



J4 and 87 pit dewatering project TROILUS GOLD CORP

Answers to the questions and comments
by the MELCC and COMEX

Troilus Gold Corp

April 2020

Troilus Gold Corp in November 2019 submitted an environmental impact assessment demand for the dewatering of the J4 pit and pit 87 at the Troilus mine site. The following document represents a translation of the questions from both the ministry of the environment and climate change and the COMEX, as well as, a summary of the planned answers from Troilus Gold corp.

QC-1 Project variation

In section 3.1 of the impact study, the proponent specifies that the pit dewatering project is part of the exploration work for the former Troilus mine. According to the proponent, due to the position and angle of the new mineralized zone, additional exploration drilling will have to be carried out from the east wall of pit J4. A diagram (see Annex 1) is presented to support this explanation.

One of the alternative solutions to dewatering would have been to drill in winter when there is an ice surface (section 3.2 of the impact study). However, this option was not chosen for security, technical and financial reasons. However, the abandonment of this alternative solution should be the subject of a more detailed justification, since it is a method having little impact on the environment.

In order to complete the analysis of alternatives to the project, the proponent must provide additional explanations by answering the following questions:

- I. TROILUS GOLD must provide further explanation as to why the dewatering of the 87 pit is necessary if drilling is to be conducted from the J4 east wall

Troilus gold Corp: The drilling will also be conducted in the east wall of the 87 pit, as shown in the next figure.

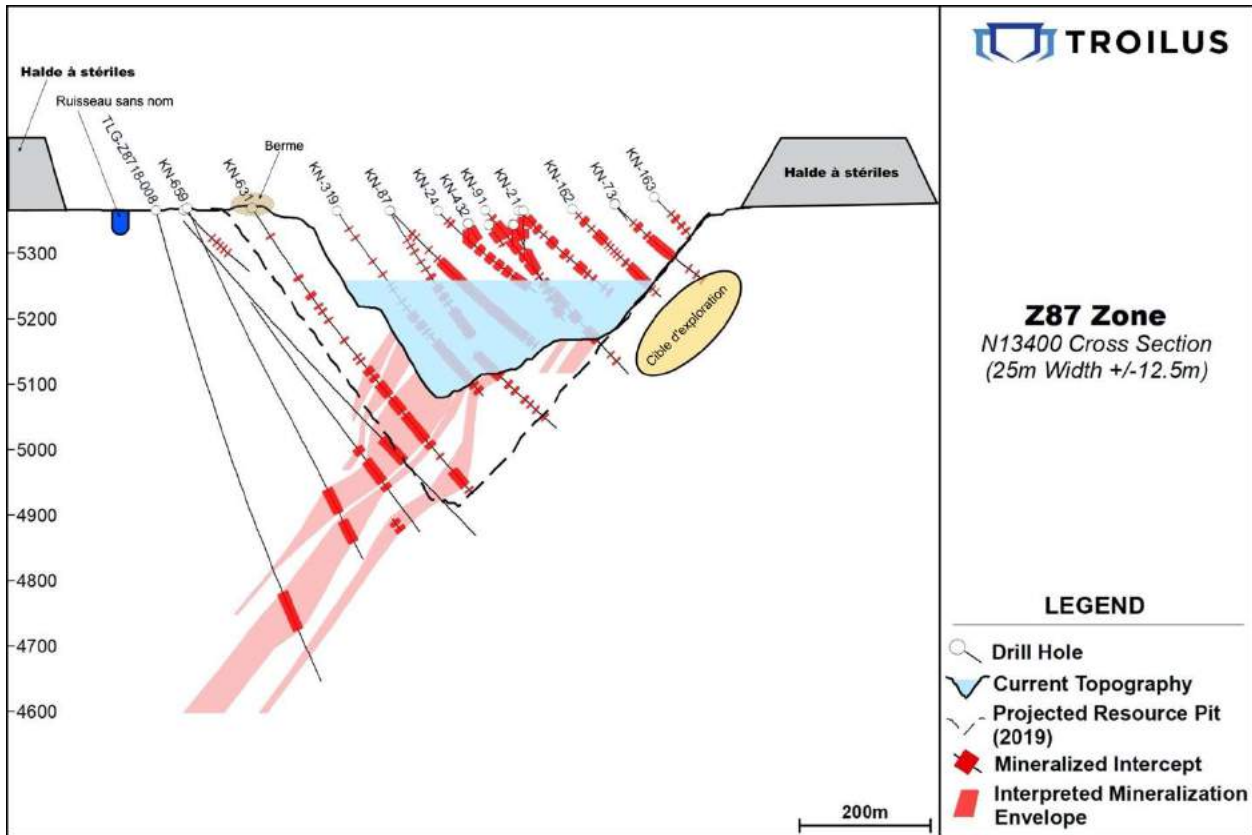


Figure 1 – Section N13400 Showing exploration target on the east wall of 87 pit. Also shown : historical drill holes.

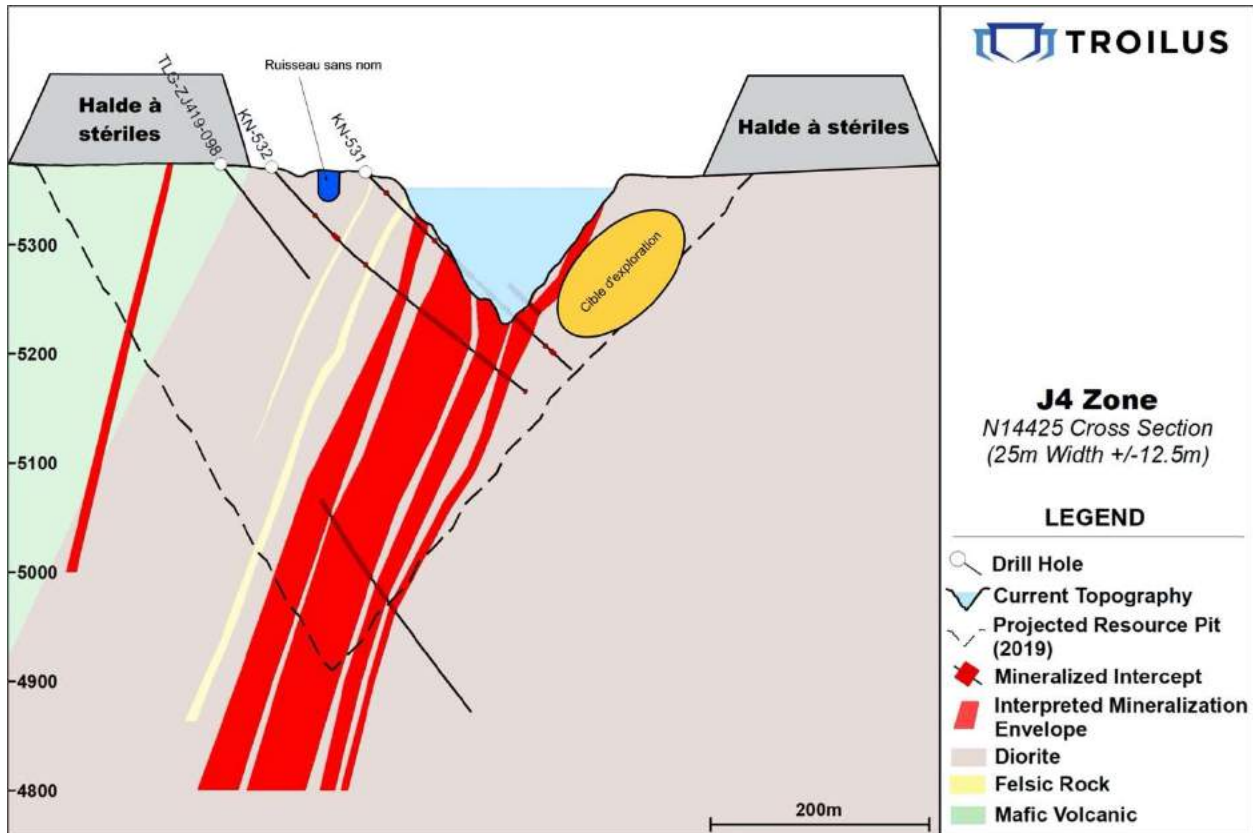


Figure 2 – Section N14425 N13400 Showing exploration target on the east wall of J4 pit. Also shown : historical drill holes

II. The company must justify the additional risks associated drilling on ice in both pits and justify why this option cannot be pursued.

The additional risks about drilling on ice are the following:

Safety of the workers due do potential instability of the ice due to vibration and inflow coming from underground water infiltration.

The time window for drilling on the ice is short: less than two months, which does not allow to flexibility in the drilling campaigns.

When drilling on the ice, the accuracy is diminished, as the driller do not see how and where the drill rod is entering the rock.

There is also a higher risk of contaminating water or ice in the pits with particles and lubricants from the drilling activities.

III. The company must prove that experts specialized in on-ice drilling have been consulted as to verify if on-ice drilling is possible in both pits.

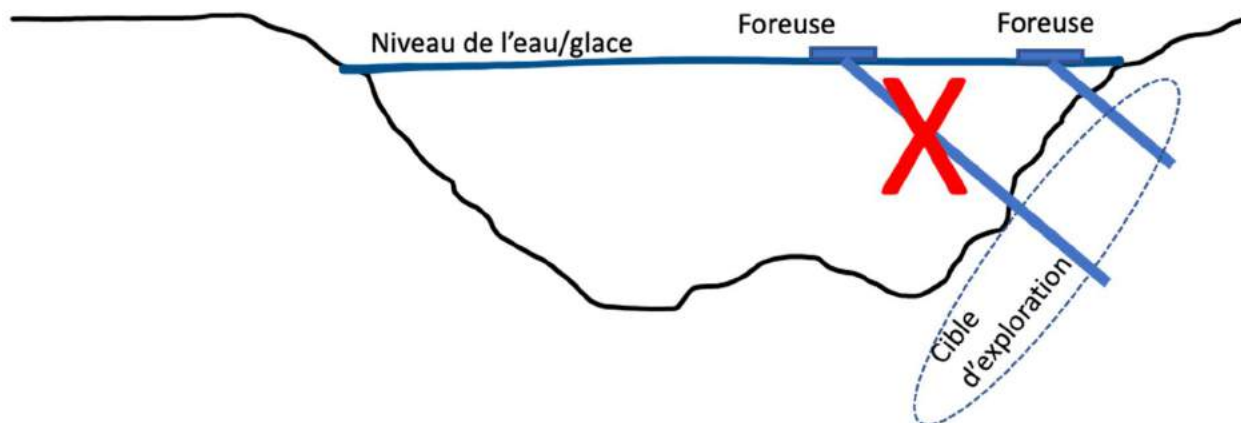
IV. The company must evaluate the possibility that drilling could be carried out on a barge. This alternative will have to be evaluated and presented using security, technical, financial and environmental criteria.

Questions ii to iv are answered simultaneously in the following text.

Exploration drilling can be done from a frozen surface such as a lake in winter. However, drilling on ice brings technical and economic challenges. For example, in terms of technical challenges, worker safety is an issue. It is essential to ensure the stability of the ice and in the case of a pit, it must also be ensured that the walls of the pit which are exposed (above the level of the ice) are stable.

To avoid equipment breakage and to ensure the accuracy of drilling, it is necessary to install the drill close enough to the walls of the pit to fix it to the wall and thus avoid vibrations of too great an amplitude. This therefore gives access to the mineralized zone at a single depth along the wall (Figure 4). To have access to greater depths, it would be necessary to move the drill away which is not possible on ice (or a body of water). The other option is to lower the water level to gain access to other levels. Which is like pumping water into the pit.

Moving away from the sides of the pit makes it extremely difficult to drill with the precision required to reach targets. A slight variation in the angle of the hole can cause a very large error and cause you to have to start a hole again. For example, a deviation of only 2 degrees is too high and forces you to start a hole again.



QC-2- Retained Solution

In section 5.3.4 of the impact study, it is specified that the dewatering of the pits implies a complete dewatering. However, no justification for this is mentioned in the document. In order to complete this section of the impact study, the promoter must answer the following questions:

I. The company will have precise if it would be possible to complete the drilling from the east ramps while maintaining a certain level of water in the pits.

It would be possible to drill to reach part of the target, However, this option was not retained as the exploration through those means would not be complete. Troilus Gold needs accurate data for the resources in order to further the technical studies to come (pre-feasibility, feasibility)

II. The proposed solution in section 3.2 should be better detailed in order to shed light on the entire dewatering process (ex, sequence of dewatering, state of pits during/after drilling, timeline)

The proposed solution is to dewater the J4 pit first. Following the results of the first drill program, other campaigns could be carried out (such as infill drilling).

It is the same situation with the 87 pit. The schedule is therefore depending on the results of the drill campaigns. It is planned to keep the bottom of the pits accessible for drilling during the duration of the exploration phase. See appendix 3 for the dewatering schedule

QC-3 – Water treatment plant capacity

In section 5.3.7 of the impact study, the proponent undertakes to comply with the rejection requirements of Directive 019 on the mining industry (Directive 019) and has acquired a water treatment system which should allow treat, if necessary, mine water during dewatering operations. However, the processing capacity of the processing unit is $300 \text{ m}^3 / \text{h}$ or $0.083 \text{ m}^3 / \text{s}$ while the anticipated pumping rate is evaluated at 2.5 to $3.5 \text{ m}^3 / \text{s}$. The ratio of the average pumping rate of the pits ($3 \text{ m}^3 / \text{s}$) to the treatment capacity ($300 \text{ m}^3 / \text{h}$) is 36, which seems to be clearly insufficient to treat the flow of water extracted in the context of the works of dewatering.

I. The company will have to explain how they anticipate treating a large volume of water with a installation that possesses a lower treatment capacity.

The company believes that the water quality obtained in the 2018 sampling campaign showcases that the treatment of the water in both pits will only be needed in the lower portion of the pits. In other words, the water treatment plant is part of a contingency plan to ensure that pumping can take place even if the directive 019 thresholds are met, be it at a slower rate due to the installations capacity. However, in order to make its best effort to meet the OER's sent by the Government, Troilus Gold will treat part of the dewatering flow through its treatment plant in order to reduce the load sent into the creek and tend toward the OERs. flowrate

QC-4- Soil and erosion

In section 9.2.2 of the impact study, it is mentioned that the dewatering of the pits could cause the development of significant erosion zones along the banks which could have the consequence of increasing the intake of materials suspended (MES) and thus affect the quality of the water as well as the fish

habitat. To remedy this problem, the proponent proposes in particular to control the speed of the current to maintain the integrity of the watercourse. In order to complete the information presented in the impact study, the promoter must answer the following questions:

I. Other than controlling the flowrate, the company will have to list other measures to offset the creation of suspended solids and their deposition further downstream; if erosion zones are detected.

The control of flowrate will be the only measure necessary to avoid the creation of erosion and deposition zones, as it would be the cause of the erosion.

However, if a certain zone is particularly sensitive to an augmented flowrate and shows signs of erosion while other portions of the stream do not, stabilisation measures; such as the installment of deflectors, cement blocks etc.. if they are deemed necessary will be the object of a certification of authorization.

All heavy machinery will also be kept at a minimal distance of 20 metres from all waterways.

II. the company will have to explain the measures that could be applied to protect the habitats of the different species of fish (spawning site) if erosion zones were detected.

The dewatering flowrate may be decreased to accommodate the reproduction of fish species that do not possess the ability to reach their spawning sites with the new increased flowrate in the unnamed stream.

III. The company must engage to stabilize those zones of erosion quickly when they are detected and to restore to their natural state, before the end of the works, the areas which could be affected by a sediment supply.

The company ensures that all erosion zones will be stabilized quickly when they are detected. Furthermore, zones that have been affected will be restored to their natural state before the end of the works.

QC-5-Pit water pumping system

In section 9.2.2 of the impact study, it is specified that "The pumping of water from the pit will be variable so that the flow downstream of the discharge point is approximately 3 m³ / s. To do this, a flow measurement station will be installed on the unnamed stream upstream of the discharge point".

I. The promoter must specify whether the pumping rate will vary on a daily, weekly or monthly basis

The pumping rate will vary weekly following the measurement of flowrate and water level downstream and upstream from the point of release as to not breach the flowrate and water level established.

Q-6- Water discharge into the unnamed stream

In section 9.4.2 of the impact study, it is specified that the increase in flow will result in increasing the water level in the unnamed stream as far as the floodplain, which could potentially modify the vegetation of these environments. In addition, the floodplains represent potential habitats for micromammals including the Cooper's vole-lemming which is listed near the unnamed stream. In order to complete the information presented in the impact study, the promoter must answer the following questions

I.the company must identify and locate the areas that could be temporarily flooded inside the flood plain and estimate the areas that could be affected.

Troilus Gold will increase slowly the flowrate to dewater the pits in order to protect the terrestrial areas that are beyond the flood plain. Right now, we do not have a precise enough topography to assess this, as some of the areas are very flat and an increase in a few centimeters of water level could mean several meters in area flooded. Troilus Gold relies on actual physical terrain follow-up at the start of the dewatering to ensure the terrestrial areas are respected.

II.The promoter must explain whether additional mitigation measures can be implemented if a change in vegetation is observed in the flooded areas during dewatering.

No additional measure other that reduced flowrate will be required.

III.The company must assess the impact that dewatering the pits could have on micromammals including the vole lemming of cooper and, if applicable, explain the mitigation measures that will be put in place to mitigate the potential impacts

It is understood that micromammals such as mouse and voles exit their habitat when a natural seasonal flood takes place. We expect the same behavior for a flood induced by the dewatering of the pits. We expect no mortality of the Vole Lemming of Cooper, as it likely will find another temporary habitat and could eventually return to its former habitat when dewatering is over.

QC-7-Water discharge into the unnamed stream

The report "Determination of flow rates suitable for breeding fish in the unnamed stream (Appendix D)" estimates flow rates for spawning sites, but this estimate is not presented for flow rates in the sections which are not necessarily potential spawning grounds, therefore in the sections which serve as migration corridors. Even if the flow rates are respected in the spawning grounds, if these speeds are not respected in the migration corridors, the fish may not be able to reach the breeding sites.

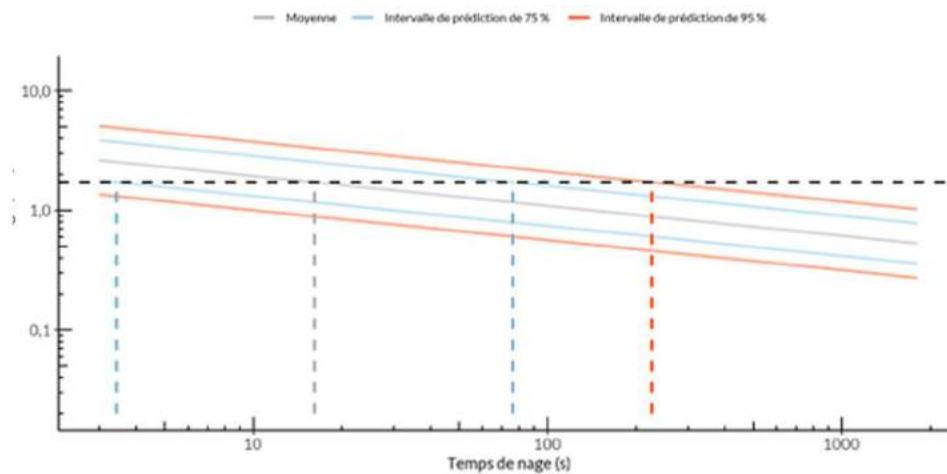
I.The company must demonstrate respect for the swimming capacity of the fish species for which potential reproduction sites have been identified in order to ensure that all of the steps that may affect the productivity of fish populations in the unnamed stream are maintained. This demonstration must be

made for sections where the slope will be increased or sections where, for other reasons, the flow speed will be increased.

TLG: The hydraulic study presented in appendix 3 of the DDM study (2019) presented in appendix D of the impact study shows that for a flow of around 3 m³ / s at the discharge point , the maximum speed of the water in the stream would be around 1.72 m / s. flow velocity and depth calculations were modeled for 21 flow sections along the creek in the study area.

The swimming capacities of the fish depend on the type and size of the fish but also on the speed or duration of the swim. They are also a function of the morphology of the river, the length of the path to be traveled in a stronger current, the temperature, the light and also the motivation of the fish to cross obstacles (Goerig, 2016).

According to the calculation tool developed by MPO (<http://fishprotectiontools.ca/en/user.html>), at this speed, we obtain the results below for salmonids and walleye.



Estimates

2,5 % des saumons et dorés jaunes de 200 mm peuvent nager à 1,72 m/s pendant au moins 226 s
12,5 % des saumons et dorés jaunes de 200 mm peuvent nager à 1,72 m/s pendant au moins 75,9 s
50 % des saumons et dorés jaunes de 200 mm peuvent nager à 1,72 m/s pendant au moins 16,1 s
87,5 % des saumons et dorés jaunes de 200 mm peuvent nager à 1,72 m/s pendant au moins 3,43 s

It is possible to calculate values for all speeds and for all lengths of fish for several species. According to our knowledge of the unnamed stream, there would be no impassable obstacle formation.

QC-8- Water discharge into the unnamed stream

According to the information presented in Appendix K of the impact study, the water temperature in the pits is between 5 and 15 degrees Celsius and will be discharged into the unnamed stream. If the water temperature in the unnamed stream is significantly higher, bringing a lot of cooler water into the stream could change the conditions observed in the fish habitat and possibly harm the use of spawning grounds by different species of fish. The promoter must answer the following questions:

I. The company must explain how it intends to ensure that there will be no thermal shock for the different species of fish that use the unnamed stream (especially at spawning sites).

2 main components of the project will ensure this.

- 1) The water being pumped from the pits will be taken from the surface (2 metres max) where the temperature is very similar with the temperature found in the unnamed stream.*
- 2) The water being released will flow down a cascade to reduce speed, increase oxygen and allow the water to adjust its temperature to the ambient air temperature.*

II. The company must demonstrate that the thermal conditions of the stream will not be significantly modified following the discharge of water from the pits into the stream.

The company is currently monitoring temperature in Lake A and the unnamed stream in order to compare with the water temperature in the pits at the depth at which water will be pumped.

water temperature taken at several points in the unnamed stream and in both pits during 2019 indicate that the surface water temperature in the pits does not appear to differ significantly from that of the unnamed stream. See figure 1 (FJ4 and J87 correspond to Pit J4 and Pit 87)

In addition, during the 12th and 13th of September 2018, a thermic stratification profile was created for the J4 pit. The information is presented in figure 2. The temperature of the surface water in Lake A during the 12th of September was 16 C.

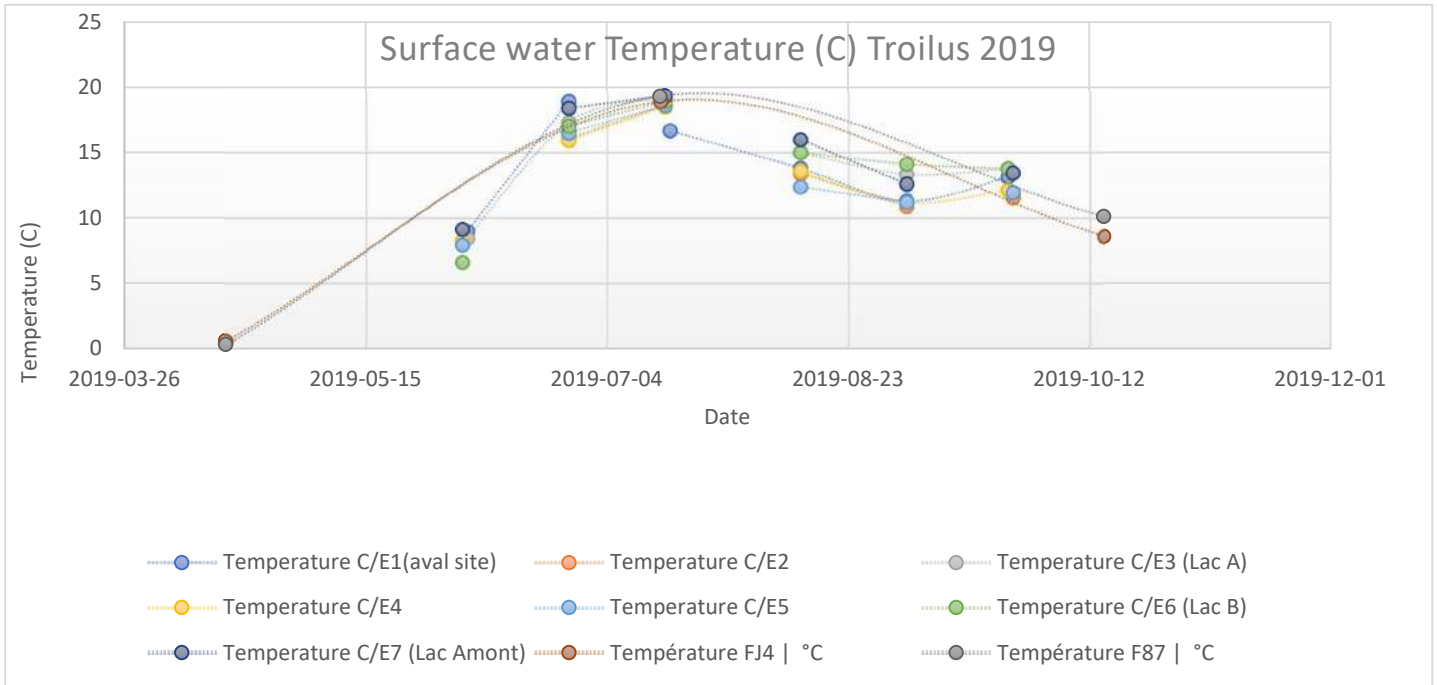


Figure 1- Water surface temperature Troilus 2019

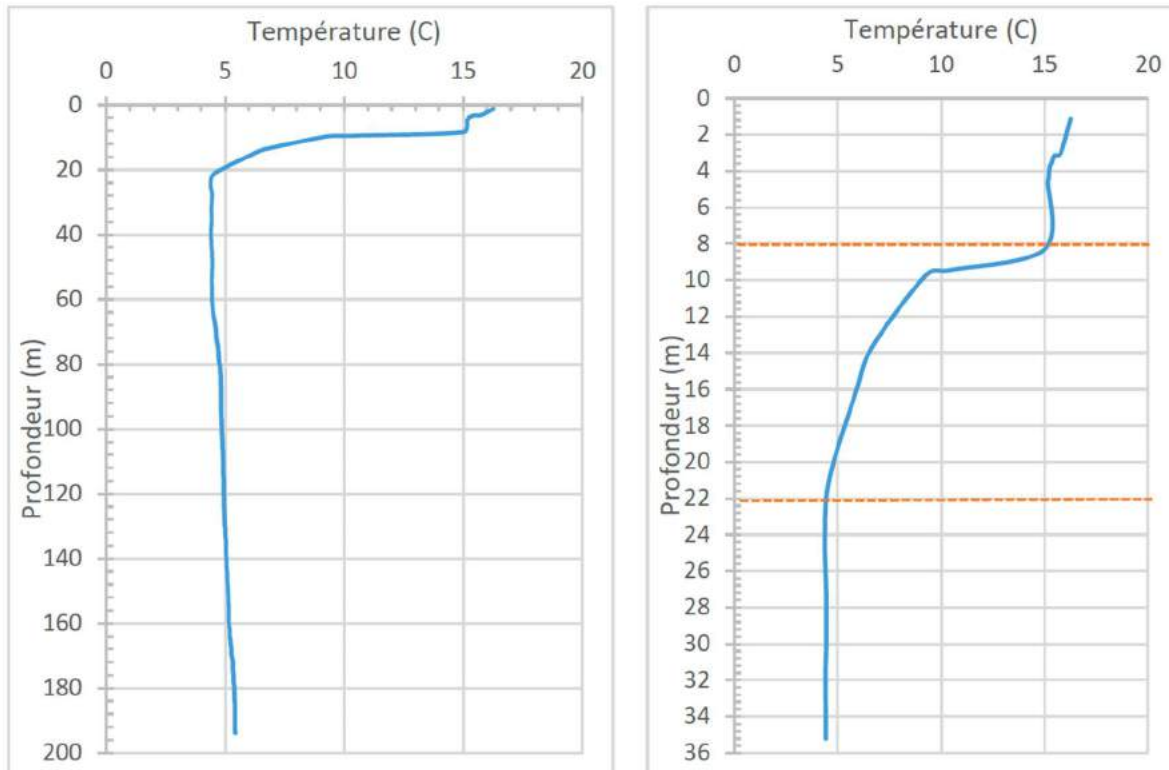


Figure 2: J4 water temperature per depth (M)

QC-9-Environmental release target

In section 10.2.4 of the impact study, it is specified that "The dewatering water will be considered as a final effluent and the parameters of Directive 019 will be sampled according to the prescribed frequency. " However, compliance with Directive 019 does not guarantee the absence of impact on the receiving environment. For this purpose, environmental discharge objectives (OER) are provided in Appendix 2 for the main contaminants present in the dewatering water of the two pits. The company must commit to:

I. Operate the water treatment plant in such a way as to respect or approach as much as possible the value of the established targets.

The company pledges to operate the treatment plant in a way to approach as much as possible the value of the established targets

II. Monitor all physico-chemical parameters subject to OER and chronic toxicity on a quarterly basis during the period of discharge of dewatering water. Acute toxicity should be monitored monthly.

The company pledges to monitor all physico-chemical parameters subject to OER and chronic toxicity on a quarterly basis and monitor acute toxicity monthly during dewatering.

III. Present the analysis of monitoring data on the quality of its dewatering effluent on an annual basis, drawing inspiration from the principles presented in the "Guidelines for the use of environmental discharge objectives relating to industrial discharges into the aquatic environment" (MDDEP, 2008) and its addendum "Comparison between the concentrations measured in the effluent and the environmental discharge objectives (OER) for existing companies" (MDDELCC, 2017).

The company pledges to present an analysis of monitoring data on the quality of its dewatering effluent on an annual basis.

QC-10- Underground waters

The study carried out by Genivar and attached to Annex I to the impact study shows that the drawdown of the water table will reach the tailings pond.

I. The company will have to explain the monitoring it intends to carry out in order to ensure that the drawdown will not have an impact on the tailings pond which is located south of the pits (eg monitoring of the park's piezometers).

A network of 5 vibrating string piezometers located on the tailing's facility will be monitored monthly when accessible. In addition, 3 piezometers at the base of the tailing's facility will be monitored and sampled bi-annually to verify the quality and level of the water table.

QC-11- Underground waters

On page 3 of Annex I to the impact study document, it is stated that "the rock is strongly jointed and faulted at the site and around pit 87".

I. The promoter must specify whether it has planned wall stabilization measures during or after the dewatering of the two pits.

The company is planning on stabilizing the walls of the pits that pose a potential risk to the security of workers, land users and the environment.

QC-12- Groundwater monitoring program

It is mentioned in section 10.2.5 of the impact study that a groundwater monitoring program will be implemented in compliance with Directive 019. In the context of this monitoring, in addition to the requirements of the Directive 019, the promoter must undertake to respect the following points:

I. If no existing well in the Lake A sector intercepts the aquifer found in the bedrock, the company must install new observation wells to allow piezometric monitoring of the groundwater of the rock aquifer in the sector.

Two existing wells (PM-3/PO-DETT 4) are already installed in proximity of lake A. PM3 -and PO-Dett 4 will continue to be monitored and sampled until definitive closure of the mine site.

II. The company must set alert thresholds for observation wells based on the characteristics of wells belonging to users of the territory of Lake A.

The alert thresholds correspond to the limits set by the ministry of the environment for the protection of aquatic life (chronic effect). Past data in the observation wells has been compiled to ensure that the thresholds set correspond to the natural concentrations on site before the dewatering takes place.

An example of the thresholds follows:

III. The company must plan mitigation measures in order to offset the impacts of a possible drawdown of the water column available in the wells belonging to the two users of the territory of Lake A

The company will ensure that the Lake A users have ample access to quality drinking water. It is expected that the water quality will remain excellent for the dinking well while the dewatering takes place. However, should an unforeseen situation arise and for whatever the drinking water is no longer good, Troilus Gold will provide potable water to the land users.

QC-13-Monitoring

In section 10.2 of the impact study, it is specified that monitoring of the quality and level of surface water will be carried out in the unnamed stream and that there will also be a piezometric monitoring which will continue. According to Tables 9.2, 9.3 and 9.4, monitoring provides in particular:

- monitoring the water level in existing wells;
- flow measurement in the unnamed stream upstream of the discharge;
- measuring the speed of water at certain critical locations during dewatering;
- monitoring the water quality of the unnamed stream;
- measurement of speed and depth of water at critical sections;
- monitoring the water level in certain sections
- monitoring the presence of fish.

the ice thickness of Lake A as well as the methods of communicating the results to users of the territory;

For clarity on the various follow-ups proposed by the company, the latter must:

- I. Submit a draft version of the follow-up program. The preliminary program must in particular present the indicators to be monitored, the frequency and duration of the monitoring as well as the period of the year concerned. In addition, the preliminary monitoring program must describe the intervention mechanism to be followed in the event that environmental degradation or the malfunction of a mitigation measure are observed during the implementation of the monitoring program, as well as the procedures and the frequency of communication of the results to users of the territory.

[See Appendix 2](#)

QC-14- Mining activities covered by the filing of a redevelopment and restoration plan

The mining activity described in the impact study is not an activity covered by the filing of a redevelopment and restoration plan under section 232.1 of the Mining Act. On the other hand, if the dewatering requires the construction of sedimentation basins to comply with environmental criteria and / or the movement of loose deposits above the thresholds mentioned in Appendix 3, a redevelopment and restoration plan must be submitted to the Ministry of Energy and Natural Resources (MERN) and the latter must be approved, and the financial guarantee paid, before the start of exploration work.

The construction of a sedimentation basin or movement of loose deposits above the thresholds in appendix 3 is not anticipated for the dewatering project. A restoration plan will be submitted if any of the thresholds of appendix 3 is reached.

Appendix 1 (groundwater quality thresholds for PO-DETT-4)

Paramètres	PO-DETT 4 (2013-2019)		MELCC Criteria mg/l						
	Min	Max	Seuil d'alerte	Résurgence dans les eaux de surface (RES) ****	Eau de consommation ****	CPC (EO)***	CPC (O)***	CVAC ***	VAA ***
Métaux (et métalloïdes)									
Argent dissous (Ag) mg/L *	<0.0001	<0.0003	CVAC			0,006	0,64	0,0001	0,00013
Arsenic dissous (As) mg/L	0,0005	0,002	CVAC	0,34	0,003	0,0003-0,01	0,021	0,15	0,34
Baryum dissous (Ba) mg/L*	0,0029	0,0029	CVAC	0,6	1	1	160	0,23	0,11
Bore dissous (B) mg/L	0,01	0,01	CVAC	28	5	0,2	160	5	28
Cadmium dissous (Cd) mg/L*	<0.00002	<0.00002	CVAC	0,0011	0,005		0,13	0,000082	0,0042
Chrome dissous (Cr) mg/L *	0,0007	0,0033	CVAC	1				0,023	0,48
Cobalt dissous (Co) mg/L	0,0005	0,01	CVAC	0,037				0,1	0,37
Cuivre dissous (Cu) mg/L*	0,05	0,23	CVAC	0,0073	1			0,0024	0,0031
Fer dissous (Fe) mg/L (1)	0,05	0,23	CVAC			0,3		1,3	3,4
Manganèse dissous (Mn) mg/L*	0,0029	0,03	CVAC	0,05	2,3	0,05	59	0,47	1
Mercuré dissous (Hg) mg/L (1)	0,02	0,1	CVAC		0,001	0,0000018	0,0000018	0,0011	0,0021
Nickel dissous (Ni) mg/L *	0,0005	0,0005	CVAC	0,26	0,007	0,07	4,6	0,013	0,12
Plomb dissous (Pb) mg/L *	0,0012	0,003	CVAC	34	19	0,01	0,19	0,00041	0,011
Sodium dissous (Na) mg/L	0,52	1,5				200			
Zinc dissous (Zn) mg/L	0,004	0,012	CVAC	0,067	5	5-7,4	26	0,031	0,031
Composés organiques volatils									
- Xylènes Totaux µg/L	0,3	0,4	CVAC	370	20	0,3	16	0,041	0,37
- Éthylbenzène µg/L	0,1	0,3	CVAC	160	1,6	0,0024	2,1	0,09	0,16
- Toluène µg/L	0,3	1	CVAC	200	24	0,24	15	0,2	1,3
1,2-Dichlorobenzène-d4 %	93	109	CVAC	70	150	0,03	1,3	7x10 ⁻⁴ (CCM)	0,12
- Benzène µg/L	0,2	0,3	CVAA			0,022	0,051	0,37	0,95
Autres composés inorganiques									
Azote ammoniacal (NH3-NH4) mg N/L**	0,01	0,03	CVAC			1,5		1,9(1)	
Chlorure (Cl) mg/L***	0,5	0,7	CVAC	860	250			230	860
Conductivité µmhos/cm	18	75							
Sulfate (SO4) mg SO4/L***	<0,6	5,3	CVAC		200	500		500(2)	500(2)
Sulfures mg S2-/L	0,02	1,43							
Nitrites-Nitrates mg N/L***	0,01	0,62	CVAC		10			3	
Cyanures totaux (CNt) mg/L***	0,001	0,005	CVAC	0,02				0,005	0,022
Paramètres intégrateurs									
Indice phénols (Colorimétrique) mg/L***	0,002	0,029	CVAC	500		860		0,45	3,4
pH ***	5,74	6,75	CVAC			6,5-8,5		6,5-9	
DBO5 mg/L	1	2	CVAC					3 (3)	
DCO mg/L	0	0							
Bicarbonate (HCO3) mg CaCO3/L à PH	24	49							
M.E.S. mg/L***	0,004	0,012	CVAC					<25	

Appendix 2-Preliminary Monitoring Program

Monitoring	Correction measures *	Method of Communication	Frequency of monitoring	Duration of monitoring
Water level in observation wells Lake A	Only necessary if supply to land users is at risk.	Annual Presentation	Biannually	Until definitive closure.
Water level in around tailings facility	Only necessary if supply to land users is at risk.	Annual presentation	Monthly /Biannually	Until definitive closure.
Water level monitoring in unnamed stream; upstream and downstream from release point	Modify flowrate to reduce possibility of flooding	Annual Presentation	weekly	During dewatering
Monitoring of flowrate in the unnamed stream; upstream and downstream from release point	Modify flowrate to reduce possibility of erosion	Annual Presentation	weekly	During dewatering
Monitoring the quality of dewatering water according to OER (Environmental release objectives) and chronic toxicity	Water treatment plant and geotubes	Annual Presentation	quarterly	During dewatering
Monitoring of the acute toxicity of dewatering water	Water treatment plant and geotubes	Annual Presentation	Monthly	During dewatering
Monitoring of groundwater quality	Not anticipated	Annual Presentation	Biannually	Until definitive closure.
Monitoring of erosion/deposition sensitive zones	Modify flowrate to reduce possibility of erosion. Return zone to natural state at end of work.	Annual Presentation	Biannually	During dewatering
Monitoring of Lake A ice thickness	Inform land users on ice thickness. Limit off high risk zones	Annual Presentation	Information updated weekly on site	During dewatering
Monitoring of wetlands and floodplains	Modify flowrate	Annual Presentation	Biannually	During dewatering
Monitoring of physico-chemical parametres in unnamed stream and Lake A.	Modify flowrate , water treatment plant and geotubes	Annual Presentation	Monthly	During dewatering
Monitoring on the presence and distribution of fish	Modify flowrate	Annual Presentation	Annually or following feedback	During dewatering

