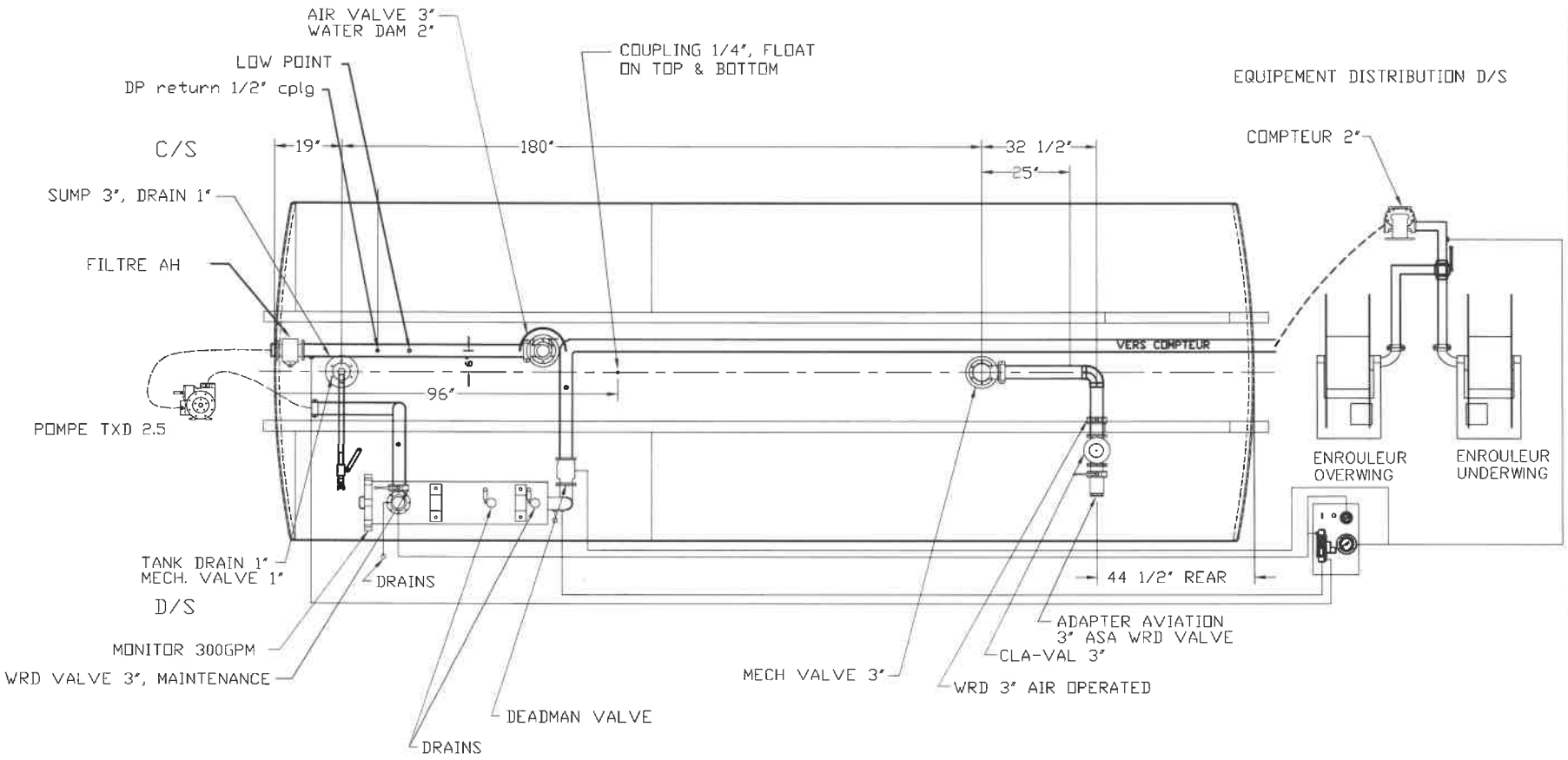
CLIENT: FCNQ			DESSINÉ PAR: D.L.	DATE: 2018/02/27	MDIN: RC140C	TOLERANCE: 0.01 1° 1/16 DEC ANG FRA
DESSIN: 11825	REV	DATE / DESCRIPTION / PAR	D.E. APPR. :	DATE:	ÉCHELLE: N/A	PAGE 5 / 6

VUE TUYAUTERIE

CLIENT APPROBATION:
28-FEV-2018



DESCRIPTION: 18000 LITRES AL MAT ET PEINTE (VUE DESSUS)				INNOCAR	
CLIENT: FCNQ			DESSINÉ PAR: D.L.	DATE: 2018/02/27	MDIN: RC140C	TOLERANCE: 0.01 1° 1/16 DEC ANG FRA
DESSIN: 11825	REV	DATE / DESCRIPTION / PAR	D.E. APPR. :	DATE:	ÉCHELLE: N/A	PAGE 6 / 6

APPENDIX B - LIMIT VALUES AND INITIAL CONCENTRATIONS

Tetra Tech QI inc, 715-46960TTA
2023-11-07 Aupaluk

Limit values and initial concentrations of contaminants

Contaminant	CAS	Norm ou Criteria	Limit Value [µg/m³]				Initial Concentration [µg/m³]				Notes
			4min	1h	24h	1 y	4min	1h	24h	1 y	
Toluene	108-88-3	Norm	600				260				
Xylene (o,m,p)	1330-20-7	Norm (see note)	350			20	150			8	Additivity
Octane	111-65-9	Criteria (see note)		3,500		350		0		0	Additivity
Isopentane	78-78-4	Criteria (see note)	3,800			240	210			9	See Table 2 (additional criterion over 1 year only),
Ethanol	64-17-5	Norm	340				0				
n-Heptane	142-82-5	Criteria	2,740				60				
n-Hexane	110-54-3	Norm	5,300			140	140			3	
1,2,4-TrimEthylbenzene	95-63-6	Criteria (see note)	590			15	140			3	Additivity
Ethylbenzene	100-41-4	Norm	740			200	140			3	
Cyclohexane	110-82-7	Criteria	1,435				40				
Benzene	71-43-2	Norm			10				3		
Diesel Fuels	68334-30-5	Criteria		1,000		4		0		0	
Diesel Fuel C9-C18 Alkane - branched and linear	1159170-26-9	Criteria		1,052				0			
Nonane	111-84-2	Criteria	11,500			442	45			0	
Gasoline (>C3)	86290-81-5	Criteria	750				0				
Butane	106-97-8	NA									No modeling required for this substance,

APPENDIX C - PRODUCT COMPOSITION

Composition of stored petroleum products

Product	CAS	Type of Limit Value	Maximum Mass Fraction According to DS	
			Gasoline	Diesel
Essence (Gasoline (>C3))	86290-81-5	SEPR	100%	
Toluene	108-88-3	Norm	25%	1%
Xylene	1330-20-7	Norm	20%	1%
Butane	106-97-8	Excluded	20%	
Octane	111-65-9	Criteria	18%	2%
2-methylbutane (Isopentane)	78-78-4	Criteria	15%	
Ethanol	64-17-5	Norm	10%	
Heptane	142-82-5	Criteria	5%	
n-Hexane	110-54-3	Norm	5%	
1,2,4-trimethylbenzene	95-63-6	Criteria	5%	
Ethylbenzene	100-41-4	Norm	4%	1%
Cyclohexane	110-82-7	Criteria	3%	
Benzene	71-43-2	Norm	1.5%	
Diesel fuels	68334-30-5	SEPR		100%
Diesel fuel C9-C18 branched and linear alkanes	1159170-26-6	N/A		30%
Nonane	111-84-2	Criteria		3%
Total			231.5%	138.0%

The sum of the mass fractions exceeds 100% since the DS indicates the maximum concentration possible in the product

FICHE DE DONNÉES DE SÉCURITÉ

1. Identification

Identificateur de produit **DIESEL**

Autres moyens d'identification

Numéro de la FDS 210

Synonymes Diesel Ultra bas soufre (ULSD) type A
Diesel Ultra bas soufre (ULSD) type B

Usage recommandé Carburant, huile de chauffage, comburant, combustible

Restrictions d'utilisation Aucun(e) connu(e).

Renseignements sur le fabricant/importateur/fournisseur/distributeur

Fabricant/fournisseur Énergie Valero Inc.
1801 McGill College, 13e étage
Montreal, Quebec H3A 2N4

Information générale 1-800-295-0391

Urgences 24 heures Canutec (613) 996-6666

Centre anti-poison du Nouveau Brunswick (506) 857-5555

Centre anti-poison de Terre-Neuve (709) 722-1110

Centre anti-poison de Nouvelle Écosse / IPE 1-800-565-8161

Centre anti-poison de l'Ontario 1-800-267-1373 (Ottawa)
1-800-268-9017 (Toronto)

Centre anti-poison du Québec 1-800-463-5060

2. Identification des dangers

Dangers physiques	Liquides inflammables	Catégorie 3
Dangers pour la santé	Toxicité aiguë, voie orale	Catégorie 4
	Toxicité aiguë, par inhalation	Catégorie 4
	Corrosion cutanée/irritation cutanée	Catégorie 2
	Lésions oculaires graves/irritation oculaire	Catégorie 2
	Cancérogénicité	Catégorie 2
	Toxicité pour certains organes cibles - exposition unique	Catégorie 1
	Toxicité pour certains organes cibles - expositions répétées	Catégorie 2 (Sang, Foie, Thymus)
	Danger par aspiration	Catégorie 1
Dangers environnementaux	Dangereux pour le milieu aquatique, danger aigu	Catégorie 2
	Dangereux pour le milieu aquatique, danger à long terme	Catégorie 2

Éléments d'étiquetage

Mention d'avertissement Danger

Mention de danger Liquide et vapeur inflammables. Nocif en cas d'ingestion. Peut être mortel en cas d'ingestion et de pénétration dans les voies respiratoires. Provoque une irritation cutanée. Provoque une sévère irritation des yeux. Nocif par inhalation. Susceptible de provoquer le cancer. Risque avéré d'effets graves pour les organes. Risque présumé d'effets graves pour les organes (Sang, Foie, Thymus) à la suite d'expositions répétées ou d'une exposition prolongée. Toxique pour les organismes aquatiques, entraîne des effets néfastes à long terme.

Conseil de prudence

Prévention Se procurer les instructions avant utilisation. Ne pas manipuler avant d'avoir lu et compris toutes les précautions de sécurité. Tenir à l'écart de la chaleur, des surfaces chaudes, des étincelles, des flammes nues et de toute autre source d'ignition. Ne pas fumer. Maintenir le récipient fermé de manière étanche. Mise à la terre et liaison équipotentielle du récipient et du matériel de réception. Utiliser du matériel électrique/de ventilation/d'éclairage antidéflagrant. Utiliser d'outils ne produisant pas des étincelles. Prendre des mesures contre les décharges électrostatiques. Ne pas respirer les brouillards ou les vapeurs. Se laver soigneusement après manipulation. Ne pas manger, boire ou fumer en manipulant ce produit. Utiliser seulement en plein air ou dans un endroit bien ventilé. Éviter le rejet dans l'environnement. Porter des gants de protection/des vêtements de protection/un équipement de protection des yeux/du visage.

Intervention EN CAS D'INGESTION: Appeler immédiatement un CENTRE ANTIPOISON/un médecin. Rincer la bouche. Ne PAS faire vomir. EN CAS DE CONTACT AVEC LA PEAU (ou les cheveux) : Enlever immédiatement tous les vêtements contaminés. Rincer la peau à l'eau. EN CAS D'INHALATION : Transporter la personne à l'extérieur et la maintenir dans une position où elle peut confortablement respirer. EN CAS DE CONTACT AVEC LES YEUX: Rincer avec précaution à l'eau pendant plusieurs minutes. Enlever les lentilles de contact si la victime en porte et si elles peuvent être facilement enlevées. Continuer à rincer. EN CAS d'exposition prouvée ou suspectée : Appeler un CENTRE ANTIPOISON/un médecin. En cas d'irritation cutanée : Demander un avis médical/Consulter un médecin. Si l'irritation des yeux persiste : Demander un avis médical/Consulter un médecin. Enlever les vêtements contaminés et les laver avant réutilisation. En cas d'incendie : utiliser un agent d'extinction approprié. Recueillir le produit répandu.

Stockage Stocker dans un endroit bien ventilé. Tenir au frais. Garder sous clef.

Élimination Éliminer le contenu/récipient conformément à la réglementation locale/régionale/nationale/internationale.

Autres dangers Aucun(e) connu(e).

Renseignements supplémentaires Aucune.

3. Composition/information sur les ingrédients

Mélanges

Dénomination chimique	Nom commun et synonymes	Numéro d'enregistrement CAS	%
Carburants diesel		68334-30-5	0 - 100
Carburants, DIESEL, C9-18-alkane branched and linear		1159170-26-9	0 - 30

Autres composants	Numéro d'enregistrement CAS	%
Nonane	111-84-2	≤ 3
Octane	111-65-9	≤ 2
Toluène	108-88-3	≤ 1
Xylène	1330-20-7	≤ 1
Éthylbenzène	100-41-4	≤ 1

Remarques sur la composition Toutes les concentrations sont exprimées en pourcentage massique.

4. Premiers soins

Inhalation Transporter la victime à l'extérieur et la maintenir au repos dans une position où elle peut confortablement respirer. Oxygène ou respiration artificielle si nécessaire. Appeler un CENTRE ANTIPOISON ou un médecin en cas de malaise.

Contact avec la peau	Enlever immédiatement tous les vêtements contaminés. Rincer la peau à l'eau/se doucher. En cas d'irritation cutanée : Demander un avis médical/Consulter un médecin. Laver les vêtements contaminés avant réutilisation.
Contact avec les yeux	Rincer immédiatement les yeux abondamment à l'eau pendant au moins 15 minutes. Enlever les lentilles de contact si la victime en porte et si elles peuvent être facilement enlevées. Continuer à rincer. Consulter un médecin si une irritation se développe et persiste.
Ingestion	Appeler immédiatement un médecin ou un centre antipoison. Rincer la bouche. Ne pas faire vomir. En cas de vomissement, garder la tête basse pour éviter une pénétration du contenu de l'estomac dans les poumons.
Symptômes et effets les plus importants, qu'ils soient aigus ou retardés	L'aspiration peut provoquer un oedème pulmonaire et une pneumonite. Irritation oculaire grave. Les symptômes peuvent inclure un picotement, un larmoiement, une rougeur, un gonflement et une vision trouble. Irritation de la peau. Peut provoquer des rougeurs et des douleurs. Ictère. Une exposition prolongée peut causer des effets chroniques.
Mention de la nécessité d'une prise en charge médicale immédiate ou d'un traitement spécial, si nécessaire	Donner des soins généraux et traiter en fonction des symptômes. Brûlures thermiques : Rincer immédiatement avec de l'eau. Tout en rinçant, retirer les vêtements qui ne collent pas à la zone touchée. Appeler une ambulance. Continuer à rincer pendant le transport vers l'hôpital. Garder la victime au chaud. Garder la victime en observation. Les symptômes peuvent être retardés.
Informations générales	Enlever immédiatement tous les vêtements contaminés. EN CAS d'exposition prouvée ou suspectée : Demander un avis médical/Consulter un médecin. En cas de malaise, demander un avis médical (montrer l'étiquette du produit lorsque possible). S'assurer que le personnel médical est averti du (des) produits(s) en cause et qu'il prend des mesures pour se protéger. Présenter cette fiche de données de sécurité au médecin traitant. Laver les vêtements contaminés avant réutilisation.

5. Mesures à prendre en cas d'incendie

Agents extincteurs appropriés	Brouillard d'eau. Mousse. Poudre chimique. Dioxyde de carbone (CO_2).
Agents extincteurs inappropriés	Ne pas utiliser un jet d'eau comme agent extincteur, car cela propagera l'incendie.
Dangers spécifiques du produit dangereux	Les vapeurs peuvent former des mélanges explosifs avec l'air. Les vapeurs peuvent se déplacer sur une distance considérable jusqu'à une source d'ignition et provoquer un retour de flammes. Des gaz dangereux pour la santé peuvent se former pendant un incendie.
Équipements de protection spéciaux et précautions spéciales pour les pompiers	Porter un appareil respiratoire autonome et un vêtement de protection complet en cas d'incendie.
Équipement/directives de lutte contre les incendies	En cas d'incendie et/ou d'explosion ne pas respirer les fumées. Éloigner les récipients du lieu de l'incendie si cela peut se faire sans risque.
Méthodes particulières d'intervention	Utiliser des procédures standard en cas d'incendie et tenir compte des dangers des autres substances en cause.
Risques d'incendie généraux	Liquide et vapeur inflammables.

6. Mesures à prendre en cas de déversement accidentel

Précautions individuelles, équipements de protection et mesures d'urgence	Tenir à l'écart le personnel non requis. Ternir les gens à l'écart de l'endroit du déversement/de la fuite et en amont du vent. Éliminer toutes les sources d'ignition (pas de cigarettes, de torches, d'étincelles ou de flammes dans la zone immédiate). Porter un équipement et des vêtements de protection appropriés durant le nettoyage. Ne pas respirer les brouillards ou les vapeurs. Ne pas toucher les récipients endommagés ou le produit déversé à moins de porter des vêtements de protection appropriés. Ventiler les espaces clos avant d'y entrer. Prévenir les autorités locales si des fuites significatives ne peuvent pas être contenues. Pour la protection individuelle, voir la section 8 de la FDS.

Méthodes et matériaux pour le confinement et le nettoyage

Éliminer toutes les sources d'ignition (pas de cigarettes, de torches, d'étincelles ou de flammes dans la zone immédiate). Tenir les matières combustibles (bois, papier, huile, etc.) à l'écart du produit déversé. Prendre des mesures de précaution contre les décharges électrostatiques. Utiliser d'outils ne produisant pas des étincelles. Empêcher l'entrée dans les cours d'eau, les égouts, les sous-sols ou les zones confinées.

Déversements importants : Arrêter l'écoulement de la substance, si cela peut se faire sans risque. Endiguer le matériau déversé, lorsque cela est possible. Utiliser un matériau non combustible comme la vermiculite, le sable ou la terre pour absorber le produit et le mettre dans un récipient pour élimination ultérieure. Après avoir récupéré le produit, rincer la zone à l'eau.

Déversements peu importants : Absorber avec de la terre, du sable ou une autre matière non combustible et transférer dans des contenants pour une élimination ultérieure. Essuyer avec une matière absorbante (par ex., tissu, lainage). Nettoyer la surface à fond pour éliminer la contamination résiduelle.

Ne jamais réintroduire le produit répandu dans son récipient d'origine en vue d'une réutilisation. Mettre le matériau dans des récipients appropriés, couverts et étiquetés. Pour l'élimination des déchets, voir la section 13 de la FDS.

Précautions relatives à l'environnement

Éviter le rejet dans l'environnement. Informer le personnel de direction et de supervision de tous les rejets dans l'environnement. Empêcher d'autres fuites ou déversements lorsqu'il est possible de le faire en toute sécurité. Éviter le rejet dans les égouts, les cours d'eau ou sur le sol.

7. Manutention et stockage

Précautions relatives à la sûreté en matière de manutention

Se procurer les instructions avant utilisation. Ne pas manipuler avant d'avoir lu et compris toutes les précautions de sécurité. Ne pas manipuler, stocker ou ouvrir près d'une flamme nue, d'une source de chaleur ou d'autres sources d'ignition. Protéger le produit du rayonnement solaire direct. Ventilation par aspiration antidéflagrante locale et générale. Prendre des mesures de précaution contre les décharges électrostatiques. Tout matériel utilisé pour la manutention de ce produit doit être mis à la terre. Utiliser d'outils ne produisant pas d'étincelles et du matériel antidéflagrant. Ne pas respirer les brouillards ou les vapeurs. Ne pas goûter ni avaler. Éviter tout contact avec les yeux, la peau et les vêtements. Éviter une exposition prolongée. Ne pas manger, ne pas boire et ne pas fumer pendant l'utilisation. Doit être manipulé dans des systèmes fermés, si possible. Utiliser seulement en plein air ou dans un endroit bien ventilé. Porter un équipement de protection individuelle approprié. Se laver les mains soigneusement après manipulation. Éviter le rejet dans l'environnement. Observer de bonnes pratiques d'hygiène industrielle.

Conditions de sûreté en matière de stockage, y compris les incompatibilités

Garder sous clef. Tenir à l'écart de la chaleur, des étincelles et des flammes nues. Empêcher l'accumulation de charges électrostatiques en utilisant des techniques de mise à la masse et de raccordement communes. Stocker dans un endroit frais et sec, à l'écart de la lumière solaire directe. Stocker dans des récipients d'origine fermés de manière étanche. Stocker dans un endroit bien ventilé. Conserver dans un endroit muni de gicleurs. Entreposer à l'écart des substances incompatibles (consulter la section 10 de la FDS).

8. Contrôle de l'exposition/protection individuelle

Limites d'exposition professionnelle

ÉTATS-UNIS. Valeurs limites d'exposition de l'ACGIH

Composants	Type	Valeur	Forme
Carburants diesel (CAS 68334-30-5)	TWA	100 mg/m3	Fraction inhalable et vapeur.
Autres composants	**Type**	**Valeur**	
Nonane (CAS 111-84-2)	TWA	200 ppm	
Octane (CAS 111-65-9)	TWA	300 ppm	
Toluène (CAS 108-88-3)	TWA	20 ppm	
Xylène (CAS 1330-20-7)	STEL	150 ppm	
	TWA	100 ppm	
Éthylbenzène (CAS 100-41-4)	TWA	20 ppm	

Canada. LEMT pour l'Alberta (Code de l'hygiène et de la sécurité au travail, Annexe 1, Tableau 2)

Composants	Type	Valeur
Carburants diesel (CAS 68334-30-5)	TWA	100 mg/m3
Autres composants	**Type**	**Valeur**
Nonane (CAS 111-84-2)	TWA	1050 mg/m3
		200 ppm

Canada. LEMT pour l'Alberta (Code de l'hygiène et de la sécurité au travail, Annexe 1, Tableau 2)

Autres composants	Type	Valeur
Octane (CAS 111-65-9)	TWA	1400 mg/m3
		300 ppm
Toluène (CAS 108-88-3)	TWA	188 mg/m3
		50 ppm
Xylène (CAS 1330-20-7)	STEL	651 mg/m3
		150 ppm
	TWA	434 mg/m3
		100 ppm
Éthylbenzène (CAS 100-41-4)	STEL	543 mg/m3
		125 ppm
	TWA	434 mg/m3
		100 ppm

Canada. LEMT pour la Colombie-Britannique. (Valeurs limites d'exposition en milieu de travail pour les substances chimiques, Réglementation sur la santé et sécurité au travail 296/97, ainsi modifiée

Composants	Type	Valeur	Forme
Carburants diesel (CAS 68334-30-5)	TWA	100 mg/m3	Vapeur et aérosol.

Autres composants	Type	Valeur
Nonane (CAS 111-84-2)	TWA	200 ppm
Octane (CAS 111-65-9)	TWA	300 ppm
Toluène (CAS 108-88-3)	TWA	20 ppm
Xylène (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm
Éthylbenzène (CAS 100-41-4)	TWA	20 ppm

Canada. LEMT de Manitoba (Règlement 217/2006, Loi sur la sécurité et l'hygiène du travail)

Composants	Type	Valeur	Forme
Carburants diesel (CAS 68334-30-5)	TWA	100 mg/m3	Fraction inhalable et vapeur.

Autres composants	Type	Valeur
Nonane (CAS 111-84-2)	TWA	200 ppm
Octane (CAS 111-65-9)	TWA	300 ppm
Toluène (CAS 108-88-3)	TWA	20 ppm
Xylène (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm
Éthylbenzène (CAS 100-41-4)	TWA	20 ppm

Canada. LEMT pour l'Ontario. (Contrôle de l'exposition à des agents biologiques et chimiques)

Composants	Type	Valeur	Forme
Carburants diesel (CAS 68334-30-5)	TWA	100 mg/m3	Fraction inhalable et vapeur.

Autres composants	Type	Valeur
Nonane (CAS 111-84-2)	TWA	200 ppm
Octane (CAS 111-65-9)	TWA	300 ppm
Toluène (CAS 108-88-3)	TWA	20 ppm
Xylène (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm
Éthylbenzène (CAS 100-41-4)	TWA	20 ppm

Canada. LEMT du Québec, (Ministère du Travail. Règlement sur la santé et la sécurité du travail)

Autres composants	Type	Valeur
Nonane (CAS 111-84-2)	TWA	1050 mg/m3
		200 ppm
Octane (CAS 111-65-9)	STEL	1750 mg/m3

Canada. LEMT du Québec, (Ministère du Travail. Règlement sur la santé et la sécurité du travail)

Autres composants	Type	Valeur
		375 ppm
	TWA	1400 mg/m3
		300 ppm
Toluène (CAS 108-88-3)	TWA	188 mg/m3
		50 ppm
Xylène (CAS 1330-20-7)	STEL	651 mg/m3
		150 ppm
	TWA	434 mg/m3
		100 ppm
Éthylbenzène (CAS 100-41-4)	STEL	543 mg/m3
		125 ppm
	TWA	434 mg/m3
		100 ppm

Valeurs biologiques limites

Indices d'exposition biologique de l'ACGIH

Autres composants	Valeur	Déterminant	Échantillon	Temps d'échantillonnage
Toluène (CAS 108-88-3)	0.3 mg/g	o-crésol, avec hydrolyse	Créatinine dans l'urine	*
	0.03 mg/l	Toluène	Urine	*
	0.02 mg/l	Toluène	Sang	*
Xylène (CAS 1330-20-7)	1.5 g/g	Acides méthylhippuriques	Créatinine dans l'urine	*
Éthylbenzène (CAS 100-41-4)	0.15 g/g	Somme de l'acide mandélique et de l'acide phénylglyoxylique	Créatinine dans l'urine	*

* - Pour des détails sur l'échantillonnage, veuiller consulter le document source.

Directives au sujet de l'exposition

Canada - LEMT pour l'Alberta : Désignation cutanée

Toluène (CAS 108-88-3) Peut être absorbé par la peau.

Canada - LEMT pour la Colombie-Britannique : Désignation cutanée

Carburants diesel (CAS 68334-30-5) Peut être absorbé par la peau.

Canada - LEMT pour le Manitoba : Désignation cutanée

Carburants diesel (CAS 68334-30-5) Peut être absorbé par la peau.

Canada - LEMT pour l'Ontario : Désignation cutanée

Carburants diesel (CAS 68334-30-5) Peut être absorbé par la peau.

Canada - LEMT pour le Québec : Désignation cutanée

Toluène (CAS 108-88-3) Peut être absorbé par la peau.

Canada - LEMT pour la Saskatchewan : Désignation cutanée

Carburants diesel (CAS 68334-30-5) Peut être absorbé par la peau.
Toluène (CAS 108-88-3) Peut être absorbé par la peau.

États-Unis - Valeurs limites d'exposition de l'ACGIH : Désignation cutanée

Carburants diesel (CAS 68334-30-5) Peut être absorbé par la peau.

Contrôles d'ingénierie appropriés

Ventilation par aspiration antidéflagrante locale et générale. Il faut utiliser une bonne ventilation générale (habituellement dix changements d'air l'heure). Les débits de ventilation doivent être adaptés aux conditions. S'il y a lieu, utiliser des enceintes d'isolement, une ventilation locale ou d'autres mesures d'ingénierie pour maintenir les concentrations atmosphériques sous les limites d'exposition recommandées. Si des limites d'exposition n'ont pas été établies, maintenir les concentrations atmosphériques à un niveau acceptable. Des douches oculaires et d'urgence sont recommandées.

Mesures de protection individuelle, telles que les équipements de protection individuelle

Protection du visage/des yeux Il est recommandé de porter des lunettes de protection chimique.

Protection de la peau	
Protection des mains	Porte des vêtements appropriés résistants aux produits chimiques On recommande des gants en Viton ou en caoutchouc nitrile.
Autre	Porter des gants appropriés résistants aux produits chimiques Il est recommandé d'utiliser un tablier imperméable.
Protection respiratoire	Respirateur chimique à cartouche contre les vapeurs organiques et masque complet.
Dangers thermiques	Porter des vêtements de protection thermique appropriés, au besoin.
Considérations d'hygiène générale	Suivre toutes les exigences de surveillance médicale. Ne pas fumer pendant l'utilisation. Tenir à l'écart des aliments et des boissons. Toujours adopter de bonnes pratiques d'hygiène personnelle, comme se laver après avoir manipulé la substance et avant de manger, de boire ou de fumer. Laver régulièrement les vêtements de travail et l'équipement de protection pour éliminer les contaminants

9. Propriétés physiques et chimiques

Apparence	
État physique	Liquide.
Forme	Liquide.
Couleur	Clair à jaune paille.
Odeur	Non disponible.
Seuil olfactif	Non disponible.
pH	Non disponible.
Point de fusion et point de congélation	Non disponible.
Point initial d'ébullition et domaine d'ébullition	145 - 375 °C (293 - 707 °F)
Point d'éclair	>= 40.0 °C (>= 104.0 °F)
Taux d'évaporation	0.2 AcBu
Inflammabilité (solides et gaz)	Sans objet.
Limites supérieures et inférieures d'inflammabilité ou d'explosibilité	
Limites d'inflammabilité - inférieure (%)	0.7 %
Limites d'inflammabilité - supérieure (%)	5 %
Tension de vapeur	0.27 kPa à 15 deg C
Densité de vapeur	Non disponible.
Densité relative	0.78 - 0.88 g/mL
Solubilité	
Solubilité (eau)	Non disponible.
Coefficient de partage n-octanol/eau	Non disponible.
Température d'auto-inflammation	> 220 °C (> 428 °F)
Température de décomposition	Non disponible.
Viscosité	1.3 - 4.1 cSt (40 °C)
Autres informations	
Propriétés explosives	Non explosif.
Propriétés comburantes	Non oxydant.

10. Stabilité et réactivité

Réactivité	Le produit est stable et non réactif dans des conditions normales d'utilisation, d'entreposage et de transport.
Stabilité chimique	La substance est stable dans des conditions normales.

Risque de réactions dangereuses	Une polymérisation dangereuse ne se produit pas.
Conditions à éviter	Éviter la chaleur, les étincelles, les flammes nues et de toute autre source d'ignition. Éviter les températures supérieures au point d'éclair. Contact avec des matériaux incompatibles.
Matériaux incompatibles	Agents comburants forts.
Produits de décomposition dangereux	Aucun produit dangereux de décomposition n'est connu.

11. Données toxicologiques

Renseignements sur les voies d'exposition probables

Inhalation	Nocif par inhalation. Risque présumé d'effets graves pour les organes par inhalation. Risque présumé d'effets graves pour les organes à la suite d'expositions répétées ou d'une exposition prolongée par inhalation.
Contact avec la peau	Provoque une irritation cutanée.
Contact avec les yeux	Provoque une sévère irritation des yeux.
Ingestion	Nocif en cas d'ingestion. L'aspiration de gouttelettes du produit dans les poumons par ingestion ou vomissement peut provoquer une pneumonie chimique grave.
Les symptômes correspondant aux caractéristiques physiques, chimiques et toxicologiques	L'aspiration peut provoquer un oedème pulmonaire et une pneumonite. Irritation oculaire grave. Les symptômes peuvent inclure un picotement, un larmoiement, une rougeur, un gonflement et une vision trouble. Irritation de la peau. Peut provoquer des rougeurs et des douleurs. Ictère.

Renseignements sur les effets toxicologiques

Toxicité aiguë	Peut être mortel en cas d'ingestion et de pénétration dans les voies respiratoires. Nocif par inhalation.

Données toxicologiques

Autres composants	Espèces	Résultats d'épreuves
Toluène (CAS 108-88-3)		
Aiguë		
Cutané		
DL50	Lapin	12200 mg/kg
Inhalation		
Vapeur		
CL50	Rat	28.1 mg/l, 4 heures
Xylène (CAS 1330-20-7)		
Aiguë		
Orale		
DL50	Rat	3523 mg/kg
Éthylbenzène (CAS 100-41-4)		
Aiguë		
Cutané		
DL50	Lapin	15400 mg/kg
Inhalation		
CL50	Rat	17.4 mg/l, 4 heures
Orale		
DL50	Rat	3500 - 4700 mg/kg

Corrosion cutanée/irritation cutanée	Provoque une irritation cutanée.
Lésions oculaires graves/irritation oculaire	Provoque une sévère irritation des yeux.

Sensibilisation respiratoire ou cutanée

Canada - LEMT pour l'Alberta : Irritant

Octane (CAS 111-65-9)	Irritant

Sensibilisation respiratoire	Pas un sensibilisant respiratoire.
Sensibilisation cutanée	On ne s'attend pas à ce que ce produit provoque une sensibilisation cutanée.

Mutagénicité sur les cellules germinales Il n'existe pas de données qui indiquent que ce produit, ou tout composant présent à des taux de plus de 0,1 %, soit mutagène ou génétoxique.

Cancérogénicité Susceptible de provoquer le cancer.

Carcinogènes selon l'ACGIH

Carburants diesel (CAS 68334-30-5)	A3 Cancérogène confirmé chez les animaux, mais inconnu chez l'homme.
Éthylbenzène (CAS 100-41-4)	A3 Cancérogène confirmé chez les animaux, mais inconnu chez l'homme.
Toluène (CAS 108-88-3)	A4 Ne peut pas être classé quant à sa cancérogénicité pour l'homme.
Xylène (CAS 1330-20-7)	A4 Ne peut pas être classé quant à sa cancérogénicité pour l'homme.

Canada - LEMT pour le Manitoba : cancérogénicité

Carburants diesel (CAS 68334-30-5)	Cancérogène confirmé chez les animaux, mais inconnu chez l'homme.
Éthylbenzène (CAS 100-41-4)	Cancérogène confirmé chez les animaux, mais inconnu chez l'homme.
Toluène (CAS 108-88-3)	Ne peut pas être classé quant à sa cancérogénicité pour l'homme.
Xylène (CAS 1330-20-7)	Ne peut pas être classé quant à sa cancérogénicité pour l'homme.

Monographies du CIRC. Évaluation globale de la cancérogénicité

Éthylbenzène (CAS 100-41-4)	2B Peut-être cancérogène pour l'homme.
Toluène (CAS 108-88-3)	3 Inclassable quant à sa cancérogénicité pour l'homme.
Xylène (CAS 1330-20-7)	3 Inclassable quant à sa cancérogénicité pour l'homme.

Toxicité pour la reproduction On ne s'attend pas à ce que ce produit présente des effets sur la reproduction ou le développement.

Toxicité pour certains organes cibles - exposition unique Risque avéré d'effets graves pour les organes.

Toxicité pour certains organes cibles - expositions répétées Risque présumé d'effets graves pour les organes (Sang, Foie, Thymus) à la suite d'expositions répétées ou d'une exposition prolongée.

Danger par aspiration Peut être mortel en cas d'ingestion et de pénétration dans les voies respiratoires.

Effets chroniques Risque présumé d'effets graves pour les organes à la suite d'expositions répétées ou d'une exposition prolongée. Toute inhalation prolongée peut être nocive.

12. Données écologiques

Écotoxicité Toxique pour les organismes aquatiques, entraîne des effets néfastes à long terme.

Composants		Espèces	Résultats d'épreuves
Carburants diesel (CAS 68334-30-5)			
Aquatique			
Aiguë			
Crustacés	DE50	Daphnia	13 mg/l, 48 heures
Poisson	DL50	Oncorhynchus mykiss	21 mg/l, 96 heures

Autres composants		Espèces	Résultats d'épreuves
Octane (CAS 111-65-9)			
Aquatique			
Crustacés	CL50	Daphnia magna	0.38 mg/l, 48 heures
Toluène (CAS 108-88-3)			
Aquatique			
Aiguë			
Crustacés	CE50	Daphnia magna	11.5 mg/l, 48 heures
Poisson	CL50	Oncorhynchus kisutch	5.5 mg/l, 96 heures
Chronique			
Crustacés	NOEC (concentration sans effet observé)	Ceriodaphnia dubia	0.74 mg/l, 7 Jours

Autres composants		Espèces	Résultats d'épreuves
Poisson	NOEC (concentration sans effet observé)	Oncorhynchus kisutch	1.4 mg/l, 40 Jours
Xylène (CAS 1330-20-7)			
Aquatique			
Poisson	CL50	Truite arc-en-ciel (Oncorhynchus mykiss)	2.6 mg/l, 96 heures
Éthylbenzène (CAS 100-41-4)			
Aquatique			
Aiguë			
Crustacés	CE50	Puce d'eau (daphnia magna)	1.81 - 2.38 mg/l, 48 heures
Poisson	CL50	Truite arc-en-ciel (Oncorhynchus mykiss)	4.2 mg/l, 96 heures
Chronique			
Crustacés	CE50	Ceriodaphnia dubia	3.6 mg/l, 7 Jours

Persistance et dégradation Aucune donnée n’est disponible sur la dégradabilité du produit.

Potentiel de bioaccumulation Aucune donnée disponible.

Mobilité dans le sol Composé supposé mobile dans le sol.

Autres effets nocifs Aucune donnée disponible.

13. Données sur l’élimination

Instructions pour l'élimination Recueillir et réutiliser ou éliminer dans des récipients scellés dans un site d’élimination des déchets autorisé. Ne pas laisser la substance
s'infiltrer dans les égoûts/les conduits d'alimentation en eau. Ne pas contaminer les étangs, les voies navigables ou les fossés avec le produit ou le récipient utilisés. Éliminer le contenu/récipient conformément à la réglementation locale/régionale/nationale/internationale.

Règlements locaux d’élimination Détruire conformément àtoutes les réglementations applicables.

Code des déchets dangereux Les codes de déchets doivent être attribués dans le cadre d'une consultation entre l'utilisateur, le fabricant et l'entreprise de décharge.

Déchets des résidus / produits non utilisés Éliminer conformément à la réglementation locale. Les récipients ou pochettes vides peuvent conserver certains résidus de produit. Éliminer ce produit et son récipient d'une manière sûre (voir : instructions d'élimination).

Emballages contaminés Comme les récipients vides peuvent contenir un résidu du produit, suivre les avertissements de l’étiquette, même une fois le récipient vide. Les contenants vides doivent être acheminés vers une installation certifiée de traitement des déchets en vue de leur élimination ou recyclage.

14. Informations relatives au transport

TMD

Numéro ONU UN1202

Désignation officielle de transport de l’ONU DIESEL, (MARINE POLLUTANT)

Classe de danger relative au transport

Classe Liquide combustible

Danger subsidiaire -

Groupe d'emballage III

Dangers environnementaux Oui

Précautions spéciales pour l'utilisateur Lire les instructions de sécurité, la FDS et les procédures d’urgence avant de manipuler.

IATA

UN number UN1202

UN proper shipping name Gas oil, (Marine Pollutant)

Transport hazard class(es)

Class 3

Subsidiary risk -

Packing group III

Environmental hazards Yes

ERG Code 3L

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number UN1202

UN proper shipping name DIESEL FUEL, (MARINE POLLUTANT)

Transport hazard class(es)

Class 3

Subsidiary risk -

Packing group III

Environmental hazards

Marine pollutant Yes

EmS F-E, S-E

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Transport en vrac selon l'Annexe II de MARPOL 73/78 et le recueil IBC Non déterminé(e).

Informations générales Polluant marin réglementé par l'IMDG.

15. Informations sur la réglementation

Réglementation canadienne Ce produit a été classé conformément aux critères de danger énoncés dans le Règlement sur les produits dangereux et la FDS contient tous les renseignements exigés par le Règlement sur les produits dangereux.

Loi réglementant certaines drogues et autres substances

Non réglementé.

Liste des marchandises d'exportation contrôlée (LCPE 1999, Annexe 3)

Non inscrit.

Gaz à effet de serre

Non inscrit.

Ontario. Substances toxiques. Loi sur la réduction des toxiques, 2009. Règlement 455/09 (1er juillet 2011)

Éthylbenzène (CAS 100-41-4)
Toluène (CAS 108-88-3)
Xylène (CAS 1330-20-7)

Règlements sur les précurseurs

Toluène (CAS 108-88-3)	Classe B

Règlements internationaux

Convention de Stockholm

Sans objet.

Convention de Rotterdam

Sans objet.

Protocole de Kyoto

Sans objet.

Protocole de Montréal

Sans objet.

Convention de Bâle

Sans objet.

Inventaires Internationaux

Pays ou région	Nom de l'inventaire	En stock (Oui/Non)*
Australie	Inventaire australien des substances chimiques (AICS)	Non
Canada	Liste intérieure des substances (LIS)	Non
Canada	Liste extérieure des substances (LES)	Oui
Chine	Inventaire des substances chimiques existantes en Chine (IECSC)	Non
Europe	Inventaire européen des substances chimiques commerciales existantes (EINECS)	Non
Europe	Liste européenne des substances chimiques notifiées (ELINCS)	Non

Pays ou région	Nom de l’inventaire	En stock (Oui/Non)*
Japon	Inventaire des substances chimiques existantes et nouvelles (ENCS)	Non
Corée	Liste des produits chimiques existants (ECL)	Non
Nouvelle-Zélande	Inventaire de la Nouvelle-Zélande	Non
Philippines	Inventaire philippin des produits et substances chimiques (PICCS)	Non
Taïwan	Inventaire des substances chimiques de Taïwan (TCSI)	Non
États-Unis et Porto Rico	Inventaire du TSCA (Toxic Substances Controls Act - Loi réglementant les substances toxiques)	Oui

*Un « Oui » indique que ce produit est conforme aux exigences de l’inventaire administré par le(s) pays ayant compétence.
Un « Non » indique qu'un ou plusieurs composant(s) du produit n'est/ne sont pas inscrit(s) ou exempt(s) d'une inscription sur l'inventaire administré par le(s) pays ayant compétence.

16. Autres informations

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Date de la révision 15-Mars-2018

Version n° 02

Avis de non-responsabilité Énergie Valero Inc. ne peut prévoir toutes les conditions d'utilisation des présentes informations et de son produit, ou des produits d'autres fabricants associés à son produit. Il relève de la responsabilité de l'utilisateur de veiller à assurer une manipulation, un entreposage et une élimination du produit en toute sécurité. L'utilisateur est responsable en cas de perte, de blessure, de dommage ou de frais causés par une utilisation inadéquate. Les renseignements contenus dans cette fiche ont été écrits selon les meilleures connaissances et la meilleure expérience actuellement disponibles.

FICHE DE DONNÉES DE SÉCURITÉ

1. Identification

Identificateur de produit	**Essence sans plomb**
Autres moyens d'identification	
Numéro de la FDS	0100
Numéro d'enregistrement CAS	86290-81-5
Synonymes	La présente fiche signalétique concerne les descriptions des produits ci-dessous à des fins de communication des risques seulement. Les spécifications techniques peuvent varier grandement selon le produit et ne font pas partie du présent document. Veuillez consulter les fiches techniques pertinentes à ce sujet. Essence Ordinaire sans plomb (sans plomb) - tous les indices d'octane, tensions de vapeur et mélanges d'éthanol. Essence Plus (intermédiaire) sans plomb - tous les indices d'octane, tension de vapeur et mélanges d'éthanol. Essence Suprême (Super) sans plomb - tous les indices d'octane, tension de vapeur et mélanges d'éthanol.
Usage recommandé	Carburant.
Restrictions d'utilisation	Aucun(e) connu(e).

Renseignements sur le fabricant/importateur/fournisseur/distributeur

Fabricant/fournisseur	Énergie Valero Inc. 1801 McGill College, 13e étage Montreal, Quebec H3A 2N4
Information générale	1-800-295-0391
Urgences 24 heures	Canutec (613) 996-6666
Centre anti-poison du Nouveau Brunswick	(506) 857-5555
Centre anti-poison de Terre-Neuve	(709) 722-1110
Centre anti-poison de Nouvelle Écosse / IPE	1-800-565-8161
Centre anti-poison de l'Ontario	1-800-267-1373 (Ottawa) 1-800-268-9017 (Toronto)
Centre anti-poison du Québec	1-800-463-5060

2. Identification des dangers

Dangers physiques	Liquides inflammables	Catégorie 1
	Dangers physiques non classifiés ailleurs	Catégorie 1
Dangers pour la santé	Corrosion cutanée/irritation cutanée	Catégorie 2
	Mutagénicité sur les cellules germinales	Catégorie 1B
	Cancérogénicité	Catégorie 1B
	Toxicité pour la reproduction	Catégorie 2
	Toxicité pour certains organes cibles - exposition unique	Catégorie 3 - effets narcotiques
	Danger par aspiration	Catégorie 1
Dangers environnementaux	Dangereux pour le milieu aquatique, danger à long terme	Catégorie 2

Éléments d'étiquetage

Mention d'avertissement Danger

Mention de danger Liquide et vapeur extrêmement inflammables. Peut être mortel en cas d'ingestion et de pénétration dans les voies respiratoires. Provoque une irritation cutanée. Peut provoquer somnolence ou des vertiges. Peut induire des anomalies génétiques. Peut provoquer le cancer. Susceptible de nuire à la fertilité ou au fœtus. Toxique pour les organismes aquatiques, entraîne des effets néfastes à long terme. Présente un danger physique qui est non classé ailleurs.

Conseil de prudence

Prévention Se procurer les instructions avant utilisation. Ne pas manipuler avant d'avoir lu et compris toutes les précautions de sécurité. Tenir à l'écart de la chaleur, des surfaces chaudes, des étincelles, des flammes nues et de toute autre source d'ignition. Ne pas fumer. Maintenir le récipient fermé de manière étanche. Mise à la terre et liaison équipotentielle du récipient et du matériel de réception. Utiliser du matériel électrique/de ventilation/d'éclairage antidéflagrant. Utiliser d'outils ne produisant pas des étincelles. Prendre des mesures contre les décharges électrostatiques. Éviter de respirer les poussières/fumées/gaz/brouillards/vapeurs/aérosols. Se laver soigneusement après manipulation. Utiliser seulement en plein air ou dans un endroit bien ventilé. Éviter le rejet dans l'environnement. Porter des gants de protection/des vêtements de protection/un équipement de protection des yeux/du visage.

Intervention EN CAS D'INGESTION: Appeler immédiatement un CENTRE ANTIPOISON/un médecin. Ne PAS faire vomir. EN CAS DE CONTACT AVEC LA PEAU (ou les cheveux) : Enlever immédiatement tous les vêtements contaminés. Rincer la peau à l'eau. En cas d'irritation cutanée : Demander un avis médical/Consulter un médecin. EN CAS D'INHALATION : Transporter la personne à l'extérieur et la maintenir dans une position où elle peut confortablement respirer. EN CAS d'exposition prouvée ou suspectée : Demander un avis médical/Consulter un médecin. Appeler un CENTRE ANTIPOISON/un médecin en cas de malaise. Enlever les vêtements contaminés et les laver avant réutilisation. En cas d'incendie : utiliser un agent d'extinction approprié. Recueillir le produit répandu.

Stockage Tenir au frais. Stocker dans un endroit bien ventilé. Maintenir le récipient fermé de manière étanche. Garder sous clef.

Élimination Éliminer le contenu/récipient conformément à la réglementation locale/régionale/nationale/internationale.

Autres dangers Aucun(e) connu(e).

Renseignements supplémentaires Aucune.

3. Composition/information sur les ingrédients

Substances

Dénomination chimique	Nom commun et synonymes	Numéro d'enregistrement CAS	%
Essence		86290-81-5	0 - 100

Constituants	Numéro d'enregistrement CAS	%
Toluène	108-88-3	0 - 25
Xylène	1330-20-7	0 - 20
Butane	106-97-8	0 - 20
Octane	111-65-9	0 - 18
2-méthylbutane	78-78-4	0 - 15
Éthanol	64-17-5	0 - 10
Heptane	142-82-5	0 - 5
n-Hexane	110-54-3	0 - 5
1,2,4-triméthylbenzène	95-63-6	0 - 5
Éthylbenzène	100-41-4	0 - 4

Constituants	Numéro d'enregistrement CAS	%
Cyclohexane	110-82-7	0 - 3
Benzène	71-43-2	0 - 1.5

Remarques sur la composition L'essence est un mélange complexe d'hydrocarbures issus de plusieurs procédés chimiques mélangés selon les spécifications standards du produit.

4. Premiers soins

Inhalation Transporter la victime à l'extérieur et la maintenir au repos dans une position où elle peut confortablement respirer. Appeler un CENTRE ANTIPOISON ou un médecin en cas de malaise.

Contact avec la peau Enlever immédiatement tous les vêtements contaminés. Rincer la peau à l'eau/se doucher. En cas d'irritation cutanée : Demander un avis médical/Consulter un médecin. Laver les vêtements contaminés avant réutilisation.

Contact avec les yeux Rincer immédiatement les yeux abondamment à l'eau pendant au moins 15 minutes. Enlever les lentilles de contact si la victime en porte et si elles peuvent être facilement enlevées. Consulter un médecin si une irritation se développe et persiste.

Ingestion Appeler immédiatement un médecin ou un centre antipoison. Rincer la bouche. Ne pas faire vomir. En cas de vomissement, garder la tête basse pour éviter une pénétration du contenu de l'estomac dans les poumons.

Symptômes et effets les plus importants, qu'ils soient aigus ou retardés L'aspiration peut provoquer un oedème pulmonaire et une pneumonite. Peut provoquer somnolence et des vertiges. Maux de tête. Nausée, vomissements. Le contact direct avec les yeux peut causer une irritation temporaire. Irritation de la peau. Peut provoquer des rougeurs et des douleurs.

Mention de la nécessité d'une prise en charge médicale immédiate ou d'un traitement spécial, si nécessaire Donner des soins généraux et traiter en fonction des symptômes. Brûlures thermiques : Rincer immédiatement avec de l'eau. Tout en rinçant, retirer les vêtements qui ne collent pas à la zone touchée. Appeler une ambulance. Continuer à rincer pendant le transport vers l'hôpital. Garder la victime en observation. Les symptômes peuvent être retardés.

Informations générales Enlever immédiatement tous les vêtements contaminés. EN CAS d'exposition prouvée ou suspectée : Demander un avis médical/Consulter un médecin. En cas de malaise, demander un avis médical (montrer l'étiquette du produit lorsque possible). S'assurer que le personnel médical est averti du (des) produits(s) en cause et qu'il prend des mesures pour se protéger. Présenter cette fiche de données de sécurité au médecin traitant. Laver les vêtements contaminés avant réutilisation.

5. Mesures à prendre en cas d'incendie

Agents extincteurs appropriés Eau pulvérisée. Brouillard d'eau. Mousse. Poudre chimique. Dioxyde de carbone (CO_2).

Agents extincteurs inappropriés Ne pas utiliser un jet d'eau concentré, car il pourrait disperser et propager le feu.

Dangers spécifiques du produit dangereux Les vapeurs peuvent causer un feu à inflammation instantanée. Les vapeurs peuvent se déplacer le long des surfaces jusqu'à une source d'ignition distante et provoquer un retour de flamme. Sensible à une décharge statique.

Équipements de protection spéciaux et précautions spéciales pour les pompiers Porter des vêtements de protection complets, y compris un casque, un appareil respiratoire autonome à pression positive ou à demande de pression, des vêtements de protection et un masque de protection.

Équipement/directives de lutte contre les incendies Porter des vêtements de protection complets, y compris un casque, un appareil respiratoire autonome à pression positive ou à demande de pression, des vêtements de protection et un masque de protection. 'S'éloigner immédiatement si le sifflement émis par les dispositifs de sécurité augmente ou en cas de décoloration des réservoirs causée par un incendie. Combattre l'incendie depuis une distance maximale ou utiliser des supports à tuyaux autonomes ou des canons à eau. Eloigner les conteneurs du lieu de l'incendie si vous pouvez le faire sans risque. En cas d'incendie, refroidir les citernes avec une pulvérisation d'eau. Refroidir les récipients exposés aux flammes avec de l'eau et continuer même une fois le feu éteint. Dans le cas d'un incendie très important, utiliser des lances sur affût télécommandées ou des canons à eau; si c'est impossible, quitter la zone et laisser le feu brûler. Les vapeurs peuvent former des mélanges explosifs avec l'air, même à la température ambiante. Éviter l'accumulation de vapeurs et gaz à des concentrations explosives. En cas de déversement, certains de ces produits peuvent s'évaporer en laissant un résidu inflammable. Un ruissellement d'eau peut nuire à l'environnement. Selon les besoins, utiliser une mousse compatible pour minimiser la formation de vapeurs.

Méthodes particulières d'intervention En cas d'incendie et/ou d'explosion, ne pas respirer les fumées. Utiliser une pulvérisation d'eau pour refroidir les récipients fermés.

6. Mesures à prendre en cas de déversement accidentel

Précautions individuelles, équipements de protection et mesures d'urgence

Tenir à l'écart le personnel non requis. Rester le vent dans le dos. Tenir à l'écart des zones basses. Ventiler les espaces clos avant d'y entrer. Ne pas toucher les récipients endommagés ou le produit déversé à moins de porter des vêtements de protection appropriés. Consulter la Section 8 de la FDS pour l'équipement de protection individuelle. Les autorités locales doivent être avisées selon les exigences réglementaires applicables.

Méthodes et matériaux pour le confinement et le nettoyage

ÉLIMINER toutes les sources d'inflammation (pas de cigarettes, de torches, d'étincelles ou de flammes dans le voisinage immédiat). Éteindre toutes les flammes à proximité. Tenir les matières combustibles (bois, papier, huile, etc.) à l'écart du produit déversé.

Déversements importants : Arrêter l'écoulement de la substance, si cela peut se faire sans risque. Endiguer le matériau déversé, lorsque cela est possible.

Déversements peu importants : Utiliser un matériau non combustible comme la vermiculite, le sable ou la terre pour absorber le produit et le mettre dans un récipient pour élimination ultérieure. Recouvrir d'une feuille de plastique pour empêcher la dispersion. Recueillir le produit répandu. Après avoir récupéré le produit, rincer la zone à l'eau. Empêcher le produit de pénétrer dans les égouts. Ne pas laisser le produit contaminer le système d'eaux souterraines. Nettoyer la surface à fond pour éliminer la contamination résiduelle. Essuyer avec une matière absorbante (par ex., tissu, lainage).

Ne jamais réintroduire le produit répandu dans son récipient d'origine en vue d'une réutilisation. Empêcher de pénétrer dans les voies d'eau, les égouts, les sous-sols, les espaces réduits Arrêter la fuite si cela peut se faire sans risque. Cette substance pollue l'eau. Il faut l'empêcher de contaminer le sol ou de pénétrer dans les égoûts, les systèmes de drainages et les plans d'eau. Endiguer le matériau déversé, lorsque cela est possible. Éliminer toutes les sources d'ignition (pas de cigarettes, de torches, d'étincelles ou de flammes dans la zone immédiate). Absorber le déversement avec de la vermiculite ou un autre matériau inerte, et le placer ensuite dans un contenant pour déchets chimiques. Nettoyer la surface à fond pour éliminer la contamination résiduelle. Ne doit pas être rejeté dans l'environnement. Ne pas laisser le produit contaminer le système d'eaux souterraines. Empêcher le produit de pénétrer dans les égouts.

Précautions relatives à l'environnement

L'essence peut contenir des mélanges oxygénés (éthanol, etc.) solubles dans l'eau et, par conséquent, des précautions doivent être prises pour protéger les sources d'eaux de surface et souterraines d'une contamination. Si l'installation ou l'exploitation possède un «plan d'urgence pour le pétrole ou des substances dangereuses», activer ses procédures. Rester contre le vent et à l'écart du déversement. Porter l'équipement de protection approprié, y compris une protection respiratoire selon les circonstances. Ne pas pénétrer ou rester dans une zone à moins que la surveillance indique qu'on puisse le faire sans danger. Isoler la zone dangereuse et restreindre l'entrée à l'équipe de secours. Extrêmement inflammable. Réviser les mesures de lutte contre les incendies, Section 5, avant de procéder au nettoyage. Tenir toutes les sources d'allumage (flammes, cigarettes, torches, etc.) et surfaces chaudes à l'écart d'une émission ou d'un rejet. Contenir tout déversement dans la plus petite zone possible. Récupérer autant du produit que possible (par ex., en aspirant le produit). Arrêter une fuite si cela peut être fait sans danger. Utiliser de l'eau pulvérisée pour disperser les vapeurs. Selon les besoins, utiliser une mousse compatible pour minimiser la formation de vapeurs. Le produit déversé doit être absorbé à l'aide d'un absorbant approprié, pour ensuite être manipulé conformément à la réglementation environnementale. Empêcher le produit déversé de pénétrer dans des égouts, des collecteurs d'eaux pluviales, d'autres systèmes de traitement ou de drainage non autorisés et des voies navigables naturelles. Communiquer avec les services de protection contre les incendies, ainsi que les agences fédérales, provinciales et locales appropriées. Si un déversement quelconque se rend jusqu'à des eaux navigables, la zone contiguë ou les rivages attenants, communiquer avec le Centre national d'information au 1 800 424-8802. Pour les déversements sur les autoroutes ou les chemins de fer, communiquer avec CHEMTREC au 1 800 424-9300.

7. Manutention et stockage

Précautions relatives à la sûreté en matière de manutention

Éliminer les sources d'inflammation. Éviter tout ce qui produit des étincelles. Mettre à la masse/à la terre le contenant et l'équipement. Ces précautions seules peuvent ne pas être suffisantes pour éliminer l'électricité statique.
Porter un équipement de protection individuelle. Ne pas respirer les poussières/fumées/gaz/brouillards/vapeurs/aérosols. Éviter tout contact avec les yeux, la peau et les vêtements. Ne pas goûter ni avaler. Éviter une exposition prolongée. Utiliser uniquement avec une ventilation appropriée. Se laver soigneusement après manipulation. Le produit est extrêmement inflammable et peut, même à température ambiante, dégager des vapeurs qui produisent des mélanges explosifs vapeur-air. NE PAS manipuler, entreposer ni ouvrir à proximité d'une flamme nue, de sources de chaleur ou de sources d'inflammation. Protéger le produit du soleil. Prendre des mesures de précaution contre les décharges électrostatiques. Tout matériel utilisé pour la manutention de ce produit doit être mis à la terre. Utiliser d'outils ne produisant pas d'étincelles et du matériel antidéflagrant. Ne pas manger, ne pas boire et ne pas fumer pendant l'utilisation. Éviter le rejet dans l'environnement.

Conditions de sûreté en matière de stockage, y compris les incompatibilités

Entreposage des liquides inflammables. Ne pas manipuler ou stocker à proximité d'une flamme nue, d'une source de chaleur ou d'autres sources d'ignition. Ce produit peut accumuler des charges statiques qui peuvent causer des étincelles et devenir une source d'ignition. La pression dans des récipients étanches peut augmenter sous l'influence de la chaleur. Conserver le récipient dans un endroit frais et bien ventilé. Tenir à l'écart des aliments, des boissons et des aliments pour animaux. Tenir hors de la portée des enfants.

8. Contrôle de l'exposition/protection individuelle

Limites d'exposition professionnelle

ÉTATS-UNIS. Valeurs limites d'exposition de l'ACGIH

Substance	Type	Valeur
Essence sans plomb	STEL	500 ppm
	TWA	300 ppm
Constituants	**Type**	**Valeur**
Benzène (CAS 71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm
Éthanol (CAS 64-17-5)	STEL	1000 ppm
2-méthylbutane (CAS 78-78-4)	TWA	1000 ppm
Octane (CAS 111-65-9)	TWA	300 ppm
Butane (CAS 106-97-8)	STEL	1000 ppm
Xylène (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm
Toluène (CAS 108-88-3)	TWA	20 ppm
Cyclohexane (CAS 110-82-7)	TWA	100 ppm
Éthylbenzène (CAS 100-41-4)	TWA	20 ppm
1,2,4-triméthylbenzène (CAS 95-63-6)	TWA	25 ppm
Heptane (CAS 142-82-5)	STEL	500 ppm
	TWA	400 ppm
n-Hexane (CAS 110-54-3)	TWA	50 ppm

Canada. LEMT pour l'Alberta (Code de l'hygiène et de la sécurité au travail, Annexe 1, Tableau 2)

Substance	Type	Valeur
Essence sans plomb	STEL	500 ppm
	TWA	300 ppm
Constituants	**Type**	**Valeur**
Benzène (CAS 71-43-2)	STEL	8 mg/m3
		2.5 ppm
	TWA	1.6 mg/m3
		0.5 ppm
Éthanol (CAS 64-17-5)	TWA	1880 mg/m3
		1000 ppm
2-méthylbutane (CAS 78-78-4)	TWA	1770 mg/m3

Canada. LEMT pour l'Alberta (Code de l'hygiène et de la sécurité au travail, Annexe 1, Tableau 2)

Constituants	Type	Valeur
		600 ppm
Octane (CAS 111-65-9)	TWA	1400 mg/m3
		300 ppm
Butane (CAS 106-97-8)	TWA	1000 ppm
Xylène (CAS 1330-20-7)	STEL	651 mg/m3
		150 ppm
	TWA	434 mg/m3
		100 ppm
Toluène (CAS 108-88-3)	TWA	188 mg/m3
		50 ppm
Cyclohexane (CAS 110-82-7)	TWA	344 mg/m3
		100 ppm
Éthylbenzène (CAS 100-41-4)	STEL	543 mg/m3
		125 ppm
	TWA	434 mg/m3
		100 ppm
1,2,4-triméthylbenzène (CAS 95-63-6)	TWA	123 mg/m3
		25 ppm
Heptane (CAS 142-82-5)	STEL	2050 mg/m3
		500 ppm
	TWA	1640 mg/m3
		400 ppm
n-Hexane (CAS 110-54-3)	TWA	176 mg/m3
		50 ppm

Canada. LEMT pour la Colombie-Britannique. (Valeurs limites d'exposition en milieu de travail pour les substances chimiques, Réglementation sur la santé et sécurité au travail 296/97, ainsi modifiée

Substance	Type	Valeur
Essence sans plomb	STEL	500 ppm
	TWA	300 ppm

Constituants	Type	Valeur
Benzène (CAS 71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm
Éthanol (CAS 64-17-5)	STEL	1000 ppm
2-méthylbutane (CAS 78-78-4)	TWA	600 ppm
Octane (CAS 111-65-9)	TWA	300 ppm
Butane (CAS 106-97-8)	STEL	750 ppm
	TWA	600 ppm
Xylène (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm
Toluène (CAS 108-88-3)	TWA	20 ppm
Cyclohexane (CAS 110-82-7)	TWA	100 ppm
Éthylbenzène (CAS 100-41-4)	TWA	20 ppm
1,2,4-triméthylbenzène (CAS 95-63-6)	TWA	25 ppm
Heptane (CAS 142-82-5)	STEL	500 ppm
	TWA	400 ppm
n-Hexane (CAS 110-54-3)	TWA	20 ppm

Canada. LEMT de Manitoba (Règlement 217/2006, Loi sur la sécurité et l'hygiène du travail)

Substance	Type	Valeur
Essence sans plomb	STEL	500 ppm
	TWA	300 ppm

Canada. LEMT de Manitoba (Règlement 217/2006, Loi sur la sécurité et l'hygiène du travail)

Constituants	Type	Valeur
Benzène (CAS 71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm
Éthanol (CAS 64-17-5)	STEL	1000 ppm
2-méthylbutane (CAS 78-78-4)	TWA	1000 ppm
Octane (CAS 111-65-9)	TWA	300 ppm
Butane (CAS 106-97-8)	STEL	1000 ppm
Xylène (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm
Toluène (CAS 108-88-3)	TWA	20 ppm
Cyclohexane (CAS 110-82-7)	TWA	100 ppm
Éthylbenzène (CAS 100-41-4)	TWA	20 ppm
1,2,4-triméthylbenzène (CAS 95-63-6)	TWA	25 ppm
Heptane (CAS 142-82-5)	STEL	500 ppm
	TWA	400 ppm
n-Hexane (CAS 110-54-3)	TWA	50 ppm

Canada. LEMT pour l'Ontario. (Contrôle de l'exposition à des agents biologiques et chimiques)

Substance	Type	Valeur
Essence sans plomb	STEL	500 ppm
	TWA	300 ppm

Constituants	Type	Valeur
Benzène (CAS 71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm
Éthanol (CAS 64-17-5)	STEL	1000 ppm
2-méthylbutane (CAS 78-78-4)	TWA	600 ppm
Octane (CAS 111-65-9)	TWA	300 ppm
Butane (CAS 106-97-8)	TWA	800 ppm
Xylène (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm
Toluène (CAS 108-88-3)	TWA	20 ppm
Cyclohexane (CAS 110-82-7)	TWA	100 ppm
Éthylbenzène (CAS 100-41-4)	TWA	20 ppm
1,2,4-triméthylbenzène (CAS 95-63-6)	TWA	25 ppm
Heptane (CAS 142-82-5)	STEL	500 ppm
	TWA	400 ppm
n-Hexane (CAS 110-54-3)	TWA	50 ppm

Canada. LEMT du Québec, (Ministère du Travail. Règlement sur la santé et la sécurité du travail)

Constituants	Type	Valeur
Benzène (CAS 71-43-2)	STEL	15.5 mg/m3
		5 ppm
	TWA	3 mg/m3
		1 ppm
Éthanol (CAS 64-17-5)	TWA	1880 mg/m3
		1000 ppm
Octane (CAS 111-65-9)	STEL	1750 mg/m3
		375 ppm
	TWA	1400 mg/m3
		300 ppm
Butane (CAS 106-97-8)	TWA	1900 mg/m3
		800 ppm

Canada. LEMT du Québec, (Ministère du Travail. Règlement sur la santé et la sécurité du travail)

Constituants	Type	Valeur
Xylène (CAS 1330-20-7)	STEL	651 mg/m3 150 ppm
	TWA	434 mg/m3 100 ppm
Toluène (CAS 108-88-3)	TWA	188 mg/m3 50 ppm
Cyclohexane (CAS 110-82-7)	TWA	1030 mg/m3 300 ppm
Éthylbenzène (CAS 100-41-4)	STEL	543 mg/m3 125 ppm
	TWA	434 mg/m3 100 ppm
1,2,4-triméthylbenzène (CAS 95-63-6)	TWA	123 mg/m3 25 ppm
Heptane (CAS 142-82-5)	STEL	2050 mg/m3 500 ppm
	TWA	1640 mg/m3 400 ppm
n-Hexane (CAS 110-54-3)	TWA	176 mg/m3 50 ppm

Valeurs biologiques limites

ACGIH

Constituants	Valeur	Déterminant	Échantillon	Temps d'échantillonnage
Benzène (CAS 71-43-2)	500 µg/g	Acide t,t-muconique	Créatinine dans l'urine	*

Indices d'exposition biologique de l'ACGIH

Constituants	Valeur	Déterminant	Échantillon	Temps d'échantillonnage
Benzène (CAS 71-43-2)	25 µg/g	Acide S-phénylmercapturique	Créatinine dans l'urine	*
Xylène (CAS 1330-20-7)	1.5 g/g	Acides méthylhippuriques	Créatinine dans l'urine	*
Toluène (CAS 108-88-3)	0.3 mg/g	o-crésol, avec hydrolyse	Créatinine dans l'urine	*
	0.03 mg/l	Toluène	Urine	*
	0.02 mg/l	Toluène	Sang	*
Éthylbenzène (CAS 100-41-4)	0.15 g/g	Somme de l'acide mandélique et de l'acide phénylglyoxylique	Créatinine dans l'urine	*
n-Hexane (CAS 110-54-3)	0.4 mg/l	2,5-hexanedione, sans hydrolyse	Urine	*

* - Pour des détails sur l'échantillonnage, veuiller consulter le document source.

Directives au sujet de l'exposition

Canada - LEMT pour l'Alberta : Désignation cutanée

Benzène (CAS 71-43-2)	Peut être absorbé par la peau.
n-Hexane (CAS 110-54-3)	Peut être absorbé par la peau.
Toluène (CAS 108-88-3)	Peut être absorbé par la peau.

Canada - LEMT pour la Colombie-Britannique : Désignation cutanée

Benzène (CAS 71-43-2)	Peut être absorbé par la peau.

n-Hexane (CAS 110-54-3)	Peut être absorbé par la peau.

Canada - LEMT pour le Manitoba : Désignation cutanée

Benzène (CAS 71-43-2)	Peut être absorbé par la peau.
n-Hexane (CAS 110-54-3)	Peut être absorbé par la peau.

Canada - LEMT pour l'Ontario : Désignation cutanée

Benzène (CAS 71-43-2)	Peut être absorbé par la peau.
n-Hexane (CAS 110-54-3)	Peut être absorbé par la peau.

Canada - LEMT pour le Québec : Désignation cutanée

n-Hexane (CAS 110-54-3)	Peut être absorbé par la peau.
Toluène (CAS 108-88-3)	Peut être absorbé par la peau.

Canada - LEMT pour la Saskatchewan : Désignation cutanée

n-Hexane (CAS 110-54-3)	Peut être absorbé par la peau.
Toluène (CAS 108-88-3)	Peut être absorbé par la peau.

États-Unis - Valeurs limites d'exposition de l'ACGIH : Désignation cutanée

Benzène (CAS 71-43-2)	Peut être absorbé par la peau.
n-Hexane (CAS 110-54-3)	Peut être absorbé par la peau.

Contrôles d'ingénierie appropriés Assurer une ventilation générale et localisée appropriée. Utiliser des enceintes d'isolement, une ventilation locale par aspiration ou d'autres mesures d'ingénierie pour maintenir les concentrations atmosphériques sous les limites d'exposition recommandées. Utiliser du matériel antidéflagrant.

Mesures de protection individuelle, telles que les équipements de protection individuelle

Protection du visage/des yeux Porter des lunettes de sécurité. En cas de possibilité d'éclaboussures, porter un écran facial complet ou des lunettes protectrices contre les produits chimiques.

Protection de la peau

Protection des mains Éviter l'exposition - se procurer des instructions spéciales avant l'utilisation. Porter des gants de protection.

Autre Porter des gants de protection chimique imperméables. Le port d'une combinaison complète et de bottes est conseillé pour la manipulation de volumes importants ou dans les situations d'urgence. Le port de vêtements de protection ignifuges est recommandé.

Protection respiratoire Utiliser un respirateur à adduction d'air filtré ou à adduction d'air, correctement ajusté et conforme à une norme approuvée si une évaluation du risque indique que c'est requis. La sélection du respirateur doit être basée sur des niveaux d'exposition connus ou anticipés, les dangers du produit et les limites d'utilisation sans danger du respirateur choisi. En cas de dépassement des limites d'exposition en milieu de travail au produit ou à ses composants, il faut porter un matériel approuvé par le NIOSH. La sélection d'un respirateur approprié doit se faire par un personnel adéquatement formé, en fonction des contaminants, du degré d'exposition possible et des facteurs de protection respiratoire publiés. L'équipement doit être disponible pour une utilisation inhabituelle et d'urgence.

Dangers thermiques Porter des vêtements de protection thermique appropriés, au besoin.

Considérations d'hygiène générale Consulter le superviseur pour obtenir des instructions de manipulation spécifiques. Éviter tout contact avec les yeux. Éviter tout contact avec la peau. Tenir à l'écart des aliments et des boissons. Se laver les mains avant les pauses et immédiatement après la manipulation du produit. Assurer l'accès à une douche oculaire et à une douche de sécurité. A manipuler conformément aux normes d'hygiène industrielle et aux consignes de sécurité.

9. Propriétés physiques et chimiques

Apparence Liquide transparent, jaune, vert ou teinté ambre.

État physique Liquide.

Forme Liquide.

Couleur Transparent, jaune, vert ou ambre.

Odeur Caractéristique. Essence.

Seuil olfactif Non disponible.

pH Non disponible.

Point de fusion et point de congélation Non disponible.

Point initial d'ébullition et domaine d'ébullition 20 - 225 °C (68 - 437 °F)

Point d'éclair < -40.0 °C (< -40.0 °F) Estimation

Taux d'évaporation > 1

Inflammabilité (solides et gaz)	Non disponible.
Limites supérieures et inférieures d'inflammabilité ou d'explosibilité	
Limites d'inflammabilité - inférieure (%)	1.3
Limites d'inflammabilité - supérieure (%)	7.6
Tension de vapeur	262 - 825 mm Hg (100 °F (37.8 °C))
Densité de vapeur	3 - 4 [Air=1]
Densité relative	0.68 - 0.79 g/cm3 (16°C)
Solubilité	
Solubilité (eau)	Négligeable.
Coefficient de partage n-octanol/eau	Non disponible.
Température d'auto-inflammation	> 260 °C (> 500 °F)
Température de décomposition	Non disponible.
Viscosité	Non disponible.
Autres informations	
Masse volumique apparente	680 - 790 kg/m3
Inflammabilité	Liquide et vapeur extrêmement inflammables.
Viscosité cinématique	0.4 - 0.9 cSt (40 °C (104 °F))
Coefficient de partage n-octanol/eau	0 Estimé.
Pourcentage de matières volatiles	100 %

10. Stabilité et réactivité

Réactivité	Le produit est non réactif dans des conditions normales d'utilisation, d'entreposage et de transport.
Stabilité chimique	Stable aux températures normales et pendant l'emploi recommandé.
Risque de réactions dangereuses	Une polymérisation dangereuse ne se produit pas.
Conditions à éviter	Chaleur, flammes et étincelles. Sources d'inflammation. Contact avec des matériaux incompatibles. Ne pas pressuriser, couper, souder, braser, percer, ou meuler les contenants vides, ni les exposer à la chaleur, à des étincelles, à l'électricité statique ou à d'autres sources d'inflammation, car ils pourraient exploser et causer des blessures, voire la mort.
Matériaux incompatibles	Agents comburants forts.
Produits de décomposition dangereux	Aucun produit dangereux de décomposition n'est connu.

11. Données toxicologiques

Renseignements sur les voies d'exposition probables

Inhalation	Peut provoquer somnolence et des vertiges. Maux de tête. Nausée, vomissements.
Contact avec la peau	Provoque une irritation cutanée.
Contact avec les yeux	Le contact direct avec les yeux peut causer une irritation temporaire.
Ingestion	L'aspiration de gouttelettes du produit dans les poumons par ingestion ou vomissement peut provoquer une pneumonie chimique grave.
Les symptômes correspondant aux caractéristiques physiques, chimiques et toxicologiques	L'aspiration peut provoquer un oedème pulmonaire et une pneumonite. Peut provoquer somnolence et des vertiges. Maux de tête. Nausée, vomissements. Irritation de la peau. Peut provoquer des rougeurs et des douleurs.

Renseignements sur les effets toxicologiques

Toxicité aiguë	Peut être mortel en cas d'ingestion et de pénétration dans les voies respiratoires.

Données toxicologiques

Constituants	Espèces	Résultats d'épreuves
Benzène (CAS 71-43-2)		
Aiguë		
Orale		
DL50	Rat	930 mg/kg
Éthanol (CAS 64-17-5)		
Aiguë		
Inhalation		
Vapeur		
CL50	Souris	39 g/m3, 4 heures
Orale		
DL50	Rat	7000 - 11000 mg/kg
2-méthylbutane (CAS 78-78-4)		
Aiguë		
Inhalation		
CL50	Souris	1000 mg/l, 1 heures
		450 mg/l, 2 heures
Xylène (CAS 1330-20-7)		
Aiguë		
Orale		
DL50	Rat	3523 mg/kg
Toluène (CAS 108-88-3)		
Aiguë		
Cutané		
DL50	Lapin	12200 mg/kg
Inhalation		
Vapeur		
CL50	Rat	28.1 mg/l, 4 heures
Cyclohexane (CAS 110-82-7)		
Aiguë		
Cutané		
DL50	Lapin	> 2000 mg/kg
Orale		
DL50	Rat	12705 mg/kg
Éthylbenzène (CAS 100-41-4)		
Aiguë		
Cutané		
DL50	Lapin	15400 mg/kg
Inhalation		
CL50	Rat	17.4 mg/l, 4 heures
Orale		
DL50	Rat	3500 - 4700 mg/kg
1,2,4-triméthylbenzène (CAS 95-63-6)		
Aiguë		
Cutané		
DL50	Lapin	> 3160 mg/kg
Inhalation		
DL50	Rat	18000 ppm, 4 heures
Orale		
DL50	Rat	2720 - 3960 mg/kg

Constituants	Espèces	Résultats d'épreuves
Heptane (CAS 142-82-5)		
Aiguë		
Inhalation		
Vapeur		
CL50	Rat	> 29.29 mg/l, 4 heures
Orale		
DL50	Rat	15000 mg/kg

Corrosion cutanée/irritation cutanée Provoque une irritation cutanée.

Lésions oculaires graves/irritation oculaire Le contact direct avec les yeux peut causer une irritation temporaire.

Sensibilisation respiratoire ou cutanée

Canada - LEMT pour l'Alberta : Irritant

Octane (CAS 111-65-9)	Irritant

Sensibilisation respiratoire Pas un sensibilisant respiratoire.

Sensibilisation cutanée On ne s'attend pas à ce que ce produit provoque une sensibilisation cutanée.

Mutagénicité sur les cellules germinales Peut induire des anomalies génétiques.

Cancérogénicité Peut provoquer le cancer.

Carcinogènes selon l'ACGIH

Benzène (CAS 71-43-2)	A1 Confirmé être cancérogène pour l'homme.
Éthylbenzène (CAS 100-41-4)	A3 Cancérogène confirmé chez les animaux, mais inconnu chez l'homme.
Toluène (CAS 108-88-3)	A4 Ne peut pas être classé quant à sa cancérogénicité pour l'homme.
Xylène (CAS 1330-20-7)	A4 Ne peut pas être classé quant à sa cancérogénicité pour l'homme.

Canada - LEMT pour l'Alberta : Catégorie de carcinogène

Benzène (CAS 71-43-2)	Confirmé être cancérogène pour l'homme.

Canada - LEMT pour le Manitoba : cancérogénicité

Benzène (CAS 71-43-2)	Confirmé être cancérogène pour l'homme.
Éthanol (CAS 64-17-5)	Cancérogène confirmé chez les animaux, mais inconnu chez l'homme.
Éthylbenzène (CAS 100-41-4)	Cancérogène confirmé chez les animaux, mais inconnu chez l'homme.
Toluène (CAS 108-88-3)	Ne peut pas être classé quant à sa cancérogénicité pour l'homme.
Xylène (CAS 1330-20-7)	Ne peut pas être classé quant à sa cancérogénicité pour l'homme.

Canada - LEMT pour le Québec : Catégorie de carcinogène

Benzène (CAS 71-43-2)	Effet cancérogène détecté chez les humains.

Monographies du CIRC. Évaluation globale de la cancérogénicité

Benzène (CAS 71-43-2)	1 Cancérogène pour l'homme.
Éthylbenzène (CAS 100-41-4)	2B Peut-être cancérogène pour l'homme.
Toluène (CAS 108-88-3)	3 Inclassable quant à sa cancérogénicité pour l'homme.
Xylène (CAS 1330-20-7)	3 Inclassable quant à sa cancérogénicité pour l'homme.

États-Unis. Rapport du NTP (National Toxicilogy Program) sur les cancérogènes

Benzène (CAS 71-43-2)	Carcinogène connu chez l'homme.

Toxicité pour la reproduction Susceptible de nuire à la fertilité ou au fœtus.

Toxicité pour certains organes cibles - exposition unique Peut provoquer somnolence et des vertiges.

Toxicité pour certains organes cibles - expositions répétées Non classé.

Danger par aspiration Peut être mortel en cas d'ingestion et de pénétration dans les voies respiratoires.

12. Données écologiques

Écotoxicité Toxique pour les organismes aquatiques, entraîne des effets néfastes à long terme.

Constituants		Espèces	Résultats d'épreuves
Benzène (CAS 71-43-2)			
Aquatique			
Crustacés	CE50	Puce d'eau (daphnia magna)	8.76 - 15.6 mg/l, 48 heures
Poisson	CL50	Truite arc-en-ciel (Oncorhynchus mykiss)	5.9 mg/l, 96 heures
Éthanol (CAS 64-17-5)			
Aquatique			
Aiguë			
Crustacés	CL50	Ceriodaphnia dubia	5012 mg/l, 48 heures
		Daphnia magna	454 mg/l, 11 Jours
Poisson	CL50	Pimephales promelas	13480 mg/l, 96 heures
Chronique			
Crustacés	NOEC (concentration sans effet observé)	Ceriodaphnia dubia	9.6 mg/l, 10 Jours
Octane (CAS 111-65-9)			
Aquatique			
Crustacés	CL50	Daphnia magna	0.38 mg/l, 48 heures
Xylène (CAS 1330-20-7)			
Aquatique			
Poisson	CL50	Truite arc-en-ciel (Oncorhynchus mykiss)	2.6 mg/l, 96 heures
Toluène (CAS 108-88-3)			
Aquatique			
Aiguë			
Crustacés	CE50	Daphnia magna	11.5 mg/l, 48 heures
Poisson	CL50	Oncorhynchus kisutch	5.5 mg/l, 96 heures
Chronique			
Crustacés	NOEC (concentration sans effet observé)	Ceriodaphnia dubia	0.74 mg/l, 7 Jours
Poisson	NOEC (concentration sans effet observé)	Oncorhynchus kisutch	1.4 mg/l, 40 Jours
Cyclohexane (CAS 110-82-7)			
Aquatique			
Crustacés	CE50	Puce d'eau (daphnia magna)	0.9 mg/l, 48 heures
Poisson	CL50	Vairon à grosse tête (Pimephales promelas)	3.961 - 5.181 mg/l, 96 heures
Éthylbenzène (CAS 100-41-4)			
Aquatique			
Aiguë			
Crustacés	CE50	Puce d'eau (daphnia magna)	1.81 - 2.38 mg/l, 48 heures
Poisson	CL50	Truite arc-en-ciel (Oncorhynchus mykiss)	4.2 mg/l, 96 heures
Chronique			
Crustacés	CE50	Ceriodaphnia dubia	3.6 mg/l, 7 Jours

Constituants		Espèces	Résultats d'épreuves
1,2,4-triméthylbenzène (CAS 95-63-6)			
Aquatique			
Aiguë			
Poisson	CL50	Vairon à grosse tête (Pimephales promelas)	7.72 mg/l, 96 heures

Persistance et dégradation Aucune donnée disponible.

Potentiel de bioaccumulation Aucune donnée disponible.

Mobilité dans le sol Aucune donnée disponible.

Autres effets nocifs On ne s'attend pas à ce que ce composant ait des effets néfastes sur l'environnement (par ex., appauvrissement de la couche d'ozone, potentiel de formation photochimique d'ozone, perturbation endocrinienne, potentiel de réchauffement de la planète).

13. Données sur l'élimination

Instructions pour l'élimination Éliminer ce produit et son récipient dans un centre de collecte des déchets dangereux ou spéciaux. Ne pas laisser la substance
s'infiltrer dans les égoûts/les conduits d'alimentation en eau. Ne pas contaminer les étangs, les voies navigables ou les fossés avec le produit ou le récipient utilisés. Détruire conformément àtoutes les réglementations applicables.

Code des déchets dangereux Les codes de déchets doivent être attribués par l'utilisateur, en fonction de l'application proposée pour le produit.

Déchets des résidus / produits non utilisés Éliminer conformément à la réglementation locale.

Emballages contaminés Mettre les emballages rincés à la disposition de services de recyclage locaux.

14. Informations relatives au transport

TMD

Numéro ONU UN1203
Désignation officielle de transport de l'ONU ESSENCE POUR MOTEURS D'AUTOMOBILES
Classe de danger relative au transport
Classe 3
Danger subsidiaire -
Groupe d'emballage II
Dangers environnementaux Oui
Précautions spéciales pour l'utilisateur Non disponible.

IATA

UN number UN1203
UN proper shipping name Gasoline
Transport hazard class(es)
Class 3
Subsidiary risk -
Packing group II
Environmental hazards Yes
ERG Code 3H
Special precautions for user Not available.

IMDG

UN number UN1203
UN proper shipping name Petrol
Transport hazard class(es)
Class 3
Subsidiary risk -
Packing group II
Environmental hazards
Marine pollutant Yes
EmS F-E, S-E
Special precautions for user Not available.

Transport en vrac selon l'Annexe II de MARPOL 73/78 et le recueil IBC Non disponible.

15. Informations sur la réglementation

Réglementation canadienne Ce produit a été classé conformément aux critères de danger énoncés dans le Règlement sur les produits dangereux et la FDS contient tous les renseignements exigés par le Règlement sur les produits dangereux.

Loi réglementant certaines drogues et autres substances

Non réglementé.

Liste des marchandises d'exportation contrôlée (LCPE 1999, Annexe 3)

Non inscrit.

Gaz à effet de serre

Non inscrit.

Ontario. Substances toxiques. Loi sur la réduction des toxiques, 2009. Règlement 455/09 (1er juillet 2011)

Benzène (CAS 71-43-2)
Éthylbenzène (CAS 100-41-4)
Toluène (CAS 108-88-3)
Xylène (CAS 1330-20-7)

Règlements sur les précurseurs

Toluène (CAS 108-88-3) Classe B

Règlements internationaux Cette fiche signalétique est conforme aux exigences du Règlement (CE) N° 1907/2006.

Convention de Stockholm

Sans objet.

Convention de Rotterdam

Sans objet.

Protocole de Kyoto

Sans objet.

Protocole de Montréal

Sans objet.

Convention de Bâle

Sans objet.

Inventaires Internationaux

Pays ou région	Nom de l'inventaire	En stock (Oui/Non)*
Australie	Inventaire australien des substances chimiques (AICS)	Oui
Canada	Liste intérieure des substances (LIS)	Oui
Canada	Liste extérieure des substances (LES)	Non
Chine	Inventaire des substances chimiques existantes en Chine (IECSC)	Non
Europe	Inventaire européen des substances chimiques commerciales existantes (EINECS)	Oui
Europe	Liste européenne des substances chimiques notifiées (ELINCS)	Non
Japon	Inventaire des substances chimiques existantes et nouvelles (ENCS)	Non
Corée	Liste des produits chimiques existants (ECL)	Oui
Nouvelle-Zélande	Inventaire de la Nouvelle-Zélande	Oui
Philippines	Inventaire philippin des produits et substances chimiques (PICCS)	Oui
Taïwan	Inventaire des substances chimiques de Taïwan (TCSI)	Oui
États-Unis et Porto Rico	Inventaire du TSCA (Toxic Substances Controls Act - Loi réglementant les substances toxiques)	Non

*Un « Oui » indique que ce produit est conforme aux exigences de l'inventaire administré par le(s) pays ayant compétence.
Un « Non » indique qu'un ou plusieurs composant(s) du produit n'est/ne sont pas inscrit(s) ou exempt(s) d'une inscription sur l'inventaire administré par le(s) pays ayant compétence.

16. Autres informations

Date de publication	18-Août-2016
Date de la révision	18-Janvier-2018
Version n°	04
Références	ACGIH EPA : Base de données AQUIRE ÉTATS-UNIS. Monographies du CIRC sur les expositions en milieu de travail aux agents chimique s HSDB® - Banque de données sur des substances dangereuses Monographies du CIRC. Évaluation globale de la cancérogénicité Rapport du NTP (National Toxicilogy Program) sur les cancérogènes ACGIH - Documentation des valeurs limites d’exposition et des indices biologiques d’exposition
Avis de non-responsabilité	L'information fournie est basée sur les données disponibles pour le produit, les composants du produit et des produits semblables. Énergie Valero Inc. ne peut prévoir toutes les conditions d'utilisation des présentes informations et de son produit, ou des produits d'autres fabricants associés à son produit. Il relève de la responsabilité de l'utilisateur de veiller à assurer une manipulation, un entreposage et une élimination du produit en toute sécurité. L'utilisateur est responsable en cas de perte, de blessure, de dommage ou de frais causés par une utilisation inadéquate. Les renseignements contenus dans cette fiche ont été écrits selon les meilleures connaissances et la meilleure expérience actuellement disponibles.

APPENDIX D - TANKS EMISSIONS ESTIMATION SOFTWARE

Tetra Tech QI inc. 715-46960TTA
2023-10-31 Aupaluk

Product parameters

Parameter	Unit	Gasoline	Diesel	
Liquid category	-	Petroleum distillates		
Single or multiple contaminant	-	Multiple		
Speciation option	-	Partial		
Average surface temperature	°F	27.28		Weather conditions at the site
Maximum surface temperature	°F	21.00		
Minimum surface temperature	°F	33.54		
Average product temperature	°F	24.52		
Vapor pressure	psia	3.2	0.012	
Minimum vapor pressure	psia	2.8	0.01	
Maximum steam pressure	psia	3.7	0.014	
Molar mass of liquid	g/mol	86.78	153	TANKS database (U.S. EPA)
Molar mass of vapors	g/mol	73.18	130	TANKS database (U.S. EPA)

Characteristics of vertical storage tanks for flammable products

Parameter		Unit	Value					
Tank		-	**Tank #1**	**Tank #2**	**Tank #9**	**Tank #10**	**Tank #11 GASOLINE**	**Tank #11 DIESEL**
Product			**Diesel**	**Essence**	**Diesel**	**Diesel**	**Gasoline**	**Diesel**
Type		-	VFRT (Vertical fixed roof)				Horizontal Tank	
Dimensions (metric)	Height	m	9.75	7.32	9.75	9.75		
	Length	m					5.03	2.55
	Diameter	m	14.63	7.62	15.50	9.00	2.42	2.42
	Ability	l	1,600,000	333,500	1,816,000	620,000	23,101	11,691
	Annual fillings	-	1.0	0.8	1.0	1.0	11.5	136.9
	Annual flow	l/an	1,600,000	265,000	1,800,000	620,000	265,000	1,600,000
Dimensions	Shell height	ft	32.0	24.0	32.0	32.0		
	Shell length	ft					16.5	8.4
	Shell diam	ft	48.0	25.0	50.9	29.5	7.9	7.9
	Max liquid height	ft	31.3	23.5	31.3	31.3	7.5	7.5
	Avg liquid height	ft	15.7	11.8	15.7	15.7		
	Working volume	gal	422,675	88,101	479,736	163,787	6,103	3,088
	Turnovers per year	-	1.0	0.8	1.0	1.0	11.5	136.9
	Net throughput	gal/yr	422,675	70,006	475,510	163,787	70,006	422,675
	Is tank heated?	No/Yes	No					
Shell Characteristics	Shell color/shade	-	Grey/Light					
	Shell condition	-	Good					
Roof Characteristics	Color/Shade	-	Grey/Light					
	Condition	-	Good					
	Kind	-	Cone				*N/A*	
	Height	ft	3				*N/A*	
Breather Vent Settings	Vacuum Setting	psig	-0.03					
	Pressure Setting	psig	0.03					

TANKS modeling results: annual emissions from tank breathing ("Breathing Losses")

Parameter	CAS	Unit	Results					
			Tank #1	Tank #2	Tank #9	Tank #10	Tank #11 Gasoline	Tank #11 Diesel
			Diesel	Essence	Diesel	Diesel	Gasoline	Diesel
Toluene	108-88-3	g/an	7,824	14,134	8,800	2,880	1,647	36
Xylene	1330-20-7	g/an	1,855	2,681	2,087	685	308	9
Butane	106-97-8	g/an		1,307,534			176,316	
Octane	111-65-9	g/an	12,419	7,997	13,966	4,577	1,084	64
2-methylbutane	78-78-4	g/an		455,584			61,122	
Ethanol	64-17-5	g/an		10,138			1,166	
Heptane	142-82-5	g/an		5,552			653	
n-Hexane	110-54-3	g/an		19,677			2,350	
1,2,4-trimethylbenzene	95-63-6	g/an		127			14	
Ethylbenzene	100-41-4	g/an	2,250	644	2,531	830	73	9
Cyclohexane	110-82-7	g/an		7,257			862	
Benzene	71-43-2	g/an		3,266			386	
Diesel Fuels	68334-30-5	g/an	35,326		39,721	13,014		
Diesel Fuel C9-C18 Alkane branched and linear	1159170-26-6	g/an	4,599		5,171	1,692		23
Nonane	111-84-2	g/an	8,645		9,720	3,184		45
Total		**g/an**	**72,920**	**1,834,677**	**81,996**	**26,862**	**245,983**	**381**

APPENDIX E - CALCULATION OF CONTAMINANT EMISSION RATES

Annual emission rates (addition of "Breathing Losses" emissions from TANKS and emissions due to pumping)

Parameter	CAS	Unit	Results						
Réservoir			Tank #1	Tank #2	Tank #9	Tank #10	Tank #11		Tank truck
		Product	Diesel	Essence	Diesel	Diesel	Gasoline	Diesel	Diesel
Toluène	108-88-3	g/s	3,05E-04	5,72E-04	3,43E-04	1,13E-04	1,76E-04	1,06E-05	4,86E-05
Xylène	1330-20-7	g/s	7,48E-05	1,13E-04	8,42E-05	2,79E-05	3,76E-05	2,94E-06	1,36E-05
Butane	106-97-8	g/s	0	5,00E-02	0	0	1,42E-02	0	0
Octane	111-65-9	g/s	4,49E-04	2,97E-04	5,05E-04	1,66E-04	7,73E-05	1,11E-05	4,67E-05
2-méthylbutane	78-78-4	g/s	0	1,69E-02	0	0	4,37E-03	0	0
Éthanol	64-17-5	g/s	0	4,17E-04	0	0	1,32E-04	0	0
Heptane	142-82-5	g/s	0	2,23E-04	0	0	6,74E-05	0	0
n-Hexane	110-54-3	g/s	0	7,75E-04	0	0	2,26E-04	0	0
1,2,4-triméthylbenzène	95-63-6	g/s	0	5,02E-06	0	0	1,43E-06	0	0
Éthylbenzène	100-41-4	g/s	8,96E-05	2,68E-05	1,01E-04	3,34E-05	8,66E-06	3,32E-06	1,56E-05
Cyclohexane	110-82-7	g/s	0	2,87E-04	0	0	8,40E-05	0	0
Benzène	71-43-2	g/s	0	1,31E-04	0	0	3,94E-05	0	0
Carburants diesel	68334-30-5	g/s	1,40E-03	0	1,58E-03	5,23E-04	0	4,72E-05	2,42E-04
Carburant diesel C9-C18 alcanes ramifiés et linéaires	1159170-26-6	g/s	2,31E-04	0	2,60E-04	8,68E-05	0	1,49E-05	7,27E-05
Nonane	111-84-2	g/s	3,08E-04	0	3,47E-04	1,14E-04	0	7,12E-06	2,92E-05
Total			2,86E-03	6,98E-02	3,22E-03	1,07E-03	1,94E-02	9,71E-05	4,69E-04

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Parameters for calculation of emission rates

Parameters	Unit	Value	Note
Ideal gas constant R	J/mol.K	8,314	
Temperature	°C	10	Max for tanks
	°F	50	
	°K	283,15	

Ideal gas law

PV=nRT
Where:
P equals pressure (in kPa)
V equals volume (in L)
n equals the gas quantity (en mol)
R represents the ideal gas constant (en kPa·L/mol-K)
T equals absolute temperature (en K)

Raoult's Law

In an ideal solution, at constant temperature,
the vapor phase partial pressure of a constituent is proportional to its liquid phase mole fraction.

Tank parameters when filling gasoline

Parameters	Unit	Réservoirs entreposage			
		Tank #1	Tank #2	Tank #9	Tank #10
Product		Diesel	Essence	Diesel	Diesel
Tank Capacity	m^3	1 600	333,5	1 816	620
Transferred Volume	m^3/an	1 600	265	1 800	620
Transfer Rate	m^3/h	90	75	90	90
Transfer Duration	h/an	17,8	3,5	20,0	6,9
Emission point	-	2	1	2	2
	-	Gooseneck	PVSV	Gooseneck	Gooseneck

Emission rate of contaminants when filling gasoline in Tank #2

										Instantaneous emission rates 1 h / 1		Daily emission rates 3,5 h / 24		Annual emission rates 3,5 h / 8760	
Ingredient	CAS	Mass Fraction	Molar Fraction	Molar Mass	Quantity of product	Vapor Pressure	Partial Pressure	Annual Emissions	Instantaneous emission rates	Instantaneous emission rates	Emission rate per source	Daily emission rates	Emission rate per source	Annual emission rates including breathing	Emission rate per source
											R_2_EV1		R_2_EV1		R_2_EV1
		g/g	mol/mol	g/mol	mol/g	psi	psi	g	g/s	g/s	g/s	g/s	g/s	g/s	g/s
Essence	86290-81-5	100%	100%	80,75	0,01238	4,44	4,44	278 119	2,19E+01	2,19E+01	2,19E+01	3,22E+00	3,22E+00	3,01E-02	3,01E-02
Toluène	108-88-3	25%	21,9%	92,14	0,00271	0,25	0,055	3 917	3,08E-01	3,08E-01	3,08E-01	4,53E-02	4,53E-02	5,72E-04	5,72E-04
Xylène	1330-20-7	20%	15,2%	106,16	0,00188	0,07	0,011	877	6,90E-02	6,90E-02	6,90E-02	1,02E-02	1,02E-02	1,13E-04	1,13E-04
Butane	106-97-8	20%	27,8%	58,12	0,00344	21,60	6,002	270 748	2,13E+01	2,13E+01	2,13E+01	3,13E+00	3,13E+00	5,00E-02	5,00E-02
Octane	111-65-9	18%	12,7%	114,23	0,00158	0,12	0,015	1 354	1,06E-01	1,06E-01	1,06E-01	1,57E-02	1,57E-02	2,97E-04	2,97E-04
2-méthylbutane	78-78-4	15%	16,8%	72,15	0,00208	8,16	1,37	76 712	6,03E+00	6,03E+00	6,03E+00	8,88E-01	8,88E-01	1,69E-02	1,69E-02
Éthanol	64-17-5	10%	17,5%	46,06	0,00217	0,48	0,084	3 008	2,37E-01	2,37E-01	2,37E-01	3,48E-02	3,48E-02	4,17E-04	4,17E-04
Heptane	142-82-5	5%	4,0%	100,20	0,00050	0,47	0,019	1 473	1,16E-01	1,16E-01	1,16E-01	1,70E-02	1,70E-02	2,23E-04	2,23E-04
n-Hexane	110-54-3	5%	4,7%	86,18	0,00058	1,52	0,071	4 763	3,74E-01	3,74E-01	3,74E-01	5,51E-02	5,51E-02	7,75E-04	7,75E-04
1,2,4-triméthylbenzène	95-63-6	5%	3,4%	120,19	0,00042	0,01	0,0003	31	2,46E-03	2,46E-03	2,46E-03	3,63E-04	3,63E-04	5,02E-06	5,02E-06
Éthylbenzène	100-41-4	4%	3,0%	106,17	0,00038	0,08	0,002	201	1,58E-02	1,58E-02	1,58E-02	2,32E-03	2,32E-03	2,68E-05	2,68E-05
Cyclohexane	110-82-7	3%	2,9%	84,16	0,00036	0,95	0,027	1 786	1,40E-01	1,40E-01	1,40E-01	2,07E-02	2,07E-02	2,87E-04	2,87E-04
Benzène	71-43-2	1,5%	1,6%	78,12	0,00019	0,91	0,014	855	6,73E-02	6,73E-02	6,73E-02	9,90E-03	9,90E-03	1,31E-04	1,31E-04
Total		231,5%	231,5%	80,75	0,01238	5,23	**12,11**	**643 846**	**5,06E+01**	**5,06E+01**	**5,06E+01**	**7,45E+00**	**7,45E+00**	**9,99E-02**	**9,99E-02**

Emission rate of contaminants when filling diesel in Tank #1

										Instantaneous emission rates 1 h / 1			Daily emission rates 17,8 h / 24			Annual emission rates 17,8 h / 8760		
Ingredient	CAS	Mass Fraction	Molar Fraction	Molar Mass	Quantity of product	Vapor Pressure	Partial Pressure	Annual Emissions	Instantaneous emission rates	Instantaneous emission rates	Emission rate per source		Daily emission rates	Emission rate per source		Annual emission rates including breathing	Emission rate per source	
											R_1_EV1	R_1_EV2		R_1_EV1	R_1_EV2		R_1_EV1	R_1_EV2
		g/g	mol/mol	g/mol	mol/g	psi	psi	g	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s
Carburants diesel	68334-30-5	100%	100%	153,81	0,00650	0,012	0,012	8 981	1,40E-01	1,40E-01	7,02E-02	7,02E-02	1,04E-01	5,20E-02	5,20E-02	1,46E-03	7,29E-04	7,29E-04
Toluène	108-88-3	1%	1,7%	92,14	0,00011	0,25	0,004	1 802	2,82E-02	2,82E-02	1,41E-02	1,41E-02	2,09E-02	1,04E-02	1,04E-02	3,05E-04	1,53E-04	1,53E-04
Xylène	1330-20-7	1%	1,4%	106,16	0,00009	0,07	0,001	505	7,88E-03	7,88E-03	3,94E-03	3,94E-03	5,84E-03	2,92E-03	2,92E-03	7,48E-05	3,74E-05	3,74E-05
Octane	111-65-9	2%	2,7%	114,23	0,00018	0,12	0,003	1 730	2,70E-02	2,70E-02	1,35E-02	1,35E-02	2,00E-02	1,00E-02	1,00E-02	4,49E-04	2,24E-04	2,24E-04
Éthylbenzène	100-41-4	1%	1,4%	106,17	0,00009	0,08	0,001	577	9,01E-03	9,01E-03	4,50E-03	4,50E-03	6,67E-03	3,34E-03	3,34E-03	8,96E-05	4,48E-05	4,48E-05
Carburant diesel C9-C18 alcanes ramifiés et linéaires	1159170-26-6	30%	27,1%	170,00	0,00176	0,012	0,003	2 694	4,21E-02	4,21E-02	2,10E-02	2,10E-02	3,12E-02	1,56E-02	1,56E-02	2,31E-04	1,16E-04	1,16E-04
Nonane	111-84-2	3%	3,6%	128,25	0,00023	0,05	0,002	1 081	1,69E-02	1,69E-02	8,45E-03	8,45E-03	1,25E-02	6,26E-03	6,26E-03	3,08E-04	1,54E-04	1,54E-04
Total		138%	138%	153,81	0,00897	0,020	**0,027**	**17 369**	**2,71E-01**	**2,71E-01**	**1,36E-01**	**1,36E-01**	**2,01E-01**	**1,01E-01**	**1,01E-01**	**2,92E-03**	**1,46E-03**	**1,46E-03**

Emission rate of contaminants when filling diesel in Tank #9

										Instantaneous emission rates 1 h / 1			Daily emission rates 20,0 h / 24			Annual emission rates 20,0 h / 8760		
Ingredient	CAS	Mass Fraction	Molar Fraction	Molar Mass	Quantity of product	Vapor Pressure	Partial Pressure	Annual Emissions	Instantaneous emission rates	Instantaneous emission rates	Emission rate per source		Daily emission rates	Emission rate per source		Annual emission rates including breathing	Emission rate per source	
											R_9_EV1	R_9_EV2		R_9_EV1	R_9_EV2		R_9_EV1	R_9_EV2
		g/g	mol/mol	g/mol	mol/g	psi	psi	g	g/s	g/s	g/s		g/s	g/s		g/s	g/s	
Carburants diesel	68334-30-5	100%	100%	153,81	0,00650	0,012	0,012	10 103	1,40E-01	1,40E-01	7,02E-02	7,02E-02	1,17E-01	5,85E-02	5,85E-02	1,64E-03	8,20E-04	8,20E-04
Toluène	108-88-3	1%	1,7%	92,14	0,00011	0,25	0,004	2 027	2,82E-02	2,82E-02	1,41E-02	1,41E-02	2,35E-02	1,17E-02	1,17E-02	3,43E-04	1,72E-04	1,72E-04
Xylène	1330-20-7	1%	1,4%	106,16	0,00009	0,07	0,001	568	7,88E-03	7,88E-03	3,94E-03	3,94E-03	6,57E-03	3,28E-03	3,28E-03	8,42E-05	4,21E-05	4,21E-05
Octane	111-65-9	2%	2,7%	114,23	0,00018	0,12	0,003	1 946	2,70E-02	2,70E-02	1,35E-02	1,35E-02	2,25E-02	1,13E-02	1,13E-02	5,05E-04	2,52E-04	2,52E-04
Éthylbenzène	100-41-4	1%	1,4%	106,17	0,00009	0,08	0,001	649	9,01E-03	9,01E-03	4,50E-03	4,50E-03	7,51E-03	3,75E-03	3,75E-03	1,01E-04	5,04E-05	5,04E-05
Carburant diesel C9-C18 alcanes ramifiés et linéaires	1159170-26-6	30%	27,1%	170,00	0,00176	0,012	0,003	3 031	4,21E-02	4,21E-02	2,10E-02	2,10E-02	3,51E-02	1,75E-02	1,75E-02	2,60E-04	1,30E-04	1,30E-04
Nonane	111-84-2	3%	3,6%	128,25	0,00023	0,05	0,002	1 216	1,69E-02	1,69E-02	8,45E-03	8,45E-03	1,41E-02	7,04E-03	7,04E-03	3,47E-04	1,73E-04	1,73E-04
Total		138%	138%	153,81	0,00897	0,020	**0,027**	**19 540**	**2,71E-01**	**2,71E-01**	**1,36E-01**	**1,36E-01**	**2,26E-01**	**1,13E-01**	**1,13E-01**	**3,28E-03**	**1,64E-03**	**1,64E-03**

Emission rate of contaminants when filling diesel in Tank #10

										Instantaneous emission rates 1 h / 1			Daily emission rates 6,9 h / 24			Annual emission rates 6,9 h / 8760		
Ingredient	CAS	Mass Fraction	Molar Fraction	Molar Mass	Quantity of product	Vapor Pressure	Partial Pressure	Annual Emissions	Instantaneous emission rates	Instantaneous emission rates	Emission rate per source		Daily emission rates	Emission rate per source		Annual emission rates including breathing	Emission rate per source	
											R_10_EV1	R_10_EV2		R_10_EV1	R_10_EV2		R_10_EV1	R_10_EV2
		g/g	mol/mol	g/mol	mol/g	psi	psi	g	g/s	g/s	g/s		g/s	g/s		g/s	g/s	
Carburants diesel	68334-30-5	100%	100%	153,81	0,00650	0,012	0,012	3 480	1,40E-01	1,40E-01	7,02E-02	7,02E-02	4,03E-02	2,01E-02	2,01E-02	5,42E-04	2,71E-04	2,71E-04
Toluène	108-88-3	1%	1,7%	92,14	0,00011	0,25	0,004	698	2,82E-02	2,82E-02	1,41E-02	1,41E-02	8,08E-03	4,04E-03	4,04E-03	1,13E-04	5,67E-05	5,67E-05
Xylène	1330-20-7	1%	1,4%	106,16	0,00009	0,07	0,001	196	7,88E-03	7,88E-03	3,94E-03	3,94E-03	2,26E-03	1,13E-03	1,13E-03	2,79E-05	1,40E-05	1,40E-05
Octane	111-65-9	2%	2,7%	114,23	0,00018	0,12	0,003	670	2,70E-02	2,70E-02	1,35E-02	1,35E-02	7,76E-03	3,88E-03	3,88E-03	1,66E-04	8,32E-05	8,32E-05
Éthylbenzène	100-41-4	1%	1,4%	106,17	0,00009	0,08	0,001	223	9,01E-03	9,01E-03	4,50E-03	4,50E-03	2,59E-03	1,29E-03	1,29E-03	3,34E-05	1,67E-05	1,67E-05
Carburant diesel C9-C18 alcanes ramifiés et linéaires	1159170-26-6	30%	27,1%	170,00	0,00176	0,012	0,003	1 044	4,21E-02	4,21E-02	2,10E-02	2,10E-02	1,21E-02	6,04E-03	6,04E-03	8,68E-05	4,34E-05	4,34E-05
Nonane	111-84-2	3%	3,6%	128,25	0,00023	0,05	0,002	419	1,69E-02	1,69E-02	8,45E-03	8,45E-03	4,85E-03	2,42E-03	2,42E-03	1,14E-04	5,71E-05	5,71E-05
Total		138%	138%	153,81	0,00897	0,020	**0,027**	**6 730**	**2,71E-01**	**2,71E-01**	**1,36E-01**	**1,36E-01**	**7,79E-02**	**3,89E-02**	**3,89E-02**	**1,08E-03**	**5,42E-04**	**5,42E-04**

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Parameters for calculation of emission rates

Parameters	Unit	Value	Note
Ideal gas constant R	J/mol.K	8,314	
Temperature	°C	10	Max for tanks
	°F	50	
	°K	283,15	

Ideal gas law

PV=nRT
Where:
P equals pressure (in kPa)
V equals volume (in L)
n equals the gas quantity (en mol)
R represents the ideal gas constant (en kPa·L/mol·K)
T equals absolute temperature (en K)

Paramètres des réservoirs pour calcul des taux d'émission lors du transbordement

Parameters	Unit	Réservoir #11		Tank truck
		Gasoline	Diesel	
Product		Essence	Diesel	Diesel
Tank Capacity	m³	23,101	11,691	18,000
Transferred Volume	m³/an	265,0	73,3	1 362,1
Transfer Rate	m³/h	9,0	22,8	48,0
Transfer Duration	h	2,57	0,51	0,38
Annual transfer duration	h/an	29,4	3,2	28,4
	-	1	1	1
Emission point	-	Connected to tank #2	Vent	Gooseneck

Raoult's Law

In an ideal solution, at constant temperature,
the vapor phase partial pressure of a constituent is proportional to its liquid phase mole fraction.

Taux d'émission lors du transbordement - RÉSERVOIR #11 DIESEL

										Instantaneous emission rates		Daily emission rates		Annual emission rates	
										0,51 h / 1		0,51 h / 24		3,2 h / 8760	
Ingredient	CAS	Mass Fraction	Molar Fraction	Molar Mass	Quantity of product	Vapor Pressure	Partial Pressure	Annual Emissions	Instantaneous emission rates	Instantaneous emission rates	Emission rate per source	Daily emission rates	Emission rate per source	Annual emission rates including breathing	Emission rate per source
											R_11_EV_DI		R_11_EV_DI		R_11_EV_DI
		g/g	mol/mol	g/mol	mol/g	psi	psi	g	g/s	g/s	g/s	g/s	g/s	g/s	g/s
Carburants diesel	68334-30-5	100%	100%	153,81	0,00650	0,012	0,012	1 487	1,28E-01	6,59E-02	6,59E-02	2,74E-03	2,74E-03	5,00E-05	5,00E-05
Toluène	108-88-3	1%	1,7%	92,14	0,00011	0,25	0,004	298	2,58E-02	1,32E-02	1,32E-02	5,51E-04	5,51E-04	1,06E-05	1,06E-05
Xylène	1330-20-7	1%	1,4%	106,16	0,00009	0,07	0,001	84	7,22E-03	3,70E-03	3,70E-03	1,54E-04	1,54E-04	2,94E-06	2,94E-06
Octane	111-65-9	2%	2,7%	114,23	0,00018	0,12	0,003	286	2,47E-02	1,27E-02	1,27E-02	5,29E-04	5,29E-04	1,11E-05	1,11E-05
Éthylbenzène	100-41-4	1%	1,4%	106,17	0,00009	0,08	0,001	95	8,25E-03	4,23E-03	4,23E-03	1,76E-04	1,76E-04	3,32E-06	3,32E-06
Carburant diesel C9-C18 alcanes ramifiés et linéaires	1159170-26-6	30%	27,1%	170,00	0,00176	0,012	0,003	446	3,85E-02	1,98E-02	1,98E-02	8,23E-04	8,23E-04	1,49E-05	1,49E-05
Nonane	111-84-2	3%	3,6%	128,25	0,00023	0,05	0,002	179	1,55E-02	7,93E-03	7,93E-03	3,30E-04	3,30E-04	7,12E-06	7,12E-06
Total		138%	138%	153,81	0,00897	0,020	**0,027**	**2 877**	**2,48E-01**	**1,27E-01**	**1,27E-01**	**5,31E-03**	**5,31E-03**	**9,99E-05**	**9,99E-05**

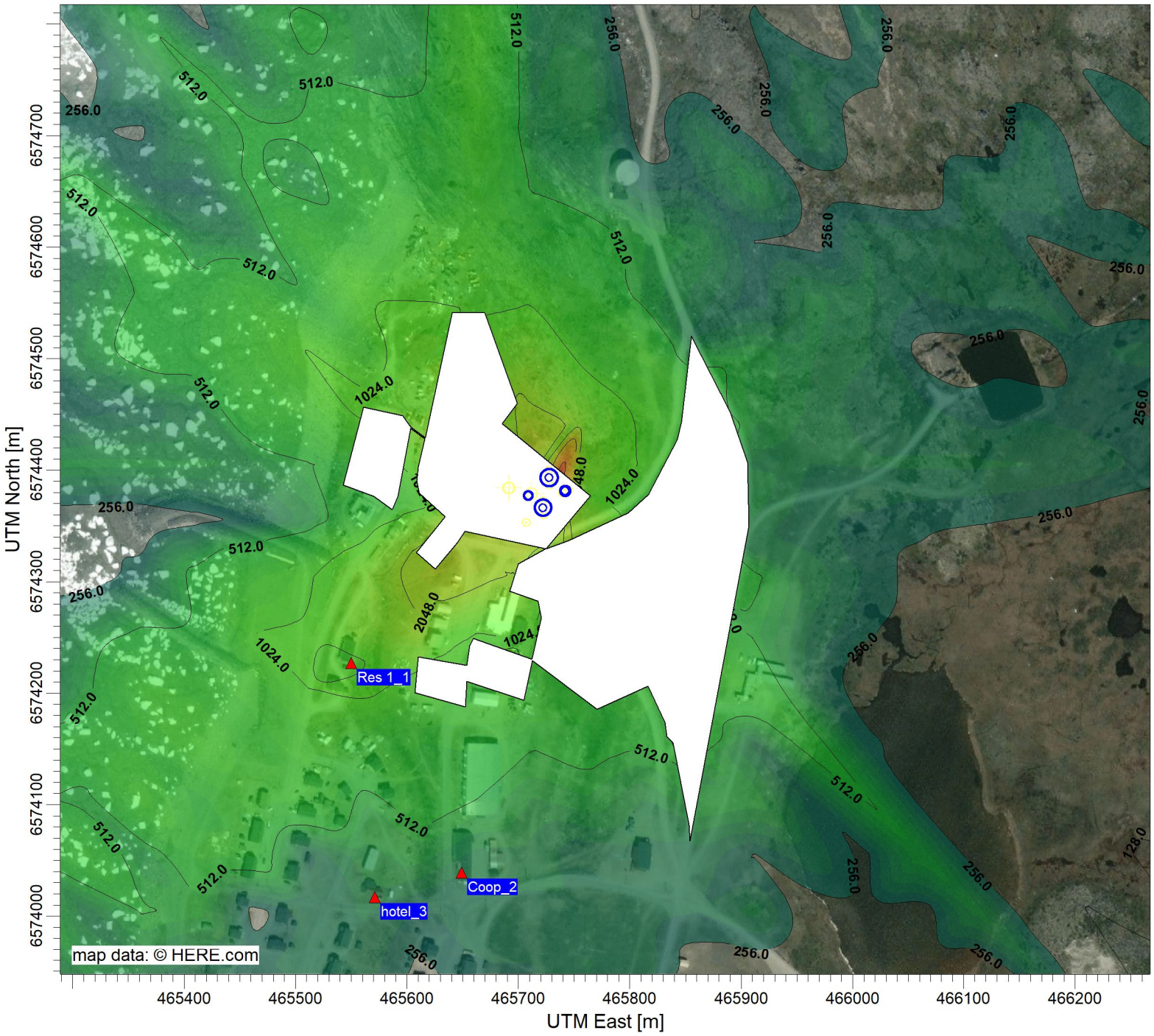
Taux d'émission lors du transbordement - CAMION-CITERNE

										Instantaneous emission rates		Daily emission rates		Annual emission rates	
										0,38 h / 1		0,38 h / 24		28,4 h / 8760	
Ingredient	CAS	Mass Fraction	Molar Fraction	Molar Mass	Quantity of product	Vapor Pressure	Partial Pressure	Annual Emissions	Instantaneous emission rates	Instantaneous emission rates	Emission rate per source	Daily emission rates	Emission rate per source	Annual emission rates including breathing	Emission rate per source
											CAM_DI		CAM_DI		CAM_DI
		g/g	mol/mol	g/mol	mol/g	psi	psi	g	g/s	g/s	g/s	g/s	g/s	g/s	g/s
Carburants diesel	68334-30-5	100%	100%	153,81	0,00650	0,012	0,012	7 646	7,48E-02	2,81E-02	2,81E-02	1,17E-03	1,17E-03	2,26E-04	2,26E-04
Toluène	108-88-3	1%	1,7%	92,14	0,00011	0,25	0,004	1 534	1,50E-02	5,63E-03	5,63E-03	2,35E-04	2,35E-04	4,86E-05	4,86E-05
Xylène	1330-20-7	1%	1,4%	106,16	0,00009	0,07	0,001	430	4,20E-03	1,58E-03	1,58E-03	6,57E-05	6,57E-05	1,36E-05	1,36E-05
Octane	111-65-9	2%	2,7%	114,23	0,00018	0,12	0,003	1 473	1,44E-02	5,41E-03	5,41E-03	2,25E-04	2,25E-04	4,67E-05	4,67E-05
Éthylbenzène	100-41-4	1%	1,4%	106,17	0,00009	0,08	0,001	491	4,81E-03	1,80E-03	1,80E-03	7,51E-05	7,51E-05	1,56E-05	1,56E-05
Carburant diesel C9-C18 alcanes ramifiés et linéaires	1159170-26-6	30%	27,1%	170,00	0,00176	0,012	0,003	2 294	2,25E-02	8,42E-03	8,42E-03	3,51E-04	3,51E-04	7,27E-05	7,27E-05
Nonane	111-84-2	3%	3,6%	128,25	0,00023	0,05	0,002	920	9,01E-03	3,38E-03	3,38E-03	1,41E-04	1,41E-04	2,92E-05	2,92E-05
Total		138%	138%	153,81	0,00897	0,020	**0,027**	**14 787**	**1,45E-01**	**5,43E-02**	**5,43E-02**	**2,26E-03**	**2,26E-03**	**4,53E-04**	**4,53E-04**

APPENDIX F - ISOCONCENTRATION CONTOUR MAPS

PROJECT TITLE:

C:\Dispersion\46960TTAAupalukv2\46960TTAAupalukv2.isc



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL

ug/m^3

Max: 9968.9 [ug/m^3] at (465738.32, 6574398.58)

99.7 | 128.0 | 256.0 | 512.0 | 1024.0 | 2048.0 | 4096.0 | 8192.0 | 9968.9

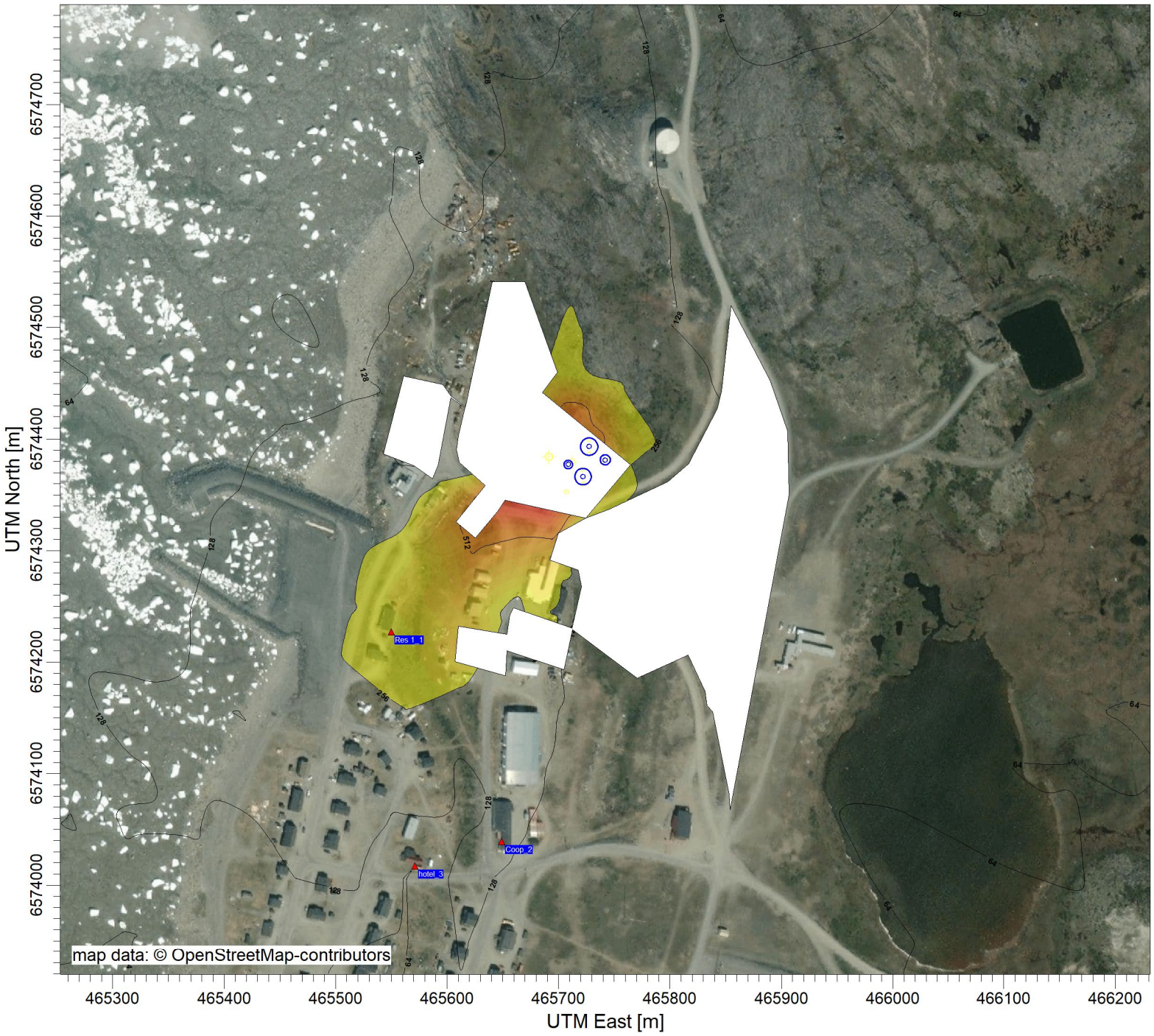
COMMENTS:

Toluène sur 4 minutes
Cut off à 340 ug/m3 (178 ug/m3 sur 1h)

SOURCES: **10**	COMPANY NAME: **Tetra Tech QI inc.**	
RECEPTORS: **3504**	MODELER: **Eduardo Leon B.Ing. M.Ing.**	TETRA TECH
OUTPUT TYPE: **Concentration**	SCALE: 1:5 000 (0 — 0.1 km)	
MAX: **9968.9 ug/m^3**	DATE: **2023-10-18**	PROJECT NO.: **715-46960TTA**

PROJECT TITLE:

C:\Dispersion\715-46960TTA Aupaluk\Optim_Wind_Aupaluk\46960TTA _Aupa



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL

ug/m^3

Max: 837 [ug/m^3] at (465670.04, 6574341.26)

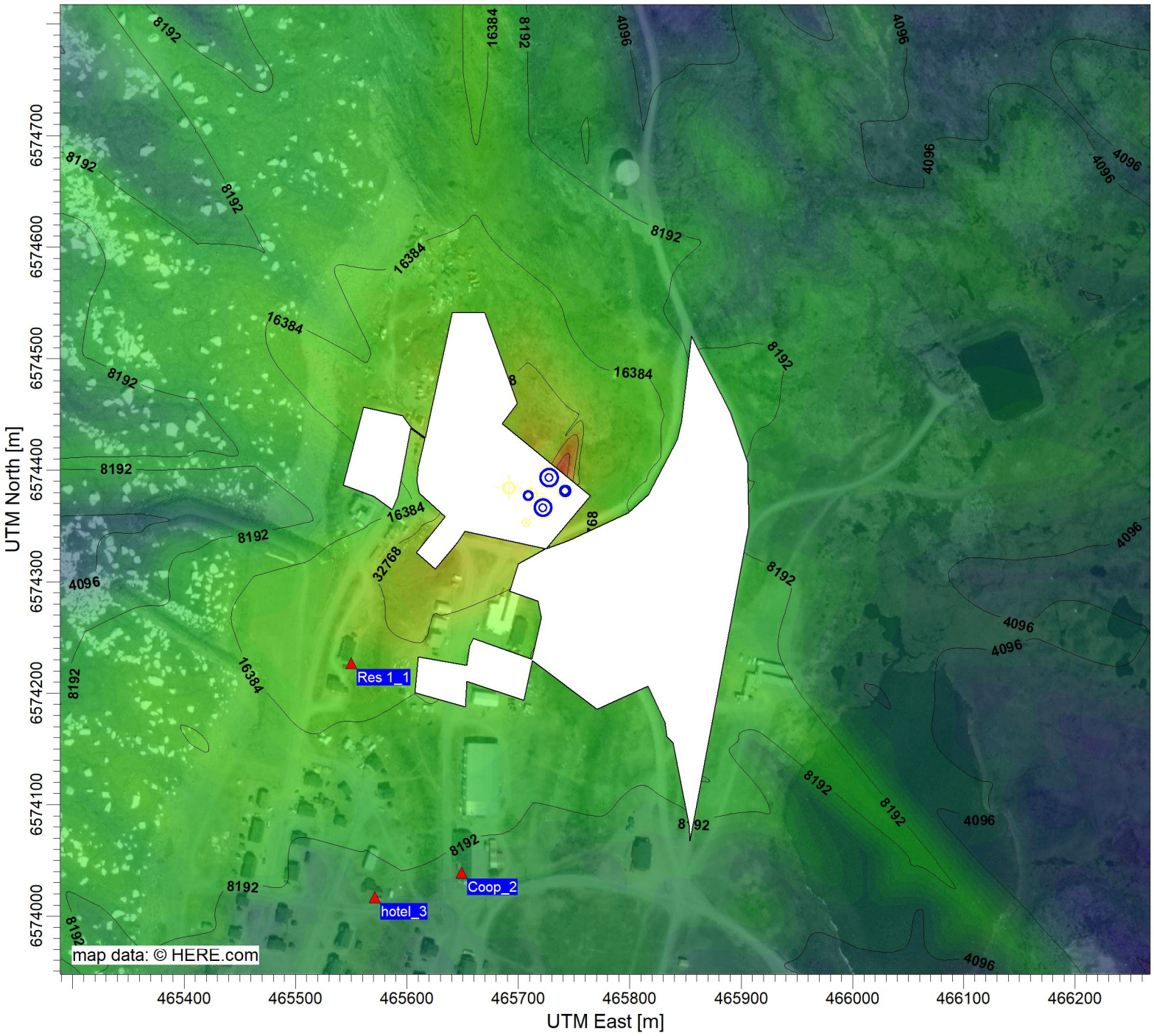
8 16 32 64 128 256 512 837

COMMENTS: Toluène sur 4 minutes Cut off à 340 ug/m3 (178 ug/m3 sur 1h) avec vitesse du vent > 3 m/s	SOURCES: **10**	COMPANY NAME: **Tetra Tech QI inc.**
	RECEPTORS: **3504**	MODELER: **Eduardo Leon B.Ing. M.Ing.**
	OUTPUT TYPE: **Concentration**	SCALE: 1:5 000 0 0.1 km
	MAX: **837 ug/m^3**	DATE: **2023-10-18**
		PROJECT NO.:

TETRA TECH

PROJECT TITLE:

C:\Dispersion\46960TTAAupalukv2\46960TTAAupalukv2.isc



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL

ug/m^3

Max: 195232 [ug/m^3] at (465738.32, 6574398.58)

1952 | 2048 | 4096 | 8192 | 16384 | 32768 | 65536 | 131072 | 195232

COMMENTS:

Isopentane sur 4 minutes
Cut off à 200 ug/m3 (105 ug/m3 sur 1h)

SOURCES: **10**	COMPANY NAME: **Tetra Tech QI inc.**	
RECEPTORS: **3504**	MODELER: **Eduardo Leon B.Ing. M.Ing.**	TETRA TECH
OUTPUT TYPE: **Concentration**	SCALE: 1:5 000 (0 — 0.1 km)	
MAX: **195232 ug/m^3**	DATE: **2023-10-18**	PROJECT NO.: **715-46960TTA**

PROJECT TITLE:

C:\Dispersion\715-46960TTA Aupaluk\Optim_Wind_Aupaluk\46960TTA _Aupa

PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL

ug/m^3

Max: 16382 [ug/m^3] at (465670.04, 6574341.26)

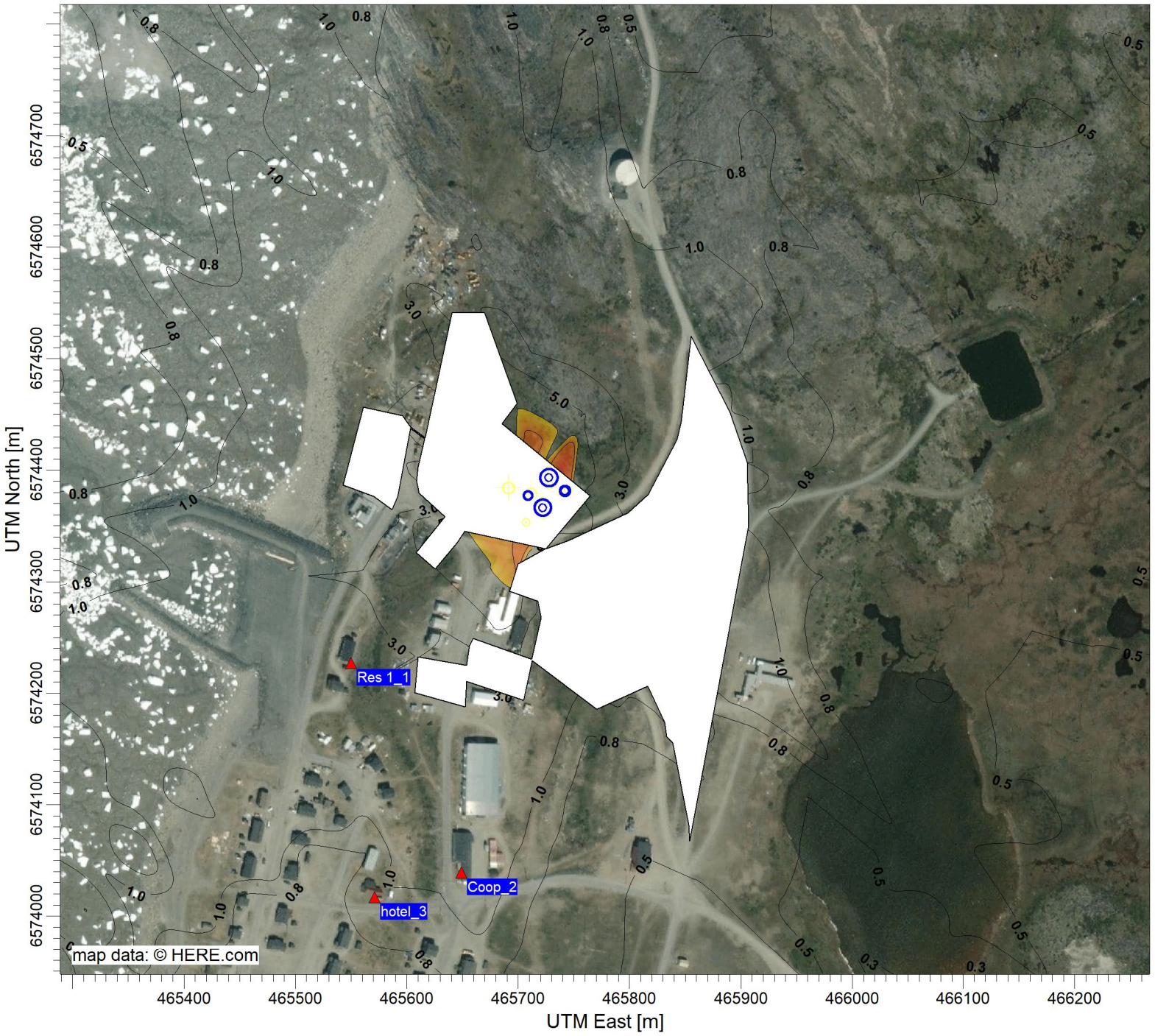
COMMENTS:

Isopentane sur 4 minutes
Cut off à 200 ug/m3 (105 ug/m3 sur 1h)
avec vitesse du vent > 3 m/s

SOURCES: **10**	COMPANY NAME: **Tetra Tech QI inc.**	
RECEPTORS: **3504**	MODELER: **Eduardo Leon B.Ing. M.Ing.**	TETRA TECH
OUTPUT TYPE: **Concentration**	SCALE: 1:5 000 (0 — 0.1 km)	
MAX: **16382 ug/m^3**	DATE: **2023-10-18**	PROJECT NO.: **715-46960TTA**

PROJECT TITLE:

C:\Dispersion\46960TTAAupalukv2\46960TTAAupalukv2.isc



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

ug/m^3

Max: 18.9 [ug/m^3] at (465738.32, 6574398.58)

0.2 0.3 0.5 0.8 1.0 3.0 5.0 8.0 10.0 18.9

COMMENTS: Benzène sur 24h Cut off à 7 ug/m3	SOURCES: **10**	COMPANY NAME: **Tetra Tech QI inc.**	
	RECEPTORS: **3504**	MODELER: **Eduardo Leon B.Ing. M.Ing.**	TETRA TECH
	OUTPUT TYPE: **Concentration**	SCALE: 1:5 000 0 0.1 km	
	MAX: **18.9 ug/m^3**	DATE: **2023-10-18**	PROJECT NO.: **715-46960TTA**

PROJECT TITLE:

C:\Dispersion\715-46960TTA Aupaluk\Optim_Wind_Aupaluk\46960TTA _Aupa

PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

ug/m^3

Max: 9.10 [ug/m^3] at (465688.13, 6574337.29)

0.09 0.10 0.40 0.50 1.00 5.00 7.00 9.10

COMMENTS:

Benzène sur 24h
Cut off à 7 ug/m3
avec vitesse du vent > 3 m/s

SOURCES: **10**	COMPANY NAME: **Tetra Tech QI inc.**	
RECEPTORS: **3504**	MODELER: **Eduardo Leon B.Ing. M.Ing.**	TETRA TECH
OUTPUT TYPE: **Concentration**	SCALE: 1:5 000 (0 — 0.1 km)	
MAX: **9.10 ug/m^3**	DATE: **2023-10-18**	PROJECT NO.: **715-46960TTA**

APPENDIX G - DETAILED RESULTS

Wind speed > 3 m/s
Maximum concentrations observed [µg/m³] (Sensitive receptors and 50 maximum values in the territory)
All contaminants

Receptor	Toluene	Xylene (o,m,p)	Octane	Isopentane	Ethanol	n-Heptane	n-Hexane	1,2,4-Trimethylbenzene	Ethylbenzene	Cyclohexane	Gasoline (>C3)	Benzene
	108-88-3	1330-20-7	111-65-9	78-78-4	64-17-5	142-82-5	110-54-3	95-63-6	100-41-4	110-82-7	86290-81-5	71-43-2
	1 h	1 h	1 h	1 h	1 h	1 h	1 h	1 h	1 h	1 h	1 h	24 h
Sensitive receptors												
Residence 1	2,75E+02	6,15E+01	9,49E+01	5,38E+03	2,11E+02	1,03E+02	3,34E+02	2,20E+00	1,41E+01	1,25E+02	1,95E+04	1,17E+00
Coop	1,48E+02	3,32E+01	5,12E+01	2,90E+03	1,14E+02	5,57E+01	1,80E+02	1,18E+00	7,58E+00	6,75E+01	1,05E+04	4,97E-01
Hotel	6,46E+01	1,45E+01	2,23E+01	1,27E+03	4,96E+01	2,43E+01	7,86E+01	5,17E-01	3,31E+00	2,95E+01	4,59E+03	4,01E-01
Infirmary	4,06E+01	9,10E+00	1,40E+01	7,96E+02	3,12E+01	1,53E+01	4,94E+01	3,25E-01	2,08E+00	1,85E+01	2,89E+03	2,45E-01
School	8,10E+01	1,82E+01	2,80E+01	1,59E+03	6,22E+01	3,05E+01	9,85E+01	6,48E-01	4,15E+00	3,69E+01	5,75E+03	2,54E-01
Church	5,07E+01	1,14E+01	1,75E+01	9,92E+02	3,89E+01	1,91E+01	6,16E+01	4,05E-01	2,59E+00	2,31E+01	3,60E+03	1,91E-01
50 maximum observed												
1	8,37E+02	1,87E+02	2,89E+02	1,64E+04	6,42E+02	3,15E+02	1,02E+03	6,69E+00	4,28E+01	3,81E+02	5,94E+04	9,10E+00
2	8,35E+02	1,87E+02	2,88E+02	1,63E+04	6,41E+02	3,14E+02	1,01E+03	6,68E+00	4,27E+01	3,81E+02	5,93E+04	8,14E+00
3	7,62E+02	1,71E+02	2,63E+02	1,49E+04	5,85E+02	2,86E+02	9,26E+02	6,10E+00	3,90E+01	3,47E+02	5,41E+04	7,76E+00
4	7,30E+02	1,63E+02	2,52E+02	1,43E+04	5,60E+02	2,74E+02	8,87E+02	5,84E+00	3,74E+01	3,33E+02	5,18E+04	7,69E+00
5	6,39E+02	1,43E+02	2,21E+02	1,25E+04	4,91E+02	2,40E+02	7,77E+02	5,11E+00	3,27E+01	2,91E+02	4,54E+04	6,89E+00
6	6,04E+02	1,35E+02	2,09E+02	1,18E+04	4,64E+02	2,27E+02	7,35E+02	4,84E+00	3,09E+01	2,76E+02	4,29E+04	6,53E+00
7	6,02E+02	1,35E+02	2,08E+02	1,18E+04	4,62E+02	2,26E+02	7,32E+02	4,81E+00	3,08E+01	2,74E+02	4,27E+04	5,83E+00
8	5,57E+02	1,25E+02	1,93E+02	1,09E+04	4,28E+02	2,10E+02	6,78E+02	4,46E+00	2,85E+01	2,54E+02	3,96E+04	5,83E+00
9	5,53E+02	1,24E+02	1,91E+02	1,08E+04	4,25E+02	2,08E+02	6,73E+02	4,42E+00	2,83E+01	2,52E+02	3,93E+04	5,08E+00
10	5,49E+02	1,23E+02	1,90E+02	1,08E+04	4,22E+02	2,07E+02	6,68E+02	4,39E+00	2,81E+01	2,51E+02	3,90E+04	4,94E+00
11	5,47E+02	1,23E+02	1,89E+02	1,07E+04	4,20E+02	2,06E+02	6,65E+02	4,38E+00	2,80E+01	2,50E+02	3,89E+04	4,86E+00
12	5,14E+02	1,15E+02	1,78E+02	1,01E+04	3,95E+02	1,93E+02	6,25E+02	4,11E+00	2,63E+01	2,34E+02	3,65E+04	4,84E+00
13	5,08E+02	1,14E+02	1,76E+02	9,96E+03	3,90E+02	1,91E+02	6,18E+02	4,07E+00	2,60E+01	2,32E+02	3,61E+04	4,55E+00
14	5,07E+02	1,14E+02	1,75E+02	9,93E+03	3,89E+02	1,91E+02	6,16E+02	4,06E+00	2,60E+01	2,31E+02	3,60E+04	4,53E+00
15	4,99E+02	1,12E+02	1,73E+02	9,78E+03	3,84E+02	1,88E+02	6,07E+02	3,99E+00	2,56E+01	2,28E+02	3,55E+04	4,28E+00
16	4,95E+02	1,11E+02	1,71E+02	9,70E+03	3,81E+02	1,86E+02	6,03E+02	3,96E+00	2,54E+01	2,26E+02	3,52E+04	4,27E+00
17	4,77E+02	1,07E+02	1,65E+02	9,35E+03	3,67E+02	1,79E+02	5,80E+02	3,82E+00	2,44E+01	2,18E+02	3,39E+04	3,96E+00
18	4,55E+02	1,02E+02	1,57E+02	8,92E+03	3,50E+02	1,71E+02	5,54E+02	3,64E+00	2,33E+01	2,08E+02	3,23E+04	3,67E+00
19	4,35E+02	9,73E+01	1,50E+02	8,51E+03	3,34E+02	1,63E+02	5,28E+02	3,48E+00	2,22E+01	1,98E+02	3,09E+04	3,48E+00
20	4,19E+02	9,38E+01	1,45E+02	8,20E+03	3,21E+02	1,57E+02	5,09E+02	3,35E+00	2,14E+01	1,91E+02	2,97E+04	3,47E+00
21	4,01E+02	8,98E+01	1,39E+02	7,85E+03	3,08E+02	1,51E+02	4,87E+02	3,21E+00	2,05E+01	1,83E+02	2,85E+04	3,24E+00
22	3,96E+02	8,86E+01	1,37E+02	7,75E+03	3,04E+02	1,49E+02	4,81E+02	3,16E+00	2,03E+01	1,80E+02	2,81E+04	3,20E+00
23	3,81E+02	8,54E+01	1,32E+02	7,47E+03	2,93E+02	1,43E+02	4,64E+02	3,05E+00	1,95E+01	1,74E+02	2,71E+04	3,13E+00
24	3,62E+02	8,10E+01	1,25E+02	7,08E+03	2,78E+02	1,36E+02	4,40E+02	2,89E+00	1,85E+01	1,65E+02	2,57E+04	3,04E+00
25	3,58E+02	8,01E+01	1,24E+02	7,00E+03	2,75E+02	1,34E+02	4,35E+02	2,86E+00	1,83E+01	1,63E+02	2,54E+04	3,02E+00
26	3,48E+02	7,80E+01	1,20E+02	6,82E+03	2,67E+02	1,31E+02	4,24E+02	2,79E+00	1,78E+01	1,59E+02	2,47E+04	3,02E+00
27	3,45E+02	7,74E+01	1,19E+02	6,76E+03	2,65E+02	1,30E+02	4,20E+02	2,76E+00	1,77E+01	1,57E+02	2,45E+04	2,95E+00
28	3,41E+02	7,64E+01	1,18E+02	6,68E+03	2,62E+02	1,28E+02	4,15E+02	2,73E+00	1,75E+01	1,55E+02	2,42E+04	2,94E+00
29	3,40E+02	7,62E+01	1,18E+02	6,67E+03	2,61E+02	1,28E+02	4,14E+02	2,72E+00	1,74E+01	1,55E+02	2,42E+04	2,91E+00
30	3,31E+02	7,42E+01	1,14E+02	6,49E+03	2,54E+02	1,25E+02	4,03E+02	2,65E+00	1,70E+01	1,51E+02	2,35E+04	2,89E+00
31	3,18E+02	7,12E+01	1,10E+02	6,22E+03	2,44E+02	1,19E+02	3,86E+02	2,54E+00	1,63E+01	1,45E+02	2,26E+04	2,82E+00
32	3,17E+02	7,10E+01	1,09E+02	6,20E+03	2,43E+02	1,19E+02	3,85E+02	2,53E+00	1,62E+01	1,44E+02	2,25E+04	2,76E+00
33	3,09E+02	6,92E+01	1,07E+02	6,05E+03	2,37E+02	1,16E+02	3,76E+02	2,47E+00	1,58E+01	1,41E+02	2,19E+04	2,74E+00
34	3,05E+02	6,83E+01	1,05E+02	5,97E+03	2,34E+02	1,15E+02	3,71E+02	2,44E+00	1,56E+01	1,39E+02	2,17E+04	2,70E+00
35	3,00E+02	6,73E+01	1,04E+02	5,88E+03	2,31E+02	1,13E+02	3,65E+02	2,40E+00	1,54E+01	1,37E+02	2,13E+04	2,62E+00
36	2,99E+02	6,71E+01	1,03E+02	5,86E+03	2,30E+02	1,13E+02	3,64E+02	2,39E+00	1,53E+01	1,37E+02	2,13E+04	2,61E+00
37	2,94E+02	6,58E+01	1,02E+02	5,76E+03	2,26E+02	1,11E+02	3,57E+02	2,35E+00	1,50E+01	1,34E+02	2,09E+04	2,60E+00
38	2,87E+02	6,43E+01	9,91E+01	5,62E+03	2,20E+02	1,08E+02	3,49E+02	2,29E+00	1,47E+01	1,31E+02	2,04E+04	2,56E+00
39	2,79E+02	6,25E+01	9,65E+01	5,47E+03	2,14E+02	1,05E+02	3,39E+02	2,23E+00	1,43E+01	1,27E+02	1,98E+04	2,49E+00
40	2,79E+02	6,25E+01	9,65E+01	5,47E+03	2,14E+02	1,05E+02	3,39E+02	2,23E+00	1,43E+01	1,27E+02	1,98E+04	2,43E+00
41	2,79E+02	6,24E+01	9,63E+01	5,46E+03	2,14E+02	1,05E+02	3,39E+02	2,23E+00	1,43E+01	1,27E+02	1,98E+04	2,43E+00
42	2,77E+02	6,21E+01	9,59E+01	5,43E+03	2,13E+02	1,04E+02	3,37E+02	2,22E+00	1,42E+01	1,26E+02	1,97E+04	2,35E+00
43	2,75E+02	6,15E+01	9,49E+01	5,38E+03	2,11E+02	1,03E+02	3,34E+02	2,20E+00	1,41E+01	1,25E+02	1,95E+04	2,35E+00
44	2,74E+02	6,15E+01	9,49E+01	5,38E+03	2,11E+02	1,03E+02	3,34E+02	2,20E+00	1,41E+01	1,25E+02	1,95E+04	2,34E+00
45	2,73E+02	6,12E+01	9,44E+01	5,35E+03	2,10E+02	1,03E+02	3,32E+02	2,19E+00	1,40E+01	1,25E+02	1,94E+04	2,33E+00
46	2,69E+02	6,03E+01	9,30E+01	5,27E+03	2,07E+02	1,01E+02	3,27E+02	2,15E+00	1,38E+01	1,23E+02	1,91E+04	2,33E+00
47	2,69E+02	6,02E+01	9,29E+01	5,26E+03	2,06E+02	1,01E+02	3,27E+02	2,15E+00	1,38E+01	1,23E+02	1,91E+04	2,31E+00
48	2,65E+02	5,94E+01	9,16E+01	5,19E+03	2,04E+02	9,97E+01	3,22E+02	2,12E+00	1,36E+01	1,21E+02	1,88E+04	2,30E+00
49	2,58E+02	5,78E+01	8,91E+01	5,05E+03	1,98E+02	9,69E+01	3,14E+02	2,06E+00	1,32E+01	1,18E+02	1,83E+04	2,28E+00
50	2,58E+02	5,77E+01	8,91E+01	5,05E+03	1,98E+02	9,69E+01	3,13E+02	2,06E+00	1,32E+01	1,18E+02	1,83E+04	2,23E+00

APPENDIX 3

Table 1 – Impacts, risks and adaptation measures to climate change applicable to the Aupaluk tank farm

Table 1 **Impacts, risks and adaptation measures to climate change applicable to the Aupaluk tank farm**

DESCRIPTION OF IMPACTS AND RISKS FOR THE PROJECT AND ITS IMPLEMENTATION ENVIRONMENT				CLIMATE CHANGE ADAPTATION MEASURES	
Effect of climate change on the hazard likely to affect the project or the impacts on the environment	**Component of the project likely to be affected by the hazard**	**Possible consequences for the project or its implementation environment**		**Location and design**	**Operation and maintenance**
Heavy rains more intense and more frequent	Drainage system of the operating area	· · Exceeding the capacity of the drainage system · · Ditch erosion	Impact and risk assessment	· Drainage installations are oversized to take into account blockages due to freezing of culverts and spring thaws, additional volumes due to increased precipitation are accommodated by the oversizing in place	· Redundancy of basin drainage thawing systems. Repair of eroded areas. Adjustment of drainage infrastructure based on observations (continuous process).
	Secondary containment of the storage area	· Filling of the basin limiting the retention capacity in the event of a spill		· Height of dikes built to the maximum value permitted by regulations, oversized volume of 10%.	· Reinforcement to maintain secondary containment dry. It must be emptied regularly. (the drain valve must be kept closed except to drain water)
Higher frequency of high winds	Traffic areas	· Formation of snow banks typical of Arctic regions creating obstacles. · Traffic at risk for inspection on the roofs of the tanks		· Orient the maneuvering areas for sweeping by the prevailing winds of the maneuvering areas · Locate obstacles so that accumulation areas do not hinder traffic · Plan the layout to facilitate snow removal · Provide hooks and ramps for lifelines	· Inspection procedure during high winds · Installation of a sleeve
Thawing of permafrost	Tank, building, dikes, development	· Instability linked to the thawing of permafrost which can lead to differential settlements · Catastrophic settlement		· Installation planned on a deposit of dry sand and gravel without ice lenses	· Monitoring of settlements and adjustment and leveling of structures
Higher ambient temperatures	Product handling	· Greater presence of steam (especially gasoline)		· Design compliant with the Quebec Construction Code	· Training of operators on the handling of petroleum products · Warning signs for the public in accordance with regulations
Ice storm	Infrastructures	· Falling ice sheets		· Protective canopies and deflectors	· Inspection procedures
Bank erosion	Infrastructure	· Erosion · Flood		· Inspection of the end of the pipeline at the bank, · Not applicable for the tank farm (elevation 21m)	· Inspection procedures

9. Le *Tome III – Ouvrages d'art* du MTMDET (2018) specifies an increase factor of 20% for southern Quebec and 18% elsewhere for flows in watersheds of 25 km2 or less.
10. The method for taking into account flow variations linked to climate change in establishing OER is currently being developed. A technical guide specifying the modalities is being prepared by the Department of Water and Atmospheric Expertise of the Ministry.