

**Rapport annuel 2019 — Projet 2a (Goodwood)
Québec**



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1 Permis et autorisations

1.1 Projet 2a

Le projet 2a a été soumis au processus d'étude d'impact ; une autorisation de projet a été délivrée en 2013 et modifiée en 2017.

Au printemps 2017, Tata Steel Minerals Canada (TSMC) a obtenu un certificat d'autorisation de 1 an sous réserve de l'absence d'effluent. Une demande de certificat a été déposée en février 2018 pour les opérations à long terme de la fosse Goodwood. Celle-ci a été approuvée en avril 2018.

En août 2019, TSMC a déposé au MELCC une demande de modification aux infrastructures existantes. Cette demande présente les travaux de réparation nécessaire dans le bassin d'accumulation de Goodwood. Puisqu'il s'agit de travaux d'entretien à des infrastructures existantes, le certificat d'autorisation n'a pas à être modifié.

1.2 Extraction de stérile de la fosse Flemming 7

Pour des raisons de sécurité, un volume de stériles situé au Québec devra être extrait lors de la reprise de l'exploitation du gisement Flemming 7 (localisé à TN&L). TSMC possède le un certificat d'autorisation (no. 92031100000) pour cette activité et aucun changement n'a eu lieu depuis l'année dernière.

2 Opérations

2.1 Extraction de stérile — Flemming 7

Depuis 2015, les opérations de la fosse Flemming 7 sont suspendues et le stérile du côté québécois est toujours en place.

2.2 Projet 2a

TSMC a décidé de retarder le projet Sunny ; cependant le suivi environnemental du milieu est en vigueur.

Aucun entreposage de minerai n'a lieu sur le territoire de la province de Québec. L'ensemble du minerai est transporté par camion au site DSO3 (Terre-Neuve-et-Labrador) pour concassage, tamisage et expédition. Le minerai est ensuite transporté par train sous forme de concentré jusqu'au port de Sept-Îles pour transbordement maritime.

La construction de l'usine de traitement a été complétée à l'automne 2019. Également, la firme WSP a débuté les plans pour la réparation du bassin Goodwood, afin que TSMC puisse les réviser. Ces réparations sont prévues pour être réalisées au cours de la saison 2020.

2.3 Résumé de dynamitage

Le Tableau 1 présente les dynamitages effectués au Québec en 2019. Les rapports de dynamitage produits par InstanTEL sont présentés en Annexe II-A. Les données sont prises à l'aide d'un microphone (UM12242 V 10-87 Micromate ISEE).

Tableau 1. Résumé des dynamitages effectués au Québec, 2019

Rapport d'événement	Date de sautage	Heure	Pression dB (L)	Pic de vibration (mm/s)
GD-753-15	2019-05-30	12:03	135.6	0.808
GD-753-16	2019-06-03	12:00	116.9	0.898
GD-753-17	2019-06-15	12:00	126.4	0.74
GD-763-01	2019-07-10	6:30	133.8	0.776
GD-763-02	2019-07-19	12:05	121.63	1.323
GD-753-19/20	2019-07-21	15:00	88.93	12.65
GD-743-18A	2019-07-26	17:15	132.96	0.322
GD-763-03A	2019-08-07	17:47	113.328	0.36
GD-763-03B	2019-08-10	12:24	116.902	0.372
GD-743-15	2019-08-14	12:15	122.4	1.752
GD-763-04	2019-08-21	13:30	118.2	0.373
GD-743-16	2019-09-22	12:00	120.252	2.377
GD-743-18B	2019-09-23	12:00	120.945	0.232
GD-743-17B	2019-09-25	12:15	113.4	0.251
GD-738-01	2019-09-27	13:30	N/A	N/A
GD-738-02	2019-09-29	11:25	132.6	0.41
GD-753-15	2019-05-30	12:03	135.6	0.808
GD-753-16	2019-06-03	12:00	116.9	0.898
GD-753-17	2019-06-15	12:00	126.4	0.74
GD-763-01	2019-07-10	6:30	133.8	0.776

3 Incidents

3.1 Incidents de 2019

Lors de la fonte des neiges, une exfiltration d'eau provenant du bassin d'accumulation a été constatée. Il s'agit, comme l'an passé, d'eau souterraine accumulée dans le bassin principal.

Un suivi de la qualité de l'eau a été effectué pendant l'événement. Un échantillon a été prélevé à la station SP-OUT le 19 mai afin de suivre l'impact environnemental du déversement. Le Tableau 2 présente les résultats de l'analyse de l'eau d'exfiltration. Aucun dépassement n'est survenu. Pour trois paramètres, la limite de détection est plus élevée que le critère de qualité pour la protection de la vie aquatique (effet chronique), ce qui ne permet pas de statuer.

Les certificats d'analyse sont présentés à l'annexe II-B.

Aucun autre incident n'est survenu au bassin Goodwood en 2019.

Tableau 2. Résultats de l'analyse de l'eau d'exfiltration, 19 mai 2019

Paramètre	Unité	Résultat
Aluminium	ug/L	56
Antimoine	ug/L	<1
Argent	ug/L	<0,2
Arsenic	ug/L	<0,3
Baryum	ug/L	<2
Bore	ug/L	<40
Cadmium	ug/L	<0,2
Chrome	ug/L	<1
Cobalt	ug/L	<0,5
Cuivre	ug/L	<1
Manganèse	ug/L	38
Mercure	ug/L	<0,01
Molybdène	ug/L	<1
Nickel	ug/L	<1
Plomb	ug/L	<0,5
Sélénium	ug/L	<1
Sodium	ug/L	336
Zinc	ug/L	<3
Azote ammoniacal	mg/L - N	0,09
Azote total Kjeldahl	mg/L - N	<0,3
Matières en suspension - MES	mg/L	2
pH	pH	6,87

Orange. Dépassement du CVAC (critère vie aquatique chronique, MELCC (2019)) ; **Rouge**. Dépassement du CVAA (critère vie aquatique aiguë, MELCC (2019)) ou toxicité aiguë ; **Inconnu**. La limite de détection rapportée ne permet pas de statuer sur le niveau de toxicité du contaminant (LDD > CVAC)

À noter que le laboratoire n'a pas analysé la dureté de l'eau avec l'analyse des métaux. Pour l'évaluation des critères, la plus petite valeur de dureté a été utilisée (10 mg/L), ce qui est représentatif des valeurs de la région.

3.1.1 Gestion du dégel printanier

À l'automne 2018, un « plan d'hivernage » a été élaboré afin de prévenir le rejet d'eau rouge dans le milieu naturel lors de la fonte des neiges au printemps 2019. Le plan est présenté à l'annexe III et consistait en la construction de trois fossés supplémentaires autour du bassin, d'une digue temporaire et d'un système de pompes pour détourner l'eau loin de la zone et hors du milieu naturel. La mise en place du plan d'hivernage et de gestion des eaux de fonte a permis d'éviter le ruissellement d'eau rouge hors du bassin d'accumulation.

Le plan est décrit ci-dessous :

- Gestion de la neige dans les infrastructures avant la fonte, incluant le déneigement des fossés afin de permettre à l'eau de bien circuler;
- Système de pompage entre le bassin d'accumulation de Goodwood et la fosse de Kivivik 1C;
- Gestion des niveaux d'eau dans la section temporaire du bassin; et

- Système de pompage en aval du bassin pour contrôler l'exfiltration, le cas échéant.

Des plans des mesures mises en place sont présentés à l'annexe III.

3.1.2 Suivis prévus au printemps 2020

Un suivi visuel du bassin sera fait afin de s'assurer qu'il n'y a aucune exfiltration lors de la fonte. Le plan d'hivernage et de gestion des eaux de fonte sera également mis en place pour le dégel au printemps 2020.

3.2 Plaintes de la communauté

Il est à noter qu'une Urgence Nationale a été signalée par une source anonyme (à TSMC) au sujet d'un « lac rouge » dans la région Goodwood au printemps 2019. Il a été subséquemment confirmé qu'il s'agissait de la fosse Goodwood utilisée par TSMC pour stocker l'eau afin d'empêcher son rejet dans le milieu naturel.

4 Suivi de la qualité de l'eau de surface

TSMC effectue un suivi de la qualité du milieu et des eaux de surface depuis 2015. L'emplacement des stations de suivi de l'eau de surface est présenté à la figure 1 de l'Annexe I. Deux stations sont suivies : EE-GW, qui correspond à la station exposée localisée à l'exutoire du lac Fra ; ER-GW, la station de référence, localisée à l'exutoire du lac Migration.

Le programme de suivi prévoit l'échantillonnage des deux stations quatre fois par année pour les paramètres suivants :

- **Conventionnels** : alcalinité, COD, COT, conductivité, chlorures, DBO5, CDO, dureté, MES, pH
- **Ions et nutriments** : azote ammoniacal, NTK, cyanures, fluorures, nitrates, nitrites, silice réactive, sulfure d'hydrogène, sulfates
- **Hydrocarbures** : C₁₀-C₅₀
- **Métaux et métalloïdes** : Al, Sb, Ag, As, Ba, Bo, Cd, Cr, Co, Cu, Sn, Fe, Mn, Mo, Ni, PT, Pb, Se, Th, U, V, Zn, Ca, CN, Cr (VI), Hg, K, Mg, Ra₂₂₆, Na, T

Et une fois par an pour les paramètres suivants :

- **Métaux traces** : Al, Sb, Ag, As, Ba, Bo, Cd, Cr, Co, Cu, Sn, Fe, Mn, Mo, Ni, PT, Pb, Se, Th, U, V, Zn

4.1 Calendrier d'échantillonnage

Les certificats d'analyse de 2019 sont présentés à l'Annexe II-C.

Deux types d'échantillonnage ont été réalisés dans le milieu naturel (EE et ER) : un échantillonnage annuel des métaux traces et un échantillonnage mensuel en période sans glace des paramètres conventionnels, ions, nutriments, hydrocarbures, métaux et métalloïdes.

Les deux stations et tous les paramètres ont été échantillonnés les mêmes dates en 2019 :

- 14 juin
- 23 juillet
- 21 août
- 20 septembre

L'échantillonnage annuel des métaux traces a été fait le 21 août.

4.1.1 Résultats de l'échantillonnage de 2019

En 2019, deux des paramètres analysés au lac Fra (EE-GW) dépassaient les critères de vie aquatique chronique, soit le pH et le phosphore total. Le pH était considéré comme trop acide lors des inventaires des mois de juillet à septembre. En comparaison, le lac Migration (ER-GW) n'a dépassé le critère de vie aquatique qu'au mois de juillet. Quant au phosphore total, il n'a pas été mesuré lors des inventaires du mois de juin. Les échantillonnages pris subséquemment dans le lac Fra ont démontré que le niveau de phosphore dépassait les critères de vie aquatique chronique en juillet et en septembre. À l'inverse, aucun dépassement de phosphore total n'a été observé au lac Migration.

Il n'a pas été possible de déterminer si la quantité d'argent dépassait le critère de vie aquatique puisque le niveau de détection de ce dernier était plus élevé que le critère de dépassement (Tableau 3). Par contre, puisque la station de référence montre une concentration similaire, cela pourrait être dû à la concentration naturelle régionale en argent et non à un dépassement dû aux activités de la mine.

Aucun autre paramètre analysé n'a dépassé les critères de vie aquatique.

Tableau 3. Dépassements des critères pour la vie aquatique du MELCC pour le suivi annuel 2019

Date	pH	Total - P (mg/L)	Ag (mg/L)
EE-GW			
2019/06/14			<0,0002
2019/07/23	5,77	0,08	<0,0002
2019/08/21	6,40		<0,0002
2019/09/20	5,89	0,147	<0,0002
ER-GW			
2019/07/23	5,52		<0,0002
2019/08/21			<0,0002
2019/09/20			<0,0002

Orange. Dépassement du CVAC (critère de vie aquatique chronique, MELCC (2019)) ; **Rouge.** Dépassement du CVAA (critère vie aquatique aiguë, MELCC (2019)) ou toxicité aiguë ; **Inconnu.** La limite de détection rapportée ne permet pas de statuer sur le niveau de toxicité du contaminant (LDD > CVAC) ; NA. Paramètre non analysé

4.2 Mise à jour du programme de suivi de l'eau de surface

Il n'y a aucune mise à jour prévue pour ce programme.

5 Suivi de la qualité des sédiments

Le suivi de la qualité des sédiments et des communautés benthiques a été réalisé en 2019. Les stations d'échantillonnages sont présentées à la Figure I- 3.

5.1 Qualité des sédiments

Le programme de suivi des sédiments prévoit un échantillonnage quinquennal aux mêmes stations que le suivi de la qualité de l'eau pour les paramètres suivants :

- Métaux (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn)

- Phosphore
- Hydrocarbures pétroliers C₁₀-C₅₀
- Carbone organique total
- Soufre

Une description visuelle des échantillons (cohésion, couleur, odeur) et une analyse granulométrique en laboratoire est fait pour chaque échantillon.

5.1.1 Échantillonnage 2019

Compte tenu de contraintes logistiques rendant complexe le transport d'embarcation sur les lacs Fra et Migration, un échantillonnage hivernal a été fait pour effectuer le suivi de la qualité des sédiments. L'échantillonnage des sédiments a eu lieu le 6 avril 2019. Cet échantillonnage a été considéré comme celui représentant les conditions du milieu pour l'année 2019. L'échantillonnage a eu lieu aux deux points, soit au centre du lac Fra (SEE-GW) et dans la baie sud-est du lac Migration (SER-GW).

Le Tableau 4 présente une description des échantillons de sédiments prélevés.

Tableau 4. Description des échantillons de sédiments

Échantillon	Glace (m)	Eau (m)	Description
SEE-GW	0,85	3,2	<ul style="list-style-type: none"> ▪ Rouge-brun ▪ Silt argileux fin avec couche organique en surface ▪ Panache rouge visible pendant la remontée de la benne ponar
SER-GW	0,85	1,8	<ul style="list-style-type: none"> ▪ Brun foncé ▪ Silt argileux fin avec fine couche organique en surface ▪ Aucun panache visible pendant la remontée de la benne ponar

Le Tableau 5 présente les échantillons montrant des dépassements des valeurs limites réglementaires du Règlement sur la protection et la réhabilitation des terrains (RPRT ; Beaulieu, 2019). Aucun dépassement n'est observé pour tous les autres paramètres analysés. Les certificats d'analyse sont présentés à l'annexe II-D.

Le seul contaminant à avoir dépassé les valeurs limites réglementaires est le soufre. Ce dernier dépassait le critère A dans le lac Fra (EE-GW) et le critère B dans le lac de référence Migration (ER-GW), avec des valeurs de 0,12 et 0,20 %g/g respectivement. Ce dépassement peut être attribué à des facteurs environnementaux plutôt qu'à une contamination, surtout que la valeur est plus élevée pour le site de référence. La présence de tourbières en bordure des lacs pourrait expliquer cette valeur élevée.

Tableau 5. Dépassements des valeurs limites réglementaires du Règlement sur la protection et la réhabilitation des terrains pour le suivi 2019

Date	S (%g/g)
------	-------------

SEE-GW	
2019/04/06	0,12
SER-GW	
2019/04/06	0,20

Jaune. Dépassement du critère A (teneurs de fond pour les paramètres inorganiques et limite de quantification pour les paramètres organiques) ; **Orange.** Dépassement du critère B (valeurs limites réglementaires de l'annexe I du RPRT) ; **Rouge.** Dépassement du critère C (valeurs limites réglementaires de l'annexe II du RPRT)

5.2 Communautés benthiques

Le programme de suivi des sédiments prévoit également un échantillonnage annuel pour effectuer un suivi des communautés benthiques. Les stations se trouvent en cours d'eau permanent, le plus près des stations d'échantillonnage des sédiments. L'échantillonnage est à effectuer au mois d'août. Les descripteurs sont :

- Densité totale des invertébrés
- Richesse (nombre de taxons)
- Indice de diversité de Simpson
- Équitabilité (indice de Pielou)
- Densité de chaque taxon
- Abondance relative des taxons
- Absence/présence de taxons
- Coefficient de Bray-Curtis

5.2.1 Échantillonnage 2019

Un suivi de la communauté benthique a été effectué le 31 juillet 2019.

Le rapport d'analyse des communautés benthiques est présenté à l'annexe IV.

5.3 Mise à jour du programme de suivi de la qualité des sédiments

Le prochain échantillonnage des sédiments sera réalisé en 2024. Les deux mêmes stations seront échantillonnées en hiver, alors que les lacs sont gelés.

Le suivi des communautés benthiques sera effectué à l'été 2020.

6 Suivi des effluents miniers

De mai à décembre 2017, TSMC a construit l'ensemble des infrastructures de la gestion de l'eau. Ceci comprend des fossés de dérivation d'eau propre, des fossés de collecte d'eau de ruissellement et un bassin d'accumulation. Pour s'assurer de la qualité du travail, TSMC a mandaté WSP pour surveiller les travaux.

En 2017, TSMC a mandaté BluMetric pour dessiner et installer l'usine de traitement de l'effluent Goodwood. La construction a été complétée à l'automne 2019 et la mise en service est prévue pour le printemps 2020. Trois à quatre semaines seront nécessaires au printemps 2020 pour démarrer l'usine.

6.1 Suivi selon le Règlement sur les effluents des mines de métaux

Puisque l'usine de traitement ne sera installée qu'en 2020, il n'y a pas eu de suivi de l'effluent en 2019. Le programme de suivi prévu est tout de même décrit dans les sections suivantes.

6.1.1 Composition de l'effluent

Le Tableau 6 présente les fréquences d'échantillonnage et les paramètres suivis pour le suivi de l'effluent. Le programme de suivi sera débuté dès la mise en marche de l'usine de traitement

Tableau 6. Paramètres prévus pour le suivi de l'effluent

En continu	Hebdomadaire	Mensuel	Trimestriel
Conductivité, pH	MES, As, Cu, Fe, Ni, Pb, Zn, pH	Toxicité aiguë (<i>O. mykiss</i> et <i>D. magna</i>)	Alcalinité, dureté totale, Al, Cd, Fe, Hg, Mo, NH ₃ , NO ₃ , oxygène dissous, température

6.1.1.1 Essai de détermination de la létalité aiguë

Deux essais sont prévus mensuellement sur six concentrations de l'effluent : 0 %, 6,25 %, 12,5 %, 25 %, 50 % et 100 %.

- *Daphnia magna*, selon la méthode SPE 1/RM/14
- *Oncorhynchus mykiss*, selon la méthode SPE 1/RM/13

S'il s'avère que les échantillons de l'effluent minier au point de rejet final présentent une létalité aiguë, une analyse physico-chimique d'un échantillon de l'effluent doit être effectuée rapidement. Les essais de toxicité à létalité aiguë se poursuivent à une fréquence de deux fois par mois. Si trois essais consécutifs sont exempts de létalité aiguë, la fréquence à une fois par mois peut être reprise (article 15 du REMM).

6.1.2 Études du suivi des effets sur l'environnement

Le projet Goodwood sera assujéti à l'étude de suivi des effets sur l'environnement (ÉSEE) lorsque le volume d'effluent rejeté atteindra 50 m³/jour, soit dès la mise en service de l'usine d'épuration. Il n'y a pas eu de rejet d'effluent en 2018 dépassant ce seuil.

Lorsque le processus sera déclenché, le suivi sera conforme aux exigences de l'annexe 5 du REMM. Les résultats seront transmis dans le cadre du rapport annuel. Les paragraphes suivants présentent les études qui seront réalisées.

6.1.2.1 Caractérisation de l'effluent

La caractérisation de l'effluent sera réalisée quatre fois par année, avec au moins un mois d'intervalle entre chaque échantillonnage. Les paramètres mesurés sont :

- **Conventionnels**: dureté, alcalinité, conductivité et température
- **Métaux** : Al, Cd, Fe, Mo, Se, NH₄, NO₃ et Hg

6.1.2.2 Essai de toxicité sublétales

Les essais de toxicité sublétales sont effectués sur une espèce de poissons, d'invertébré, de plante et d'algue, lorsque l'effluent est rejeté dans l'eau douce, ce qui est le cas pour le projet 2a. Ces essais seront réalisés deux fois par année lors des trois premières années d'assujettissement aux ÉSEE, puis une fois l'an si l'effluent est non toxique pendant six essais consécutifs. Les essais prévus sont :

- **Poisson**: essai de croissance et de survie des larves de *Pimephales promelas* (Rapport SPE 1/RM/22) ou aux premiers stades du cycle biologique de *Oncorhynchus mykiss* (Rapport SPE 1/RM/28).

- **Invertébré** : essai de reproduction et survie sur le cladocère *Ceriodaphnia dubia* (Rapport SPE 1/RM/21)
- **Plante** : essai de mesure de l'inhibition de la croissance de la lentille d'eau *Lemna minor* (Rapport SPE 1/RM/37)
- **Algue** : essai d'inhibition de la croissance de l'algue *Selenastrum capricornutum* (Rapport SPE 1/RM/25)

6.1.3 Suivi biologique

En vertu de l'article 9, Partie 2 de l'ÉSEE (annexe 5 du REMM), il est prévu qu'une étude sur la population de poissons soit réalisée dans le cas où la concentration de l'effluent dans la zone exposée est supérieure à 1 % en deçà de 250 m en aval du point de rejet final. Il est par conséquent requis d'effectuer une mesure de la concentration de l'effluent à 250 m en aval du point de rejet final dès 2013. Également, une étude sur les tissus de poisson devra être réalisée si une concentration de mercure total égale ou supérieure à 0,10 µg/L est relevée lors de la caractérisation.

6.2 Suivi selon la Directive 019 sur l'industrie minière

Un suivi de l'effluent final est également requis selon la Directive 019 sur l'industrie minière (MDDEP, 2012), dont les exigences sont indiquées dans la section 2.1.1.1.1 de la Directive 019, en vertu de l'article 22 de la Loi sur la qualité de l'environnement (LQE), et conformément aux objectifs environnementaux de rejet (OER) calculés par le MELCC spécifiquement pour le projet 2a. À partir du moment où le projet est assujéti à la procédure d'ÉSEE, TSMC sera assujéti à deux types de suivi, soit un régulier et un annuel.

Le suivi régulier de l'effluent minier comprend un système automatisé et continu du pH et du débit, ainsi que le prélèvement d'un échantillon instantané et l'analyse de certains paramètres selon les fréquences indiquées au Tableau 7. Ces fréquences doivent être maintenues jusqu'à l'arrêt définitif des activités minières.

Tableau 7. Suivi selon la Directive 019 sur l'industrie minière

En continu	3 / semaine	Hebdomadaire	Mensuel	Annuel
pH, débit	MES	As, Cu, Fe, Ni, Pb, Zn	Toxicité aiguë (<i>O. mykiss</i> et <i>D. magna</i>)	Alcalinité, Cl ⁻ , conductivité, DBO ₅ , DCO, débit, dureté, F ⁻ , C ₁₀ -C ₅₀ , solides dissous, solides totaux, substances phénoliques, SO ₄ ²⁻ , turbidité, NH ₃ , NTK, NO ₂ , NO ₃ , PT, Al, Cd, Ca, Cr, Co, Mg, Mn, Hg, Mo, K, Si, Na, S ²⁻ , S ₂ O ₃ ²⁻

Le suivi annuel est effectué une fois par an, au cours de la période estivale. Il comprend l'analyse et la mesure de plusieurs paramètres (Tableau 7). L'échantillonnage et les mesures du suivi annuel doivent être réalisés au cours d'une même journée et s'additionnent au suivi hebdomadaire régulier pour cette semaine.

Pour évaluer la toxicité globale des effluents miniers selon la Directive 019, ce suivi comprend aussi des essais de toxicité aiguë, lesquels ont été ciblés par le MDDEFP, à savoir :

- toxicité létale chez le crustacé *Daphnia magna*. Méthode MA 500 – D.mag. 1.0. Révision 4;
- létalité aiguë chez *Onchorynchus mykiss*, méthode SPE1/RM/13, 2^e édition.

6.3 Suivi selon les objectifs environnementaux de rejet (OER)

Un suivi des contaminants pour lesquels des OER ont été déterminés est requis pour chacun des effluents miniers dans le but de démontrer qu'ils les respectent. Ce suivi sera réalisé à la même fréquence que celle prévue pour le suivi réalisé en vertu de la Directive 019.

Le MELCC a déposé à TSMC des OER pour le projet 2a. Ce document présente, notamment, les concentrations ainsi que les charges vers lesquelles doivent tendre les effluents finaux du site Goodwood.

Les paramètres supplémentaires exigés (baryum, sélénium, sulfure d'hydrogène) seront analysés lors du suivi annuel, soit une fois au cours de l'été. De plus, les solides dissous seront analysés quatre fois l'an, plutôt qu'une fois l'an comme demandé par la Directive 019.

6.4 Résumé des suivis de l'effluent

Le Tableau 7 présente l'ensemble des suivis à réaliser au niveau de l'effluent minier de Goodwood. Ces suivis seront en place lorsqu'un débit de 50 m³/jour sera mesuré à l'effluent, c'est-à-dire lorsque l'usine de filtration sera opérationnelle.

Tableau 8. Résumé des suivis de l'effluent

En continu	3 / semaine	Hebdomadaire	Mensuel	Trimestriel	Annuel
pH, conductivité, débit	MES	As, Cu, Fe, Ni, Pb, Zn	Toxicité aiguë (<i>O. mykiss</i> et <i>D. magna</i>)	Alcalinité, dureté totale, Al, Cd, Fe, Hg, Mo, NH ₃ , NO ₃ , oxygène dissous, température	Cl ⁻ , DBO ₅ , DCO, dureté, F ⁻ , C ₁₀ -C ₅₀ , solides dissous, solides totaux, substances phénoliques, SO ₄ ²⁻ , turbidité, NH ₃ , NTK, NO ₂ , NO ₃ , PT, Al, Cd, Ca, Cr, Co, Mg, Mn, Hg, Mo, K, Si, Na, S ²⁻ , S ₂ O ₃ ²⁻

7 Suivi de l'eau souterraine

Des travaux de forage ont été effectués en automne 2016 afin de détecter la présence d'eau souterraine en aval des installations au point topographique le plus bas. Les deux puits, Gdw-P01 et Gdw-P02, d'une profondeur de 65 et 80 m respectivement, n'ont détecté aucune présence d'eau souterraine. L'emplacement de ces forages est présenté à la Figure I- 2.

7.1 Relevé des niveaux d'eau

Le relevé du niveau d'eau dans les puits doit être réalisé deux fois par an : au printemps et en été. En 2019, le relevé a seulement été réalisé à l'automne, soit le 25 septembre.

7.2 Échantillonnage de l'eau souterraine

Advenant la présence d'eau dans les puits, un échantillonnage d'eau sera prélevé et analysé selon les paramètres suivants :

- HP C₁₀-C₅₀
- pH, ORP
- Oxygène dissous
- Conductivité

- Nitrites/nitrates
- Phosphore total
- Sulfures
- Cyanures totaux
- Métaux dissous (Al, Ag, Ba, B, As, Cd, Ca, Cr, Co, Cu, Fe, Mg, Mn, Hg, Mo, Ni, Pb, Sb, Se, K, Na, Zn)
- Carbonates/bicarbonates
- Chlorures
- Sulfates
- Fluorures
- Solides totaux dissous

Puisqu'aucune présence d'eau n'a été détectée dans les deux puits en 2019, aucun échantillonnage n'a été réalisé.

7.3 Mise à jour du programme de suivi de l'eau souterraine

Aucune mise à jour n'est prévue. Les puits seront visités en 2020 pour vérifier la présence d'une nappe phréatique et, si nécessaire, un échantillonnage de l'eau sera réalisé.

8 Suivi de la qualité de l'air

Depuis 2015, TSMC a mis en place un suivi de la qualité de l'air pour le projet DSO. Ce suivi est complètement opérationnel pour la première fois en 2018. Les certificats d'analyses de 2019 sont joints à l'Annexe II. La localisation des stations d'échantillonnages est représentée sur Figure I- 4 de l'Annexe I.

En 2017, TSMC a débuté le développement d'un système de gestion des données permettant la comparaison des résultats par mois et année pour chaque station.

8.1 Échantillonnage 2019

Les périodes d'échantillonnage et les résultats sont présentés dans les sections suivantes. Les certificats d'analyse sont présentés à l'annexe II-E. Les tableaux de calculs pour comparaison avec les normes (24h, 30 jours, annuel selon les critères) sont présentés à l'annexe V.

De nombreux problèmes reliés à des erreurs analytiques ou à des calculs erronés ont été encourus par TSMC en 2019. L'annexe II-G présente une lettre du laboratoire AGAT présentant toutes les erreurs provenant du laboratoire.

8.1.1 NO₂

Le suivi 2019 de la concentration de NO₂ devait normalement se dérouler chaque mois aux stations AQS2 et AQS4. Par contre, de mauvaises informations fournies par le laboratoire AGAT ont fait en sorte que les échantillons entre les mois de mars et juin n'ont pu être analysés (voir Annexe II-G).

Des résultats d'analyses sont disponibles pour deux périodes d'échantillonnage du NO₂, soit :

- Du 26 juin au 27 juillet
- Du 27 juillet au 26 août

Aucun dépassement des normes provinciales (QC et TNL) ne fut enregistré en 2019. La valeur la plus élevée a été mesurée à la station ASQ2 pour la période du 27 juillet au 26 août, avec une valeur de 1,69 µ/m³

(valeur mesurée de 0,9 ppbv converti en considérant que 1 ppb NO₂=1,88 µg/m³) pour une période de 30 jours., bien en deçà de la norme provinciale de 103 µ/m³/an.

8.1.2 Retombés de poussières

8.1.2.1 Période hivernale

Un échantillonnage de neige a été réalisé à la fin de l'hiver à proximité des cinq stations de suivi de la qualité de l'air. Le Tableau 9 présente la description des échantillons de neige.

Il n'y a pas de norme au Québec concernant les retombés de poussières. Celle de Terre-Neuve et Labrador est de 7,0 g/m²/30 jours. Les résultats obtenus aux différentes stations sont bien en deçà de cette norme. L'annexe V présente les calculs de déposition de poussières et de métaux.

Tableau 9. Description des échantillons de neige et résultat de retombé de poussières

Station	Date échantillonnage	Épaisseur neige (m)	Description	Retombée de poussières (g/m ² /30j)
AQS 1	2019-04-06	1,75	Neige légère et poudreuse. Pas de compactage. C'est dans une vallée, proche d'un cours d'eau. Aucune décoloration observée. Échantillonneur d'air absent.	0,29
AQS 2	2019-04-06	1,5	Légère décoloration observée près de la station et dans les alentours. Neige compactée la plupart du temps sur le chemin.	0,02
AQS 3	2019-03-31	0,24	Haut dans la montagne. Échantillonneur d'air présent.	0,63
AQS 4	2019-03-31	0,75	Seulement 0,52 m d'échantillonné. Près de la cabane du lac Foggy. Échantillonneur d'air présent.	0,11
AQS 5	2019-04-06	1,18	Neige compacte à la surface et molle en dessous. Aucune décoloration en surface. Échantillonneur d'air absent.	0,13

8.1.2.2 Période estivale

Pour la période estivale, les résultats sont disponibles seulement pour les mois de juin à août. Dû à une erreur du laboratoire, il n'y a pas de résultats pour la période de fin août à début septembre. Le Tableau 10 présente les dates d'échantillonnage et les résultats concernant les retombés de poussières. L'annexe V présente les calculs de déposition de poussières et de métaux.

Les valeurs mesurées sont bien en deçà de la norme de 7,0 g/m²/30 jours de Terre-Neuve et Labrador.

Tableau 10. Résultats de retombés de poussières – été 2019

Station	Date début	Date fin	Retombée de poussières (g/m ² /30j)
AQS 1	2019-06-26	2019-07-26	<1,134
AQS 2	2019-06-26	2019-07-27	<1,098
AQS 3	2019-06-26	2019-07-27	1,199
AQS 4	2019-06-27	2019-07-27	1,688

Station	Date début	Date fin	Retombée de poussières (g/m ² /30j)
AQS 1	2019-07-26	2019-08-25	1,588
AQS 2	2019-07-27	2019-08-26	2,348
AQS 3	2019-07-27	2019-08-26	0,823
AQS 4	2019-07-27	2019-08-26	1,519

8.1.3 Particules PM2,5 et PMT

Les certificats d'analyse présentés à l'annexe II présentent des erreurs au niveau des dates d'échantillonnage. Celles-ci ont été corrigées dans les calculs pour les particules présentés à l'annexe V et dans le Tableau 11, qui présente les résultats pour les particules de poussières PM2,5. Les concentrations pour les PMT ne sont pas présentées dans ce tableau, seulement à l'annexe V. La concentration en PMT est plus faible que celle des particules PM2,5, laissant croire à une erreur de la part du laboratoire.

Les faibles concentrations de PM2,5 captées aux stations d'échantillonnages, bien en deçà de la norme québécoise de 30 µg/m³, suggèrent une absence de contamination de l'air ambiant aux sites d'échantillonnage.

Tableau 11. Résultats des particules PM2,5

Station	Date début	Concentration moyenne / 24h (µg/m ³)
		PM2,5
AQS1	2019-06-07	16,217
AQS2	2019-06-26	17,465
AQS2	2019-07-10	15,385
AQS2	2019-07-25	14,138
AQS4	2019-06-25	11,227
AQS4	2019-07-23	12,059
AQS4	2019-07-08	14,970

8.2 Station météorologique

La station météorologique a été installée en août 2019. La station Kivivic a été installée sur une surface plate et peu rocheuse derrière les remorques à KM24 (à Terre-Neuve-et-Labrador), à une distance de plus de 10 fois la hauteur des bâtiments, telle que prescrite.



Figure 1. Station météo Kivivic

Les coordonnées de cette station sont : N55.05213; W67.31022. La localisation est montrée à la Figure I-4.

8.3 Mise à jour du programme de suivi de la qualité de l'air

Les moniteurs d'air PQ200 utilisés par TSMC ont posé des problèmes techniques et logistiques importants concernant le maintien du programme de suivi de la qualité de l'air en 2019 et au cours des années précédentes. Les moniteurs PQ200 sont lourds, délicats et nécessitent des solutions d'alimentation externes encombrantes. Cela les rend difficiles à manœuvrer et à installer en terrains accidentés, lesquels représentent la plupart des emplacements de suivi de la qualité de l'air autour du projet Goodwood. Ils sont mieux adaptés aux opérations fixes et non à l'utilisation mobile, telle qu'actuellement.

À ce titre, TSMC a été en communication avec les gouvernements provinciaux du Québec et de Terre-Neuve-et-Labrador, ainsi que BBA, consultant qui effectue le suivi de la qualité de l'air, pour évaluer les programmes de surveillance de l'air sur d'autres sites miniers aux conditions climatiques similaires au Québec. TSMC et BBA visent à évaluer le potentiel de remplacement des PQ200 par des solutions de surveillance de l'air tout aussi précises, mais plus pratiques et plus conviviales. Les options préliminaires proposées par BBA sont actuellement à l'étude par le gouvernement du Québec.

Le plan d'échantillonnage proposé par TSMC répondra aux exigences du certificat d'autorisation.

Également, TSMC s'assurera d'obtenir tous les résultats valables en 2020.

9 Suivi des caractéristiques géochimiques des stériles

Le programme de suivi des stériles miniers prévoit deux composites par mois, à une fréquence d'environ 24 échantillons par million de tonnes de stériles pour les paramètres suivants :

- Pourcentage de soufre
- Essais statiques MABA
- Essais de lixiviation TCLP
- Métaux (Ag, As, Ba, Cd, Co, Cr, Cu, Fe, Sn, Mn, Hg, Mo, Ni, Pb, Se, Zn)
- Paramètres indiqués dans la Directive 019 (B, U, Fluorures totaux, Nitrites et Nitrates)

9.1 Échantillonnage 2019

Un seul échantillonnage des stériles a été fait en 2019, le 22 novembre. Quatre échantillons ont été prélevés dans différents secteurs de la halde à stériles. Les certificats d'analyses sont présentés à l'annexe II-F.

Aucun des échantillons n'avait de concentration de soufre détectable, soit tous sous la limite de détection. Cela confirme qu'il n'y a pas de minéral sulfureux dans les stériles.

Les analyses ont également montré qu'il n'y a pas de potentiel acidifiant (PA) dans les stériles. Un seul échantillon a montré un potentiel de neutralisation (PN), les trois autres ont un potentiel de 0. Une valeur nette positive (PN-PA) montre que le stérile ne produira pas de drainage minier acide, mais ce résultat doit être interprété en relation avec le contenu en soufre ou en minéraux sulfureux. Puisque la concentration en sulfures est faible ou inexistante, cela montre que les stériles n'ont pas de potentiel de générer du drainage minier acide.

Également, l'essai de lixiviation a montré qu'il y avait peu de métaux dissous, ce qui est un critère pour déterminer le potentiel pour le drainage minier acide.

9.2 Mise à jour du programme de suivi des stériles

Aucune mise à jour n'est prévue. Le programme de suivi sera poursuivi en 2020 pour respecter les conditions du certificat.

10 Suivi géotechnique

Conformément au plan de surveillance pour le projet 2A, TSMC doit fournir une étude hydrogéologique et hydrologique permettant de statuer sur le nombre d'années qui seront nécessaires pour le remplissage complet de la fosse. Les travaux de terrain ont été réalisés à l'automne 2019. L'étude est présentée à l'annexe VI.

Conformément à son certificat d'exploitation pour le projet 2A, TSMC doit vérifier régulièrement la stabilité physique des infrastructures à Goodwood (*La stabilité physique des ouvrages, les digues du bassin d'accumulation, bermes et haldes feront également l'objet d'un suivi régulier*). Cela se fait en tout temps pendant les opérations à Goodwood. Si le personnel sur le site observe des problèmes liés à la stabilité physique des infrastructures Goodwood, ils sont signalés aux gestionnaires.

En 2019, une attention particulière a été portée aux infrastructures de gestion de l'eau du site, soit le bassin et les fossés. Les rapports sur le déneigement incomplet de certains fossés ont été traités immédiatement. En outre, des rapports sur les pentes de la halde à stérile ont été également traités en menant une enquête sur la pente de ce dernier.

Les ouvrages majeurs, digues du bassin d'accumulation et haldes doivent également être inspectés par des experts externes une fois l'an. Leurs observations pour 2019 et recommandations sont présentés dans le rapport de l'annexe VI.

11 Suivi du caribou

L'analyse des données mensuelles obtenues par le gouvernement du Québec permet de suivre les caribous (*Rangifer tarandus*).

TSMC n'a pu obtenir le positionnement des caribous les plus près de la mine pour l'année 2019 avant la date de remise de ce rapport.

11.1 Contribution au projet Caribou Ungava

Depuis 2014, TSMC est partenaire du programme de recherche *Caribou Ungava* et participe au programme pour une valeur de 100 000 \$ annuellement.

Le programme de recherche suit les populations et il s'est engagé à soumettre la localisation des caribous s'ils pénètrent la zone tampon de TSMC.

Il vise à quantifier les facteurs qui déterminent la dynamique de population et l'utilisation de l'espace du caribou migrateur dans un contexte de changements climatiques et anthropiques.

Le programme Caribou Ungava a comme objectifs de déterminer les effets des activités anthropiques sur l'utilisation de l'espace et la survie des caribous, analyser les interactions caribou-prédateurs et poursuivre les analyses sur la dynamique de population du caribou afin d'assurer le maintien des activités socio-économiques, culturelles, et de chasse de subsistance. Finalement, l'impact des changements climatiques et des variations démographiques sur l'habitat du caribou est étudié.

Conformément au certificat d'autorisation pour le projet 2A, ce partenariat doit durer 5 ans (2014-2019) et TSMC a rempli cette exigence.

11.2 Contribution au programme CARMA

Depuis 2013, TSMC est partenaire du réseau *CircumArctic Rangifer Monitoring and Assessment* (CARMA). Ce réseau regroupe des scientifiques, des gestionnaires et des communautés ayant à cœur la survie des troupeaux de caribou nordiques.

Conformément au certificat d'autorisation pour le projet 2A, ce partenariat doit durer 5 ans, soit jusqu'en 2019 et TSMC a rempli cette exigence.

12 Suivi de la faune aviaire

TSMC s'est engagé dans l'étude d'impact à effectuer un suivi quinquennal de l'avifaune. Ce suivi a pour but de déterminer si les activités minières ont un effet sur les populations nicheuses locales.

Des inventaires de référence ont été menés par Groupe Hémisphères inc. en 2008 et 2009. Un premier suivi a été réalisé en 2017. Le prochain suivi de la faune aviaire est prévu pour 2022.

13 Suivi des pertes d'habitats fauniques

TSMC s'est engagé dans l'étude d'impact à effectuer un suivi des pertes d'habitats fauniques. Ce suivi a pour but de vérifier si les superficies perdues estimées dans l'étude d'impact correspondent à celles mesurées sur le terrain.

L'évaluation sera faite lorsque l'aménagement des infrastructures sera plus avancé, soit en 2020. L'aménagement du site sera alors presque entièrement complété.

14 Plan de fermeture et réhabilitation

14.1 Plan stratégique de réhabilitation

Ce plan stratégique définit les assises nécessaires pour la restauration des sites miniers opérés par TSMC durant toute la durée de ses activités minières, de même que lors de la fermeture du projet. Le programme

de restauration progressive est mis en œuvre afin de réduire l'exposition des sols à nu, diminuer la production de poussières, restaurer les fonctions des écosystèmes et préserver la qualité de l'eau provenant des haldes et des fosses.

Ce plan stratégique supporte l'équipe Environnement et Permis de TSMC pour évaluer les priorités de restauration, former les équipes nécessaires, définir les meilleures approches de restauration et méthodes à utiliser et définir un calendrier réaliste de restauration progressive.

Il décrit également les actions de restauration déjà entreprises par TSMC en collaboration avec les Universités Laval et McGill, T2 Environnement et Viridis Terra Innovations de même qu'avec la firme Earth Alive Clean Technologies inc. En 2017 cette collaboration a permis à TSMC d'adapter le plan de fermeture et de réhabilitation selon les réalités nordiques.

TSMC s'est engagé à restaurer ses sites en collaboration étroite avec les communautés locales qui seront consultés préalablement à la production du plan de fermeture. TSMC ne demandera pas d'être libéré de ses responsabilités tant que le travail de restauration ne sera pas effectué à l'entière satisfaction des communautés locales.

Le plan stratégique a été présenté aux communautés au début 2018 (le document est déjà disponible sur le serveur de partage de données entre TSMC et les communautés) et soumis à l'ensemble des gouvernements.

En 2021, une version mise à jour du plan de fermeture et de réhabilitation de TSMC sera fournie. La spécification de l'installation de la berne de roches stériles assurant la sécurité autour de la fosse sera présentée, ainsi que l'analyse de stabilité de la fosse en post-restauration sera présentée dans la prochaine révision du plan de restauration.

14.2 Projet de recherche en réhabilitation des habitats affectés par l'exploitation minière

14.2.1 Titre du projet

Isolement, identification et sélection des symbiotes végétaux racinaires en vue d'améliorer la réhabilitation des habitats de la toundra arctique et alpine du Québec affectés par l'exploitation minière

14.2.2 Description

Le projet a débuté en juin 2016 par la collaboration de TSMC, T2 Environnement et Viridis Terra Innovations. Le rapport final est attendu au printemps 2020

Les objectifs scientifiques poursuivis par le projet sont:

- décrypter le métagénome racinaire et rhizosphérique des espèces clés des sites miniers en milieu nordique;
- isoler et identifier morphologiquement et moléculairement les champignons ectomycorhiziens, éricoides et endophytes associés aux espèces clés culturelles de la toundra forestière (*Picea mariana*, *Betula glandulosa* et *Vaccinium uliginosum*); et
- sélectionner *in vitro* et *in vivo* les meilleurs isolats de champignons et d'endophytes pour leur résistance aux stress générés par les rejets de l'industrie minière à l'aide des paramètres morphométriques, physiologiques et biochimiques.

Les objectifs fondamentaux de la recherche vont permettre de générer de nouvelles connaissances scientifiques en vue de développer de nouvelles phytotechnologies spécifiques aux milieux arctique et subarctique. Les objectifs appliqués vont permettre le développement d'un savoir-faire technique pertinent, transposable et économiquement viable pour adresser les problèmes environnementaux complexes actuels et futurs qui affligent le développement minier en milieu nordique.

14.2.3 Résultats

Les taux de survie des espèces testées, qui ont planté dans des zones représentatives et en fonction de divers paramètres et méthodes, fournissent des informations précieuses concernant les phytotechnologies les plus applicables pour la restauration éventuelle dans le secteur DSO4. Bien qu'une grande partie des parcelles d'essai et des travaux de restauration globaux aient été effectués en ce qui concerne le site DSO3, les données et les enseignements tirés de ces essais devraient être très utiles et transférables aux efforts de restauration pour le projet Goodwood.

Jusqu'à présent, des parcelles d'essai ont été plantées dans les haldes de stériles de Timmins 4 et Timmins 6, le ruisseau Elross et une zone délibérément choisie pour sa forte pente près de la fosse Timmins 1, qui est parfaitement adaptée aux études de stabilité des pentes. Les taux de survie des espèces utilisées dans ces essais en fonction des différentes méthodes de préparation du site et des amendements du sol sont présentés à l'annexe VI.

Sols dans le secteur de Goodwood

Les paramètres physico-chimiques et minéralogiques des sols du secteur de Goodwood ont été évalués, afin de vérifier comment les caractéristiques du sol interagissent avec les espèces testées, ainsi que les facteurs qui devront être considérés lors de la restauration. Les tableaux de résultats sont présentés à l'annexe VII.

14.2.3.1 Décrypter le métagénome racinaire et rhizosphérique des espèces clés des sites miniers en milieu nordique

Les plantes indigènes de la mine de fer de Schefferville ont été récoltées dans des zones alpines et dans la tundra, perturbées et non perturbées en août 2016 et 2017. Les communautés microbiennes de sol en vrac, de rhizosphère et de racines ont été analysées par séquençage d'amplicon à haut débit de l'ADN total extrait de différentes espèces de plantes représentatives en croissance sur le site.

Une analyse statistique des données a ensuite été réalisée en ciblant spécifiquement les micro-organismes associés aux plantes en croissance sur les sites. Les communautés bactériennes rhizosphérique et endophytique de plantes poussant sur les sites perturbés et non perturbés se sont révélées être significativement différentes.

Parmi les taxons bactériens et fongiques dominants, il a été observé que certains ne sont présents que dans les racines et la rhizosphère des plantes provenant de sites perturbés. Celles-ci incluent des espèces impliquées dans la réduction de l'oxyde de fer, la séquestration des métaux et la résistance aux métaux lourds telle que *Geobacter*, *Polaromonas* et *Cyanobacteria*. Ces micro-organismes peuvent permettre aux plantes de mieux tolérer et prospérer dans des environnements difficiles et pourraient éventuellement être utilisés comme inoculum pour augmenter l'efficacité de la réhabilitation du site minier.

14.2.3.2 Isoler et identifier morphologiquement et moléculairement les champignons associés aux espèces clés culturelles de la tundra forestière

Plus de 400 isolats fongiques ont été identifiés avec succès, et les séquences ont été soumises à la banque de données GenBank (<http://www.ncbi.nlm.nih.gov>). Une analyse statistique préliminaire a permis de démontrer un patron contrasté des communautés cultivables des symbiotes racinaires isolés en milieu naturel et en milieu perturbé. On remarque aussi que les végétaux ne recrutent pas les mêmes micro-organismes selon l'état de leur environnement.

14.2.3.3 Sélectionner les meilleurs isolats de champignons et d'endophytes pour leur résistance aux stress générés par les rejets de l'industrie minière

Des champignons candidats ont été sélectionnés *in vitro* pour leur croissance et la production des métabolites en présence des résidus de la mine, ainsi qu'en présence de différentes concentrations de l'hématite (Fe_2O_3). Les isolats sélectionnés vont nous servir pour la production d'inoculum. Une autre expérience sur la performance de *Betula glandulosa* et *Alnus crispa* plantées sur du mort-terrain amendé avec du biochar et de la tourbe de sphaigne vient d'être complétée.

Des différences significatives ont été décelées entre *A. crispa* et *B. glandulosa* pour chacune des variables déterminées, respectivement pour les biomasses racinaire, foliaire, caulinare, et totale. Par contre, les facteurs biochar et tourbes n'ont pas eu d'effets significatifs sur la production de biomasses des deux espèces.

De plus, les résultats ont montré que *A. crispa* croissait mieux que *B. glandulosa* dans le mort-terrain. Dans une autre expérience, nous avons montré que la performance (survie, taux de levée des pousses, nombre total de pousses, production de biomasse) de boutures de *Salix planifolia* plantées verticalement ou horizontalement sur deux types de substrats (morts-terrains et résidus) était plus importante sur les morts-terrains que sur les résidus à la fin de l'expérience (7 semaines). Ces résultats suggèrent que la multiplication végétative de *S. planifolia* présente un potentiel de revégétalisation des morts-terrains des sites de mine de fer.

14.2.4 Coordination, communication et dissémination des résultats et de l'information générés par le projet à toutes les parties prenantes.

Un plan de communication, de dissémination des résultats et de l'information est en place (en moyenne 5 réunions par an) pour favoriser la concertation et le partenariat entre les chercheurs et les utilisateurs potentiels.

Les comptes rendus de ces réunions sont disponibles dans la boîte Dropbox du projet, gérée par la professionnelle de recherche Marie-Ève Beaulieu à l'Université Laval. Au moins 5 publications scientifiques dans des revues avec comité de lecture à partir des résultats de ce projet sont prévues.

Certains des résultats ont déjà été présentés à des conférences internationales :

- ICOM9 à Prague, 30 Juillet 30-4 août, 2017. Titre : Isolation and morpho-molecular identification of root plant symbionts of Quebec's arctic and alpine tundra; et
- 7 th European Bioremediation Conference (EBC-VII) et 11 th International Society for Environmental Biotechnology conference (ISEB 2018), à Chania, du 25 juin 2018 au 28 juin 2018. Titre: Isolation and morpho-molecular identification of root symbionts for the ecological restoration of Schefferville iron ore mining site in northern Quebec, Canada
- Publication dans Québec Science (40) juillet-août 2019, intitulée: Pour que le rouge passe au vert.

Hormis les rapports annuels, les résultats de la présente recherche seront aussi relayés au moyen de colloques et séances d'information dont un atelier à Montréal prévue dans la semaine du 8 avril 2019 au siège de TSMC.

14.2.5 Conseil National de Recherches Canada

En 2019, TSMC a financé un projet de recherche dirigé par le Conseil national de recherches du Canada (CNRC), intitulé : Effets de l'apport de biocharbon dans les dépôts de surface sur la croissance des plantes dans un environnement de pergélisol discontinu.

Les stériles des opérations minières de TSMC génèrent de la poussière pendant la saison sèche et une charge excessive de sédiments dans les eaux de surface, au printemps et à l'automne.

En raison de leur minéralogie, dominée par les oxydes de fer et le silicate, les stériles et les routes d'accès construites avec ces derniers sont les principales causes de fines particules rougeâtres dans les eaux de surface et l'air. Ces particules sont générées principalement pendant le transport du minerai, l'érosion éolienne, le ruissellement printanier, les fortes pluies, les processus cryogéniques et l'érosion des pentes.

Ces événements ou processus affectent les haldes de stériles résultant des activités minières de TSMC et ceux laissés par IOC. Bien qu'il ne soit pas possible d'enlever les haldes de stériles, il est possible de contrôler leurs impacts et ainsi de réduire l'empreinte environnementale de TSMC.

Dans le cadre d'une stratégie de développement durable préconisée par TSMC, l'approche proposée par le CNRC est basée sur le principe du développement durable "3RV" - réduction, réutilisation, recyclage et récupération, pour contrôler ou atténuer l'impact des résidus miniers et des particules rouges générées. Les méthodes proposées ci-dessous utilisent des matériaux *in situ* pour résoudre les problèmes environnementaux sur le site.

À noter que dans 20 ou 30 ans, lorsque les opérations minières de TSMC seront réduites ou terminées dans la région, les opérations de TSMC devront être fermées et réhabilitées. Pour obtenir des résultats en 20 ans dans cette région du Nord, où les conditions climatiques sont uniques, nous devons mettre en place des mesures de réhabilitation maintenant.

Parmi l'ensemble de solutions économiquement et écologiquement rentables pour réduire les particules dans l'air et l'eau de surface, le CNRC propose une approche comprenant des méthodes passives et actives. La revégétalisation est une méthode passive de stabilisation de la pente des haldes de stériles qui contrôle la charge de sédiments avec des arbustes et des arbres combinés avec des bandes de couvert végétal. L'hydro-ensemencement est une méthode active à considérer avec la revégétalisation. Pour limiter la poussière provenant du transport du minerai, des méthodes actives telles que l'hydro-ensemencement combiné à la pulvérisation d'un additif biodégradable sur la surface de la route stabiliseront les particules. Cependant, le simple fait de recouvrir la surface des routes de halage constituées de stériles avec des matériaux granulaires naturels provenant d'une fosse d'emprunt de gravier local limitera l'impact des particules rougeâtres dans l'air et dans le milieu aquatique.

À la suite de la réunion du 12 février 2019 tenue au bureau CANMet - RNCAN à Ottawa en présence de Dre Mariana Trindade (TSMC), Dre Suzanne Beauchemin, Sean Langley (RNCAN) et Didier Barré (NRC), TSMC a demandé au CNRC d'aider TSMC dans le développement d'une solution de restauration des zones minières DSO3 et DSO4 pour limiter l'érosion des pentes générée par le ruissellement, les processus cryogéniques et l'érosion éolienne. L'approche proposée est basée sur la végétalisation et la valorisation de la terre végétale et des morts-terrains stockés, impliquant BIOCHAR comme source de nutriments - générés par la pyrolyse du bois et du carton - dans le sol pour aider la croissance des plantes sur le site de TSMC. De plus, BIOCHAR a la capacité de capturer le CO₂ libéré lors de l'altération du pergélisol associé aux activités minières.

TSMC reconnaît la nécessité de finaliser le stock de terre végétale et de mort-terrain et la Zone Howse pour le développement du couple BIOCHAR-SOL, ainsi que la nécessité d'identifier les acteurs de l'industrie BIOCHAR-Pyrolyse situés dans la région Québec-Atlantique. Pour débiter et développer les solutions proposées, l'approche de CNRC sera étendue sur plus de deux ans.

Étape 1 – année fiscale 2019-2020

- a) Caractérisation de la terre végétale, du mort-terrain, de la contamination résiduelle par le THP ou des stocks non définis dans la zone DS03-DS04 ainsi que de la terre végétale *in situ* dans la région Howse – par le CNRC;
- b) Développement d'un secteur BIOCHAR – par CNRC/TSMC.

À la suite de la caractérisation des haldes et des dépôts de surface effectuée par le CNRC et de la valorisation des résidus organiques effectuée par TSMC, l'intention est de mélanger le mort-terrain, la terre végétale et les résidus de compostage afin de les réutiliser comme couverture superficielle pour la végétalisation des haldes de stériles.

15 Communautés

15.1 Programme d'information aux citoyens

Durant l'année 2019, TSMC s'est occupé d'informer régulièrement les communautés locales des mises à jour sur les activités minières et d'exploitation, ainsi que des mesures prises pour protéger l'environnement :

- Annonces diffusées sur les stations de radio communautaires locales naskapiées et innues informant des mises à jour sur les activités minières, les progrès de la stabilisation du concentrateur et les mesures d'atténuation environnementales. (Annexe VIII-A)
- Infolettre distribuée à toutes les boîtes postales de Schefferville, Matimekush-Lac John et Kawawachikamach sur l'avancement du projet de minerai de fer de TSMC, les mesures d'atténuation environnementales, l'accès aux terres agricoles, les avantages socio-économiques pour les communautés, ainsi que la disponibilité d'un numéro d'urgence sans frais pendant 24 heures par TSMC. Ce numéro n'a pas été utilisé par les membres des communautés pour soulever des problèmes environnementaux ou d'autres types. (Annexe VIII-B)
- Des avis de dynamitage aux deux semaines ont été distribués par écrit aux bureaux de la Nation Naskapie de Kawawachikamach (NNK) et de la Nation Innu Matimekush-Lac John (NIMLJ), ainsi qu'à la ville de Schefferville pour informer la population des activités minières et de dynamitage à Goodwood, en plus de fournir les coordonnées de TSMC. (Annexe VIII-C)
- Des réunions du comité de santé, sécurité et environnement ont eu lieu en février et décembre 2019 avec des représentants de la NNK, de la NIMLJ, d'Innu Takuaikan Uashat mak Mani-utenam (ITUM), de la nation innue et du conseil de communauté NunatuKavut. Des présentations détaillées sur le projet minier et des informations sur l'environnement et la santé et sécurité ont été fournies.
- Réunions du comité de suivi environnemental et social du projet 2A tenues en mars et octobre 2019, auxquelles ont participé des représentants naskapis et inuits. (Voir l'Annexe VIII-D pour le procès-verbal des réunions et le contenu des présentations)
- Autres réunions, communications et événements entre les groupes autochtones du Québec et TSMC tels que détaillés dans le journal des communications. (Annexe VIII-E)
- Communiqué de presse sur la qualité de l'eau au site minier TSMC. (Annexe VIII-B)
- Visite du site en mars 2019 par des membres du comité consultatif environnemental de Kativik, de l'administration régionale de Kativik (ARK) et de la NNK. (Annexe VIII-F)
- Plusieurs réunions avec des représentants des communautés sur le thème de la qualité de l'eau et visites du site Goodwood au printemps et à l'été 2019 avec des représentants des communautés locales.

Les citoyens ont toujours la possibilité de communiquer directement avec TSMC par le biais de ses représentants en environnement affaires communautaires par téléphone, courriel et médias sociaux, et par l'intermédiaire de représentants du comité de santé, sécurité et environnement des communautés, et à tout moment en visitant le site de la mine de minerai de fer de TSMC.

Les représentants en environnement des communautés jouent un rôle clé dans la réception des commentaires et des plaintes des membres des communautés concernant le projet, lesquelles sont transmises à TSMC. Les représentants ont le rôle important de se tenir au courant des activités minières et

des questions relatives à l'environnement, ainsi que de diffuser l'information auprès des membres des communautés.

15.2 Programme d'évaluation de la perception du projet

Les usagers du territoire concernés par le Projet 2a sont principalement les citoyens de Matimekush-Lac John et Kawawachikamach, habitants à proximité du projet.

À la suite de clarifications de l'administrateur, un sondage d'opinion du Projet 2a (le Sondage) sera effectuée en 2020 par un tiers responsable de la collecte de données auprès des usagers du territoire.

Au moment de la finalisation de ce rapport, le sondage faisait partie du processus d'acquisition de TSMC, un appel d'offre a été lancé pour les entreprises spécialisées dans ces études. L'élaboration d'un plan de gestion de la rétroaction et des plaintes est incluse dans le l'étendu des travaux, en plus du sondage.

15.3 Comité de suivi environnemental et social

Un comité de santé, sécurité et environnement de la communauté a été créé en 2013 et se réunit à Schefferville plusieurs fois par an. Il est composé de représentants en environnement provenant de la NNK, la NIMLJ, l'ITUM, de la nation innue, du conseil de communauté de Nunatukavut et de TSMC.

Un comité de suivi environnemental et social a été créé en 2015, composé de représentants de l'ARK, de Makivik et de TSMC. Le comité s'est réuni deux fois en 2019. Le procès-verbal de la réunion et les documents de la présentation sont joints (Annexe VIII-G).

15.3.1 Plan de fermeture et de réhabilitation du projet 2A

Le plan de fermeture et de réhabilitation (le Plan) a été examiné lors de la réunion du comité de suivi environnemental et social (le Comité), le 28 mars 2019.

Voici un résumé des questions et commentaires reçus :

- Le document sera-t-il renouvelé tous les 5 ans? Oui
- À propos des travaux de restauration, il existe de nombreuses méthodes possibles, notamment les plantations et les applications microbiennes. En 2019, l'accent sera mis sur ce qui a bien fonctionné et le déplacement vers les régions plus au nord de Kivivic et Goodwood. TSMC se concentre sur les tests de caractérisation de l'eau rougeâtre et du sol, puis sur les rendre convenables pour la revégétalisation. Un activateur de sol ne sera pas réutilisé en 2020.
- TSMC impliquera autant que possible les communautés pour permettre un transfert de connaissances, afin que celles-ci puissent éventuellement prendre la tête des travaux de restauration, tout en écartant progressivement les consultants. Le transfert bidirectionnel de connaissances est toujours encouragé.
- TSMC et son consultant, T2 Environnement, considèrent également la possibilité d'une plantation de gaulis et d'une serre pour lesquelles des connaissances locales seront sollicités.
- La possibilité de remplir les fosses est considérée, compte tenu des préoccupations des communautés.
- Conformément à la suggestion de Makivik Corp., TSMC étudiera la possibilité de remplir les bassins de collecte avec un matériau inerte.

16 Opérations 2019 et conclusion

TSMC a poursuivi en 2019 l'exploitation de la fosse Goodwood, ainsi que la préparation des travaux à exécuter pour la réparation du bassin d'accumulation.

TSMC débutera les travaux en 2020 avec la mise en place du plan de gestion des eaux lors du dégel printanier. Par la suite, les opérations devraient débuter en juin 2020, en fonction de l'avancement du printemps.

Parallèlement, les préparatifs sont en cours pour la mise en service de l'unité de traitement des eaux, qui devrait être installée au cours de l'été 2020. Les travaux de réparation du bassin de Goodwood seront également entrepris au cours de l'été 2020.

17 Références

- TSMC [Tata Steel Minerals Canada Ltd.]. (2018) *Rapport annuel 2017 — Projet 2a (Goodwood) — Québec*. Rapport annuel présenté au ministère de l'Environnement et de la Lutte contre les changements climatiques, direction générale de l'évaluation environnementale et stratégique.
- TSMC [Tata Steel Minerals Canada Ltd.]. (2018) *Plan de suivi de la qualité de l'air du Projet DSO*. Tata Steel Minerals Canada Ltd, 22 p. et 3 annexes.
- Beaulieu, M. (2019) *Guide d'intervention – Protection des sols et réhabilitation des terrains contaminés*. Québec, ministère de l'Environnement et de la Lutte contre les changements climatiques, 219 p. + annexes
- Ministère de l'Environnement et Lutte contre les changements climatiques [MELCC] (2019). *Critères de la qualité de l'eau de surface*. En ligne : http://www.environnement.gouv.qc.ca/eau/criteres_eau/index.asp

ANNEXES

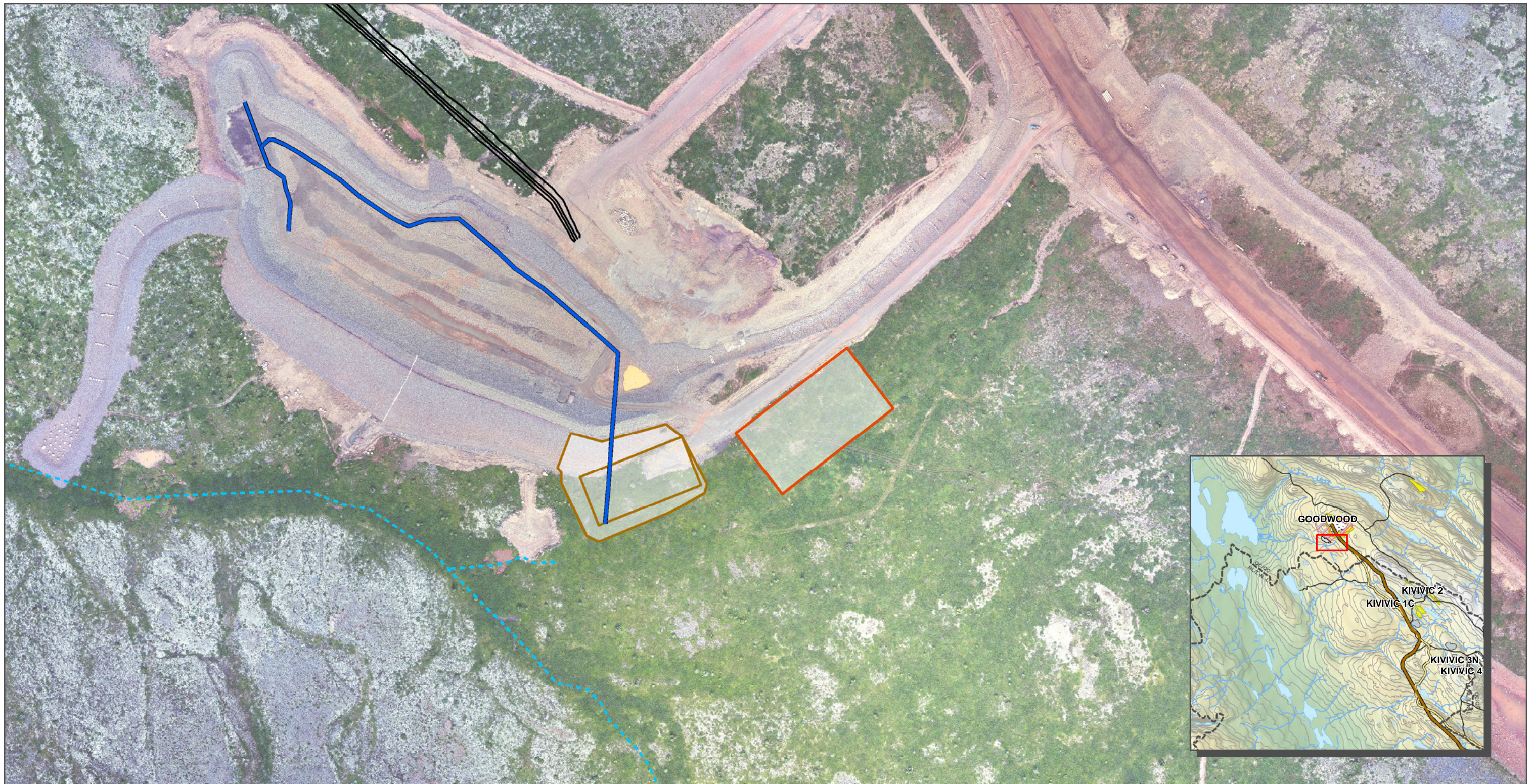
Annexe I. Figures

Figure I- 1. Modifications prévues aux infrastructures

Figure I- 2. Stations d'échantillonnage de la qualité de l'eau

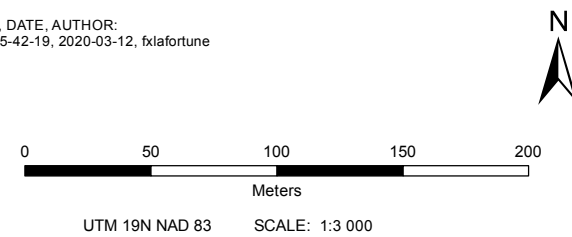
Figure I- 3. Stations de suivi des sédiments et du benthos

Figure I- 4. Stations d'échantillonnage de la qualité de l'air



- Planned Footprint of Treatment Plant / Empreinte prévue de l'usine de traitement
- New Footprint of Treatment Plant / Nouvelle empreinte de l'usine de traitement
- New Ditch F1 / Nouveau fossé F1
- Accumulation Pond Drain / Drain du bassin d'accumulation
- Intermittent Watercourse / Cours d'eau intermittent

FILE, PROJECT, DATE, AUTHOR:
GH-1148 , PR185-42-19, 2020-03-12, fxlafortune

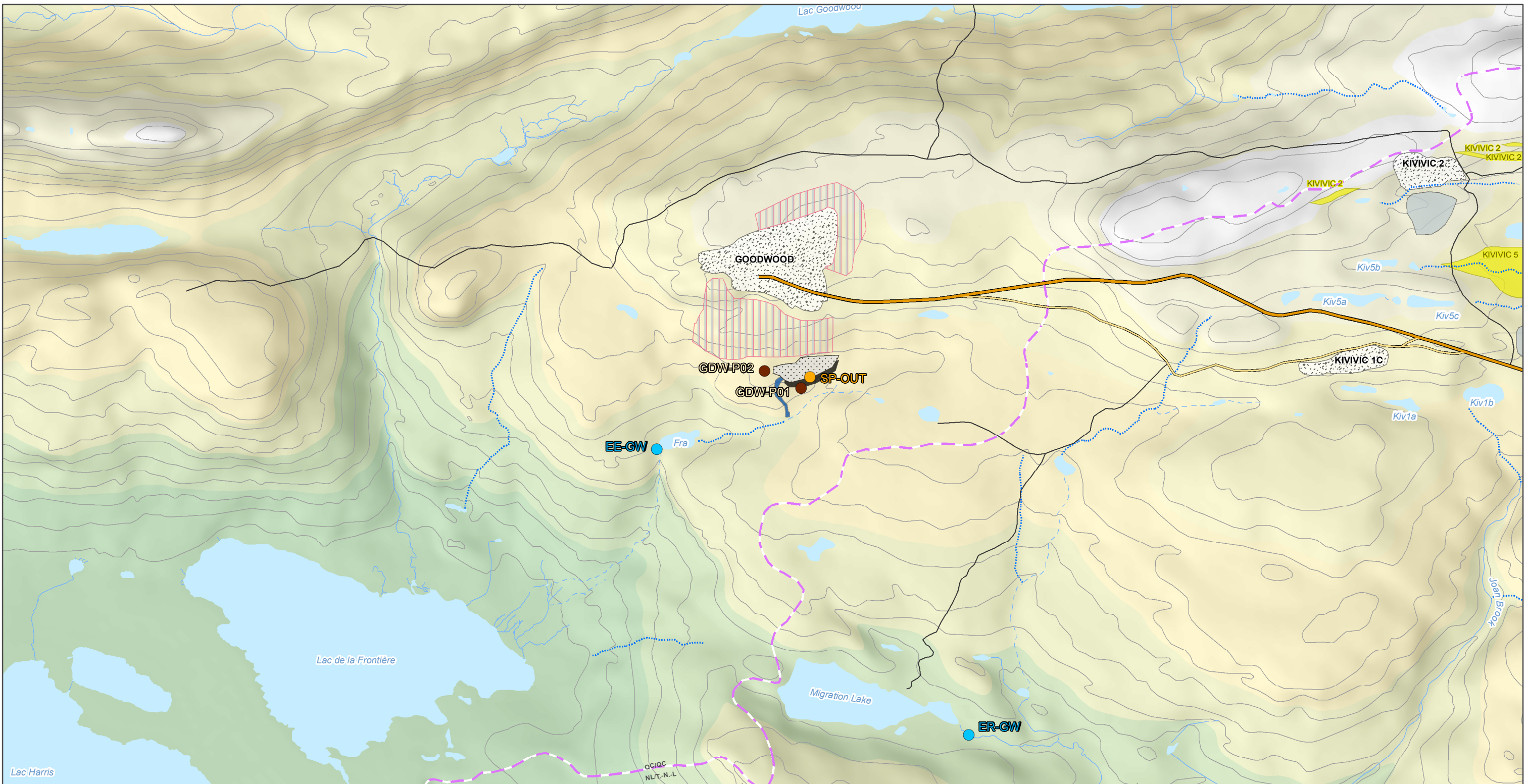


SOURCES:
Government of Canada, NTDB, 1/50,000, 1979
Government of Newfoundland-and-Labrador and Government of Quebec, Boundary used for claims
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology and wetlands update, 2010
Gouvernement du Canada, BNDT, 1/50 000, 1979
Gouvernement de Terre-Neuve-et-Labrador et gouvernement du Québec, frontière utilisée pour les titres miniers
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise à jour de l'hydrologie et des milieux humides, 2010

2019 ANNUAL REPORT - PROJECT 2A (GOODWOOD) QUEBEC /
RAPPORT ANNUEL 2019 – PROJET 2A (GOODWOOD) QUÉBEC

Modifications prévues aux infrastructures / Planned Infrastructure Modifications

Groupe Hémisphères
1001, route de l'Église, Bureau 302, Québec (QC) Canada, G1V 3V7
2120, rue Sherbrooke est, Bureau 204, Montréal (QC) Canada, H2K 1C3



Water Monitoring Stations

- Exfiltration / Exfiltration
- Groundwater / Eau souterraine
- Surface Water / Eau de surface
- Provincial border / Frontière provinciale
- Waterbody / Plan d'eau
- Permanent Watercourse / Cours d'eau permanent
- Intermittent Watercourse / Cours d'eau intermittent
- Storm Runoff / Chenal torrentiel
- Contour interval / Courbe de niveau

- Haul road / Main access road / Route de halage / Route d'accès principale
- DSO4 bypass road / Route de contournement
- Other Access Road / Autre route d'accès

Pit / Deposit / Waste Dump

- Deposit / Gisement

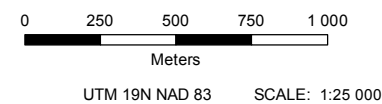
TSMC existing infrastructure / Infrastructure existante

- Pit / Fosse
- Sedimentation pond / Bassin de sédimentation
- Spillway / Evacuateur de crue
- Dike / Digue
- Dump / Halde

TSMC projected infrastructure / Infrastructure projetée

- Dump / Halde

FILE, PROJECT, DATE, AUTHOR:
GH-1149, PR185-42-19, 2020-03-12, fxlafortune



SOURCES:
Government of Canada, NTDB, 1:50,000, 1979
Government of Newfoundland-and-Labrador and Government of Quebec, Boundary used for claims
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology and wetlands update, 2010

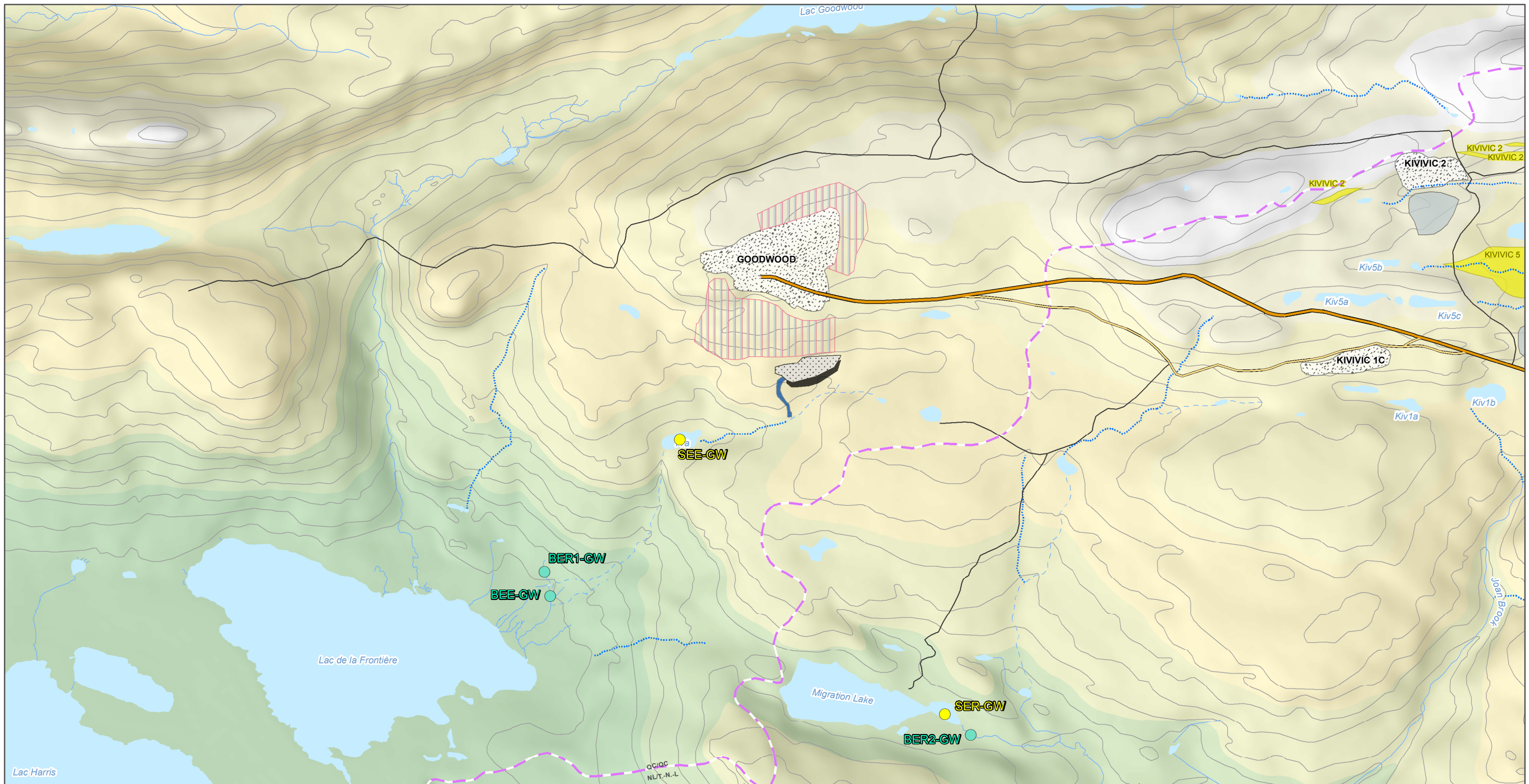
Gouvernement du Canada, BNDT, 1/50 000, 1979
Gouvernement de Terre-Neuve-et-Labrador et gouvernement du Québec, frontière utilisée pour les titres miniers
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise à jour de l'hydrologie et des milieux humides, 2010



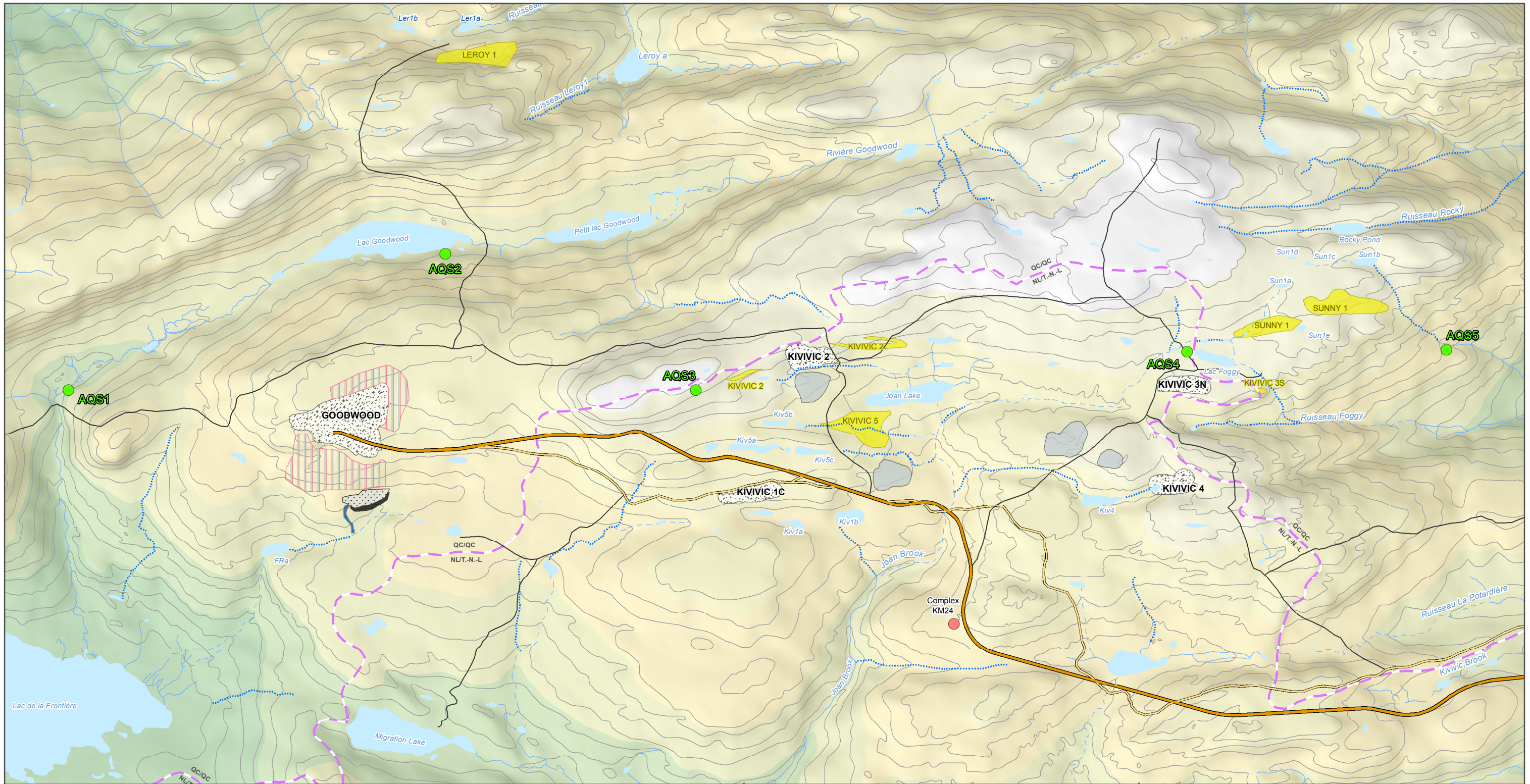
2019 ANNUAL REPORT - PROJECT 2A (GOODWOOD) QUEBEC /
RAPPORT ANNUEL 2019 - PROJET 2A (GOODWOOD) QUÉBEC

**Stations de suivi de la qualité de l'eau - DSO4 /
Water Quality Monitoring Stations - DSO4**

Groupe Hémisphères
1001, route de l'Église, Bureau 302, Québec (QC) Canada, G1V 3V7
2120, rue Sherbrooke est, Bureau 204, Montréal (QC) Canada, H2K 1C3



<p>Sediment Monitoring Stations</p> <ul style="list-style-type: none"> ● Benthos ● Sediment / Sédiment - - - Provincial border / Frontière provinciale ■ Waterbody / Plan d'eau — Permanent Watercourse / Cours d'eau permanent - - - Intermittent Watercourse / Cours d'eau intermittent · · · · · Storm Runoff / Chenal torrentiel — Contour interval / Courbe de niveau 	<p>— Haul road / Main access road / Route de halage / Route d'accès principale</p> <p>— DSO4 bypass road / Route de contournement</p> <p>— Other Access Road / Autre route d'accès</p> <p>Pit / Deposit / Waste Dump</p> <ul style="list-style-type: none"> ■ Deposit / Gisement 	<p>TSMC existing infrastructure / Infrastructure existante</p> <ul style="list-style-type: none"> Pit / Fosse Sedimentation pond / Bassin de sédimentation Spillway / Evacuateur de crue Dike / Digue Dump / Halde <p>TSMC projected infrastructure / Infrastructure projetée</p> <ul style="list-style-type: none"> Dump / Halde 	<p>FILE, PROJECT, DATE, AUTHOR: GH-1150, PR185-42-19, 2020-03-11, fxlafortune</p> <div style="text-align: center;"> </div> <div style="text-align: center;"> <p>UTM 19N NAD 83 SCALE: 1:25 000</p> </div> <p><small>SOURCES: Government of Canada, NTDB, 1:50,000, 1979 Government of Newfoundland-and-Labrador and Government of Quebec, Boundary used for claims New Millennium Capital Corp., Mining sites and roads Groupe Hémisphères, Hydrology and wetlands update, 2010</small></p> <p><small>Gouvernement du Canada, BNDT, 1/50 000, 1979 Gouvernement de Terre-Neuve-et-Labrador et gouvernement du Québec, frontière utilisée pour les titres miniers New Millennium Capital Corp., gisements et routes Groupe Hémisphères, mise à jour de l'hydrologie et des milieux humides, 2010</small></p>
			<p>2019 ANNUAL REPORT - PROJECT 2A (GOODWOOD) QUEBEC / RAPPORT ANNUEL 2019 - PROJET 2A (GOODWOOD) QUÉBEC</p> <p>Stations de suivi des sédiments et du benthos - DSO4 / Sediment and Benthos Monitoring Stations - DSO4</p> <div style="text-align: center;"> </div> <p><small>1001, route de l'Église, Bureau 302, Québec (QC) Canada, G1V 3V7 2120, rue Sherbrooke est, Bureau 204, Montréal (QC) Canada, H2K 1C3</small></p>
			<p>Figure I - 3</p>



Air Monitoring Stations

- Air Quality Station / Station de la qualité de l'air
- Weather Station / Station météorologique
- Provincial border / Frontière provinciale
- Waterbody / Plan d'eau
- Permanent Watercourse / Cours d'eau permanent
- Intermittent Watercourse / Cours d'eau intermittent
- Storm Runoff / Chenal torrentiel
- Contour interval / Courbe de niveau

- Haul road / Main access road / Route de halage / Route d'accès principale
- DSO4 bypass road / Route de contournement
- Other Access Road / Autre route d'accès
- TSMC facilities / Installations
- Pit / Deposit / Waste Dump**
- Deposit / Gisement

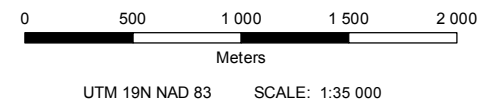
TSMC existing infrastructure / Infrastructure existante

- Pit / Fosse
- Sedimentation pond / Bassin de sédimentation
- Spillway / Evacuateur de crue
- Dike / Digue
- Dump / Halde

TSMC projected infrastructure / Infrastructure projetée

- Dump / Halde

FILE, PROJECT, DATE, AUTHOR:
GH-1151, PR185-42-19, 2020-03-11, fxlafortune



SOURCES:
Government of Canada, NTDB, 1:50 000, 1979
Government of Newfoundland-and-Labrador and Government of Quebec, Boundary used for claims
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology and wetlands update, 2010

Gouvernement du Canada, BNDT, 1/50 000, 1979
Gouvernement de Terre-Neuve-et-Labrador et gouvernement du Québec, frontière utilisée pour les titres miniers
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise à jour de l'hydrologie et des milieux humides, 2010



2019 ANNUAL REPORT - PROJECT 2A (GOODWOOD) QUEBEC /
RAPPORT ANNUEL 2019 - PROJET 2A (GOODWOOD) QUÉBEC

**Stations de suivi de la qualité de l'air - DSO4 /
Air Quality Monitoring Stations - DSO4**

Groupe Hémisphères
1001, route de l'Église,
Bureau 302, Québec (QC)
Canada, G1V 3V7

2120, rue Sherbrooke est,
Bureau 204, Montréal (QC)
Canada, H2K 1C3

Annexe II. Certificats d'analyse

A. Rapport de dynamitage

Date/Time MicL at 12:00:53 May 30, 2019
Trigger Source Geo: 7.000 mm/s, Mic: 110.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 8.82 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/K4.MMB

Serial Number UM12241 V 10-87 Micromate DIN
Battery Level 3.8 Volts
Unit Calibration June 30, 2017 by InstanTel
File Name __TEMP.EVT

Post Event Notes
 GD-753-15

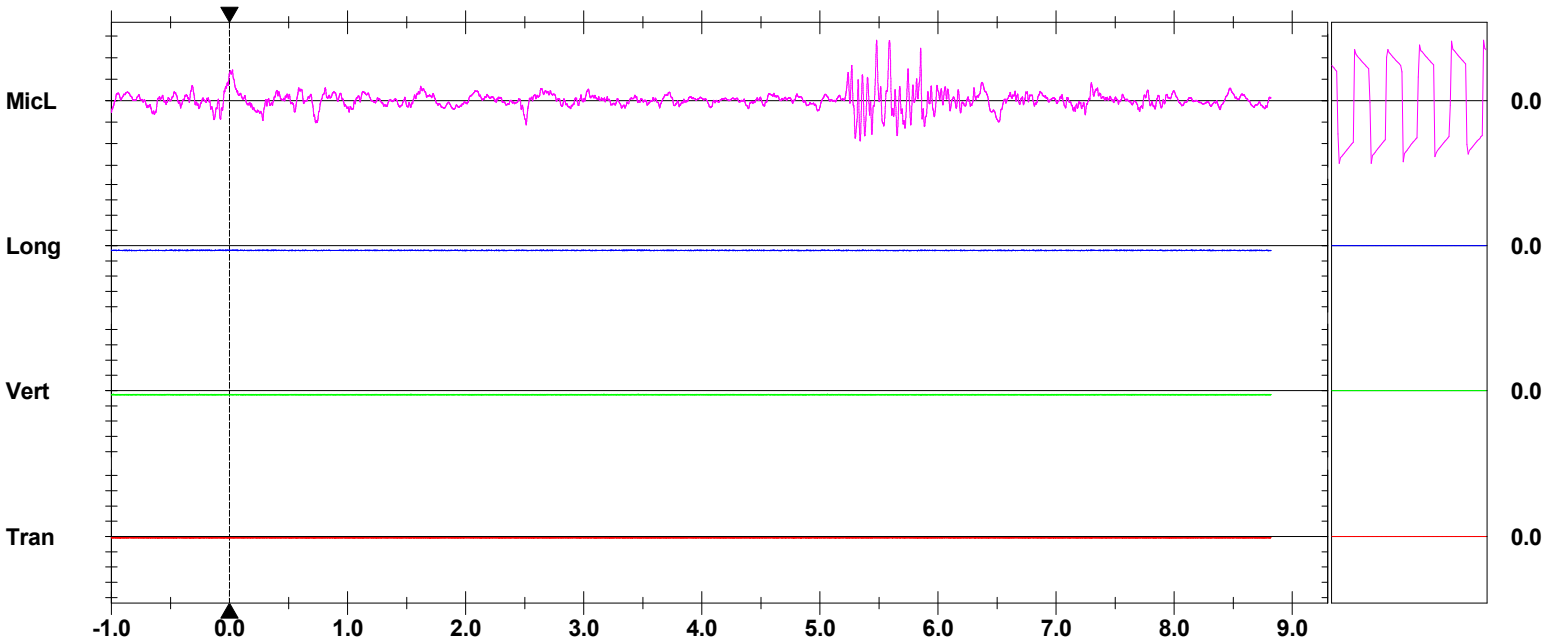
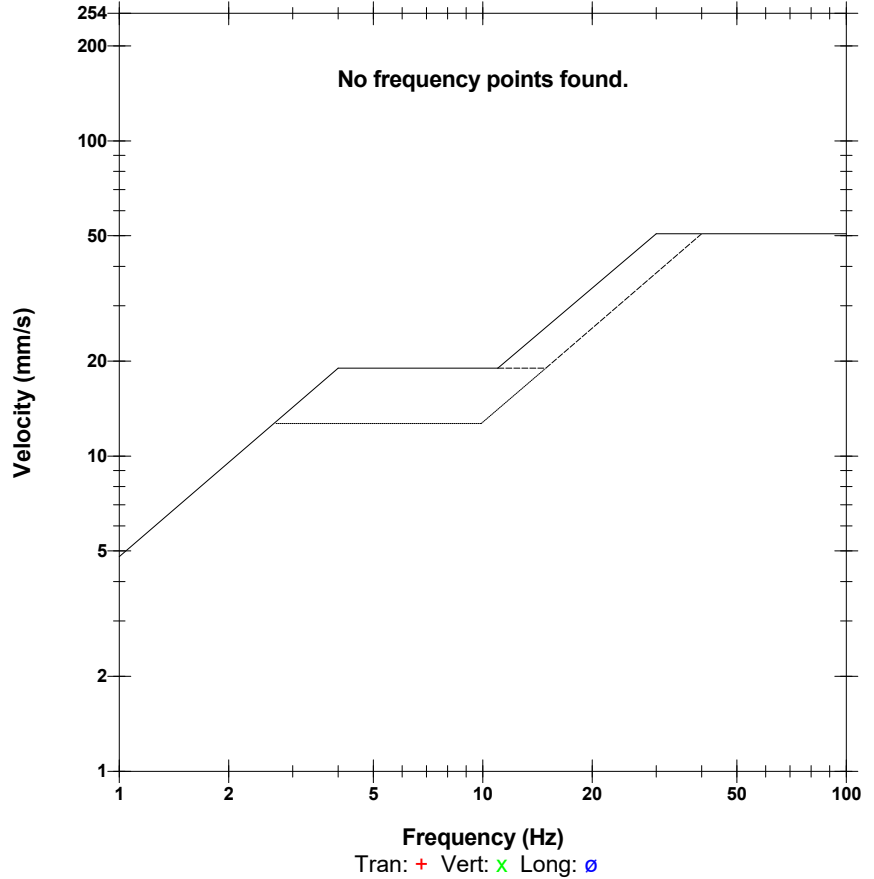
Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 116.9 dB(L) at 5.480 sec
ZC Freq 13.0 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1617 mv)

	Tran	Vert	Long	
PPV	0.205	0.575	0.678	mm/s
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	7.958	-0.419	7.640	sec
Peak Acceleration	0.013	0.013	0.013	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	0.0	0.0	0.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 0.898 mm/s at 7.640 sec
N/A: Not Applicable

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time MicL at 11:58:48 June 3, 2019
Trigger Source Geo: 7.000 mm/s, Mic: 110.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 20.783 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/K4.MMB

Serial Number UM12241 V 10-87 Micromate DIN
Battery Level 3.8 Volts
Unit Calibration June 30, 2017 by InstanTel
File Name __TEMP.EVT

Post Event Notes
 GD-753-16

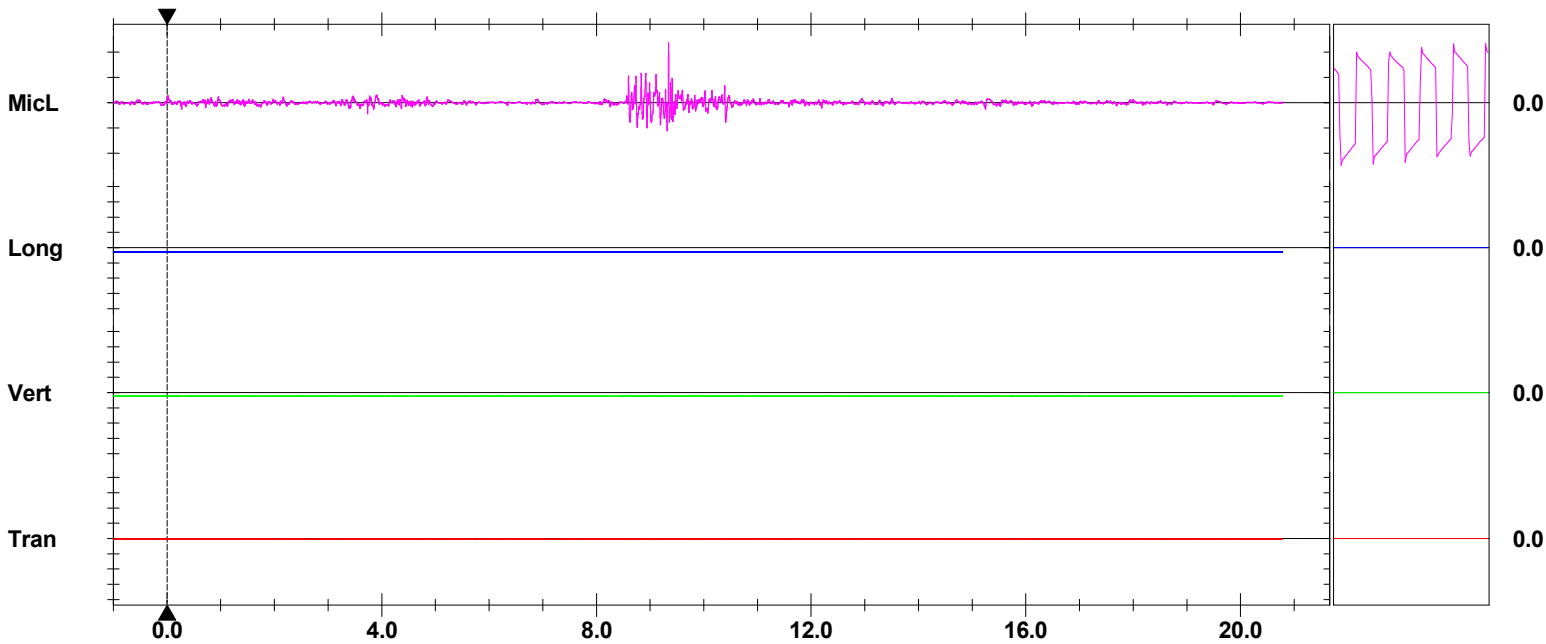
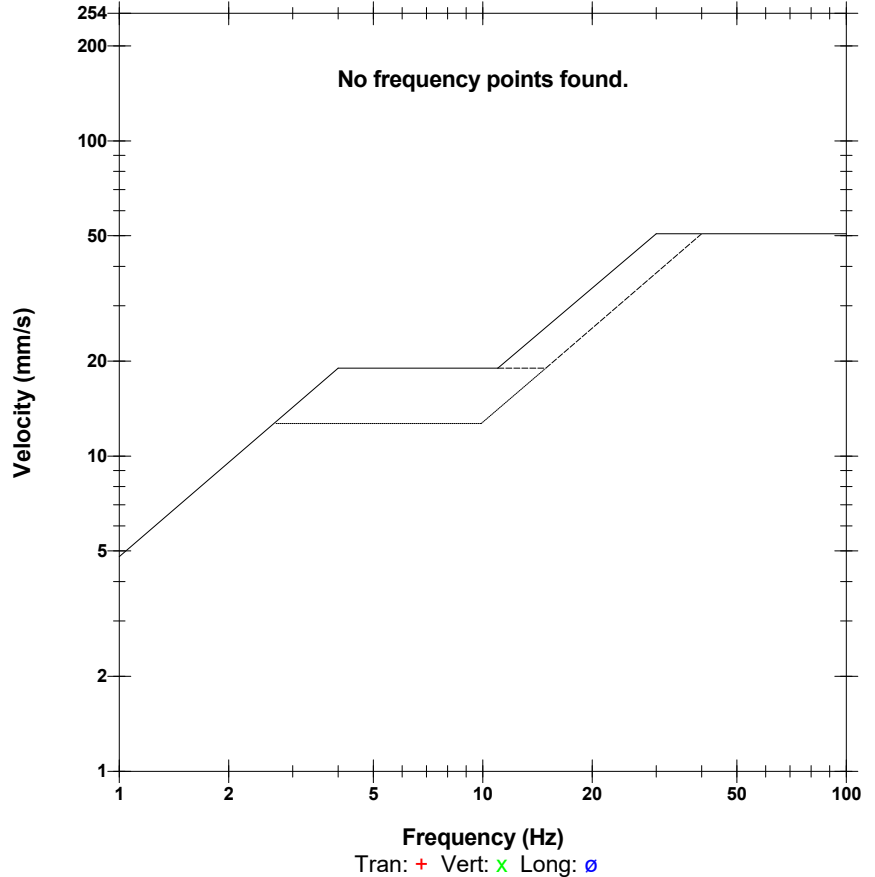
Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 135.6 dB(L) at 9.344 sec
ZC Freq 29 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1579 mv)

	Tran	Vert	Long	
PPV	0.150	0.520	0.623	mm/s
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	9.054	0.965	17.008	sec
Peak Acceleration	0.013	0.013	0.015	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	0.0	0.0	0.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 0.808 mm/s at 15.828 sec
 N/A: Not Applicable

USBM R18507 And OSMRE



Time Scale: 1.00 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 50.00 pa.(L)/div
Trigger =

Sensor Check

Date/Time MicL at 12:01:05 June 15, 2019
Trigger Source Geo: 7.000 mm/s, Mic: 110.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 9.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/K4.MMB

Serial Number UM12241 V 10-87 Micromate ISEE
Battery Level 3.7 Volts
Unit Calibration June 30, 2017 by InstanTel
File Name UM12241_20190615120105.IDFW

Post Event Notes
 GD-753-17

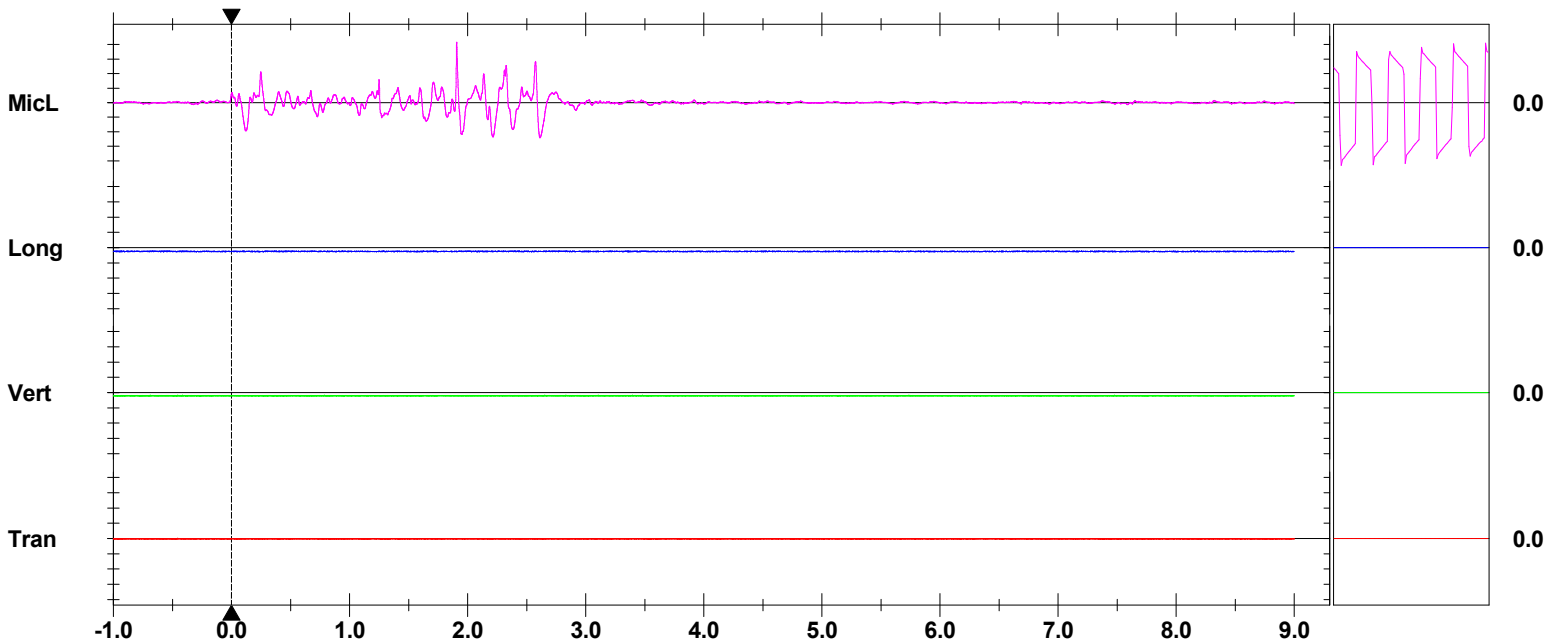
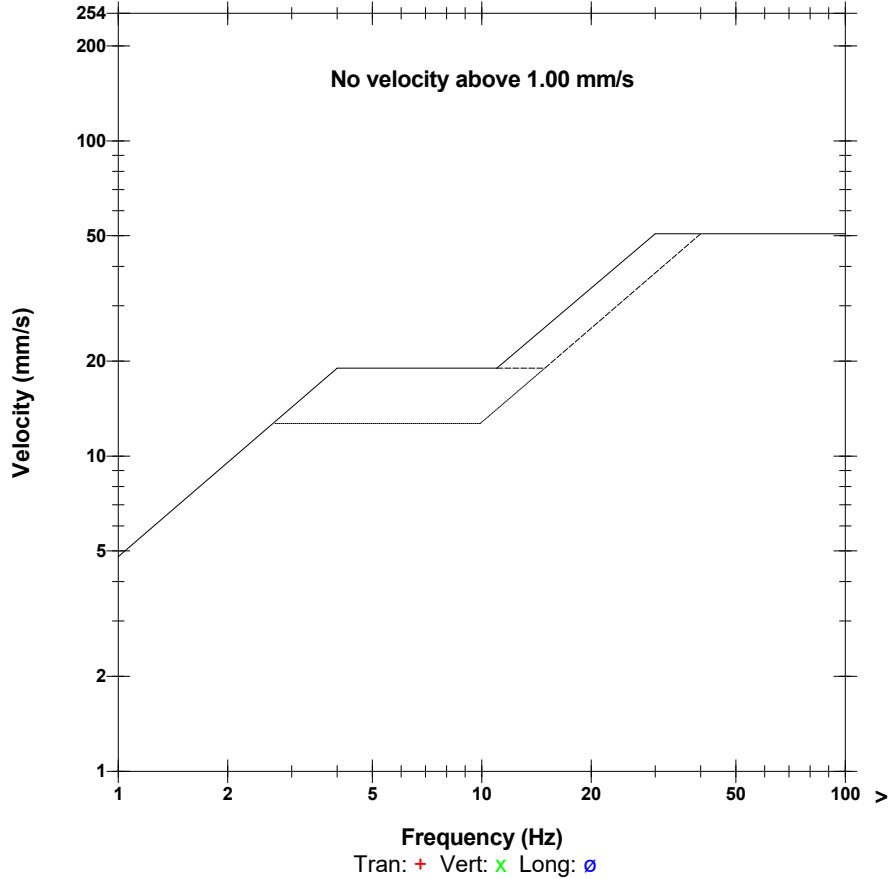
Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 126.4 dB(L) at 1.908 sec
ZC Freq 18.6 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1479 mv)

	Tran	Vert	Long	
PPV	0.102	0.465	0.567	mm/s
ZC Freq	47	N/A	N/A	Hz
Time (Rel. to Trig)	-0.403	7.315	7.315	sec
Peak Acceleration	0.015	0.016	0.015	g
Peak Displacement	0.002	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	0.0	0.0	0.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 0.740 mm/s at 7.315 sec
N/A: Not Applicable

USBM RI8507 And OSMRE



Date/Time MicL at 06:30:39 July 10, 2019
Trigger Source Geo: 7.000 mm/s, Mic: 110.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 9.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/TATA.MMB

Serial Number UM12242 V 10-87 Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration June 30, 2017 by Instantel
File Name UM12242_20190710063039.IDFW

Post Event Notes

GD-763-01
 Seismograph set up off waste dump road

Notes

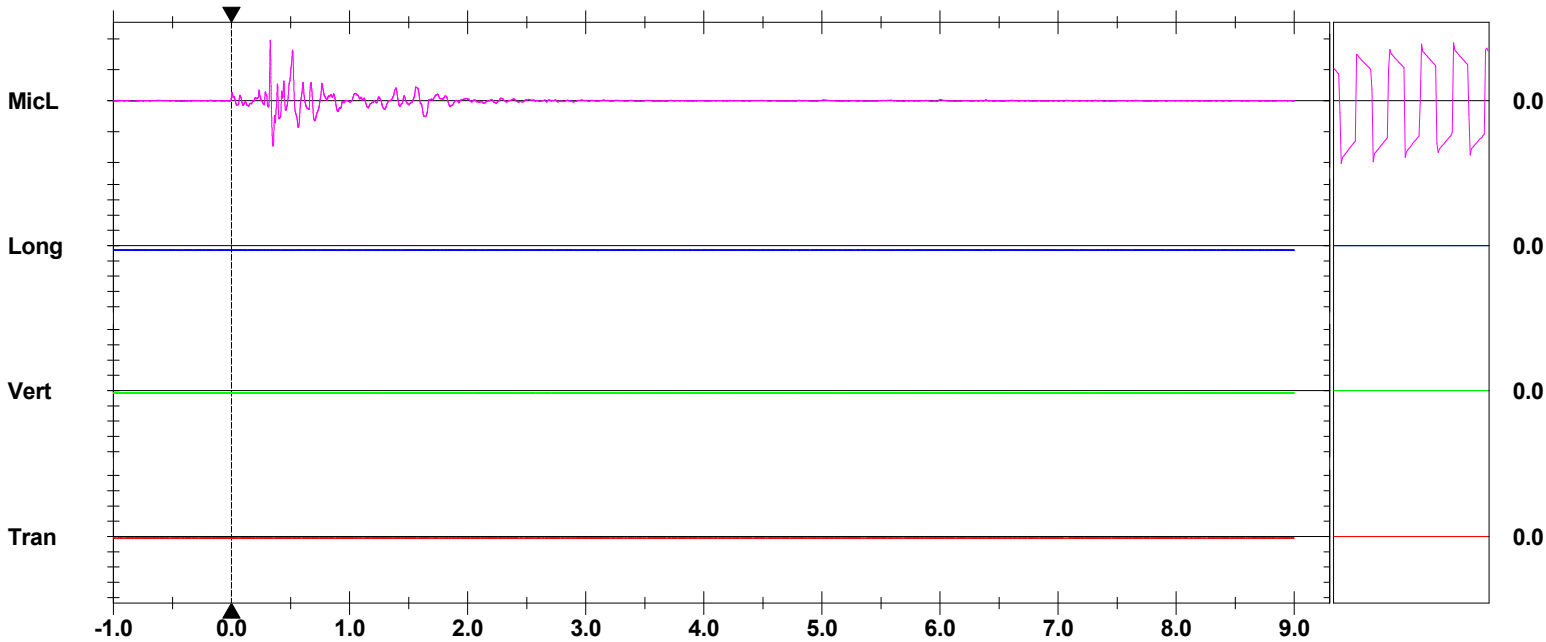
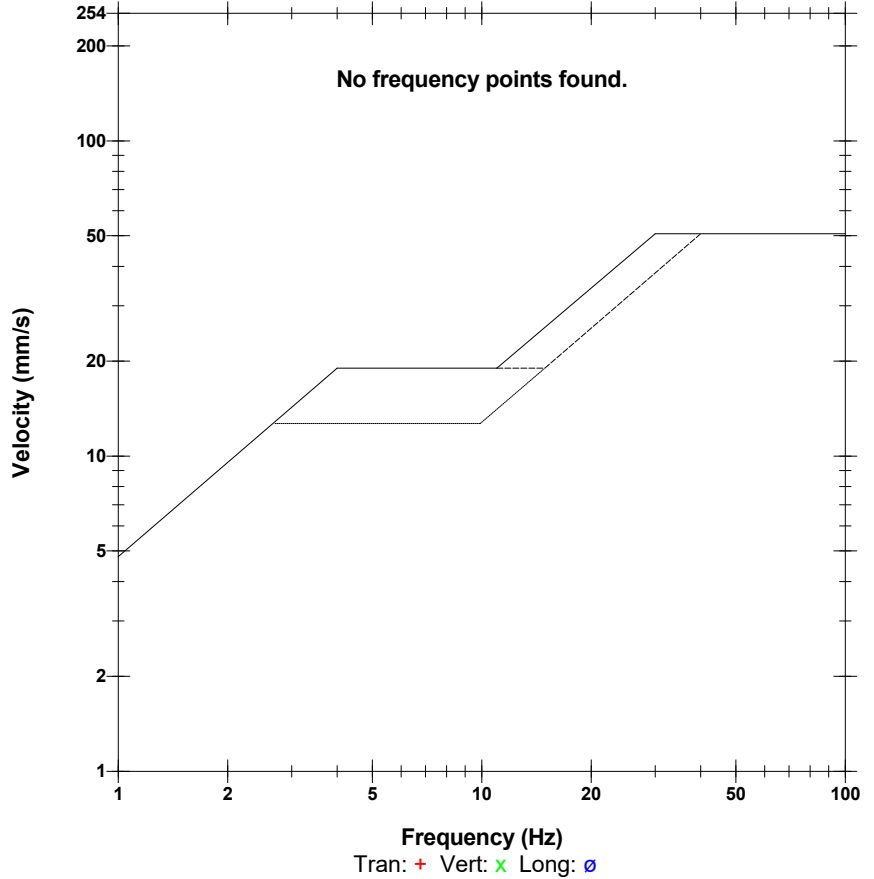
Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 133.8 dB(L) at 0.329 sec
ZC Freq 27 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1554 mv)

	Tran	Vert	Long	
PPV	0.244	0.363	0.654	mm/s
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	0.901	-0.138	3.101	sec
Peak Acceleration	0.013	0.015	0.015	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	0.0	0.0	0.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 0.776 mm/s at 4.814 sec
 N/A: Not Applicable

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 50.00 pa.(L)/div
Trigger =

Sensor Check

Date/Time MicL at 12:04:44 July 19, 2019
Trigger Source Geo: 7.000 mm/s, Mic: 6.325 pa.(L)
Range Geo: 254.0 mm/s
Record Time 9.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/K4.MMB

Serial Number UM12241 V 10-87 Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration June 30, 2017 by InstanTel
File Name UM12241_20190719120444.IDFW

Post Event Notes

GD-763-02
 (This blast also has a very low value of the air blast overpressure)

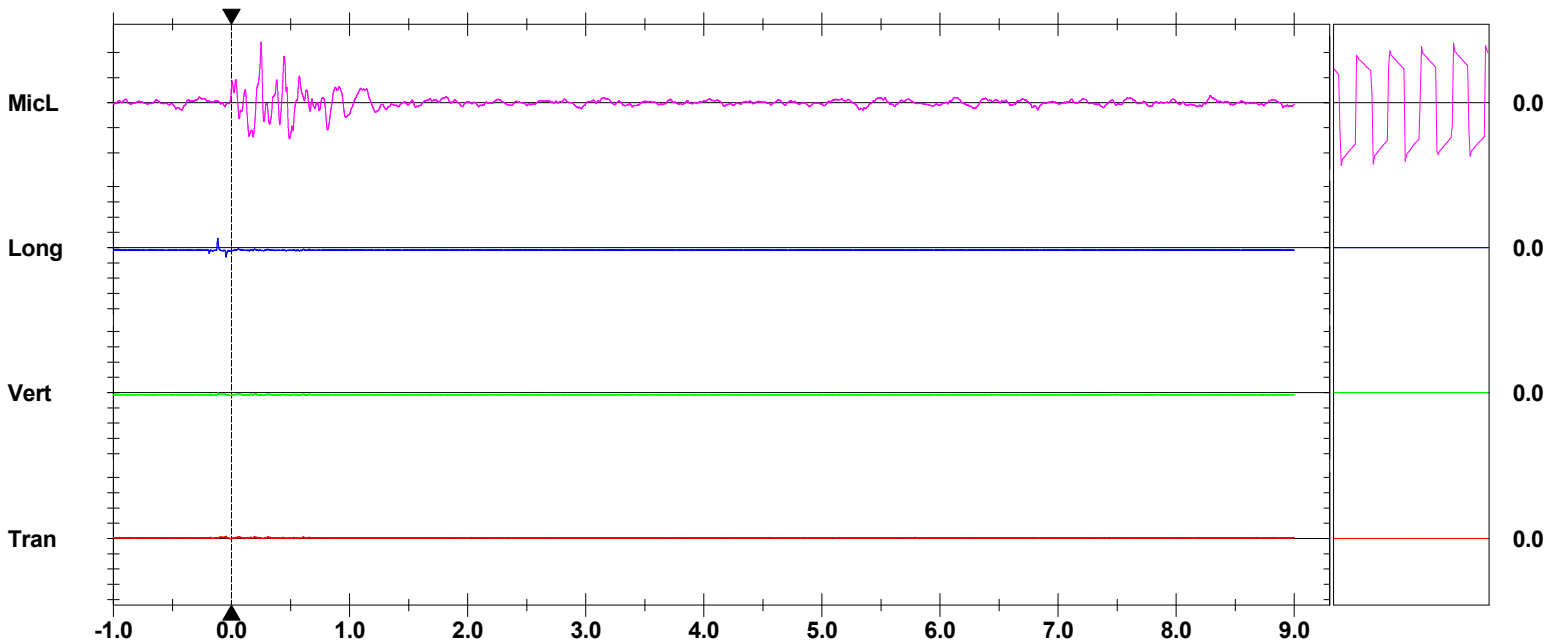
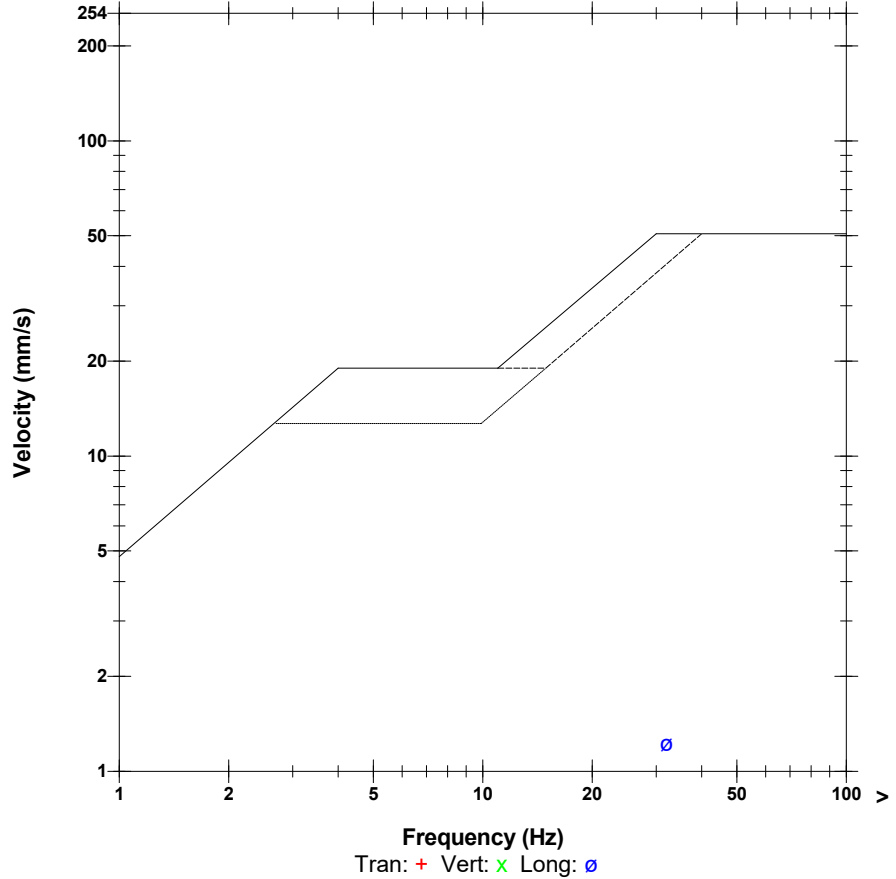
Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 24.14 pa.(L) at 0.250 sec
ZC Freq 8.8 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1313 mv)

	Tran	Vert	Long	
PPV	0.284	0.402	1.277	mm/s
ZC Freq	3.6	N/A	N/A	Hz
Time (Rel. to Trig)	-0.045	-0.007	-0.045	sec
Peak Acceleration	0.016	0.015	0.035	g
Peak Displacement	0.040	0.000	0.145	mm
Sensor Check	Passed	Passed	Passed	
Frequency	0.0	0.0	0.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 1.323 mm/s at -0.045 sec
 N/A: Not Applicable

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 14:50:56 July 21, 2019
Trigger Source Geo: 7.000 mm/s, Mic: 6.325 pa.(L)
Range Geo: 254.0 mm/s
Record Time 2103.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/K4.MMB

Serial Number UM12241 V 10-87 Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration June 30, 2017 by InstanTel
File Name UM12241_20190721145056.IDFW

Notes

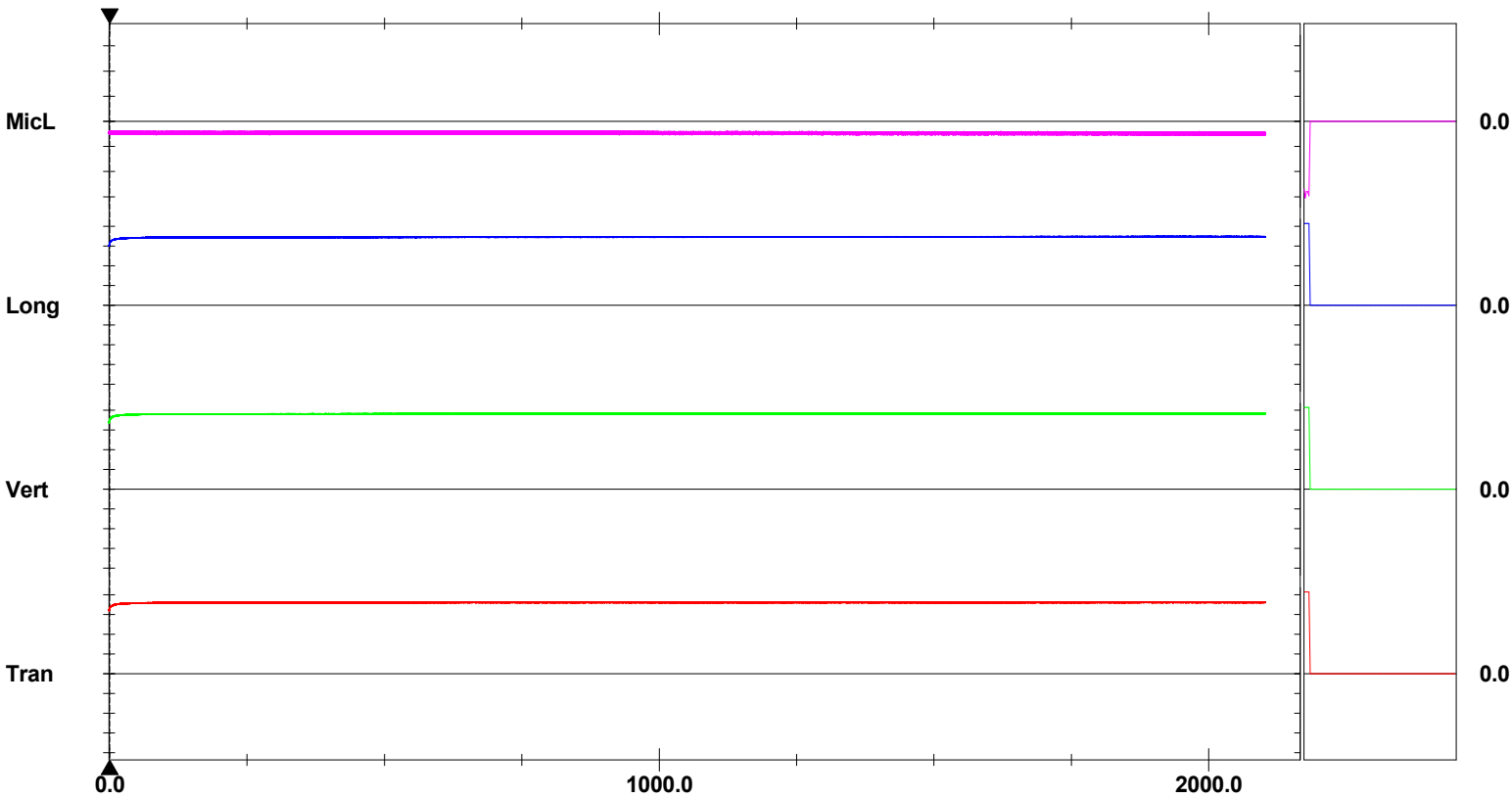
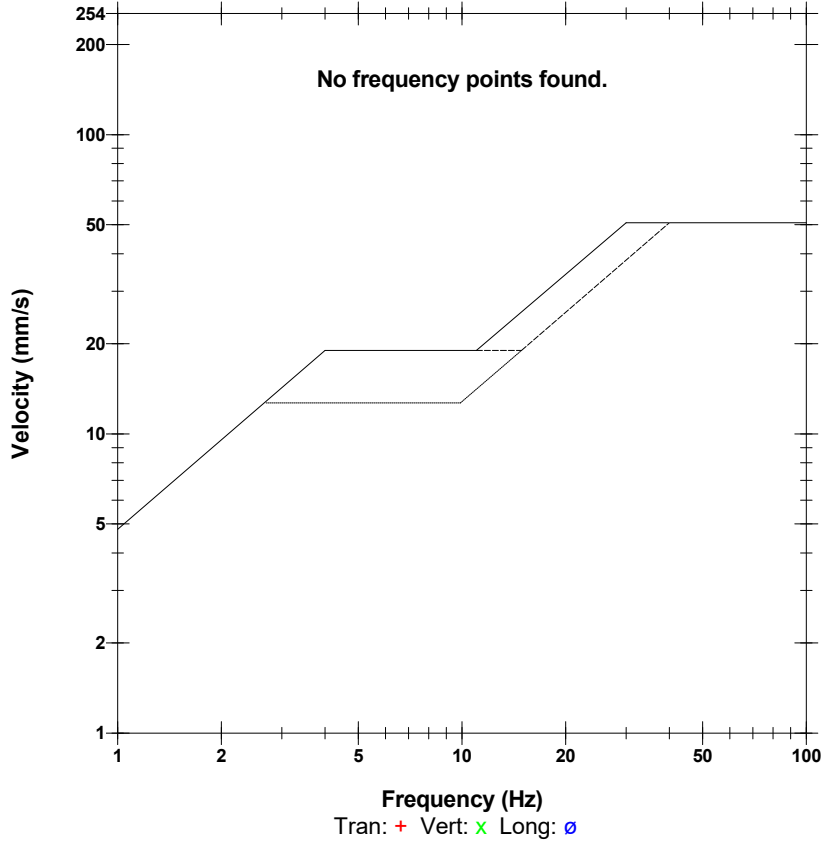
Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 0.559 pa.(L) at 1483.628 sec
ZC Freq N/A
Channel Test Check (Freq = 0.0 Hz Amp = 0 mv)

	Tran	Vert	Long	
PPV	7.267	7.701	6.991	mm/s
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	480.518	1610.778	1916.660	sec
Peak Acceleration	0.013	0.012	0.013	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Check	Check	Check	
Frequency	1024.0	1024.0	1024.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 12.65 mm/s at 2067.291 sec
N/A: Not Applicable

USBM RI8507 And OSMRE



Time Scale: 250.00 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time MicL at 17:19:35 July 26, 2019
Trigger Source Geo: 12.70 mm/s, Mic: 68.95 pa.(L)
Range Geo: 254.0 mm/s
Record Time 3.0 sec at 1024 sps
Operator/Setup: Operator/factory.MMB

Serial Number UM12240 V 10-87 Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration June 30, 2017 by InstanTel
File Name __TEMP.EVT

Post Event Notes
 T3-695-07

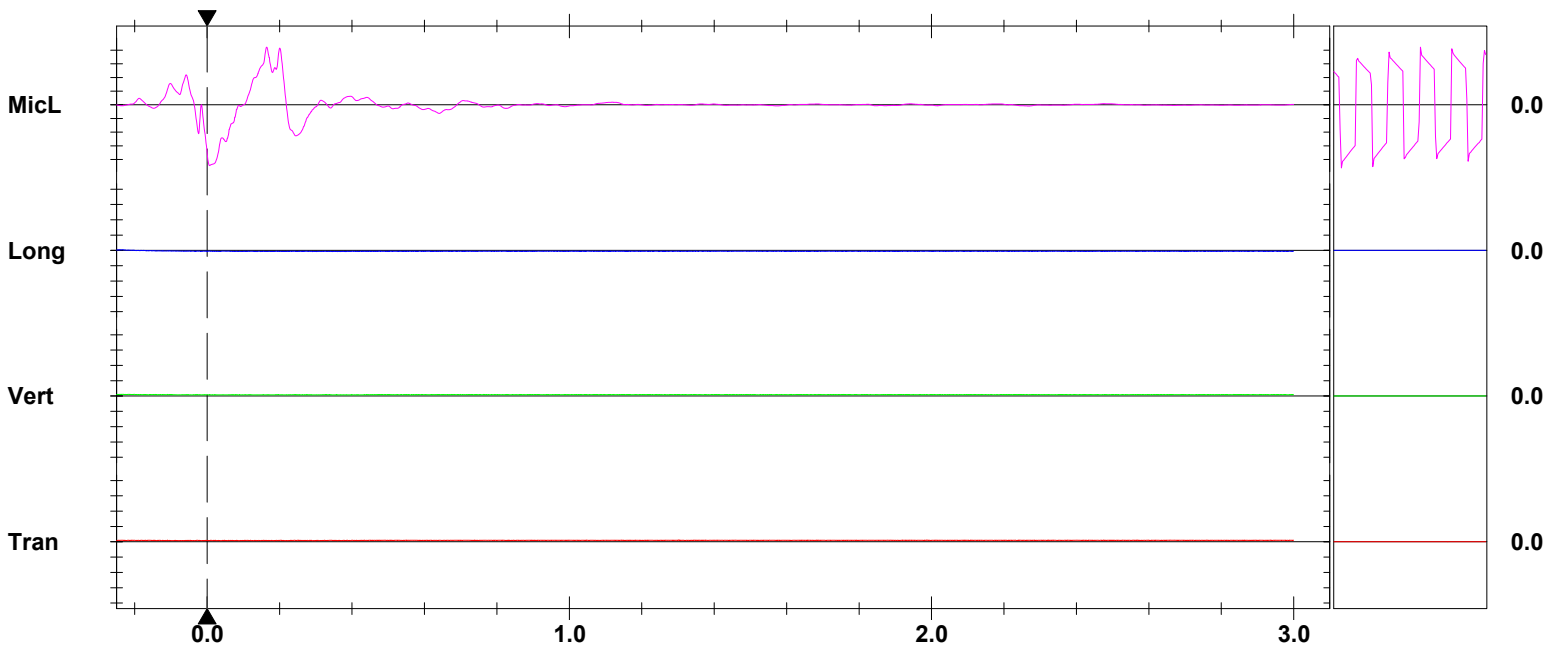
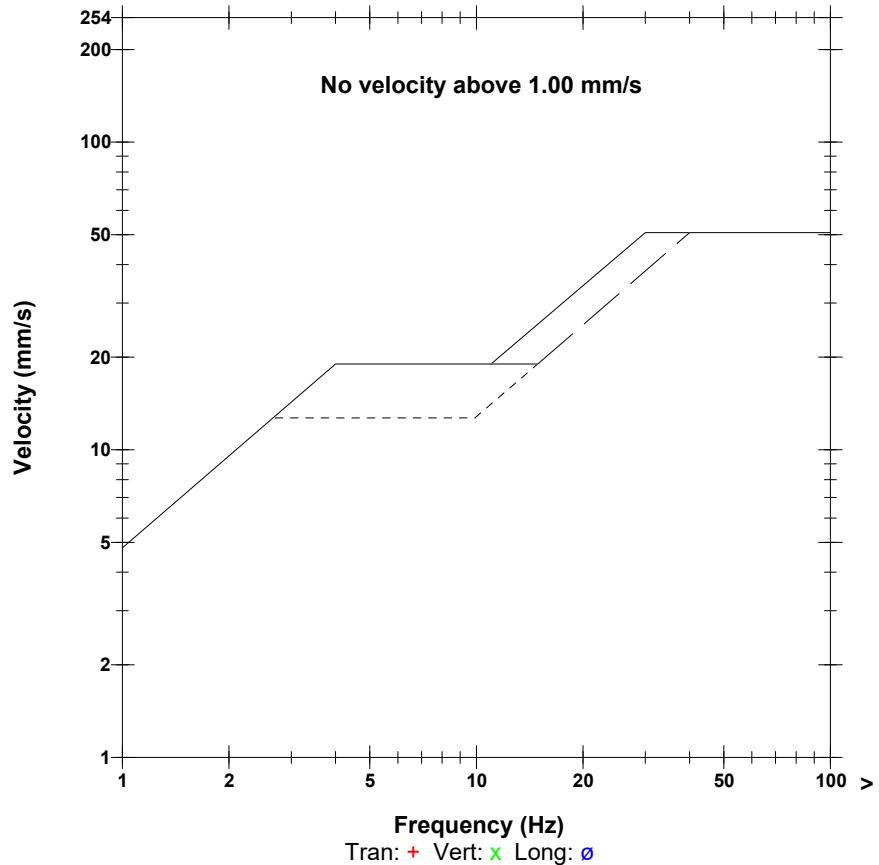
Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 88.94 pa.(L) at 0.007 sec
ZC Freq 4.3 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1435 mv)

	Tran	Vert	Long	
PPV	0.229	0.229	0.158	mm/s
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	1.408	-0.233	0.138	sec
Peak Acceleration	0.007	0.007	0.007	g
Peak Displacement	0.000	0.000	0.001	mm
Sensor Check	Passed	Passed	Passed	
Frequency	0.0	0.0	0.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 0.322 mm/s at 1.757 sec
N/A: Not Applicable

USBM RI8507 And OSMRE



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 20.00 pa.(L)/div
Trigger =

Sensor Check

Date/Time MicL at 12:11:48 August 14, 2019
Trigger Source Geo: 7.000 mm/s, Mic: 110.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 9.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/K4.MMB

Serial Number UM12241 V 10-87 Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration June 30, 2017 by InstanTel
File Name UM12241_20190814121148.IDFW

Post Event Notes
 GD-743-15

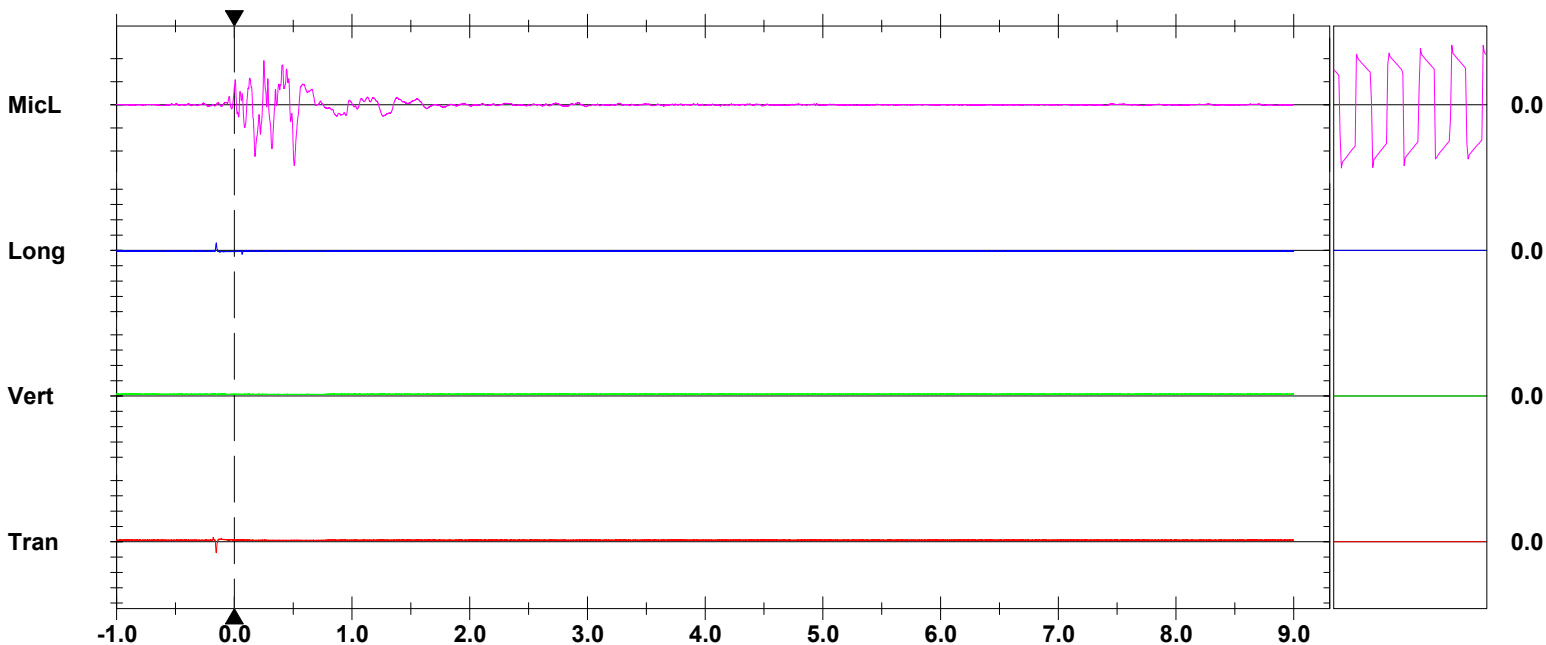
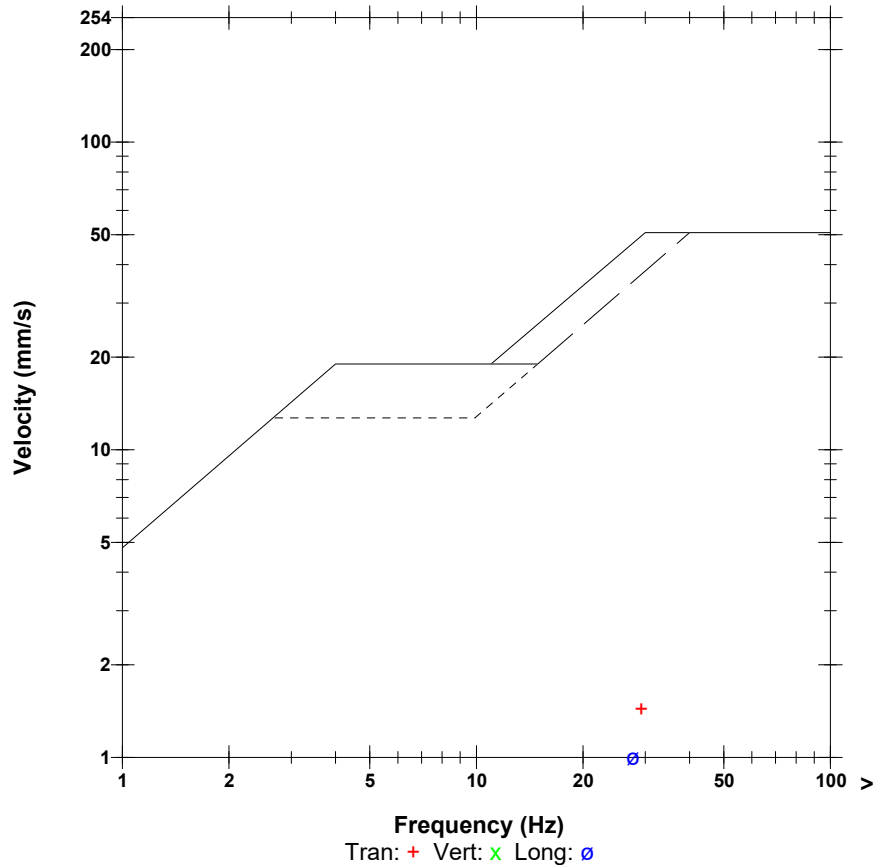
Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 122.4 dB(L) at 0.509 sec
ZC Freq 6.4 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1413 mv)

	Tran	Vert	Long	
PPV	1.434	0.323	1.001	mm/s
ZC Freq	29	N/A	28	Hz
Time (Rel. to Trig)	-0.154	-0.157	-0.152	sec
Peak Acceleration	0.036	0.015	0.028	g
Peak Displacement	0.085	0.000	0.038	mm
Sensor Check	Passed	Passed	Passed	
Frequency	0.0	0.0	0.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 1.752 mm/s at -0.152 sec
N/A: Not Applicable

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time MicL at 13:23:33 August 21, 2019
Trigger Source Geo: 7.000 mm/s, Mic: 110.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 9.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/K4.MMB

Serial Number UM12241 V 10-87 Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration June 30, 2017 by InstanTel
File Name UM12241_20190821132333.IDFW

Post Event Notes
 GD-763-04

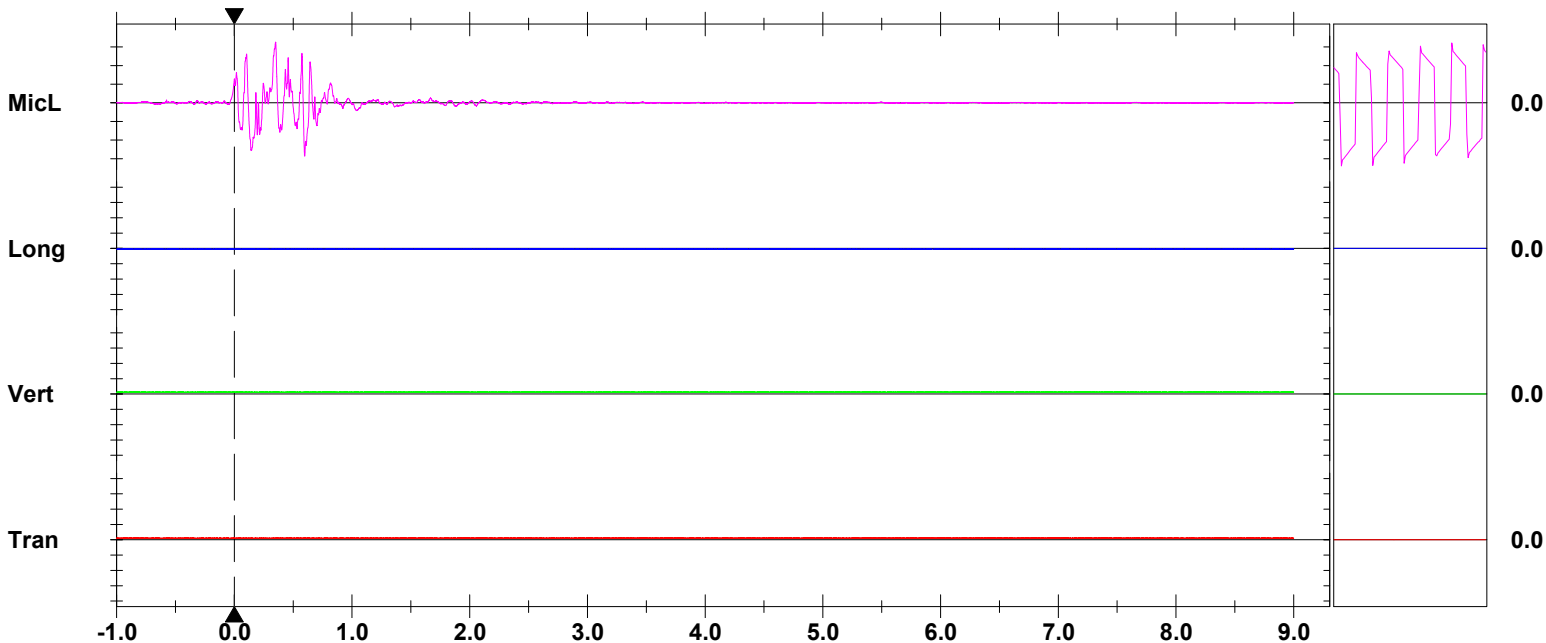
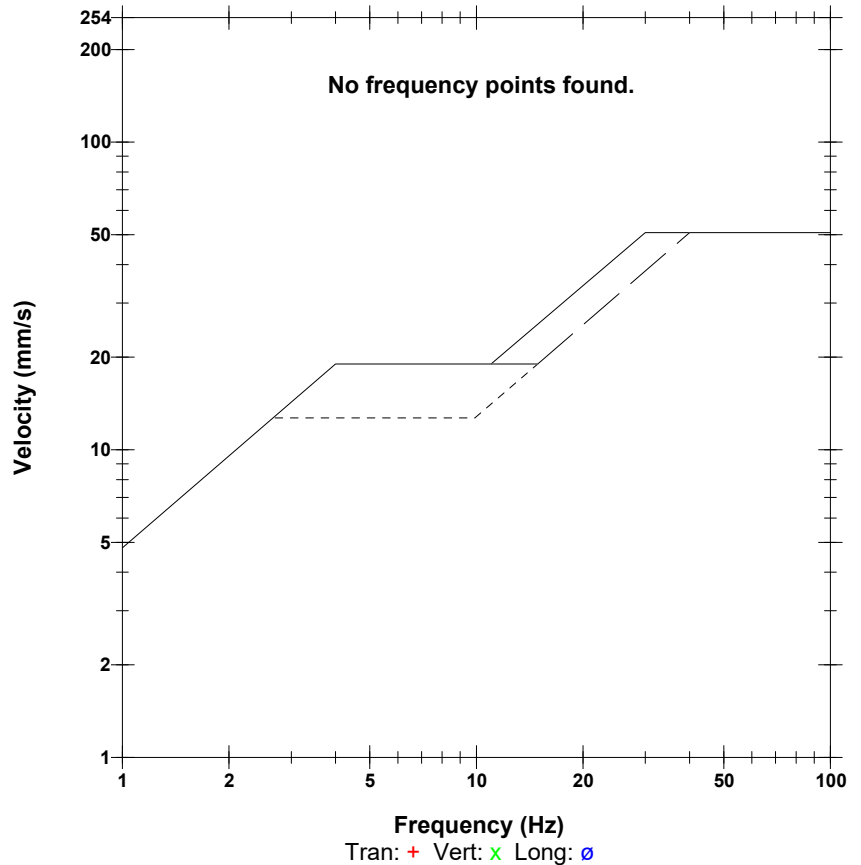
Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 118.2 dB(L) at 0.351 sec
ZC Freq 6.4 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1395 mv)

	Tran	Vert	Long	
PPV	0.252	0.276	0.134	mm/s
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	3.471	0.951	-0.485	sec
Peak Acceleration	0.015	0.015	0.013	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	0.0	0.0	0.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 0.373 mm/s at 2.427 sec
N/A: Not Applicable

USBM RI8507 And OSMRE



Date/Time MicL at 12:12:10 September 25, 2019
Trigger Source Geo: 7.000 mm/s, Mic: 110.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 9.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/GD.MMB

Serial Number UM12244 V 10-87 Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration June 30, 2017 by InstanTel
File Name UM12244_20190925121210.IDFW

Post Event Notes
 GD-743-17B

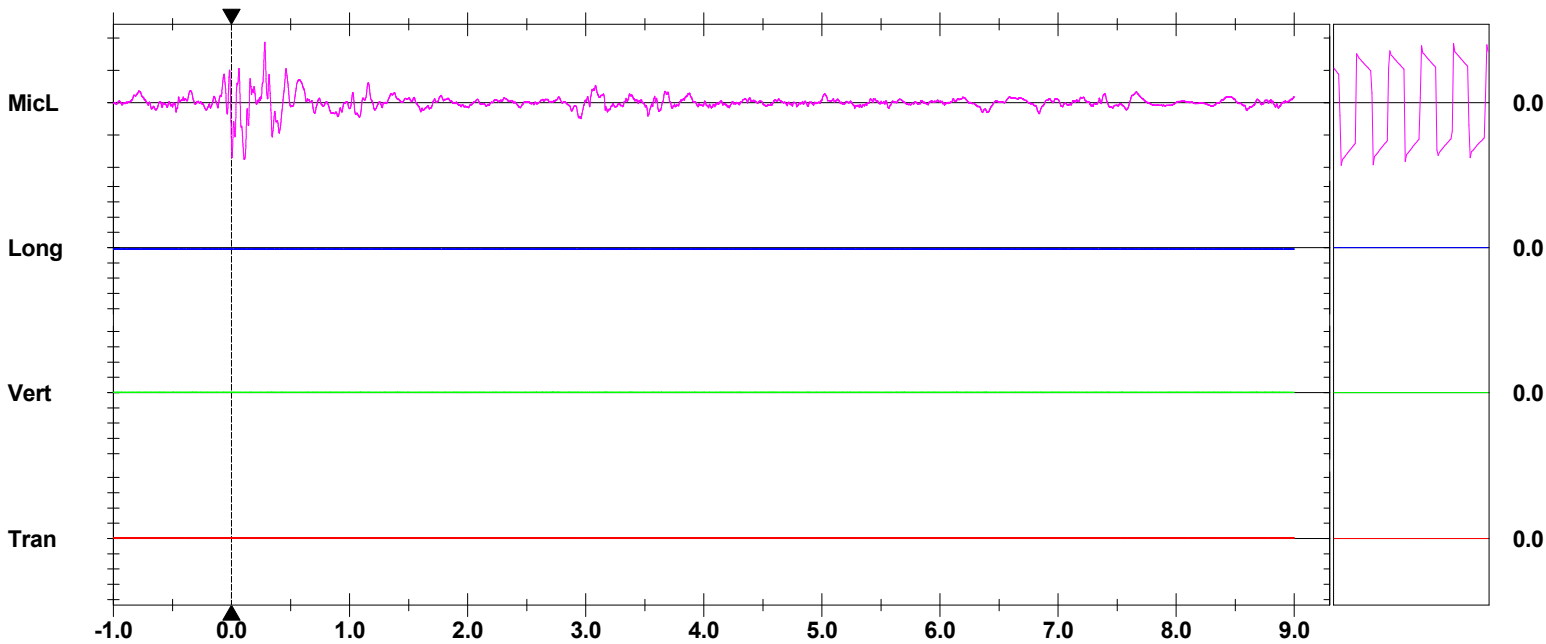
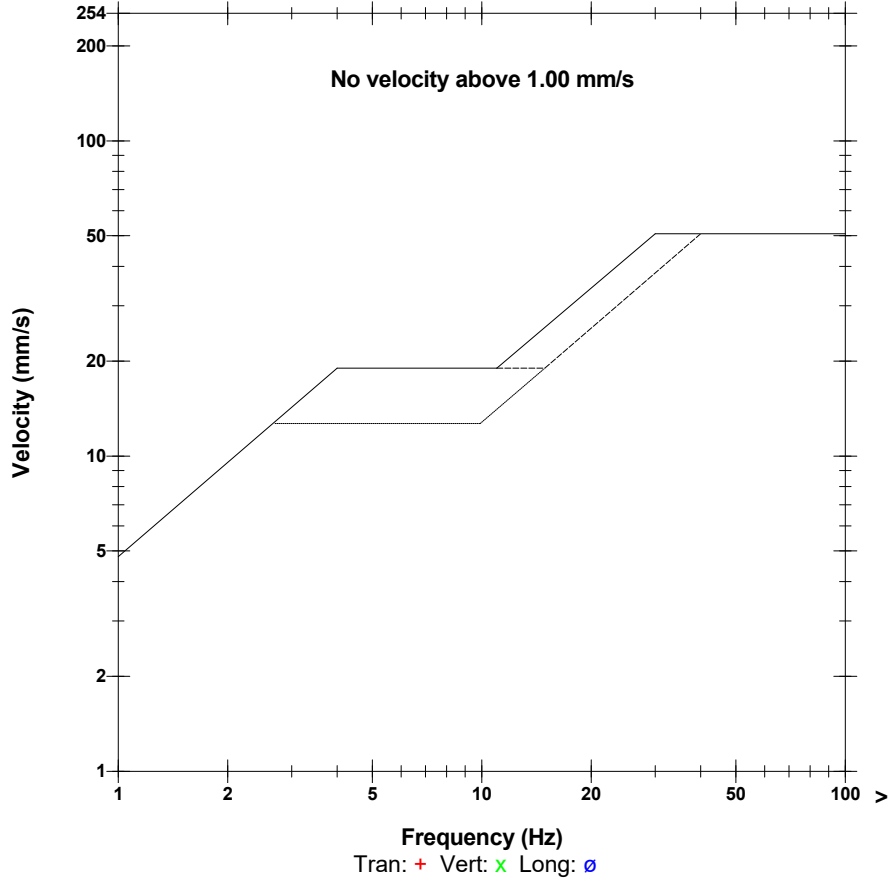
Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 113.4 dB(L) at 0.283 sec
ZC Freq 4.4 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1448 mv)

	Tran	Vert	Long	
PPV	0.110	0.087	0.244	mm/s
ZC Freq	N/A	11.9	N/A	Hz
Time (Rel. to Trig)	2.910	2.767	-0.085	sec
Peak Acceleration	0.015	0.013	0.013	g
Peak Displacement	0.000	0.002	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	0.0	0.0	0.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 0.251 mm/s at -0.085 sec
N/A: Not Applicable

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time MicL at 11:25:07 September 29, 2019
Trigger Source Geo: 7.000 mm/s, Mic: 110.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 9.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup: Operator/GD.MMB

Serial Number UM12244 V 10-87 Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration June 30, 2017 by InstanTel
File Name UM12244_20190929112507.IDFW

Post Event Notes
 GD-738-02

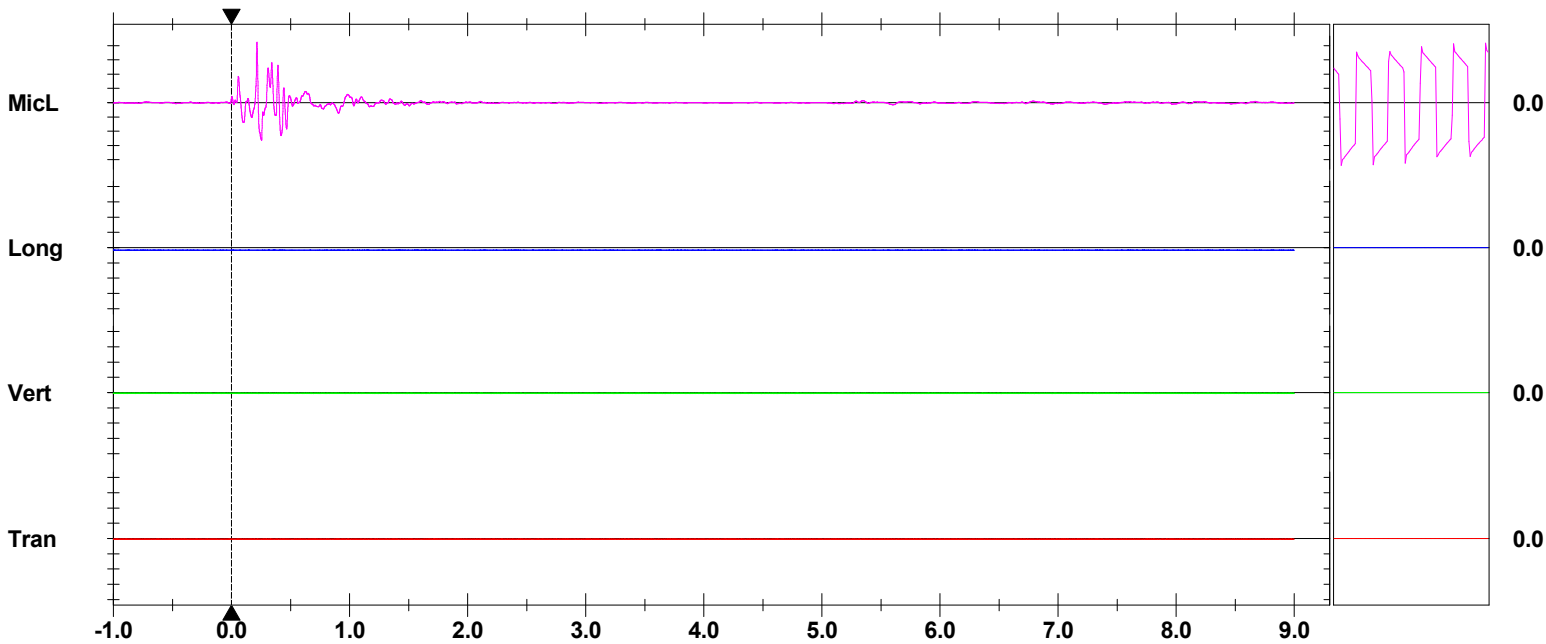
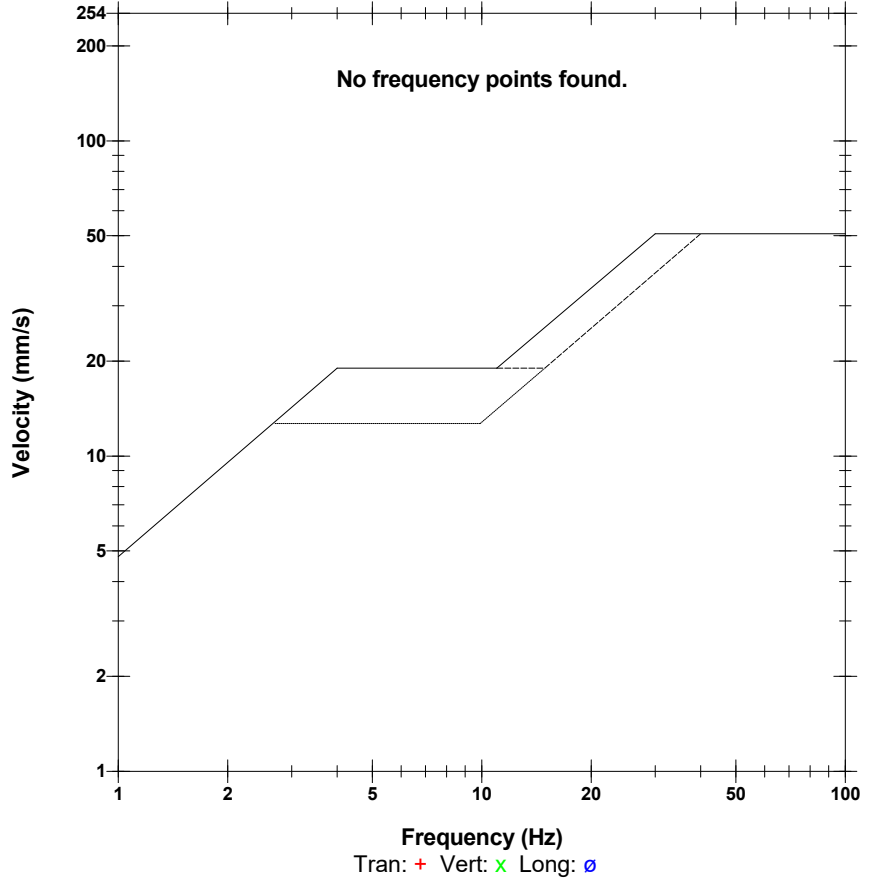
Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 132.6 dB(L) at 0.216 sec
ZC Freq 19.0 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1586 mv)

	Tran	Vert	Long	
PPV	0.134	0.142	0.378	mm/s
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	-0.168	-0.384	0.112	sec
Peak Acceleration	0.013	0.013	0.015	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	0.0	0.0	0.0	Hz
Overswing Ratio	0.0	0.0	0.0	

Peak Vector Sum 0.410 mm/s at 3.000 sec
 N/A: Not Applicable

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 20.00 pa.(L)/div
Trigger =

Sensor Check

B. Qualité de l'eau d'exfiltration du bassin de Goodwood



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Goodwood

AGAT WORK ORDER: 19M469470

WATER ANALYSIS REVIEWED BY: Jalel Rouissi, Chimiste

DATE REPORTED: 2019-07-04

VERSION*: 1

PAGES (INCLUDING COVER): 6

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M469470

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JF DION

ATTENTION TO: Mariana Trindade

SAMPLING SITE: GOODWOOD (QUEBEC)

Inorganic Analyses - Surface Water

DATE RECEIVED: 2019-05-21

DATE REPORTED: 2019-07-04

SAMPLE DESCRIPTION: GW-EXF-1
SAMPLE TYPE: SW
DATE SAMPLED: 2019-05-20

Parameter	Unit	G / S	RDL	211377
Ammonia Nitrogen	mg/L - N		0.02	0.09
Total Kjeldahl Nitrogen	mg/L - N		0.3	<0.3
Total Suspended Solids	mg/L		2	2
pH	pH		NA	6.87

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

211377 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M469470

PROJECT: Goodwood

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CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JF DION

ATTENTION TO: Mariana Trindade

SAMPLING SITE: GOODWOOD (QUEBEC)

Total Extractable Metals

DATE RECEIVED: 2019-05-21

DATE REPORTED: 2019-07-04

SAMPLE DESCRIPTION: GW-EXF-1
SAMPLE TYPE: SW
DATE SAMPLED: 2019-05-20
G / S RDL 211377

Parameter	Unit	G / S	RDL	211377
Aluminum	µg/L		5	56
Antimony	µg/L		1	<1
Silver	µg/L		0.2	<0.2
Arsenic	µg/L		0.3	<0.3
Barium	µg/L		2	<2
Boron	µg/L		40	<40
Cadmium	µg/L		0.2	<0.2
Chromium	µg/L		1	<1
Cobalt	µg/L		0.5	<0.5
Copper	µg/L		1	<1
Manganese	µg/L		1	38
Mercury	µg/L		0.01	<0.01
Molybdenum	µg/L		1	<1
Nickel	µg/L		1	<1
Lead	µg/L		0.5	<0.5
Selenium	µg/L		1	<1
Sodium	µg/L		200	336
Zinc	µg/L		3	<3

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

211377 A higher RDL indicates that a dilution has been performed to reduce the concentration of analytes or to reduce matrix interference.

Certified By: _____



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Quality Assurance

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Goodwood
 SAMPLED BY: JF DION

 AGAT WORK ORDER: 19M469470
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: GOODWOOD (QUEBEC)

Water Analysis

RPT Date: 2019-07-04			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Extractable Metals															
Aluminum	245842		176	172	2.3%	< 5	89%	80%	120%	90%	80%	120%	NA	80%	120%
Antimony	245842		<1	<1	NA	< 1	113%	80%	120%	92%	80%	120%	107%	80%	120%
Silver	245842		<0.2	<0.2	NA	< 0.2	NA	80%	120%	103%	80%	120%	104%	80%	120%
Arsenic	245842		<0.3	<0.3	NA	< 0.3	109%	80%	120%	110%	80%	120%	117%	80%	120%
Barium	245842		5	5	NA	< 2	109%	80%	120%	95%	80%	120%	NA	80%	120%
Boron	245842		<40	<40	NA	< 40	112%	80%	120%	117%	80%	120%	103%	80%	120%
Cadmium	245842		<0.2	<0.2	NA	< 0.1	103%	80%	120%	102%	80%	120%	NA	80%	120%
Chromium	245842		6	6	0.0%	< 1	111%	80%	120%	107%	80%	120%	NA	80%	120%
Cobalt	245842		0.8	0.8	NA	< 0.5	114%	80%	120%	109%	80%	120%	102%	80%	120%
Copper	245842		NA	NA	0.0%	< 1	108%	80%	120%	98%	80%	120%	NA	80%	120%
Manganese	245842		4	4	NA	< 1	104%	80%	120%	99%	80%	120%	94%	80%	120%
Mercury	211668		<0.01	<0.01	NA	< 0.01	102%	80%	120%	99%	80%	120%	110%	80%	120%
Molybdenum	245842		<1	<1	NA	< 1	106%	80%	120%	119%	80%	120%	105%	80%	120%
Nickel	245842		3	3	NA	< 1	107%	80%	120%	104%	80%	120%	103%	80%	120%
Lead	245842		0.5	0.5	NA	< 0.5	110%	80%	120%	109%	80%	120%	98%	80%	120%
Selenium	245842		<1	<1	NA	< 1	117%	80%	120%	120%	80%	120%	NA	80%	120%
Sodium	245842		1640	1630	0.6%	< 200	103%	80%	120%	101%	80%	120%	NA	80%	120%
Zinc	245842		11	11	NA	< 3	106%	80%	120%	96%	80%	120%	NA	80%	120%

Comments: NA : Non applicable

If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

NA as the percent recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.

NA in the spiked blank or CRM indicates that it is not required by the procedure.

The percent recovery of the CRM may be outside of the acceptability criteria of 80-120%, if conform to the criteria provided on the Certificate of Analysis of the reference material.

Inorganic Analyses - Surface Water

Ammonia Nitrogen	204118		1.72	1.75	1.7%	< 0.02	116%	80%	120%	89%	80%	120%	NA	80%	120%
Total Kjeldahl Nitrogen	209556		0.9	0.9	NA	< 0.3	106%	80%	120%	100%	80%	120%	87%	80%	120%
Total Suspended Solids	210192		7	7	NA	< 2	90%	80%	120%	NA			107%	80%	120%
pH	211498		7.80	7.83	0.4%		100%	80%	120%	100%	80%	120%	NA		

Comments: NA : Non applicable

If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

NA as the percent recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.

NA in the spiked blank or CRM indicates that it is not required by the procedure.

The percent recovery of the CRM may be outside of the acceptability criteria of 80-120%, if conform to the criteria provided on the Certificate of Analysis of the reference material.

Certified By: _____



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Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Goodwood
 SAMPLED BY: JF DION

AGAT WORK ORDER: 19M469470
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: GOODWOOD (QUEBEC)

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Ammonia Nitrogen	2019-05-28	2019-05-28	INOR-101-6051F	MA. 303 - N 2.0	COLORIMETRY
Total Kjeldahl Nitrogen	2019-05-29	2019-05-29	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Total Suspended Solids	2019-05-27	2019-05-28	INOR-101-6028F	MA. 115 - S.S. 1.2	GRAVIMETRY
pH	2019-05-22	2019-05-22	INOR-101-6021F	MA. 100 - pH 1.1	ELECTROMETRY
Aluminum	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Barium	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-06-10	2019-06-12	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Chromium	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Cobalt	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Copper	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Manganese	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Mercury	2019-05-24	2019-05-24	MET-101-6102F	MA. 200 Hg 1.1	COLD VAPOR/AA
Molybdenum	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Lead	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Selenium	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Sodium	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Zinc	2019-06-10	2019-06-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS

C. Qualité de l'eau



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Goodwood

AGAT WORK ORDER: 19M488236

MICROBIOLOGY ANALYSIS REVIEWED BY: Linda Maille, Superviseur Microbiology

TRACE ORGANICS REVIEWED BY: Robert Roch, Chimiste

WATER ANALYSIS REVIEWED BY: Jalel Rouissi, Chimiste

DATE REPORTED: 2019-09-03

VERSION*: 1

PAGES (INCLUDING COVER): 15

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M488236

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JFD

ATTENTION TO: Mariana Trindade

SAMPLING SITE: QUEBEC

Microbiology - Surface Water

DATE RECEIVED: 2019-07-04

DATE REPORTED: 2019-09-03

Parameter	Unit	DSO4-ER-GW-		DSO4-EE-GW-	
		G / S	RDL	G / S	RDL
SAMPLE DESCRIPTION: Q1-2019 Q1-2019					
SAMPLE TYPE: SW SW					
DATE SAMPLED: 2019-06-14 2019-06-14					
Total Coliforms	CFU/100ml		2	2	30
Atypical Bacteria	CFU/100ml		2	62	2
Fecal Coliforms	CFU/100ml		2	<2	<2
Temperature upon receipt	°C		N/A	10.0	10.0

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
324641-324688 The results are preliminary and subject to change if they are not certified.

Certified By:



Linda Houllé

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Certificate of Analysis

AGAT WORK ORDER: 19M488236

PROJECT: Goodwood

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ST. LAURENT, QUEBEC
CANADA H4S 1V9
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<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JFD

ATTENTION TO: Mariana Trindade

SAMPLING SITE: QUEBEC

Petroleum Hydrocarbons in Water

DATE RECEIVED: 2019-07-04

DATE REPORTED: 2019-09-03

Parameter	Unit	DSO4-ER-GW-		DSO4-EE-GW-	
		G / S	RDL	G / S	RDL
SAMPLE DESCRIPTION: Q1-2019 Q1-2019 SAMPLE TYPE: SW SW DATE SAMPLED: 2019-06-14 2019-06-14					
Petroleum Hydrocarbons C10-C50	µg/L	100	<100	<100	
Surrogate	Unit	Acceptable Limits			
Nonane	%	40-140	107	102	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

324641-324688 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By: _____



Robert Roch

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Certificate of Analysis

AGAT WORK ORDER: 19M488236

PROJECT: Goodwood

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TEL (514)337-1000
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<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JFD

ATTENTION TO: Mariana Trindade

SAMPLING SITE: QUEBEC

Inorganic Analyses

DATE RECEIVED: 2019-07-04

DATE REPORTED: 2019-09-03

Parameter	Unit	G / S	SAMPLE DESCRIPTION:	
			DSO4-ER-GW-	DSO4-EE-GW-
			Q1-2019	Q1-2019
			SW	SW
			DATE SAMPLED: 2019-06-14	2019-06-14
			324641	324688
Alkalinity	mg/L - CaCO3		1.5	<1.5
Ammonia Nitrogen	mg/L - N		0.02	0.32
Total Kjeldahl Nitrogen	mg/L - N		0.3	<0.3
Dissolved Organic Carbon	mg/L		0.30	3.40
Total Organic Carbon	mg/L		0.30	3.98
Chloride	mg/L		0.5	<0.5
Hexavalent Chromium	mg/L		0.008	<0.008
Conductivity (25 Celsius)	µmhos/cm		2	4
Total Cyanide	mg/L - CN		0.005	<0.005
BOD5	mg/L - O2		2	<2
COD	mg/L - O2		5	<5
Fluoride	mg/L		0.10	<0.10
Total Suspended Solids	mg/L		2	<2
Nitrate	mg/L - N		0.02	<0.02
Nitrite	mg/L - N		0.02	<0.02
Dissolved Oxygen	mg/L - O2		3	8
pH	pH		NA	7.51
Total Phenols	mg/L		0.002	0.002
Total Phosphorus	mg/L - P		0.02	<0.02
Reactive Silica	mg/L		0.05	1.60
Dissolved Solids	mg/L		10	<10
Sulfate	mg/L		0.5	0.5
Total Sulfide	mg/L S-2		0.02	<0.02
Nitrite-Nitrate (Montreal) (mg/L -N)	mg/L - N		0.04	<0.04

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

324641-324688 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M488236

PROJECT: Goodwood

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CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JFD

ATTENTION TO: Mariana Trindade

SAMPLING SITE: QUEBEC

Subcontracting

DATE RECEIVED: 2019-07-04

DATE REPORTED: 2019-09-03

		DSO4-ER-GW-		DSO4-EE-GW-	
SAMPLE DESCRIPTION:		Q1-2019		Q1-2019	
SAMPLE TYPE:		SW		SW	
DATE SAMPLED:		2019-06-14		2019-06-14	
Parameter	Unit	G / S	RDL	324641	324688
Radium-226	Bq/L	0.005	<0.005	<0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
324641-324688 Subcontract analysis

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M488236

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JFD

ATTENTION TO: Mariana Trindade

SAMPLING SITE: QUEBEC

Total Extractable Metals

DATE RECEIVED: 2019-07-04

DATE REPORTED: 2019-09-03

Parameter	Unit	DSO4-ER-GW-		DSO4-EE-GW-	
		SAMPLE DESCRIPTION: Q1-2019		Q1-2019	
		SAMPLE TYPE: SW		SW	
		DATE SAMPLED: 2019-06-14		2019-06-14	
		G / S	RDL	324641	324688
Aluminum	µg/L		5	70	18
Antimony	µg/L		1	<1	<1
Silver	µg/L		0.2	<0.2	<0.2
Arsenic	µg/L		0.3	<0.3	<0.3
Barium	µg/L		2	<2	<2
Boron	µg/L		40	<40	<40
Cadmium	µg/L		0.2	<0.2	<0.2
Chromium	µg/L		1	<1	<1
Cobalt	µg/L		0.5	<0.5	<0.5
Copper	µg/L		1	<1	<1
Tin	µg/L		5	<5	<5
Iron	µg/L		60	<60	<60
Manganese	µg/L		1	29	30
Mercury	µg/L		0.01	0.01	<0.01
Molybdenum	µg/L		1	<1	<1
Nickel	µg/L		1	<1	<1
Lead	µg/L		0.5	<0.5	<0.5
Potassium	µg/L		100	120	<100
Selenium	µg/L		1	<1	<1
Sodium	µg/L		200	223	<200
Thallium	µg/L		1	<1	<1
Titanium	µg/L		3	<3	<3
Uranium	µg/L		0.5	<0.5	<0.5
Vanadium	µg/L		1	<1	<1
Zinc	µg/L		3	<3	<3
Hardness	µg/L - CaCO3		1000	1230	<1000

Certified By: _____



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AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19M488236

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
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CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JFD

ATTENTION TO: Mariana Trindade

SAMPLING SITE: QUEBEC

Total Extractable Metals

DATE RECEIVED: 2019-07-04

DATE REPORTED: 2019-09-03

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

324641-324688 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By: _____



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Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Goodwood
 SAMPLED BY: JFD

AGAT WORK ORDER: 19M488236
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: QUEBEC

Trace Organics Analysis

RPT Date: 2019-09-03			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE		MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons in Water															
Petroleum Hydrocarbons C10-C50	MR		3530	3500	0.9%	< 100	NA	70%	130%	94%	70%	130%	NA	70%	130%

Comments: NA : Non applicable
 If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
 NA as the percent recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.
 NA in the spiked blank or CRM indicates that it is not required by the procedure.

Certified By: _____



Robert Roch

AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Quality Assurance

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Goodwood
 SAMPLED BY: JFD

 AGAT WORK ORDER: 19M488236
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: QUEBEC

Water Analysis															
RPT Date: 2019-09-03			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Total Extractable Metals

Aluminum	323737		<5	<5	NA	< 5	99%	80%	120%	103%	80%	120%	106%	80%	120%
Antimony	323737		<1	<1	NA	< 1	109%	80%	120%	99%	80%	120%	120%	80%	120%
Silver	323737		<0.2	<0.2	NA	< 0.2	NA	80%	120%	102%	80%	120%	100%	80%	120%
Arsenic	323737		<0.3	<0.3	NA	< 0.3	99%	80%	120%	106%	80%	120%	111%	80%	120%
Barium	323737		107	101	5.8%	< 2	92%	80%	120%	95%	80%	120%	NA	80%	120%
Boron	323737		257	262	1.9%	< 40	106%	80%	120%	102%	80%	120%	NA	80%	120%
Cadmium	323737		<0.2	<0.2	NA	< 0.2	103%	80%	120%	99%	80%	120%	NA	80%	120%
Chromium	323737		<1	<1	NA	< 1	102%	80%	120%	102%	80%	120%	99%	80%	120%
Cobalt	323737		<0.5	<0.5	NA	< 0.5	103%	80%	120%	104%	80%	120%	91%	80%	120%
Copper	323737		2	2	NA	< 1	102%	80%	120%	102%	80%	120%	103%	80%	120%
Tin	323737		<5	<5	NA	< 5	NA	80%	120%	103%	80%	120%	109%	80%	120%
Iron	323737		747	706	5.6%	< 60	98%	80%	120%	99%	80%	120%	NA	80%	120%
Manganese	323737		22	21	4.7%	< 1	101%	80%	120%	97%	80%	120%	NA	80%	120%
Mercury	1		NA	NA	NA	< 0.01	106%	80%	120%	102%	80%	120%	NA	80%	120%
Molybdenum	323737		<1	<1	NA	< 1	100%	80%	120%	103%	80%	120%	NA	80%	120%
Nickel	323737		4	3	NA	< 1	104%	80%	120%	101%	80%	120%	104%	80%	120%
Lead	323737		<0.5	<0.5	NA	< 0.5	101%	80%	120%	104%	80%	120%	NA	80%	120%
Potassium	323737		13500	13600	0.7%	< 100	98%	80%	120%	95%	80%	120%	NA	80%	120%
Selenium	323737		<1	<1	NA	< 1	99%	80%	120%	105%	80%	120%	116%	80%	120%
Sodium	323737		268000	266000	0.7%	< 200	102%	80%	120%	105%	80%	120%	NA	80%	120%
Thallium	323737		<1	<1	NA	< 1	100%	80%	120%	104%	80%	120%	99%	80%	120%
Titanium	323737		<3	<3	NA	< 3	NA	80%	120%	98%	80%	120%	106%	80%	120%
Uranium	323737		<0.5	<0.5	NA	< 0.5	99%	80%	120%	105%	80%	120%	106%	80%	120%
Vanadium	323737		<1	<1	NA	< 1	104%	80%	120%	101%	80%	120%	99%	80%	120%
Zinc	323737		3	<3	NA	< 3	102%	80%	120%	103%	80%	120%	115%	80%	120%

Comments: NA : Non applicable

If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

NA as the percent of recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.

NA in the spiked blank or CRM indicates that it is not required by the procedure.

The percent recovery of the CRM may be outside of the acceptability criteria of 80-120%, if conform to the criteria provided on the Certificate of Analysis of the reference material.

Inorganic Analyses

Alkalinity	308458		103	102	1.0%	< 1.5	95%	80%	120%	92%	80%	120%	NA	80%	120%
Ammonia Nitrogen	316867		0.38	0.42	10.0%	< 0.02	109%	80%	120%	116%	80%	120%	NA	80%	120%
Dissolved Organic Carbon	3		NA	NA	0.0%	< 0.30	110%	80%	120%	108%	80%	120%	NA	80%	120%
Total Organic Carbon	324491		3.71	3.72	0.3%	< 0.30	110%	80%	120%	108%	80%	120%	117%	80%	120%
Chloride	327076		<0.5	<0.5	NA	< 0.5	95%	80%	120%	84%	80%	120%	111%	80%	120%
Hexavalent Chromium	312129		< 0.008	< 0.008	NA	< 0.008	97%	80%	120%	102%	80%	120%	NA	80%	120%
Conductivity (25 Celsius)	319250		9	9	NA	< 2	103%	80%	120%	102%	80%	120%	102%	80%	120%
Total Cyanide	324688	324688	<0.005	<0.005	NA	< 0.005	77%	80%	120%	101%	80%	120%	83%	80%	120%
BOD5	1		NA	NA	0.0%	< 2	85%	80%	120%	92%	80%	120%	88%	80%	120%
COD	342049		<5	<5	NA	< 5	109%	80%	120%	97%	80%	120%	NA	80%	120%



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Goodwood
 SAMPLED BY: JFD

AGAT WORK ORDER: 19M488236
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: QUEBEC

Water Analysis (Continued)

RPT Date: 2019-09-03			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Fluoride	327076		<0.10	<0.10	NA	< 0.10	100%	80%	120%	105%	80%	120%	NA	80%	120%
Total Suspended Solids	326040		13	13	0.0%	< 2	98%	80%	120%	NA	80%	120%	96%	80%	120%
Nitrate	327076		NA	NA	0.0%	< 0.02	96%	80%	120%	96%	80%	120%	96%	80%	120%
Nitrite	327076		<0.02	<0.02	NA	< 0.02	NA	80%	120%	91%	80%	120%	105%	80%	120%
pH	325688		7.00	7.03	0.4%		99%	80%	120%	99%	80%	120%	NA		
Total Phenols	324641	324641	0.002	<0.002	NA	< 0.002	100%	80%	120%	90%	80%	120%	80%	80%	120%
Reactive Silica	307536		4.81	4.80	0.2%	< 0.05	113%	80%	120%	120%	80%	120%	107%	70%	130%
Dissolved Solids	324641	324641	<10	14	NA	< 10	102%	80%	120%	NA	80%	120%	106%	80%	120%
Sulfate	327076		NA	NA	0.0%	< 0.5	98%	80%	120%	95%	80%	120%	NA	80%	120%
Total Sulfide	325688		0.13	0.13	0.0%	< 0.02	92%	80%	120%	92%	80%	120%	113%	80%	120%

Comments: NA : Non applicable
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Inorganic Analyses

BOD5	1		NA	NA	0.0%	< 2	80%	80%	120%	88%	80%	120%	102%	80%	120%
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Comments: NA : Non applicable
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Certified By:



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Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M488236

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY: JFD

SAMPLING SITE: QUEBEC

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis					
Total Coliforms	2019-07-06	2019-07-06	MIC-102-7017	MA.700-Col 1.0	N/A
Atypical Bacteria	2019-07-06	2019-07-06	MIC-102-7017	MA.700-Col1.0	N/A
Fecal Coliforms	2019-07-06	2019-07-06	MIC-102-7013	MA.700-Fec.Ec 1.0	N/A
Temperature upon receipt	2019-07-05	2019-07-05	N/A		N/A
Trace Organics Analysis					
Petroleum Hydrocarbons C10-C50	2019-07-05	2019-07-05	ORG-100-5104F	MA.400-HYD. 1.1	GC/FID
Nonane	2019-07-05	2019-07-05	ORG-100-5104F	MA.400-HYD. 1.1	GC/FID

Method Summary

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Goodwood
 SAMPLED BY: JFD

 AGAT WORK ORDER: 19M488236
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: QUEBEC

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Alkalinity	2019-07-05	2019-07-05	INOR-101-6000F, unaccredited by MDDELCC	MA. 315 - Alc-Aci 1.0	TITRATION
Ammonia Nitrogen	2019-07-17	2019-07-17	INOR-101-6051F	MA. 303 - N 2.0	COLORIMETRY
Total Kjeldahl Nitrogen		2019-07-30	INOR-101-6048F	MA.300-NTPPT 2.0	COLORIMETRY
Dissolved Organic Carbon	2019-07-05	2019-07-05	INOR-101-6049F, unaccredited by MDDELCC	MA.300-C1.0	INFRARED DETECTION
Total Organic Carbon	2019-07-05	2019-07-05	INOR-101-6049F	MA.300-C1.0	INFRARED DETECTION
Chloride	2019-07-10	2019-07-10	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Hexavalent Chromium	2019-07-05	2019-07-05	INOR-101-6034F	MA. 200 - CrHex 1.1	SPECTROPHOTOMETRY
Conductivity (25 Celsius)	2019-07-16	2019-07-16	INOR-101-6016F	MA.115-Cond. 1.1	CONDUCTIVIMETER
Total Cyanide	2019-07-19	2019-07-19	INOR-101-6061F	MA. 300 - CN 1.2	COLORIMETRY
BOD5	2019-07-31	2019-08-07	INOR-101-6006F	MA. 315 - DBO 1.1	ELECTROMETRIC
COD	2019-07-31	2019-07-31	INOR-101-6042F	MA.315-DCO 1.1	SPECTROPHOTOMETRY
Fluoride	2019-07-10	2019-07-10	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Total Suspended Solids	2019-07-05	2019-07-06	INOR-101-6028F	MA. 115 - S.S. 1.2	GRAVIMETRY
Nitrate	2019-07-10	2019-07-10	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrite	2019-07-10	2019-07-10	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Dissolved Oxygen	2019-08-07	2019-08-07	INOR-101-6006F, unaccredited by MDDELCC	MA. 315 - DBO 1.1	ELECTROMETRIC
pH	2019-07-05	2019-07-05	INOR-101-6021F	MA. 100 - pH 1.1	ELECTROMETRIC
Total Phenols	2019-07-13	2019-07-13	INOR-101-6062F	MA. 404 - I. Phé 2.2	COLORIMETRY
Total Phosphorus		2019-07-26	INOR-101-6048F	MA.300-NTPPT 2.0	COLORIMETRY
Reactive Silica	2019-08-05	2019-08-05	INOR-101-6071F, unaccredited by MDDELCC	AQ2 EPA-122A Rev 5	COLORIMETRY
Dissolved Solids	2019-07-19	2019-07-20	INOR-101-6054F	MA.115-S.D. 1.0	GRAVIMETRY
Sulfate	2019-07-10	2019-07-10	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Total Sulfide	2019-07-12	2019-07-12	INOR-101-6055F	MA.300-S 1.2	SPECTROPHOTOMETRY
Radium-226			Subcontracted	Subcontracted	N/A
Aluminum	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Barium	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-07-05	2019-07-08	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Chromium	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Cobalt	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Copper	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Tin	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Iron	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Manganese	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Mercury	2019-07-10	2019-07-10	MET-101-6102F	MA. 200 Hg 1.1	COLD VAPOR/AA
Molybdenum	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Lead	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Potassium	2019-07-05	2019-07-08	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Selenium	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Sodium	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Thallium	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M488236

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY: JFD

SAMPLING SITE: QUEBEC

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Titanium	2019-07-05	2019-07-08	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Uranium	2019-07-05	2019-07-08	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Vanadium	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Zinc	2019-07-05	2019-07-08	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Hardness	2019-07-08	2019-07-08	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS

Chaîne de traçabilité Environnement

Eau potable RQEP (réseau) - Veuillez utiliser le formulaire du MDDELCC

Information pour le rapport

Compagnie : TSMC
 Adresse : _____
 Téléphone : _____ Téléc. : _____
 Projet : Goodwood
 Lieu de prélèvement : Quebec
 Prélevé par : JFD

Rapport envoyé à

1. Nom: TSMC mailing list
 Courriel: _____
 2. Nom: _____
 Courriel: _____

Critères à respecter

PRTC ABC RESC
 CCME
 Eau consommation
 Eau résurg. Surface
 Eau résurg. Salée
 CMM Sanitaire Pluvial
 Autre. _____

Délais d'analyse requis (jours ouvrables)

Environnemental: Régulier: 5 à 7 jours Urgent: Même jour 1 jour 2 jours 3 jours
Haute Résolution: Régulier: 10 à 15 jours Urgent: < 10 jours
 Date Requête: _____
 AA/MM/JJ

Facturé à Mêmes adresse: Oui Non
 Compagnie : TSMC
 Contact : _____
 Courriel : _____
 Adresse : _____
 Bon de commande : 300000242 Soumission : _____

Commentaires: voir le page pour paramètres à analyser
Appendix "Quebec"

Matrice (légende) EP Eau potable EB Eau brute EPI Eau de piscine
 S Sol B Boue SE Sédiment ES Eau de surface AF Affluent
 SL Solide EU Eau usée EF Effluent ST Eau souterraine A Air

IDENTIFICATION DE L'ÉCHANTILLON	PRÉLÈVEMENT		MATRICE	NB DE CONTENANTS
	DATE (AA/MM/JJ)	HEURE		
<u>DS04-ER-GW-Q1-2014</u>	<u>19/06/14</u>	<u>8:05</u>	<u>ES</u>	<u>16</u>
<u>DS04-EF-GW-Q1-2014</u>	<u>"</u>	<u>9:53</u>	<u>ES</u>	<u>16</u>

Format de rapport

Portrait (échantillon/page) Paysage (échantillons/page)

Hydrocarbures pétroliers C1C-C50		COURT DÉLAI DE CONSERVATION	
<input type="checkbox"/> P-AP	<input type="checkbox"/> ETEX <input type="checkbox"/> HAM <input type="checkbox"/> HAC-HAM <input type="checkbox"/> T-IM <input type="checkbox"/>	<input type="checkbox"/> COD	<input type="checkbox"/> o-PDA
<input type="checkbox"/> Chlorobenzènes	<input type="checkbox"/> Phtalates <input type="checkbox"/> COSV <input type="checkbox"/>	<input type="checkbox"/> Couleur	<input type="checkbox"/> Turbidité
<input type="checkbox"/> EPC: Congénères	<input type="checkbox"/> Aroclor <input type="checkbox"/> CENC <input type="checkbox"/>	<input type="checkbox"/> DBO ₅ Carbonée	<input type="checkbox"/> Fécules
<input type="checkbox"/> Éthylène glycol	<input type="checkbox"/> Formaldéhyde	<input type="checkbox"/> Coliformes: Totaux	<input type="checkbox"/> E.coli
<input type="checkbox"/> Huiles et graisses: Minérales	<input type="checkbox"/> Totales	<input type="checkbox"/> Microbiologie (autre):	<input type="checkbox"/> H-R/MS: Dioxines/Furanes
<input type="checkbox"/> Pesticides: OC	<input type="checkbox"/> OP <input type="checkbox"/> Herbicides	<input type="checkbox"/> CMM 2003-47: Sanitaire	<input type="checkbox"/> NP <input type="checkbox"/> NPE
<input type="checkbox"/> Diquat/ Paraquat	<input type="checkbox"/> Glyphosate	<input type="checkbox"/> FMD	<input type="checkbox"/> REIMR art
<input type="checkbox"/> Phénols (GC-MS)	<input type="checkbox"/> Indice phénolique (4AAP)		
<input type="checkbox"/> Métaux - Sol	<input type="checkbox"/> Hg <input type="checkbox"/> S ₂ <input type="checkbox"/> CrVI		
<input type="checkbox"/> Métaux - ST	<input type="checkbox"/> Hg <input type="checkbox"/> CrVI <input type="checkbox"/> CuII <input type="checkbox"/> U		
<input type="checkbox"/> Métaux: Filtré sur terrain	<input type="checkbox"/> Filtré au lab		
<input type="checkbox"/> Métaux (spécifier):			
<input type="checkbox"/> Dureté totale			
<input type="checkbox"/> Alcalinité	<input type="checkbox"/> Bromates <input type="checkbox"/> Conductivité		
<input type="checkbox"/> Chlorures	<input type="checkbox"/> Fluorures <input type="checkbox"/> Sulfates <input type="checkbox"/> Bromures		
<input type="checkbox"/> Cyanures: Totaux	<input type="checkbox"/> Disponibles <input type="checkbox"/> Oxydables		
<input type="checkbox"/> ECO	<input type="checkbox"/> COT		
<input type="checkbox"/> N ₂ + NH ₄	<input type="checkbox"/> NTK <input type="checkbox"/> NO ₂ + HO ₃		
<input type="checkbox"/> Solides: Totaux	<input type="checkbox"/> Dissous <input type="checkbox"/> MES <input type="checkbox"/> MESV		
<input type="checkbox"/> Sulfures - Eau	<input type="checkbox"/> Soufre total - Sol		
<input type="checkbox"/> F ₂	<input type="checkbox"/> NO ₂ <input type="checkbox"/> NO ₃		
<input type="checkbox"/> Absorbance UV	<input type="checkbox"/> Couleur		
<input type="checkbox"/> DBO ₅	<input type="checkbox"/> Carbonée		
<input type="checkbox"/> Coliformes: Totaux	<input type="checkbox"/> Fécules		
<input type="checkbox"/> Microbiologie (autre):			
<input type="checkbox"/> H-R/MS: Dioxines/Furanes	<input type="checkbox"/> HA ₂		
<input type="checkbox"/> CMM 2003-47: Sanitaire	<input type="checkbox"/> Pluvial		
<input type="checkbox"/> FMD	<input type="checkbox"/> REIMR art		

Échantillon remis par (nom en lettres moulées et signature) Jean-François Dion

Date (AA/MM/JJ) 19/06/14 Heure 14:00

Échantillon reçu par (nom en lettres moulées et signature) Ali

Date (AA/MM/JJ) 19/06/14 Heure 15H

Page 1 de 2
 N°: 070287

Quebec EEM p

METALS	CONVENTIONALS
Aluminum (Al)	Conductivity
Arsenic (As)	Nitrates (N-NO3-)
Barium (Ba)	Nitrites (N-NO2-)
Cadmium (Cd)	Nitrogen ammonia (N-NH3)
Calcium (Ca)	pH
Chromium (Cr)	Alkalinity Total (as CaCO3) pH 4.5
Copper (Cu)	Bicarbonates (HCO3 as CaCO3)
Total Hardness (CaCO3)	Carbonate (CO3 as CaCO3)
Iron (Fe)	Sulfates (SO4)
Magnesium (Mg)	Total dissolved solids
Manganese (Mn)	Total suspended solids (TSS)
Molybdenum (Mo)	Dissolved oxygen
Mercury (Hg)	Hydrogen Sulphide
Nickel (Ni)	
Lead (Pb)	
Selenium (Se)	
Zinc (Zn)	
Radium 226	

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*Handwritten blue text: Métaux
Totaux*

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Good Wood

AGAT WORK ORDER: 19M496706

TRACE ORGANICS REVIEWED BY: Manal Seif, Report Writer

WATER ANALYSIS REVIEWED BY: Jalel Rouissi, Chimiste

DATE REPORTED: 2019-09-04

VERSION*: 1

PAGES (INCLUDING COVER): 13

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M496706

PROJECT: Good Wood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: Adam Calvert

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

Petroleum Hydrocarbons in Water

DATE RECEIVED: 2019-07-24

DATE REPORTED: 2019-09-04

Parameter	Unit	SAMPLE DESCRIPTION:		DS04-ER-GW-	DS04-EE-GW-
		G / S	RDL	Q2-2019	Q2-2019
Petroleum Hydrocarbons C10-C50	µg/L	100	<100	<100	<100
Surrogate	Unit	Acceptable Limits			
Nonane	%	40-140	73	91	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

375876-375943 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M496706

PROJECT: Good Wood

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ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: Adam Calvert

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-07-24

DATE REPORTED: 2019-09-04

Parameter	Unit	SAMPLE DESCRIPTION:		DS04-ER-GW-	DS04-EE-GW-
		Q2-2019		Q2-2019	Q2-2019
		SAMPLE TYPE:		SW	SW
		DATE SAMPLED:		2019-07-23	2019-07-23
		G / S	RDL	375876	375943
Mercury	µg/L		0.1	<0.1	<0.1
Aluminum	µg/L		10	11	25
Antimony	µg/L		1	<1	<1
Silver	µg/L		0.2	<0.2	<0.2
Arsenic	µg/L		1	<1	<1
Barium	µg/L		5	<5	<5
Boron	µg/L		40	<40	<40
Cadmium	µg/L		0.5	<0.5	<0.5
Calcium	µg/L		100	<100	256
Chromium	µg/L		1	<1	<1
Cobalt	µg/L		0.5	<0.5	<0.5
Copper	µg/L		1	<1	<1
Hardness	µg/L - CaCO3		1000	<1000	1310
Tin	mg/L		0.5	<0.5	<0.5
Iron	µg/L		70	<70	<70
Manganese	µg/L		1	9	19
Molybdenum	µg/L		1	<1	<1
Nickel	µg/L		1	<1	<1
Lead	µg/L		1	<1	<1
Potassium	µg/L		100	<100	110
Thallium	µg/L		1	<1	<1
Titanium	µg/L		3	<3	<3
Uranium	µg/L		0.5	<0.5	<0.5
Vanadium	µg/L		1	<1	<1
Zinc	µg/L		3	<3	10
Radium-226	Bq/L		0.005	<0.005	<0.005
Magnesium	µg/L		100	<100	164

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M496706

PROJECT: Good Wood

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CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: Adam Calvert

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-07-24

DATE REPORTED: 2019-09-04

Parameter	Unit	DS04-ER-GW-		DS04-EE-GW-	
		G / S	RDL	G / S	RDL
SAMPLE DESCRIPTION:		Q2-2019		Q2-2019	
SAMPLE TYPE:		SW		SW	
DATE SAMPLED:		2019-07-23		2019-07-23	
Selenium	µg/L	1	<1	<1	<1
Sodium	µg/L	200	263	291	291

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M496706

PROJECT: Good Wood

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<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: Adam Calvert

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

Tata Steel - QC Packages - Conventionals

DATE RECEIVED: 2019-07-24

DATE REPORTED: 2019-09-04

Parameter	Unit	DS04-ER-GW-		DS04-EE-GW-	
		SAMPLE DESCRIPTION: Q2-2019		Q2-2019	
		SAMPLE TYPE: SW		SW	
		G / S	RDL	375876	375943
BOD5	mg/L - O2		2	<2	<2
COD	mg/L - O2		5	<5	<5
Dissolved Organic Carbon	mg/L		0.30	1.33	1.45
Dissolved Oxygen	mg/L - O2		3	9	10
Fluoride	mg/L		0.10	<0.10	<0.10
Chromium VI	mg/L		0.008	<0.008	<0.008
Ammonia Nitrogen	mg/L - N		0.02	0.08	0.05
Reactive Silica	mg/L		0.05	<0.05	0.60
Total Kjeldahl Nitrogen	mg/L - N		0.3	<0.3	34.2
Total Cyanide	mg/L - CN		0.005	<0.005	<0.005
Total Organic Carbon	mg/L		0.30	1.43	1.61
Alkalinity	mg/L - CaCO3		1.5	<1.5	<1.5
Chloride	mg/L		0.5	<0.5	0.6
Nitrate	mg/L - N		0.02	<0.02	0.02
Nitrite	mg/L - N		0.02	<0.02	<0.02
Sulfate	mg/L		0.5	1.4	<0.5
Total Suspended Solids	mg/L		2	<2	<2
Dissolved Solids	mg/L		10	10	<10
Total Sulfide	mg/L S-2		0.02	0.02	0.08
Total Phenols	mg/L		0.002	0.007	0.008
Total Phosphorus	mg/L - P		0.02	<0.02	0.08
pH	pH		NA	5.52	5.77
Conductivity (25 Celsius)	µmhos/cm		2	2	4

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



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Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Good Wood
 SAMPLED BY: Adam Calvert

AGAT WORK ORDER: 19M496706
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE:

Trace Organics Analysis

RPT Date: 2019-09-04			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons in Water															
Petroleum Hydrocarbons C10-C50	MR		3170	3390	6.7%	< 100	NA	70%	130%	85%	70%	130%	NA	70%	130%

Comments: NA : Non applicable
 If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
 NA as the percent recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.
 NA in the spike blank or CRM indicates that it is not required by the procedure.

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Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: Good Wood
SAMPLED BY: Adam Calvert

AGAT WORK ORDER: 19M496706
ATTENTION TO: Mariana Trindade
SAMPLING SITE:

Water Analysis															
RPT Date: 2019-09-04			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Tata Steel - QC Packages - Conventionals

BOD5	1		NA	NA	0.0%	< 2	80%	80%	120%	88%	80%	120%	102%	80%	120%
COD	361043		<5	<5	NA	< 5	88%	80%	120%	80%	80%	120%	NA	80%	120%
Dissolved Organic Carbon	1		NA	NA	0.0%	< 0.30	106%	80%	120%	102%	80%	120%	NA	80%	120%
Fluoride	375682		7.86	8.10	3.0%	< 0.10	87%	80%	120%	106%	80%	120%	NA	80%	120%
Chromium VI	377984		< 0.008	< 0.008	NA	< 0.008	100%	80%	120%	97%	80%	120%	NA	80%	120%
Ammonia Nitrogen	369806		0.36	0.38	5.4%	< 0.02	117%	80%	120%	101%	80%	120%	NA	80%	120%
Reactive Silica	372785		< 0.05	< 0.05	NA	< 0.05	102%	90%	110%	105%	70%	130%	112%	70%	130%
Total Kjeldahl Nitrogen	313616		0.9	0.8	NA	< 0.3	117%	80%	120%	86%	80%	120%	NA	80%	120%
Total Cyanide	377347		0.016	0.014	NA	< 0.005	82%	80%	120%	89%	80%	120%	99%	80%	120%
Total Organic Carbon	375876	375876	1.43	1.39	NA	< 0.30	106%	80%	120%	102%	80%	120%	92%	80%	120%
Alkalinity	375876	375876	<1.5	<1.5	NA	< 1.5	94%	80%	120%	93%	80%	120%	96%	80%	120%
Chloride	375682		NA	NA	0.0%	< 0.5	96%	80%	120%	86%	80%	120%	NA	80%	120%
Nitrate	375682		0.22	0.26	16.7%	< 0.02	99%	80%	120%	101%	80%	120%	100%	80%	120%
Nitrite	375682		0.25	0.24	4.1%	< 0.02	NA	80%	120%	94%	80%	120%	94%	80%	120%
Sulfate	375682		NA	NA	0.0%	< 0.5	108%	80%	120%	102%	80%	120%	NA	80%	120%
Total Suspended Solids	378282		6	7	NA	< 2	98%	80%	120%	NA			102%	80%	120%
Dissolved Solids	375876	375876	10	<10	NA	< 10	104%	80%	120%	NA			106%	80%	120%
Total Sulfide	375773		< 0.02	< 0.02	NA	< 0.02	86%	80%	120%	93%	80%	120%	NA	80%	120%
Total Phenols	375876	375876	0.007	0.003	NA	< 0.002	85%	80%	120%	90%	80%	120%	NA	80%	120%
Total Phosphorus	380988		0.34	0.32	6.1%	< 0.02	102%	80%	120%	89%	80%	120%	NA	80%	120%
pH	375876	375876	5.52	5.58	1.1%		99%	80%	120%	99%	80%	120%	NA		
Conductivity (25 Celsius)	377263		25	25	0.0%	< 2	106%	80%	120%	104%	80%	120%	99%	80%	120%

Tata Steel - QC Package - Metals

Mercury	375876	375876	<0.1	<0.1	NA	< 0.1	97%	80%	120%	95%	80%	120%	98%	80%	120%
Aluminum	377742		14	14	NA	< 10	100%	80%	120%	95%	80%	120%	NA	80%	120%
Antimony	377742		<1	<1	NA	< 1	109%	80%	120%	100%	80%	120%	120%	80%	120%
Silver	377742		<0.2	<0.2	NA	< 0.2	NA	80%	120%	101%	80%	120%	102%	80%	120%
Arsenic	377742		<1	<1	NA	< 1	97%	80%	120%	101%	80%	120%	113%	80%	120%
Barium	377742		16	17	NA	< 5	87%	80%	120%	92%	80%	120%	NA	80%	120%
Boron	377742		<40	<40	NA	< 40	100%	80%	120%	87%	80%	120%	NA	80%	120%
Cadmium	377742		<0.5	<0.5	NA	< 0.5	97%	80%	120%	99%	80%	120%	NA	80%	120%
Calcium	377742		26000	23900	8.4%	< 100	93%	80%	120%	103%	80%	120%	NA	80%	120%
Chromium	377742		<1	<1	NA	< 1	99%	80%	120%	102%	80%	120%	NA	80%	120%
Cobalt	377742		<0.5	<0.5	NA	< 0.5	101%	80%	120%	102%	80%	120%	105%	80%	120%
Copper	377742		2	2	NA	< 1	100%	80%	120%	99%	80%	120%	115%	80%	120%
Tin	377742		<0.5	<0.5	NA	< 0.5	NA	80%	120%	106%	80%	120%	107%	80%	120%
Iron	377742		<70	<70	NA	< 70	98%	80%	120%	105%	80%	120%	NA	80%	120%
Manganese	377742		2	2	NA	< 1	99%	80%	120%	98%	80%	120%	NA	80%	120%
Molybdenum	377742		<1	<1	NA	< 1	99%	80%	120%	116%	80%	120%	111%	80%	120%
Nickel	377742		2	2	NA	< 1	99%	80%	120%	102%	80%	120%	NA	80%	120%
Lead	377742		<1	<1	NA	< 1	98%	80%	120%	100%	80%	120%	106%	80%	120%



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: Good Wood
SAMPLED BY: Adam Calvert

AGAT WORK ORDER: 19M496706
ATTENTION TO: Mariana Trindade
SAMPLING SITE:

Water Analysis (Continued)

RPT Date: 2019-09-04			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Potassium	377742		1380	1410	2.2%	< 100	101%	80%	120%	95%	80%	120%	NA	80%	120%
Thallium	377742		<1	<1	NA	< 1	96%	80%	120%	99%	80%	120%	105%	80%	120%
Titanium	377742		<3	<3	NA	< 3	NA	80%	120%	100%	80%	120%	NA	80%	120%
Uranium	377742		<0.5	<0.5	NA	< 0.5	97%	80%	120%	102%	80%	120%	108%	80%	120%
Vanadium	377742		<1	<1	NA	< 1	102%	80%	120%	100%	80%	120%	NA	80%	120%
Zinc	377742		69	72	4.3%	< 3	99%	80%	120%	100%	80%	120%	NA	80%	120%
Magnesium	377742		6070	6400	5.3%	< 100	96%	80%	120%	97%	80%	120%	NA	80%	120%
Selenium	377742		<1	<1	NA	< 1	95%	80%	120%	93%	80%	120%	108%	80%	120%
Sodium	377742		22220	23390	5.1%	< 200	101%	80%	120%	91%	80%	120%	NA	80%	120%
Tata Steel - QC Packages - Conventionals															
BOD5	1		NA	NA	0.0%	< 2	85%	80%	120%	96%	80%	120%	88%	80%	120%

Certified By: _____



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Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M496706

PROJECT: Good Wood

ATTENTION TO: Mariana Trindade

SAMPLED BY: Adam Calvert

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis					
Petroleum Hydrocarbons C10-C50	2019-07-31	2019-07-31	ORG-100-5104F	MA.400-HYD. 1.1	GC/FID
Nonane	2019-07-31	2019-07-31	ORG-100-5104F	MA.400-HYD. 1.1	GC/FID

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M496706

PROJECT: Good Wood

ATTENTION TO: Mariana Trindade

SAMPLED BY: Adam Calvert

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Mercury	2019-07-29	2019-07-29	MET-101-6102F	MA. 200 Hg 1.1	COLD VAPOR/AA
Aluminum	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Barium	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-07-25	2019-07-26	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Calcium	2019-07-25	2019-07-26	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Chromium	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Cobalt	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Copper	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Hardness			MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Tin	2019-07-25	2019-07-26	MET-101-6107F	MA. 200 - Mét 1.2	ICP/OES
Iron	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Manganese	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Molybdenum	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Lead	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Potassium	2019-07-25	2019-07-26	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Thallium	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Titanium	2019-07-25	2019-07-26	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Uranium	2019-07-25	2019-07-26	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Vanadium	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Zinc	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Radium-226			Subcontracted	Subcontracted	N/A
Magnesium	2019-07-25	2019-07-26	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Selenium	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Sodium	2019-07-25	2019-07-26	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
BOD5	2019-07-31	2019-08-07	INOR-101-6006F	MA. 315 - DBO 1.1	ELECTROMETRIC
COD	2019-08-05	2019-08-05	INOR-101-6042F	MA.315-DCO 1.1	SPECTROPHOTOMETRY
Dissolved Organic Carbon	2019-07-30	2019-07-30	INOR-101-6049F, unaccredited by MDDELCC	MA.300-C1.0	INFRARED DETECTION
Dissolved Oxygen		2019-08-28	INOR-101-6006F, unaccredited by MDDELCC	MA. 315 - DBO 1.1	ELECTROMETRIC
Fluoride	2019-07-25	2019-07-25	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Chromium VI	2019-07-25	2019-07-25	INOR-101-6034F	MA. 200 - CrHex 1.1	SPECTROPHOTOMETRY
Ammonia Nitrogen	2019-07-31	2019-07-31	INOR-101-6051F	MA. 303 - N 2.0	COLORIMETRY
Reactive Silica	2019-08-06	2019-08-06	INOR-101-6071F, unaccredited by MDDELCC	AQ2 EPA-122A Rev 5	COLORIMETRY
Total Kjeldahl Nitrogen	2019-08-09	2019-08-12	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Total Cyanide	2019-07-30	2019-07-30	INOR-101-6061F	MA. 300 - CN 1.2	COLORIMETRY
Total Organic Carbon	2019-07-30	2019-07-30	INOR-101-6049F	MA.300-C1.0	INFRARED DETECTION
Alkalinity	2019-07-30	2019-07-30	INOR-101-6000F, unaccredited by MDDELCC	MA. 315 - Alc-Aci 1.0	TITRATION

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M496706

PROJECT: Good Wood

ATTENTION TO: Mariana Trindade

SAMPLED BY: Adam Calvert

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Chloride	2019-07-25	2019-07-25	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrate	2019-07-25	2019-07-25	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrite	2019-07-25	2019-07-25	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Sulfate	2019-07-25	2019-07-25	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Total Suspended Solids	2019-07-29	2019-07-30	INOR-101-6028F	MA. 115 - S.S. 1.2	GRAVIMETRY
Dissolved Solids	2019-07-26	2019-07-27	INOR-101-6054F	MA.115-S.D. 1.0	GRAVIMETRY
Total Sulfide	2019-07-25	2019-07-25	INOR-101-6055F	MA.300-S 1.2	SPECTROPHOTOMETRY
Total Phenols	2019-07-29	2019-07-29	INOR-101-6062F	MA. 404 - I. Phé 2.2	COLORIMETRY
Total Phosphorus	2019-08-09	2019-08-09	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
pH	2019-07-24	2019-07-24	INOR-101-6021F	MA. 100 - pH 1.1	ELECTROMETRIC
Conductivity (25 Celsius)	2019-07-29	2019-07-29	INOR-101-6016F	MA.115-Cond. 1.1	CONDUCTIVIMETER

AGAT Laboratories

9770 Route Transcanadienne
 St-Laurent, Québec, H4S 1V9
 Tel: 514.337.1000 Fax.: 514.333.3046
 agatlabs.com

Laboratory Use Only
 AGAT Work Order 149496 706
 No. of Coolers: _____
 Arrival Temperature: 11.9 | 10.9 | 14.7
 Custody Seal Intact?: Yes No N/A

Chain of Custody - Environmental Chemistry

Client Information

Company: Tata Steel Minerals Canada
 Address: 1000 Rue Sherbrooke Ouest
Montreal, QC H3A 3G4
 Phone: 514-764-6700 Fax: _____
 Project No: Goodwood
 Sample Location: Quebec
 Sampled By: Adam Calvert

Report Sent To

1. Name: Mariana Trindade
 Email: mariana.trindade@tatasteel.com.br
 2. Name: Team Email List
 Email: provided to AGAT

Guideline Criteria

PRTC ABC RESC
 CCME Other: _____
 Eau consommation
 Eau réurg. Surface
 Eau réurg. Salée
 CMM Sanitary Storm

Turn Around Time Required (Business Days)

Environmental: Regular: 5 to 7 days 10 to 15 days
 Rush: < 12 hours < 10 days
 24 hours
 48 hours
 72 hours
Ultra Trace: Regular: 10 to 15 days
 Rush: < 10 days
 Date Required: _____

Invoice To

Same Address: Yes No

Company: _____
 Contact: _____
 Email: _____
 Address: _____
 PO No: 3000000296 Quote No: _____

Comments:

Matrix (legend)

EP Drinking Water (MDDEDEC Form)
 S Soil B Sludge SE Sediment ES Surface Water AF Effluent
 SL Solid EU Wastewater EF Effluent ST Groundwater A Air

SAMPLE IDENTIFICATION	SAMPLE DATE		MATRIX	No. OF CONTAINERS
	DATE (DD/MM/YY)	TIME		
DS04-ER-GW-Q2-2019	23/07/19	5:37am	ES	14
DS04-EE-GW-Q2-2019	23/07/19	7:08am	ES	14

Report Format

Portrait (sample/page) Landscape (multi sample/page)

SAMPLES RECEIVED AFTER 4 PM WILL BE RECORDED AS RECEIVED ON NEXT BUSINESS DAY

																			SHORT HOLD TIME																																																
BTEX	MAH	VOC	THH-MAH	THM	Petroleum Hydrocarbons C10-C50	Phthalates	Chlorobenzenes	PCB: Congeners	Arochlor	Ethylene glycol	Glycols (Scan)	Formaldehyde	Mineral Oil & Grease	Total Oil & Grease	Pesticides (specify):	Phenols (GC-MS)	Phenolic Compounds (4AAP)	6 Metals (Cd, Cr, Cu, Ni, Pb, Zn)	13 Metals TC - Soil	17 Metals TC - Water	Mercury	Selenium - Soil	Total Hardness	Alkalinity	Bicarbonate	Conductivity	Chloride	Fluoride	Sulphate	Bromide	Cyanide: Total	Available	Oxidizable	COD	P total	TOC	NH ₃	TKN	NO ₂ + NO ₃	Solides: Total	Dissolved	TSS	VSS	Sulphide - Water	Total Sulphur - Soil	Dissolved Metals filtered by Laboratory:	pH	NO ₂	NO ₃	o-PO4	Absorbance	Colour	Turbidity	BOD ₅	CBOD ₅	Hexavalent Chromium	Coliforms: Total	Fecal	E.coli	Microbiology (other):	HR/MS: PCDD/PCDF	PAH	PCB	CMM 2008-47: Sanitary	Storm	RMD	REIMR art.
Appendix A																			g	5/12	"Quebec" - Lab Analy...													Requirements																																	

Samples Released by (Print and Sign) <u>Adam Calvert</u> / <u>Adam Calvert</u>	Date (DD/MM/YY) <u>23/07/19</u>	Time <u>13:00</u>	Samples Received by (Print and Sign) <u>[Signature]</u>	Date (DD/MM/YY) <u>19/07/24</u>	Time <u>14:35</u>	Page <u>1</u> of <u>1</u>
Samples Released by (Print and Sign)	Date (DD/MM/YY)	Time	Samples Received by (Print and Sign)	Date (DD/MM/YY)	Time	N°:

Quebec parameters:		
DSO4 2a (Sunny and Goodwood) environmental monitoring and G		
METALS	CONVENTIONAL	MICROBIOLOGICAL TESTS
Mercury (Hg)	BOD5	Total coliforms
Total phosphorous	COD	Fecal coliforms
Aluminium (Al)	Conductivity	
Antimony (Sb)	Dissolved organic carbon	
Silver (Ag)	Dissolved oxygen	
Arsenic (As)	Fluoride (F)	
Barium (Ba)	Hexavalent Chromium (Cr 6+)	
Boron (B)	Nitrogen ammonia (N-NH3)	
Cadmium (Cd)	pH	
Calcium (Ca)	Reactive silica (SiO2)	
Chromium (Cr)	TKN Total Kjeldahl Nitrogen	
Cobalt (Co)	Total Cyanide (CN)	
Copper (Cu)	Total Organic Carbon	
Total Hardness (CaCO3)	Alkalinity Total [as CaCO3] pH 4.5	
Tin (Sn)	Chloride (Cl)	
Iron (Fe)	Nitrites (N-NO2-)	
Magnesium (Mg)	Nitrates (N-NO3-)	
Manganese (Mn)	Sulfates (SO4)	
Molybdenum (Mo)	Total suspended solids (TSS)	
Nickel (Ni)	Total dissolved solids	
Lead (Pb)	Hydrogen Sulphide	
Potassium (K)	Phenols-4AAP	
Selenium (Se)		
Sodium (Na)		
Thallium (Tl)		
Titanium (Ti)		
Uranium (U)		
Vanadium (V)		
Zinc (Zn)		
Radium 226 (Ra)		



Métaux

Totaux

+ TKN et NH₃

Sur tous.



TPH

Interlab à envoyer à

AGAZ Dartmouth avec

Critères Atlantique PIRI



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Goodwood

AGAT WORK ORDER: 19M508397

MICROBIOLOGY ANALYSIS REVIEWED BY: Linda Maille, Superviseur Microbiology

WATER ANALYSIS REVIEWED BY: Jalel Rouissi, Chimiste

DATE REPORTED: 2019-09-25

VERSION*: 1

PAGES (INCLUDING COVER): 11

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M508397

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Package - Microbiological

DATE RECEIVED: 2019-08-22

DATE REPORTED: 2019-09-25

Parameter	Unit	SAMPLE DESCRIPTION:		DSO4-ER-GW	DSO4-EE-GW
		G / S	RDL	462306	462323
Fecal Coliforms	CFU/100ml	2	<2	29	
Total Coliforms	CFU/100ml	2	<2	<2	
Temperature upon receipt	°C	NA	8.4	8.4	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
462306-462323 Analysis performed passed the regulatory conservation time of 48 hours.

Certified By:



Linda Houllé

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Certificate of Analysis

AGAT WORK ORDER: 19M508397

PROJECT: Goodwood

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ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-08-22

DATE REPORTED: 2019-09-25

Parameter	Unit	SAMPLE DESCRIPTION:		DSO4-ER-GW	DSO4-EE-GW
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-08-21	2019-08-21
		G / S	RDL	462306	462323
Mercury	µg/L		0.1	<0.1	<0.1
Total Phosphorus			20	<20	<20
Aluminum	µg/L		10	<10	13
Antimony	µg/L		1	<1	<1
Silver	µg/L		0.2	<0.2	<0.2
Arsenic	µg/L		1	<1	<1
Barium	µg/L		5	<5	<5
Boron	µg/L		40	<40	<40
Cadmium	µg/L		0.5	<0.5	<0.5
Calcium	µg/L		100	<100	373
Chromium	µg/L		1	<1	<1
Cobalt	µg/L		0.5	<0.5	<0.5
Copper	µg/L		1	<1	<1
Total hardness	µg/L - CaCO3		1000	<1000	1830
Tin	mg/L		0.5	<0.5	<0.5
Iron	µg/L		70	<70	<70
Manganese	µg/L		1	8	44
Molybdenum	µg/L		1	<1	<1
Nickel	µg/L		1	<1	<1
Lead	µg/L		1	<1	<1
Potassium	µg/L		100	<100	108
Thallium	µg/L		1	<1	<1
Titanium	µg/L		3	<3	<3
Uranium	µg/L		0.5	<0.5	<0.5
Vanadium	µg/L		1	<1	<1
Zinc	µg/L		3	17	<3
Radium-226	Bq/L		0.005	0.009	<0.005

Certified By:



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AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19M508397

PROJECT: Goodwood

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FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-08-22

DATE REPORTED: 2019-09-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M508397

PROJECT: Goodwood

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ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Packages - Conventionals

DATE RECEIVED: 2019-08-22

DATE REPORTED: 2019-09-25

Parameter	Unit	SAMPLE DESCRIPTION:		DSO4-ER-GW	DSO4-EE-GW
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-08-21	2019-08-21
		G / S	RDL	462306	462323
BOD5	mg/L - O2		2	<2	<2
BOD5 (day 0)				8/28/2019	8/28/2019
COD	mg/L - O2		5	<5	<5
Dissolved Organic Carbon	mg/L		0.30	0.79	1.11
Dissolved Oxygen	mg/L		3	8	6
Fluoride	mg/L		0.10	<0.10	<0.10
chromium VI	mg/L		0.008	<0.008	<0.008
Ammonia Nitrogen	mg/L - N		0.02	0.60	0.98
pH	pH		NA	7.78	6.40
Reactive silica	mg/L		0.05	<0.05	<0.05
Total Kjeldahl Nitrogen	mg/L - N		0.3	8.5	7.1
Total Cyanide	mg/L - CN		0.005	<0.005	<0.005
Alkalinity	mg/L - CaCO3		1.5	<1.5	<1.5
Chloride	mg/L		0.5	<0.5	1.1
Nitrate	mg/L - N		0.02	0.02	0.03
Nitrite	mg/L - N		0.02	<0.02	<0.02
Sulfate	mg/L		0.5	<0.5	<0.5
Total Suspended Solids	mg/L		2	<2	<2
Dissolved Solids	mg/L		10	16	24
Total Sulfide	mg/L S-2		0.02	<0.02	<0.02
Total Phenols (colorimetry)	mg/L		0.002	0.003	0.003
Total Phosphorus	mg/L - P		0.02	<0.02	<0.02
Total Organic Carbon	mg/L		0.30	0.93	1.39

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



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Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: Goodwood
SAMPLED BY:

AGAT WORK ORDER: 19M508397
ATTENTION TO: Mariana Trindade
SAMPLING SITE:

Water Analysis															
RPT Date: 2019-09-25			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Tata Steel - QC Package - Metals															
Mercury	464740		<0.1	<0.1	NA	< 0.1	105%	80%	120%	110%	80%	120%	109%	80%	120%
Total Phosphorus	461065		< 20	< 20	NA	< 20	96%	80%	120%	99%	80%	120%	92%	80%	120%
Aluminum	462306	462306	<10	14	NA	< 10	100%	80%	120%	107%	80%	120%	109%	80%	120%
Antimony	462306	462306	<1	<1	NA	< 1	109%	80%	120%	94%	80%	120%	119%	80%	120%
Silver	462306	462306	<0.2	<0.2	NA	< 0.2	NA	80%	120%	98%	80%	120%	83%	80%	120%
Arsenic	462306	462306	<1	<1	NA	< 1	101%	80%	120%	94%	80%	120%	109%	80%	120%
Barium	462306	462306	<5	<5	NA	< 5	90%	80%	120%	91%	80%	120%	NA	80%	120%
Boron	462306	462306	<40	<40	NA	< 40	99%	80%	120%	101%	80%	120%	112%	80%	120%
Cadmium	462306	462306	<0.5	<0.5	NA	< 0.5	98%	80%	120%	94%	80%	120%	NA	80%	120%
Calcium	462306	462306	<100	130	NA	< 100	100%	80%	120%	96%	80%	120%	NA	80%	120%
Chromium	462306	462306	<1	<1	NA	< 1	100%	80%	120%	95%	80%	120%	113%	80%	120%
Cobalt	462306	462306	<0.5	<0.5	NA	< 0.5	96%	80%	120%	97%	80%	120%	106%	80%	120%
Copper	462306	462306	<1	<1	NA	< 1	103%	80%	120%	118%	80%	120%	118%	80%	120%
Tin	462306	462306	<0.5	<0.5	NA	< 0.5	NA	80%	120%	101%	80%	120%	108%	80%	120%
Iron	462306	462306	<70	<70	NA	< 70	106%	80%	120%	106%	80%	120%	NA	80%	120%
Manganese	462306	462306	8	8	0.0%	< 1	98%	80%	120%	100%	80%	120%	113%	80%	120%
Molybdenum	462306	462306	<1	<1	NA	< 1	99%	80%	120%	98%	80%	120%	110%	80%	120%
Nickel	462306	462306	<1	<1	NA	< 1	102%	80%	120%	112%	80%	120%	109%	80%	120%
Lead	462306	462306	<1	<1	NA	< 1	105%	80%	120%	101%	80%	120%	NA	80%	120%
Potassium	462306	462306	<100	<100	NA	< 100	97%	80%	120%	100%	80%	120%	115%	80%	120%
Thallium	462306	462306	<1	<1	NA	< 1	100%	80%	120%	98%	80%	120%	116%	80%	120%
Titanium	462306	462306	<3	<3	NA	< 3	NA	80%	120%	101%	80%	120%	115%	80%	120%
Uranium	462306	462306	<0.5	<0.5	NA	< 0.5	103%	80%	120%	101%	80%	120%	120%	80%	120%
Vanadium	462306	462306	<1	<1	NA	< 1	98%	80%	120%	96%	80%	120%	119%	80%	120%
Zinc	462306	462306	17	<3	NA	< 3	103%	80%	120%	97%	80%	120%	NA	80%	120%
Tata Steel - QC Packages - Conventional															
BOD5	467223		11400	11200	1.8%	< 2	102%	80%	120%	95%	80%	120%	NA	80%	120%
COD	462306	462306	< 5	< 5	NA	< 5	93%	80%	120%	92%	80%	120%	NA	80%	120%
Dissolved Organic Carbon	1		NA	NA	0.0%	< 0.30	94%	80%	120%	96%	80%	120%	NA	80%	120%
Fluoride	460716		<0.10	<0.10	NA	< 0.10	88%	80%	120%	97%	80%	120%	104%	80%	120%
chromium VI	459070		0.067	0.069	2.9%	< 0.008	103%	80%	120%	98%	80%	120%	NA	80%	120%
Ammonia Nitrogen	459233		0.85	0.79	7.3%	< 0.02	117%	80%	120%	110%	80%	120%	NA	80%	120%
pH	461408		5.96	5.99	0.5%		101%	80%	120%	101%	80%	120%	NA		
Reactive silica	462306	462306	< 0.05	< 0.05	NA	< 0.05	88%	80%	120%	100%	70%	130%	92%	70%	130%
Total Kjeldahl Nitrogen	413457		57.3	58.1	1.4%	< 0.3	84%	80%	120%	93%	80%	120%	NA	80%	120%
Total Cyanide	462306	462306	<0.005	<0.005	NA	< 0.005	92%	80%	120%	91%	80%	120%	106%	80%	120%
Alkalinity	460844		17.1	17.9	4.6%	< 1.5	95%	80%	120%	106%	80%	120%	97%	80%	120%
Chloride	460716		3.4	3.4	0.0%	< 0.5	101%	80%	120%	94%	80%	120%	101%	80%	120%
Nitrate	460716		0.07	0.06	NA	< 0.02	98%	80%	120%	106%	80%	120%	106%	80%	120%
Nitrite	460716		<0.02	<0.02	NA	< 0.02	NA	80%	120%	94%	80%	120%	95%	80%	120%
Sulfate	460716		7.2	7.2	0.0%	< 0.5	98%	80%	120%	100%	80%	120%	101%	80%	120%
Total Suspended Solids	465690		6	8	NA	< 2	100%	80%	120%	NA			104%	80%	120%



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: Goodwood
SAMPLED BY:

AGAT WORK ORDER: 19M508397
ATTENTION TO: Mariana Trindade
SAMPLING SITE:

Water Analysis (Continued)

RPT Date: 2019-09-25			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Solids	462308		3240	3240	0.0%	< 10	105%	80%	120%	NA			NA	80%	120%
Total Sulfide	460844		< 0.02	< 0.02	NA	< 0.02	95%	80%	120%	98%	80%	120%	87%	80%	120%
Total Phenols (colorimetry)	462306	462306	0.003	0.003	NA	0.002	98%	80%	120%	80%	80%	120%	95%	80%	120%
Total Phosphorus	461065		< 0.02	< 0.02	NA	< 0.02	96%	80%	120%	91%	80%	120%	92%	80%	120%
Total Organic Carbon	445415		3.93	3.90	0.8%	< 0.30	94%	80%	120%	96%	80%	120%	105%	80%	120%

Certified By: _____



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Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M508397

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis					
Fecal Coliforms	2019-08-23	2019-08-23	MIC-102-7013	MA.700-Fec.Ec 1.0	N/A
Total Coliforms	2019-08-23	2019-08-23	MIC-102-7017	MA.700-Col 1.0	N/A
Temperature upon receipt	2019-08-23	2019-08-23	N/A		N/A

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M508397

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Mercury	2019-08-26	2019-08-26	MET-101-6102F	MA. 200 Hg 1.1	COLD VAPOR/AA
Total Phosphorus	2019-09-07	2019-09-07			
Aluminum	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Barium	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-08-26	2019-08-29	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Calcium	2019-08-26	2019-08-29	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Chromium	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Cobalt	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Copper	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Total hardness	2019-08-26	2019-08-29	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Tin	2019-08-26	2019-08-29	MET-101-6107F	MA. 200 - Mét 1.2	ICP/OES
Iron	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Manganese	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Molybdenum	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Lead	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Potassium	2019-08-26	2019-08-29	MET-101-6105F, non accrédité par le MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Thallium	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Titanium	2019-08-26	2019-08-29	MET-101-6105F, non accrédité par le MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Uranium	2019-08-26	2019-08-29	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Vanadium	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Zinc	2019-08-26	2019-08-29	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Radium-226			Subcontracted	Subcontracted	N/A
BOD5	2019-08-28	2019-09-02	INOR-101-6006F	MA. 315 - DBO 1.1	ELECTROMETRY
BOD5 (day 0)					ELECTROMETRY
COD	2019-08-27	2019-08-27	INOR-101-6042F	MA.315-DCO 1.1	SPECTROPHOTOMETRY
Dissolved Organic Carbon	2019-08-23	2019-08-23	INOR-101-6049F, unaccredited by MDDELCC	MA.300-C1.0	INFRARED DETECTION
Dissolved Oxygen		2019-08-23	Special	SM 4500-O G . 21 ième ed.	DO METER
Fluoride	2019-08-23	2019-08-23	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
chromium VI	2019-08-22	2019-08-22	INOR-101-6034F	MA. 200 - CrHex 1.1	SPECTROPHOTOMETRY
Ammonia Nitrogen	2019-09-06	2019-09-06	INOR-101-6051F	MA. 303 - N 2.0	COLORIMETRY
pH	2019-08-22	2019-08-22	INOR-101-6021F	MA. 100 - pH 1.1	ELECTROMETRY
Reactive silica	2019-08-28	2019-08-28	INOR-101-6071F, non accrédité MDDELCC	AQ2 EPA-122A Rev 5	COLORIMÉTRIE
Total Kjeldahl Nitrogen	2019-08-29	2019-08-29	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Total Cyanide	2019-08-26	2019-08-26	INOR-101-6061F	MA. 300 - CN 1.2	SPECTROPHOTOMETER
Alkalinity	2019-08-22	2019-08-22	INOR-101-6000F, unaccredited by MDDELCC	MA. 315 - Alc-Aci 1.0	TITRATION
Chloride	2019-08-23	2019-08-23	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrate	2019-08-23	2019-08-23	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrite	2019-08-23	2019-08-23	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M508397

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Sulfate	2019-08-23	2019-08-23	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Total Suspended Solids	2019-08-27	2019-08-28	INOR-101-6028F	MA. 115 - S.S. 1.2	GRAVIMETRY
Dissolved Solids	2019-08-26	2019-08-27	INOR-101-6054F	MA.115-S.D. 1.0	GRAVIMETRY
Total Sulfide	2019-08-23	2019-08-23	INOR-101-6055F	MA.300-S 1.2	SPECTROPHOTOMETRY
Total Phenols (colorimetry)	2019-08-24	2019-08-24	INOR-101-6062F	MA. 404 - I. Phé 2.2	COLORIMETRY
Total Phosphorus	2019-09-07	2019-09-07	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Total Organic Carbon	2019-08-23	2019-08-23	INOR-101-6049F	MA.300-C1.0	INFRARED DETECTION



9770 Route Transcanadienne
 St-Laurent, Québec
 H4S 1V9
 http://webearth.agatlabs.com

Tel.: 514.337.1000
 Fax.: 514.333.3046
 agatlabs.com

Laboratory use Only
 Arrival Condition: Good Poor (complete 'notes')
 Arrival Temperature: 24.13.5 186 AGAT Job Number: _____
 Notes: _____

Report To:
 Company: Tata Steel Minerals Canada
 Contact: Mariana Trindade
 Address: 1000 Sherbrooke West, Suite 1120
 Montreal, QC H3A 3G4

Project #: Goodwood
Quote #: RFQ 20190118

Invoice to: Same (Y/N) - Circle
 Company: Tata Steel Minerals Canada
 Contact: Jay Adhvaryu
 Email: jay.adhvaryu@tatasteelcanada.com
 Phone: 514 333 3046 Fax: _____
 PO #: 3000000242

Report Information
 1. Name: Mariana Trindade
 Email: mariana.trindade@tatasteelcanada.com
 2. Name: Jean-Francois Dion
 Email: jeanfrancois.dion@tatasteelcanada.com

Regulatory Requirements (Check):
 List Guidelines on Report Do Not List Guidelines on Report
 PIRI Site Info (check all that apply):
 Tier 1 Res. Pot. Coarse
 Tier 2 Com N/Pot. Fine
 Gas Fuel Lube
 CCME CDWQ
 Ind Com Res/P Ag FWAL Sediment
 Other: NL MMER

Report Format
 Single PDF sample per page
 Multiple PDF samples per page
 Excel Format Included

Turnaround Time (TAT) Business Days
Regular TAT: 5 - 7 days
Rush TAT: 1 day 2 days
 3 - 4 days

SAMPLE IDENTIFICATION	DATE / TIME SAMPLED	SAMPLE MATRIX	# OF CONTAINERS	COMMENTS - Site/Sample Info, Sample Containment	Fecal & Total Coliforms	Metals + Cations, Total	Mercury, Total	Hardness	Total Phosphorous & TKN	Conductivity & Alkalinity	Dissolved Organic Carbon	Dissolved Oxygen	Anions (F ⁻ , NO ₂ ⁻ , NO ₃ ⁻ , Cl ⁻ , SO ₄ ²⁻)	Ammonia as N & Reactive Silica	Chemical Oxygen Demand	BOD5 & pH	Phenols -4AAP - Mississauga	TOC	Sulphide as S ²⁻	Hexavalent Chromium	Cyanide, Total	Total Dissolved Solids & Total Suspended Solids	Radium-226	Petroleum Hydrocarb (C10-C50)
DSO4-ER-GW	21-Aug-2019 9:45 AM	water	14		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
DSO4-EE-GW	21-Aug-2019 11:00 AM	water	14		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Sample Relinquished By (print name & sign) Pallav Sinha Date/Time 13:00 PM Samples Received By (print name and sign) [Signature] Date/Time [Signature] Special Instructions [Signature]

Sample Relinquished By (print name & sign) _____ Date/Time _____ Samples Received By (print name and sign) _____ Date/Time _____

Page _____ of _____ **Tata Steel - Quebec Conventionals**



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: QC Quarterly, Surface water

AGAT WORK ORDER: 19M521330

WATER ANALYSIS REVIEWED BY: Marie-Flora Coustou, Report Writer

DATE REPORTED: 2019-10-22

VERSION*: 1

PAGES (INCLUDING COVER): 8

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M521330

PROJECT: QC Quarterly, Surface water

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: ADAM CALVERT

ATTENTION TO: Mariana Trindade

SAMPLING SITE: GOODWOOD

TP Low (Water)

DATE RECEIVED: 2019-09-23

DATE REPORTED: 2019-10-22

Parameter	Unit	DSO4-ER-GW-		DSO4-EE-GW-	
		G / S	RDL	G / S	RDL
SAMPLE DESCRIPTION:		ULL-2019		ULL-2019	
SAMPLE TYPE:		SW		SW	
DATE SAMPLED:		2019-09-20		2019-09-20	
Total Phosphorus	mg/L	0.006	<0.006	<0.006	<0.006

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19M521330

PROJECT: QC Quarterly, Surface water

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<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: ADAM CALVERT

ATTENTION TO: Mariana Trindade

SAMPLING SITE: GOODWOOD

Total Metals Low Level

DATE RECEIVED: 2019-09-23

DATE REPORTED: 2019-10-22

Parameter	Unit	DSO4-ER-GW-		DSO4-EE-GW-	
		G / S	RDL	554008	554096
Mercury	µg/L	0.003	<0.003	<0.003	<0.003
Thallium	µg/L	0.002	<0.002	<0.002	<0.002
Tin	µg/L	0.01	0.03	0.05	0.05
Titanium	µg/L	0.1	<0.1	1.3	1.3
Uranium	µg/L	0.005	<0.005	0.007	0.007

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
554008 Analysis performed at AGAT Burnaby.

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19M521330

PROJECT: QC Quarterly, Surface water

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CANADA H4S 1V9
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<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: ADAM CALVERT

ATTENTION TO: Mariana Trindade

SAMPLING SITE: GOODWOOD

Ultra-Low Total Extractable Metals

DATE RECEIVED: 2019-09-23

DATE REPORTED: 2019-10-22

Parameter	Unit	SAMPLE DESCRIPTION:		DSO4-ER-GW-	DSO4-EE-GW-
		G / S		ULL-2019	ULL-2019
		RDL		SW	SW
		DATE SAMPLED:		2019-09-20	2019-09-20
Aluminum	µg/L		0.5	8.8	16.1
Antimony	µg/L		0.005	<0.005	<0.005
Silver	µg/L		0.003	<0.003	0.004
Arsenic	µg/L		0.08	<0.08	<0.08
Barium	µg/L		0.03	0.35	3.31
Boron	µg/L		0.3	0.9	2.2
Cadmium	µg/L		0.006	0.007	0.023
Calcium	µg/L		20	90	271
Chromium	µg/L		0.04	0.24	0.27
Cobalt	µg/L		0.005	0.015	0.038
Copper	µg/L		0.05	0.27	0.46
Iron	µg/L		0.5	17.5	106
Magnesium	µg/L		10	52	194
Manganese	µg/L		0.03	7.07	26.0
Molybdenum	µg/L		0.01	0.05	0.29
Nickel	µg/L		0.03	0.25	0.27
Lead	µg/L		0.01	0.06	0.06
Potassium	µg/L		10	66	133
Selenium	µg/L		0.05	0.12	0.08
Sodium	µg/L		0.05	92.8	248
Vanadium	µg/L		2	<2	<2
Zinc	µg/L		0.5	2.8	2.3
Total Hardness	µg/L - CaCO3		1000	<1000	1480

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

554008-554096 A higher RDL indicates that a dilution was needed to reduce the concentration of certain analytes or to reduce matrix interferences.

Certified By:



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Quality Assurance

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: QC Quarterly, Surface water
 SAMPLED BY: ADAM CALVERT

 AGAT WORK ORDER: 19M521330
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: GOODWOOD

Water Analysis

RPT Date: 2019-10-22			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Ultra-Low Total Extractable Metals															
Aluminum	556400		6.6	5.8	13.1%	< 0.5	86%	80%	120%	101%	80%	120%	96%	80%	120%
Antimony	556400		0.168	0.031	NA	< 0.005	118%	80%	120%	101%	80%	120%	115%	80%	120%
Silver	556400		0.006	0.005	NA	< 0.003	NA	80%	120%	96%	80%	120%	96%	80%	120%
Arsenic	556400		0.13	<0.08	NA	< 0.08	92%	80%	120%	93%	80%	120%	109%	80%	120%
Barium	556400		19.6	19.7	0.9%	< 0.03	87%	80%	120%	84%	80%	120%	NA	80%	120%
Boron	556400		119	124	4.4%	< 0.3	95%	80%	120%	104%	80%	120%	NA	80%	120%
Cadmium	556400		0.022	0.017	NA	< 0.006	95%	80%	120%	96%	80%	120%	96%	80%	120%
Calcium	556400		28800	29400	1.9%	< 20	83%	80%	120%	99%	80%	120%	NA	80%	120%
Chromium	556400		0.54	0.46	16.2%	< 0.04	92%	80%	120%	92%	80%	120%	102%	80%	120%
Cobalt	556400		0.074	0.053	NA	< 0.005	93%	80%	120%	93%	80%	120%	96%	80%	120%
Copper	556400		75.9	75.9	0.1%	< 0.05	102%	80%	120%	98%	80%	120%	NA	80%	120%
Iron	556400		318	319	0.1%	< 0.5	93%	80%	120%	92%	80%	120%	NA	80%	120%
Magnesium	556400		9020	9170	1.6%	< 10	94%	80%	120%	107%	80%	120%	NA	80%	120%
Manganese	556400		12.8	13.0	1.5%	< 0.03	87%	80%	120%	89%	80%	120%	NA	80%	120%
Molybdenum	556400		1.87	1.62	14.5%	< 0.01	91%	80%	120%	96%	80%	120%	97%	80%	120%
Nickel	556400		0.93	0.93	0.5%	< 0.03	95%	80%	120%	95%	80%	120%	95%	80%	120%
Lead	556400		0.77	0.70	9.4%	< 0.01	86%	80%	120%	109%	80%	120%	84%	80%	120%
Potassium	556400		5360	5060	5.7%	< 10	96%	80%	120%	105%	80%	120%	NA	80%	120%
Selenium	556400		0.20	0.63	NA	< 0.05	91%	80%	120%	89%	80%	120%	107%	80%	120%
Sodium	556400		154000	156000	1.4%	< 0.05	98%	80%	120%	105%	80%	120%	NA	80%	120%
Vanadium	556400		<0.02	<0.02	NA	< 0.02	97%	80%	120%	96%	80%	120%	94%	80%	120%
Zinc	556400		8.7	8.9	2.5%	< 0.5	95%	80%	120%	102%	80%	120%	100%	80%	120%

Comments: NA : Not applicable

NA for duplicate RPD indicates that RPD could not be calculated or that both results were less than 5x the RDL. NA for percent recovery in the Sample Spike section indicates that the results were not reported due to sample heterogeneity or the sample concentration was too high compared to the added standards. NA in the spiked blank or the CRM indicates that it was not a required part of the procedure. The percent recovery of the CRM is permitted to be outside of control limits of 80 to 120% if the RPD of the CRM is acceptable.

NA dans le pourcentage de récupération de l'échantillon fortifié indique que le résultat n'est pas fourni en raison de l'hétérogénéité de l'échantillon ou de la concentration trop élevée par rapport à l'ajout.

NA dans le blanc fortifié ou le MRC indique qu'il n'est pas requis par la procédure.

Le pourcentage de récupération du MRC peut être en dehors du critère d'acceptabilité de 80-120%, s'il est conforme à l'écart du certificat du matériau de référence.

TP Low (Water)

Total Phosphorus	554008	554008	<0.006	<0.006	NA	< 0.006	99%	90%	110%	96%	90%	110%	94%	80%	120%
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Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Total Metals Low Level

Mercury	560940		<0.03	0.03	NA	< 0.003	92%	85%	115%	91%	90%	110%			
Thallium	560522		< 0.002	< 0.002	NA	< 0.002	108%	85%	115%	99%	90%	110%			
Tin	560522		< 0.01	< 0.01	NA	< 0.01				95%	90%	110%			
Titanium	560522		1.7	1.5	12.5%	< 0.1				99%	90%	110%			



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: QC Quarterly, Surface water
 SAMPLED BY: ADAM CALVERT

AGAT WORK ORDER: 19M521330
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: GOODWOOD

Water Analysis (Continued)

RPT Date: 2019-10-22			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Uranium	560522		1.01	1.03	2.0%	< 0.005	112%	85%	115%	99%	90%	110%			

Certified By: _____



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Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: QC Quarterly, Surface water
 SAMPLED BY: ADAM CALVERT

AGAT WORK ORDER: 19M521330
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: GOODWOOD

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Total Phosphorus	2019-09-26	2019-09-26	INOR-93-1022	SM 4500-P B & E	SPECTROPHOTOMETER
Mercury	2019-09-26	2019-09-26	MET-181-6103	Modified from EPA 245.7	CV/AA
Thallium	2019-09-25	2019-09-26	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Tin	2019-09-25	2019-09-26	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Titanium	2019-09-25	2019-09-26	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Uranium	2019-09-25	2019-09-26	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Aluminum	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Barium	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-09-27	2019-09-27	MET-101-6105F, not accredited byDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Calcium	2019-09-27	2019-09-27	MET-101-6105F, not accredited byDDELCC	MA. 200 - Mét 1.2	ICP/MS
Chromium	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Cobalt	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Copper	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Iron	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Magnesium	2019-09-27	2019-09-27	MET-101-6105F, not accredited byDDELCC	MA. 200 - Mét 1.2	ICP/MS
Manganese	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Molybdenum	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Lead	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Potassium	2019-09-27	2019-09-27	MET-101-6105F, not accredited byDDELCC	MA. 200 - Mét 1.2	ICP/MS
Selenium	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Sodium	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Vanadium	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Zinc	2019-09-27	2019-09-27	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS



À l'usage exclusif du laboratoire

Bon de travail AGAT: _____
Nb. de glaciers: 2,3
Température à l'arrivée: _____

Glace Bloc réfrigérant Aucun
Scélé légal intact: Oui Non N/A

Chaîne de traçabilité Environnement

Eau potable RQEP (réseau) – Veuillez utiliser le formulaire du MDDELCC

Information pour le rapport

Compagnie: Tata Steel Minerals Canada
Adresse: 1000 rue Sherbrooke Ouest
Montréal, QC H3A 3G4
Téléphone: 514-764-6700 ext 705 Téléc.: _____
Projet: QC Quarterly Surface Water
Lieu de prélèvement: Goodwood
Prélevé par: Adam Calvert

Rapport envoyé à

1. Nom: Mariana Trindade
Courriel: mariana.trindade@tatasteelcanada.com
2. Nom: Joan Email List
Courriel: JOMCenvironment@tatasteelcanada.com

Critères à respecter

PRTC ABC RESC
 CCME
 Eau consommation
 Eau résurg. Surface
 Eau résurg. Salée
CMM Sanitaire Pluvial
 Autre.

Format de rapport

Portrait (échantillon/page) Paysage (échantillons/page)

Délais d'analyse requis (Jours ouvrables)

Environnemental: Régulier: 5 à 7 jours Urgent: Même jour
 1 jour
 2 jours
 3 jours

Haute Résolution: Régulier: 10 à 15 jours Urgent: < 10 jours
Date Require: _____

Facturé à Mêmes adresse: Oui Non

Compagnie: _____
Contact: _____
Courriel: _____
Adresse: _____

Bon de commande: 3000000296 Soumission: _____

Commentaires:

Matrice (légende)

EP	Eau potable	EB	Eau brute	EPI	Eau de piscine
S	Sol	B	Boue	SE	Sédiment
ES	Eau de surface	AF	Affluent		
SL	Solide	EU	Eau usée	EF	Effluent
ST	Eau souterraine	A	Air		

IDENTIFICATION DE L'ÉCHANTILLON	PRÉLÈVEMENT		MATRICE	NB. DE CONTENANTS
	DATE (AA/MM/JJ)	HEURE		
<u>D504-ER-GW-ULL-2019</u>	<u>19/09/20</u>	<u>10:00am</u>	<u>ES</u>	<u>3</u>
<u>D504-EE-GW-ULL-2019</u>	<u>19/09/20</u>	<u>11:00am</u>	<u>ES</u>	<u>3</u>

Hydrocarbures pétroliers C10-C50	HAP	BTEX	HAM	HAC-HAM	THM	Chlorobenzènes	Phthalates	COSV	BPC: Congénères	Aroclor	CBNC	Éthylène glycol	Formaldéhyde	Huiles et graisses: Minérales	Totales	Pesticides: OC	OP	Herbicides	Diquat / Paraquat	Glyphosate	Phénols (GC-MS)	Indice phénolique (4AAP)	Métaux - Sol	Hg	Se	CrVI	Métaux - ST	Hg	CrVI	CrIII	U	Métaux: Filtré sur terrain	Filtré au lab	Métaux (spécifier):	Dureté totale	Alcalinité	Bromates	Conductivité	Chlorures	Fluorures	Sulfates	Bromures	Cyanures: Totaux	Disponibles	Oxydables	DCO	COT	NH ₃ + NH ₄	NTK	NO ₂ + NO ₃	NO ₃	P total	Solides: Totaux	Dissous	MES	MESV	Sulfures - Eau	Soufre total - Sol	pH	NO ₂	NO ₃	o-PO4	COD	Absorbance UV	Couleur	Turbidité	DBO ₅	DBO ₃	Carbonée	Coliformes: Totaux	Fécaux	E. coli	Microbiologie (autre):	HR/MS: Dioxines/Furanes	HAP	BPC	CMM 2008-47: Sanitaire	Pluvial	NP	NPE	RMD	REIMR art.	<u>XXX Ultra Low Level</u>
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Echantillon remis par (nom en lettres moulées et signature) <u>Adam Calvert / Adam Calvert</u>	Date (AA/MM/JJ) <u>19/09/20</u>	Heure <u>13:00</u>	Echantillon reçu par (nom en lettres moulées et signature) <u>[Signature]</u>	Date (AA/MM/JJ) <u>12/30</u>	Heure <u>12:30</u>	Page <u>1</u> de <u>1</u>
Echantillon remis par (nom en lettres moulées et signature)	Date (AA/MM/JJ)	Heure	Echantillon reçu par (nom en lettres moulées et signature)	Date (AA/MM/JJ)	Heure	N ^o : <u>230911</u> 207892



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: QC Quarterly surface water

AGAT WORK ORDER: 19M521230

MICROBIOLOGY ANALYSIS REVIEWED BY: Katia Etienne, Microbiologiste

TRACE ORGANICS REVIEWED BY: Manal Seif, Report Writer

WATER ANALYSIS REVIEWED BY: Philippe Morneau, chimiste

DATE REPORTED: 2019-11-25

VERSION*: 1

PAGES (INCLUDING COVER): 13

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M521230
PROJECT: QC Quarterly surface water

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
SAMPLED BY: ADAM CALVERT

ATTENTION TO: Mariana Trindade
SAMPLING SITE: GOODWOOD

Tata Steel - QC Package - Microbiological

DATE RECEIVED: 2019-09-23

DATE REPORTED: 2019-11-25

Parameter	Unit	DSO4-ER-GW		DSO4-EE-GW	
		G / S	RDL	G / S	RDL
SAMPLE DESCRIPTION:		-Q4-2019		-Q4-2019	
SAMPLE TYPE:		SW		SW	
DATE SAMPLED:		2019-09-20		2019-09-20	
Total Coliforms	CFU/100ml	2	1000	700	
Fecal Coliforms	CFU/100ml	2	<2	15	
Temperature upon receipt	°C	NA	8.6	8.6	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
553575-553660 Analysis performed passed the regulatory conservation time of 48 hours.

Certified By: _____



Mariana Trindade

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Certificate of Analysis

AGAT WORK ORDER: 19M521230
PROJECT: QC Quarterly surface water

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<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
SAMPLED BY: ADAM CALVERT

ATTENTION TO: Mariana Trindade
SAMPLING SITE: GOODWOOD

Petroleum Hydrocarbons in Groundwater

DATE RECEIVED: 2019-09-23

DATE REPORTED: 2019-11-25

Parameter	Unit	DSO4-ER-GW		DSO4-EE-GW	
		G / S	RDL	G / S	RDL
SAMPLE DESCRIPTION:		-Q4-2019		-Q4-2019	
SAMPLE TYPE:		SW		SW	
DATE SAMPLED:		2019-09-20		2019-09-20	
Petroleum Hydrocarbons C10-C50	µg/L	100	136	<100	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

553575-553660 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By: _____



Handwritten signature

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Certificate of Analysis

AGAT WORK ORDER: 19M521230
PROJECT: QC Quarterly surface water

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CLIENT NAME: TATA STEEL MINERALS CANADA LTD
SAMPLED BY: ADAM CALVERT

ATTENTION TO: Mariana Trindade
SAMPLING SITE: GOODWOOD

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-09-23

DATE REPORTED: 2019-11-25

Parameter	Unit	DSO4-ER-GW		DSO4-EE-GW		
		SAMPLE DESCRIPTION: -Q4-2019		-Q4-2019		
		SAMPLE TYPE: SW		SW		
		DATE SAMPLED: 2019-09-20		2019-09-20		
		G / S	RDL	RDL	553660	
Mercury	µg/L		0.1	<0.1	0.1	<0.1
Total Phosphorus	µg/L - P		20	<20	20	147
Aluminum	µg/L		10	<10	10	37
Antimony	µg/L		1	<1	1	<1
Silver	µg/L		0.2	<0.2	0.2	<0.2
Arsenic	µg/L		1	<1	1	<1
Barium	µg/L		5	<5	5	<5
Boron	µg/L		40	<40	40	<40
Cadmium	µg/L		0.5	<0.5	0.5	<0.5
Calcium	µg/L		100	<100	100	177
Chromium	µg/L		1	<1	1	<1
Cobalt	µg/L		0.5	<0.5	0.5	<0.5
Copper	µg/L		1	<1	1	<1
Total Hardness	µg/L - CaCO3		1000	<1000	1000	1460
Tin	µg/L		5	<5	5	<5
Iron	µg/L		70	<70	70	181
Magnesium	µg/L		100	<100	100	246
Manganese	µg/L		1	9	1	37
Molybdenum	µg/L		1	<1	1	<1
Nickel	µg/L		1	<1	1	<1
Lead	µg/L		1	<1	1	<1
Potassium	µg/L		100	<100	100	138
Selenium	µg/L		1	<1	1	<1
Sodium	µg/L		200	<200	200	283
Thallium	µg/L		1	<1	1	<1
Titanium	µg/L		3	<3	3	<3
Uranium	µg/L		1.0	<1.0	0.5	<0.5

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M521230
PROJECT: QC Quarterly surface water

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CLIENT NAME: TATA STEEL MINERALS CANADA LTD
SAMPLED BY: ADAM CALVERT

ATTENTION TO: Mariana Trindade
SAMPLING SITE: GOODWOOD

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-09-23

DATE REPORTED: 2019-11-25

Parameter	Unit	DSO4-ER-GW		DSO4-EE-GW	
		G / S	RDL	G / S	RDL
SAMPLE DESCRIPTION:		-Q4-2019		-Q4-2019	
SAMPLE TYPE:		SW		SW	
DATE SAMPLED:		2019-09-20		2019-09-20	
Vanadium	µg/L	1	<1	1	<1
Zinc	µg/L	3	<3	3	<3
Radium-226	Bq/L	0.005	<0.005	0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M521230
PROJECT: QC Quarterly surface water

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CLIENT NAME: TATA STEEL MINERALS CANADA LTD
SAMPLED BY: ADAM CALVERT

ATTENTION TO: Mariana Trindade
SAMPLING SITE: GOODWOOD

Tata Steel - QC Packages - Conventionals

DATE RECEIVED: 2019-09-23

DATE REPORTED: 2019-11-25

Parameter	Unit	DSO4-ER-GW		DSO4-EE-GW	
		G / S	RDL	553575	553660
SAMPLE DESCRIPTION: -Q4-2019 -Q4-2019					
SAMPLE TYPE: SW SW					
DATE SAMPLED: 2019-09-20 2019-09-20					
BOD5	mg/L - O2		2	3	3
BOD5 (day 0)			10/3/2019	10/3/2019	
COD	mg/L - O2		5	5	<5
Conductivity (Salinity - mS/cm)	mS/cm		2	<2	<2
Dissolved Organic Carbon	mg/L		0.30	0.67	1.00
Dissolved Oxygen	mg/L		3	10	10
Fluoride	mg/L		0.10	<0.10	<0.10
Chromium VI	mg/L		0.008	<0.008	<0.008
Ammonia Nitrogen	mg/L - N		0.02	0.13	0.19
pH	pH		NA	6.55	5.89
Reactive Silica	mg/L		0.05	<0.05	0.9920
Total Kjeldahl Nitrogen	mg/L - N		0.3	<0.3	<0.3
Total Cyanide	mg/L - CN		0.005	<0.005	<0.005
Total Organic Carbon	mg/L		0.30	1.00	1.63
Alkalinity	mg/L - CaCO3		1.5	<1.5	<1.5
Chloride	mg/L		0.5	<0.5	1.2
Nitrate	mg/L - N		0.02	<0.02	<0.02
Nitrite	mg/L - N		0.02	<0.02	<0.02
Sulfate	mg/L		0.5	0.5	1.5
Total Suspended Solids	mg/L		2	<2	3
Total Dissolved Solids	mg/L		10	<10	<10
Total Sulfide	mg/L S-2		0.02	<0.02	<0.02
Total Phenols (colorimetry)	mg/L		0.002	0.006	0.006
Total Phosphorus	mg/L - P		0.02	<0.02	0.15
Report Reviewer Montreal Chem.			x	x	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
553575 Holding time not met for pH.

Certified By: _____



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Quality Assurance

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: QC Quarterly surface water
 SAMPLED BY: ADAM CALVERT

 AGAT WORK ORDER: 19M521230
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: GOODWOOD

Water Analysis															
RPT Date: 2019-11-25			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Tata Steel - QC Package - Metals

Mercury	1		NA	NA	NA	< 0.1	99%	80%	120%	107%	80%	120%	NA	80%	120%
Aluminum	553565		163	148	9.7%	< 10	111%	80%	120%	104%	80%	120%	NA	80%	120%
Antimony	553565		<1	<1	NA	< 1	112%	80%	120%	98%	80%	120%	109%	80%	120%
Silver	553565		<0.2	<0.2	NA	< 0.2	NA	80%	120%	99%	80%	120%	99%	80%	120%
Arsenic	553565		<1	<1	NA	< 1	95%	80%	120%	103%	80%	120%	104%	80%	120%
Barium	553565		55	53	4.1%	< 5	97%	80%	120%	99%	80%	120%	NA	80%	120%
Boron	553565		<40	<40	NA	< 40	108%	80%	120%	100%	80%	120%	114%	80%	120%
Cadmium	553565		<0.5	<0.5	NA	< 0.5	101%	80%	120%	102%	80%	120%	120%	80%	120%
Calcium	553565		14200	14000	1.5%	< 100	92%	80%	120%	91%	80%	120%	NA	80%	120%
Chromium	553565		1	1	NA	< 1	97%	80%	120%	102%	80%	120%	93%	80%	120%
Cobalt	553565		1.1	1.1	NA	< 0.5	99%	80%	120%	102%	80%	120%	89%	80%	120%
Copper	553565		3	3	NA	< 1	102%	80%	120%	101%	80%	120%	96%	80%	120%
Tin	553565		<5	<5	NA	< 5	NA	80%	120%	109%	80%	120%	100%	80%	120%
Iron	553565		181	163	NA	< 70	105%	80%	120%	118%	80%	120%	NA	80%	120%
Magnesium	553565		6130	6300	2.8%	< 100	106%	80%	120%	113%	80%	120%	NA	80%	120%
Manganese	553565		85	83	2.2%	< 1	106%	80%	120%	108%	80%	120%	NA	80%	120%
Molybdenum	553565		<1	<1	NA	< 1	95%	80%	120%	101%	80%	120%	96%	80%	120%
Nickel	553565		3	3	NA	< 1	101%	80%	120%	96%	80%	120%	97%	80%	120%
Lead	553565		<1	<1	NA	< 1	100%	80%	120%	102%	80%	120%	88%	80%	120%
Potassium	553565		3380	3490	3.4%	< 100	101%	80%	120%	111%	80%	120%	NA	80%	120%
Selenium	553565		<1	<1	NA	< 1	90%	80%	120%	92%	80%	120%	105%	80%	120%
Sodium	553565		2490	2480	0.6%	< 200	105%	80%	120%	109%	80%	120%	NA	80%	120%
Thallium	553565		<1	<1	NA	< 1	98%	80%	120%	100%	80%	120%	98%	80%	120%
Titanium	553565		14	12	NA	< 3	NA	80%	120%	108%	80%	120%	NA	80%	120%
Uranium	553565		<0.5	<0.5	NA	< 0.5	98%	80%	120%	106%	80%	120%	96%	80%	120%
Vanadium	553565		<1	<1	NA	< 1	98%	80%	120%	105%	80%	120%	98%	80%	120%
Zinc	553565		3	<3	NA	< 3	104%	80%	120%	87%	80%	120%	101%	80%	120%

Tata Steel - QC Packages - Conventionals

BOD5	578829		131	148	12.5%	< 2	67%	80%	120%	84%	80%	120%	NA	80%	120%
Conductivity (Salinity - mS/cm)	553316		66	65	1.5%	< 2	103%	80%	120%	105%	80%	120%	NA	80%	120%
Dissolved Organic Carbon	2		NA	NA	NA	< 0.30	85%	80%	120%	84%	80%	120%	NA	80%	120%
Fluoride	553316		<0.10	<0.10	NA	< 0.10	87%	80%	120%	98%	80%	120%	102%	80%	120%
Chromium VI	538450	538450	0.808	0.810	0.2%	< 0.008	93%	80%	120%	98%	80%	120%	103%	80%	120%
Ammonia Nitrogen	545795		0.17	0.16	4.3%	< 0.02	105%	80%	120%	111%	80%	120%	NA	80%	120%
pH	553179		7.89	7.88	0.1%		98%	80%	120%	100%	80%	120%	NA		
Total Kjeldahl Nitrogen	553575	553575	<0.3	<0.3	NA	< 0.3	90%	80%	120%	80%	80%	120%	NA	80%	120%
Total Cyanide	553575	553575	<0.005	<0.005	NA	< 0.005	87%	80%	120%	99%	80%	120%	98%	80%	120%
Total Organic Carbon	553575	553575	1.00	0.99	NA	< 0.30	85%	80%	120%	84%	80%	120%	69%	80%	120%
Alkalinity	553565		13.4	14.4	7.1%	< 1.5	97%	80%	120%	99%	80%	120%	95%	80%	120%
Chloride	553316		1.6	1.4	NA	< 0.5	90%	80%	120%	85%	80%	120%	85%	80%	120%
Nitrate	553316		0.99	1.01	1.8%	< 0.02	88%	80%	120%	102%	80%	120%	104%	80%	120%



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: QC Quarterly surface water
SAMPLED BY: ADAM CALVERT

AGAT WORK ORDER: 19M521230
ATTENTION TO: Mariana Trindade
SAMPLING SITE: GOODWOOD

Water Analysis (Continued)

RPT Date: 2019-11-25			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nitrite	553316		<0.02	<0.02	NA	< 0.02	NA	80%	120%	89%	80%	120%	89%	80%	120%
Sulfate	553316		8.2	8.2	0.1%	< 0.5	93%	80%	120%	96%	80%	120%	98%	80%	120%
Total Suspended Solids	554098		20	18	8.5%	< 2	97%	80%	120%	NA			90%	80%	120%
Total Dissolved Solids	553575	553575	<10	<10	NA	< 10	102%	80%	120%	NA			106%	80%	120%
Total Sulfide	538450	538450	0.802	0.810	1.0%	< 0.02	93%	80%	120%	98%	80%	120%	103%	80%	120%
Total Phenols (colorimetry)	553575	553575	0.006	0.005	NA	< 0.002	84%	80%	120%	120%	80%	120%	80%	80%	120%
Tata Steel - QC Packages - Conventionals															
Total Phosphorus	553660		0.15	0.12	22.2%	< 0.02	100%	80%	120%	NA	80%	120%	118%	80%	120%

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M521230

PROJECT: QC Quarterly surface water

ATTENTION TO: Mariana Trindade

SAMPLED BY: ADAM CALVERT

SAMPLING SITE: GOODWOOD

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis					
Total Coliforms	2019-09-23	2019-09-23	MIC-102-7017	MA.700-Col 1.0	N/A
Fecal Coliforms	2019-09-23	2019-09-23	MIC-102-7013	MA.700-Fec.Ec 1.0	N/A
Temperature upon receipt	2019-09-23	2019-09-23	N/A		N/A
Trace Organics Analysis					
Petroleum Hydrocarbons C10-C50	2019-10-04	2019-10-04	ORG-100-5104F	MA.400-HYD. 1.1	GC / FID

Method Summary

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: QC Quarterly surface water
 SAMPLED BY: ADAM CALVERT

 AGAT WORK ORDER: 19M521230
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: GOODWOOD

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Mercury	2019-09-24	2019-09-24	MET-101-6102F	MA. 200 Hg 1.1	COLD VAPOR/AA
Total Phosphorus	2019-09-30	2019-09-30	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Aluminum	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Barium	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-09-24	2019-09-24	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Calcium	2019-09-24	2019-09-24	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Chromium	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Cobalt	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Copper	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Total Hardness	2019-09-24	2019-09-24	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Tin	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Iron	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Magnesium	2019-09-24	2019-09-24	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Manganese	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Molybdenum	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Lead	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Potassium	2019-09-24	2019-09-24	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Selenium	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Sodium	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Thallium	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Titanium	2019-09-24	2019-09-24	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Uranium	2019-09-24	2019-09-24	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Vanadium	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Zinc	2019-09-24	2019-09-24	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Radium-226			Subcontracted	Subcontracted	N/A
BOD5	2019-10-03	2019-10-08	INOR-101-6006F	MA. 315 - DBO 1.1	ELECTROMETRY
BOD5 (day 0)					ELECTROMETRY
COD	2019-09-26	2019-09-27	INOR-101-6042F	MA.315-DCO 1.1	SPECTROPHOTOMETRY
Conductivity (Salinity - mS/cm)	2019-09-26	2019-09-26	INOR-101-6016F	Standard method 2520	CONDUCTIVIMETRY
Dissolved Organic Carbon	2019-09-25	2019-09-25	INOR-101-6049F, unaccredited by MDDELCC	MA.300-C1.0	INFRARED DETECTION
Dissolved Oxygen	2019-09-24	2019-09-24	INOR-101-6006F, unaccredited by MDDELCC	MA. 315 - DBO 1.1	DO METER
Fluoride	2019-09-26	2019-09-26	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Chromium VI	2019-09-23	2019-09-23	INOR-101-6034F	MA. 200 - CrHex 1.1	SPECTROPHOTOMETRY
Ammonia Nitrogen	2019-10-03	2019-10-03	INOR-101-6051F	MA. 303 - N 2.0	COLORIMETRY
pH	2019-09-23	2019-09-23	INOR-101-6021F	MA. 100 - pH 1.1	ELECTROMETRY
Reactive Silica	2019-10-07	2019-10-07	INOR-101-6071F, unaccredited by MDDELCC	AQ2 EPA-122A Rev 5	COLORIMETRY
Total Kjeldahl Nitrogen	2019-10-11	2019-10-11	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M521230

PROJECT: QC Quarterly surface water

ATTENTION TO: Mariana Trindade

SAMPLED BY: ADAM CALVERT

SAMPLING SITE: GOODWOOD

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Cyanide	2019-09-26	2019-09-26	INOR-101-6061F	MA. 300 - CN 1.2	COLORIMETRY
Total Organic Carbon	2019-09-25	2019-09-25	INOR-101-6049F	MA.300-C1.0	INFRARED DETECTION
Alkalinity	2019-09-26	2019-09-26	INOR-101-6000F, unaccredited by MDDELCC	MA. 315 - Alc-Aci 1.0	TITRATION
Chloride	2019-09-26	2019-09-26	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrate	2019-09-26	2019-09-26	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrite	2019-09-26	2019-09-26	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Sulfate	2019-09-26	2019-09-26	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Total Suspended Solids	2019-09-24	2019-09-25	INOR-101-6028F	MA. 115 - S.S. 1.2	GRAVIMETRY
Total Dissolved Solids	2019-09-26		INOR-101-6054F	MA.115-S.D. 1.0	GRAVIMETRY
Total Sulfide	2019-09-25	2019-09-25	INOR-101-6055F	MA.300-S 1.2	SPECTROPHOTOMETRY
Total Phenols (colorimetry)	2019-09-24	2019-09-25	INOR-101-6062F	MA. 404 - I. Phé 2.2	COLORIMETRY
Total Phosphorus	2019-09-30	2019-09-30	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Report Reviewer Montreal Chem.		2019-11-25	NA	NA	



À l'usage exclusif du laboratoire
Bon de travail AGAT: **19H501230**
Nb. de glaciers: **26**
Température à l'arrivée: _____
Scélé légal intact: Oui Non N/A

Chaîne de traçabilité - Environnement

Information du client
Compagnie: Tata Steel Minerals Canada
Adresse: 1600 Rue Sherbrooke Ouest
Montreal, QC H3A 3G4
Téléphone: 514-744-6700 ext. 705 Téléc.: _____
Projet: QC Quarterly Surface Water
Lieu de prélèvement: Goodwood
Prélevé par: Adam Calvert

Rapport envoyé à
1. Nom: Mariana Trindade
Courriel: mariana.trindade@tatasteelcanada.com
2. Nom: Team Email List
Courriel: TSMC.environment@tatasteelcanada.com

Critères à respecter
 PRTC ABC RESC
 CCME Autre: _____
 Eau consommation
 Eau résurg. Surface
 Eau résurg. Salée
CMM Sanitaire Pluvial

Délais d'analyse requis (jours ouvrables)
Environnemental: Régulier: 5 à 7 jours Régulier: 10 à 15 jours
Urgent: < 12 heures Urgent: < 10 jours
 24 heures
 48 heures
 72 heures
Date Requite: _____
AA/AM/JJ

Facturé à Même adresse: Oui Non
Compagnie: _____
Contact: _____
Courriel: _____
Adresse: _____
Bon de commande: 3000000296 Soumission: _____

Commentaires:

Matrice (légende)

EP	Eau potable	(Note pour réseau : Veuillez fournir votre formulaire MDELCC)
S	Sol	B Boue SE Sédiment ES Eau de surface AF Affluent
SL	Solide	EU Eau usée EF Effluent ST Eau souterraine A Air

Format de rapport
 Portrait (échantillon/page) Paysage (échantillons/page)

LES ÉCHANTILLONS REÇUS APRÈS 18 H SERONT ENREGISTRÉS COMME ÉTANT REÇUS LE JOUR OUVRABLE SUIVANT

IDENTIFICATION DE L'ÉCHANTILLON	PRÉLÈVEMENT		MATRICE	NB. DE CONTENANTS
	DATE (AA/MM/JJ)	HEURE		
<u>DS04-FR-GW-Q4-2019</u>	<u>19/09/20</u>	<u>10:00am</u>	<u>ES</u>	<u>12</u>
<u>DS04-EE-GW-Q4-2019</u>	<u>19/09/20</u>	<u>11:00am</u>	<u>ES</u>	<u>12</u>

LES ÉCHANTILLONS REÇUS APRÈS 18 H SERONT ENREGISTRÉS COMME ÉTANT REÇUS LE JOUR OUVRABLE SUIVANT										
COURT DÉLAI DE CONSERVATION										
<input type="checkbox"/> BTEX	<input type="checkbox"/> HAM	<input type="checkbox"/> COV	<input type="checkbox"/> HAC-HAM	<input type="checkbox"/> THM	<input type="checkbox"/> Hydrocarbures pétroliers 210-C50	<input type="checkbox"/> Phthalates	<input type="checkbox"/> BPC: Congénères	<input type="checkbox"/> Aroclor	<input type="checkbox"/> Glycols (balayage)	<input type="checkbox"/> Formaldéhyde
<input type="checkbox"/> Agr	<input type="checkbox"/> Chlorobenzènes	<input type="checkbox"/> Minérales	<input type="checkbox"/> Totales	<input type="checkbox"/> Pesticides (spécifier):	<input type="checkbox"/> Phénols (GC-MS)	<input type="checkbox"/> Indice phénolique (4AAP)	<input type="checkbox"/> 6 Métaux (Cd, Cr, Cu, Ni, Pb, Zn)	<input type="checkbox"/> 13 Métaux TC - Sol	<input type="checkbox"/> 17 Métaux TC - Eau	<input type="checkbox"/> Métaux (spécifier):
<input type="checkbox"/> Mercure	<input type="checkbox"/> Sélénium - Sol	<input type="checkbox"/> Dureté totale	<input type="checkbox"/> Alcalinité	<input type="checkbox"/> Bicarbonates	<input type="checkbox"/> Conductivité	<input type="checkbox"/> Chlorures	<input type="checkbox"/> Fluorures	<input type="checkbox"/> Sulfates	<input type="checkbox"/> Bromures	<input type="checkbox"/> Cyanures: Total
<input type="checkbox"/> DCO	<input type="checkbox"/> P total	<input type="checkbox"/> COO	<input type="checkbox"/> NH ₃	<input type="checkbox"/> NTK	<input type="checkbox"/> NO ₂ + NO ₃	<input type="checkbox"/> Solides: Total	<input type="checkbox"/> Dissous	<input type="checkbox"/> MES	<input type="checkbox"/> MESV	<input type="checkbox"/> Sulfures - Eau
<input type="checkbox"/> Sulfures - Eau	<input type="checkbox"/> Soufre total - Sol	COURT DÉLAI DE CONSERVATION								
<input type="checkbox"/> Métaux dissous filtrés au laboratoire:	<input type="checkbox"/> pH	<input type="checkbox"/> NO ₂	<input type="checkbox"/> NO ₃	<input type="checkbox"/> o-P04	<input type="checkbox"/> Absorbance UV	<input type="checkbox"/> Couleur	<input type="checkbox"/> Turbidité	<input type="checkbox"/> DBO ₅	<input type="checkbox"/> Carbonée	<input type="checkbox"/> Chrome hexavalent
<input type="checkbox"/> Coliformes: Total	<input type="checkbox"/> Fécules	<input type="checkbox"/> E.coli	<input type="checkbox"/> Microbiologie (autre):	<input type="checkbox"/> HR/MS: PCDD/PCDF	<input type="checkbox"/> HAP	<input type="checkbox"/> BPC	<input type="checkbox"/> CMM 2008-47: Sanitaire	<input type="checkbox"/> Pluvial	<input type="checkbox"/> RMD	<input type="checkbox"/> REIMR art.

Echantillon remis par (nom en lettres moulées et signature): Adam Calvert
Date (AA/MM/JJ): 19/09/20 Heure: 13:00

Echantillon reçu par (nom en lettres moulées et signature): _____
Date (AA/MM/JJ): _____ Heure: _____

Date (AA/MM/JJ): 12/30 Heure: _____
Page 1 de 2
Date (AA/MM/JJ): 12/3/09/10 Heure: _____
N°: **182530**

Quebec parameters:	
METALS	CONVENTIONAL
Mercury (Hg)	BOD5
Total phosphorous	COD
Aluminum (Al)	Conductivity
Antimony (Sb)	Dissolved organic carbon
Silver (Ag)	Dissolved oxygen
Arsenic (As)	Fluoride (F)
Barium (Ba)	Hexavalent Chromium (Cr 6+)
Boron (B)	Nitrogen ammonia (N-NH3)
Cadmium (Cd)	pH
Calcium (Ca)	Reactive silica (SiO2)
Chromium (Cr)	TKN Total Kjeldahl Nitrogen
Cobalt (Co)	Total Cyanide (CN)
Copper (Cu)	Total Organic Carbon
Total Hardness (CaCO3)	Alkalinity Total (as CaCO3) pH 4.5
Tin (Sn)	Chloride (Cl)
Iron (Fe)	Nitrites (N-NO2-)
Magnesium (Mg)	Nitrates (N-NO3-)
Manganese (Mn)	Sulfates (SO4)
Molybdenum (Mo)	Total suspended solids (TSS)
Nickel (Ni)	Total dissolved solids
Lead (Pb)	Hydrogen Sulphide
Potassium (K)	Phenols-4AAP
Selenium (Se)	
Sodium (Na)	
Thallium (Tl)	
Titanium (Ti)	
Uranium (U)	
Vanadium (V)	
Zinc (Zn)	
Radium 226 (Ra)	

⇓

Métaux
Totaux

+ TKN et NH3
Sur tous.

⇓

TPH

Intenlab à envoyer à
AGAT Dartmouth avec

Critères Atlantique PIRI



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: QC Quarterly Surface Water-Sunny

AGAT WORK ORDER: 19M489624

MICROBIOLOGY ANALYSIS REVIEWED BY: Linda Maille, Superviseur Microbiology

TRACE ORGANICS REVIEWED BY: Félix Brasseur, chimiste

WATER ANALYSIS REVIEWED BY: Jalel Rouissi, Chimiste

DATE REPORTED: 2019-08-20

VERSION*: 1

PAGES (INCLUDING COVER): 14

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M489624

PROJECT: QC Quarterly Surface Water-Sunny

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY: JFD

SAMPLING SITE:

Microbiology - Surface Water

DATE RECEIVED: 2019-07-08

DATE REPORTED: 2019-08-20

DS04-EE-SUN-

SAMPLE DESCRIPTION: Q1-2019

SAMPLE TYPE: SW

DATE SAMPLED: 2019-07-05

Parameter	Unit	G / S	RDL	336978
Total Coliforms	CFU/100ml		2	<2
Atypical Bacteria	CFU/100ml		2	170
Temperature upon receipt	°C		N/A	25.8

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
336978 The results are preliminary and subject to change if they are not certified.

Certified By:



Linda Maille

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Certificate of Analysis

AGAT WORK ORDER: 19M489624

PROJECT: QC Quarterly Surface Water-Sunny

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY: JFD

SAMPLING SITE:

Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.0) - EPH Only

DATE RECEIVED: 2019-07-08

DATE REPORTED: 2019-08-20

		DS04-EE-SUN-		
SAMPLE DESCRIPTION:		Q1-2019		
SAMPLE TYPE:		SW		
DATE SAMPLED:		2019-07-05		
Parameter	Unit	G / S	RDL	336978
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.10	<0.10
>C21-C32 Hydrocarbons	mg/L		0.1	<0.1
Return to Baseline at C32				NR
Surrogate	Unit	Acceptable Limits		
Isobutylbenzene - EPH	%		70-130	99
n-Dotriacontane - EPH	%		70-130	105

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19M489624

PROJECT: QC Quarterly Surface Water-Sunny

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY: JFD

SAMPLING SITE:

Inorganic Analyses - Surface Water

DATE RECEIVED: 2019-07-08

DATE REPORTED: 2019-08-20

		DS04-EE-SUN-	
SAMPLE DESCRIPTION:		Q1-2019	
SAMPLE TYPE:		SW	
DATE SAMPLED:		2019-07-05	
Parameter	Unit	G / S	RDL
Ammonia Nitrogen	mg/L - N		0.02 0.08
Total Kjeldahl Nitrogen	mg/L - N		0.05 0.05
Chloride	mg/L		0.5 <0.5
Weak Acid Dissociable Cyanide	mg/L - CN		0.01 <0.01
BOD5	mg/L - O2		2 <2
Total Suspended Solids	mg/L		2 <2
Nitrate	mg/L - N		0.02 0.02
Nitrite	mg/L - N		0.02 <0.02
Dissolved Oxygen	mg/L - O2		3 10
pH	pH		NA 6.59
Total Phosphorus	mg/L - P		0.01 0.01
Total Phenols	mg/L		0.002 0.006
Sulfate	mg/L		0.5 2.1
COD	mg/L - O2		5 <5
Dissolved Organic Carbon	mg/L		0.30 1.98
Fluoride	mg/L		0.10 <0.10
Chromium VI	mg/L		0.008 <0.008
Reactive Silica	mg/L		0.05 <0.05
Alkalinity	mg/L - CaCO3		1.5 14.5
Dissolved Solids	mg/L		10 24
Total Organic Carbon	mg/L		0.30 2.08
Nitrite-Nitrate (Montreal) (mg/L -N)	mg/L - N		0.04 <0.04

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

336978 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19M489624

PROJECT: QC Quarterly Surface Water-Sunny

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY: JFD

SAMPLING SITE:

Total Extractable Metals

DATE RECEIVED: 2019-07-08

DATE REPORTED: 2019-08-20

DS04-EE-SUN-

SAMPLE DESCRIPTION: Q1-2019

SAMPLE TYPE: SW

DATE SAMPLED: 2019-07-05

Parameter	Unit	G / S	RDL	336978
Aluminum	µg/L		5	6
Antimony	µg/L		1	<1
Silver	µg/L		0.2	<0.2
Arsenic	µg/L		0.3	<0.3
Barium	µg/L		2	<2
Boron	µg/L		40	<40
Cadmium	µg/L		0.2	<0.2
Calcium	µg/L		100	2850
Chromium	µg/L		1	1
Cobalt	µg/L		0.5	<0.5
Copper	µg/L		1	<1
Iron	µg/L		60	126
Magnesium	µg/L		100	1950
Manganese	µg/L		1	9
Mercury	µg/L		0.01	0.02
Molybdenum	µg/L		1	<1
Nickel	µg/L		1	<1
Lead	µg/L		0.5	<0.5
Selenium	µg/L		1	<1
Sodium	µg/L		200	671
Thallium	µg/L		1	<1
Uranium	µg/L		0.5	<0.5
Vanadium	µg/L		1	<1
Zinc	µg/L		3	19
Tin	mg/L		0.005	<0.005
Titanium	mg/L		0.003	<0.003
Potassium	mg/L		0.100	0.164

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19M489624

PROJECT: QC Quarterly Surface Water-Sunny

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY: JFD

SAMPLING SITE:

Total Extractable Metals

DATE RECEIVED: 2019-07-08

DATE REPORTED: 2019-08-20

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

336978 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference

Certified By: _____



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Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: QC Quarterly Surface Water-Sunny
 SAMPLED BY: JFD

AGAT WORK ORDER: 19M489624
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE:

Trace Organics Analysis

RPT Date: 2019-08-20			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.0) - EPH Only

>C10-C16 Hydrocarbons	1	-99999	0.82	0.82	0.0%	< 0.05	86%	70%	130%	85%	70%	130%	76%	70%	130%
>C16-C21 Hydrocarbons	1	-99999	2.68	2.68	0.0%	< 0.10	82%	70%	130%	85%	70%	130%	76%	70%	130%
>C21-C32 Hydrocarbons	1	-99999	1.36	1.34	1.0%	< 0.1	82%	70%	130%	85%	70%	130%	76%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: _____



Félix Brousseau

AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Quality Assurance

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: QC Quarterly Surface Water-Sunny
 SAMPLED BY: JFD

 AGAT WORK ORDER: 19M489624
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE:

Water Analysis															
RPT Date: 2019-08-20			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Extractable Metals															
Aluminum	337295		<5	<5	NA	< 5	87%	80%	120%	98%	80%	120%	105%	80%	120%
Antimony	337295		<1	<1	NA	< 1	108%	80%	120%	100%	80%	120%	NA	80%	120%
Silver	337295		<0.2	<0.2	NA	< 0.2	NA	80%	120%	103%	80%	120%	120%	80%	120%
Arsenic	337295		<0.3	<0.3	NA	< 0.3	96%	80%	120%	109%	80%	120%	119%	80%	120%
Barium	337295		<2	<2	NA	< 2	83%	80%	120%	94%	80%	120%	NA	80%	120%
Boron	337295		<40	<40	NA	< 40	97%	80%	120%	108%	80%	120%	NA	80%	120%
Cadmium	337295		<0.2	<0.2	NA	< 0.1	93%	80%	120%	102%	80%	120%	NA	80%	120%
Calcium	337295		3070	3060	0.3%	< 100	88%	80%	120%	102%	80%	120%	NA	80%	120%
Chromium	337295		<1	<1	NA	< 1	99%	80%	120%	107%	80%	120%	115%	80%	120%
Cobalt	337295		<2.0	<2.0	NA	< 0.5	101%	80%	120%	105%	80%	120%	109%	80%	120%
Copper	337295		<1	<1	NA	< 1	99%	80%	120%	111%	80%	120%	118%	80%	120%
Iron	337295		<60	<60	NA	< 60	98%	80%	120%	109%	80%	120%	NA	80%	120%
Magnesium	337295		2320	2500	7.5%	< 100	91%	80%	120%	103%	80%	120%	NA	80%	120%
Manganese	337295		<1	<1	NA	< 1	99%	80%	120%	101%	80%	120%	108%	80%	120%
Mercury	1		NA	NA	0.0%	< 0.01	101%	80%	120%	104%	80%	120%	NA	80%	120%
Molybdenum	337295		<1	<1	NA	< 1	97%	80%	120%	106%	80%	120%	110%	80%	120%
Nickel	337295		<1	<1	NA	< 1	95%	80%	120%	101%	80%	120%	114%	80%	120%
Lead	337295		<0.5	<0.5	NA	< 0.5	96%	80%	120%	110%	80%	120%	NA	80%	120%
Selenium	337295		<1	<1	NA	< 1	98%	80%	120%	109%	80%	120%	NA	80%	120%
Sodium	337295		339	355	NA	< 200	94%	80%	120%	118%	80%	120%	NA	80%	120%
Thallium	337295		<1	<1	NA	< 1	93%	80%	120%	103%	80%	120%	115%	80%	120%
Uranium	337295		<0.5	<0.5	NA	< 0.5	95%	80%	120%	107%	80%	120%	115%	80%	120%
Vanadium	337295		<1	<1	NA	< 1	101%	80%	120%	105%	80%	120%	113%	80%	120%
Zinc	337295		<3	<3	NA	< 3	99%	80%	120%	104%	80%	120%	NA	80%	120%
Tin	337295		<0.005	<0.005	NA	< 0.005	NA	80%	120%	105%	80%	120%	111%	80%	120%
Titanium	337295		<0.003	<0.003	NA	< 0.003	NA	80%	120%	105%	80%	120%	111%	80%	120%
Potassium	337295		0.196	0.209	NA	< 0.100	96%	80%	120%	99%	80%	120%	NA	80%	120%

Comments: NA : Non applicable

If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

NA as the percent recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.

NA in the spiked blank or CRM indicates that it is not required by the procedure.

The percent of recovery of the CRM may be outside of the acceptability criteria of 80-120%, if conform to the criteria provided on the Certificate of Analysis of the reference material.

Inorganic Analyses - Surface Water

Ammonia Nitrogen	336978	336978	0.08	0.08	NA	< 0.02	108%	80%	120%	100%	80%	120%	NA	80%	120%
Chloride	327076		<0.5	<0.5	NA	< 0.5	95%	80%	120%	84%	80%	120%	111%	80%	120%
Weak Acid Dissociable Cyanide	331279		< 0.01	< 0.01	NA	< 0.01	109%	80%	120%	96%	80%	120%	104%	80%	120%
BOD5	39537		205	195	5.0%	< 2	85%	80%	120%	92%	80%	120%	87%	80%	120%
Total Suspended Solids	331756		73	69	5.6%	< 2	97%	80%	120%	NA			102%	80%	120%
Nitrate	327076		NA	NA	0.0%	< 0.02	96%	80%	120%	96%	80%	120%	96%	80%	120%
Nitrite	327076		<0.02	<0.02	NA	< 0.02	NA	80%	120%	91%	80%	120%	105%	80%	120%
pH	335947		5.98	5.96	0.3%		100%	80%	120%	101%	80%	120%	NA		

Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: QC Quarterly Surface Water-Sunny
SAMPLED BY: JFD

AGAT WORK ORDER: 19M489624
ATTENTION TO: Mariana Trindade
SAMPLING SITE:

Water Analysis (Continued)

RPT Date: 2019-08-20			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Phenols	336978	336978	0.006	0.004	NA	0.002	95%	80%	120%	100%	80%	120%	NA	80%	120%
Sulfate	327076		NA	NA	0.0%	< 0.5	98%	80%	120%	95%	80%	120%	NA	80%	120%
COD	338021		15	16	NA	< 5	102%	80%	120%	87%	80%	120%	83%	80%	120%
Dissolved Organic Carbon	1		NA	NA	0.0%	< 0.30	111%	80%	120%	111%	80%	120%	NA	80%	120%
Fluoride	327076		<0.10	<0.10	NA	< 0.10	100%	80%	120%	105%	80%	120%	NA	80%	120%
Chromium VI	336978	336978	< 0.008	< 0.008	NA	< 0.008	105%	80%	120%	105%	80%	120%	83%	80%	120%
Reactive Silica	372785		< 0.05	< 0.05	NA	< 0.05	102%	90%	110%	105%	70%	130%	112%	70%	130%
Alkalinity	309314		21.6	24.2	11.4%	< 1.5	95%	80%	120%	93%	80%	120%	NA	80%	120%
Dissolved Solids	318088		< 10	16	NA	< 10	101%	80%	120%	NA			104%	80%	120%
Total Organic Carbon	331880		1.26	1.27	NA	< 0.30	111%	80%	120%	111%	80%	120%	98%	80%	120%

Comments: NA : Non applicable

If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

NA as the percent recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.

NA in the spiked blank or CRM indicates that it is not required by the procedure.

The percent of recovery of the CRM may be outside of the acceptability criteria of 80-120%, if conform to the criteria provided on the Certificate of Analysis of the reference material.

Certified By: _____




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Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M489624

PROJECT: QC Quarterly Surface Water-Sunny

ATTENTION TO: Mariana Trindade

SAMPLED BY: JFD

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis					
Total Coliforms	2019-07-10	2019-07-10	MIC-102-7017	MA.700-Col 1.0	N/A
Atypical Bacteria	2019-07-10	2019-07-10	MIC-102-7017	MA.700-Col1.0	N/A
Temperature upon receipt	2019-07-08	2019-07-08	N/A		N/A
Trace Organics Analysis					
>C10-C16 Hydrocarbons	2019-07-12	2019-07-15	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	2019-07-12	2019-07-15	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	2019-07-12	2019-07-15	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Return to Baseline at C32	2019-07-12	2019-07-15	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	2019-07-12	2019-07-15	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
n-Dotriacontane - EPH	2019-07-12	2019-07-15	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID

Method Summary

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: QC Quarterly Surface Water-Sunny
 SAMPLED BY: JFD

 AGAT WORK ORDER: 19M489624
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Ammonia Nitrogen	2019-07-17	2019-07-17	INOR-101-6051F	MA. 303 - N 2.0	COLORIMETRY
Total Kjeldahl Nitrogen		2019-07-30	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Chloride	2019-07-10	2019-07-10	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Weak Acid Dissociable Cyanide	2019-07-11	2019-07-11	INOR-101-6036F	MA. 300 - CN 1.2	COLORIMETRY
BOD5	2019-07-31	2019-08-05	INOR-101-6006F	MA. 315 - DBO 1.1	ELECTROMETRIC
Total Suspended Solids	2019-07-11	2019-07-12	INOR-101-6028F	MA. 115 - S.S. 1.2	GRAVIMETRY
Nitrate	2019-07-10	2019-07-10	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrite	2019-07-10	2019-07-10	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Dissolved Oxygen		2019-08-07	INOR-101-6006F, unaccredited by MDDELCC	MA. 315 - DBO 1.1	ELECTROMETRIC
pH	2019-07-10	2019-07-10	INOR-101-6021F	MA. 100 - pH 1.1	ELECTROMETRIC
Total Phosphorus		2019-08-01	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Total Phenols	2019-07-16	2019-07-16	INOR-101-6062F	MA. 404 - I. Phé 2.2	COLORIMETRY
Sulfate	2019-07-10	2019-07-10	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
COD	2019-08-06	2019-08-06	INOR-101-6042F	MA.315-DCO 1.1	SPECTROPHOTOMETRY
Dissolved Organic Carbon	2019-07-10	2019-07-10	INOR-101-6049F, unaccredited by MDDELCC	MA.300-C1.0	INFRARED DETECTION
Fluoride	2019-07-10	2019-07-10	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Chromium VI	2019-07-10	2019-07-10	INOR-101-6034F	MA. 200 - CrHex 1.1	SPECTROPHOTOMETRY
Reactive Silica	2019-08-06	2019-08-06	INOR-101-6071F, unaccredited by MDDELCC	AQ2 EPA-122A Rev 5	COLORIMETRY
Alkalinity	2019-07-12	2019-07-12	INOR-101-6000F, unaccredited by MDDELCC	MA. 315 - Alc-Aci 1.0	TITRATION
Dissolved Solids	2019-07-17	2019-07-18	INOR-101-6054F	MA.115-S.D. 1.0	GRAVIMETRY
Total Organic Carbon	2019-07-10	2019-07-10	INOR-101-6049F	MA.300-C1.0	INFRARED DETECTION
Aluminum	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Barium	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-07-11	2019-07-13	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Calcium	2019-07-11	2019-07-13	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Chromium	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Cobalt	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Copper	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Iron	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Magnesium	2019-07-11	2019-07-13	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Manganese	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Mercury	2019-07-11	2019-07-11	MET-101-6102F	MA. 200 Hg 1.1	COLD VAPOR/AA
Molybdenum	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Lead	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Selenium	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Sodium	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Thallium	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Uranium	2019-07-11	2019-07-13	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M489624

PROJECT: QC Quarterly Surface Water-Sunny

ATTENTION TO: Mariana Trindade

SAMPLED BY:JFD

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Vanadium	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Zinc	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Tin	2019-07-11	2019-07-13	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Titanium	2019-07-11	2019-07-13	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Potassium	2019-07-11	2019-07-13	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS



AGAT Laboratoires

350 rue Franquet, Ville de Québec,
Québec, G1P 4P3

Tél.: 418.266.5511 Téléc.: 418.653.2335

fr.agatlabs.com

A l'usage des clients / 190489 624
Boîte de livraison (GA) :
Nb. de glacières:
Température à l'arrivée: 26.4°C / 25.8°C / 25.9°C

Glace Bloc réfrigérant Aucun
Scélé légal intact: Oui Non N/A

Chaîne de traçabilité Environnement

Eau potable RQEP (réseau) – Veuillez utiliser le formulaire du MDDELCC

Information pour le rapport

Compagnie : Tata Steel Minerals Canada
Adresse : 1000 Rue Sherbrooke Ouest, Montreal, QC, H3A 3G4
Téléphone : 514.764.6700 x.765 Téléc.:
Projet : QC Quarterly Surface Water - Sunny
Lieu de prélèvement : DS04 QC
Prélevé par : JFD

Rapport envoyé à

1. Nom: Mariana Trindade
Courriel: mariana.trindade@tatasteelcanada.com
2. Nom: TSMC Environment Team
Courriel: * Team Email List *

Critères à respecter

PRTC ABC RESC
 CCME
 Eau consommation
 Eau résurg. Surface
 Eau résurg. Salée
CMM Sanitaire Pluvial
 Autre.

Format de rapport

Portrait (échantillon/page) Paysage (échantillons/page)

Délais d'analyse requis (jours ouvrables)

Environnemental: 5 à 7 jours Régulier: 10 à 15 jours
Urgent: Même jour Urgent: < 10 jours
 1 jour Date Requête:
 2 jours
 3 jours

Facturé à

Même adresse: Oui Non
Compagnie: _____
Contact: _____
Courriel: _____
Adresse: _____
Bon de commande: 3000000296 Soumission: _____

Commentaires:

Matrice (légende)

EP Eau potable EB Eau brute EPI Eau de piscine
S Sol B Boue SE Sédiment ES Eau de surface AF Affluent
SL Solide EU Eau usée EF Effluent ST Eau souterraine A Air

IDENTIFICATION DE L'ÉCHANTILLON	PRÉLÈVEMENT		MATRICE	NB. DE CONTENANTS
	DATE (AA/MM/JJ)	HEURE		
DS04-EE-SUN-Q1-2019 (19/07/05)	19/07/05	8:30am	ES	16
"APPENDIX A - p. 5/12 - Laboratory Analysis"				

Hydrocarbures pétroliers C10-C50	HAP	BTEX	HAM	HAC-HAM	THM	Chlorobenzènes	Phtalates	COSV	BPC: Congénères	Aroclor	CBNC	Éthylène glycol	Formaldéhyde	Huiles et graisses: Minérales	Totales	Pesticides: OC	OP	Herbicides	Diquat / Paraquat	Glyphosate	Phénols (GC-MS)	Indice phénolique (4AAP)	Métaux - Sol	Hg	Se	CrVI	Métaux - ST	Hg	CrVI	CrIII	U	Métaux: Filtré sur terrain	Filtré au lab	Métaux (spécifier):	Dureté totale	Alcalinité	Bromates	Conductivité	Chlorures	Fluorures	Sulfates	Bromures	Cyanures: Totaux	Disponibles	Oxydables	DCO	COT	NH ₃ + NH ₄	NTK	NO ₂ + NO ₃	P total	Solides: Totaux	Dissous	MES	MESV	Sulfures - Eau	Soufre total - Sol	pH	NO ₂	NO ₃	o-PO4	COD	Absorbance UV	Couleur	Turbidité	DBO ₅	DBO ₆	Carbonée	Coliformes: Totaux	Fécaux	E.coli	Microbiologie (autre):	HR/MS: Dioxines/Furanes	HAP	BPC	CMM 2008-47: Sanitaire	Pluvial	NP	NPE	RMD	REIMR art.
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Echantillon remis par (nom en lettres moulées et signature)
Adam Calvert / Adam Calvert

Date (AA/MM/JJ) 19/07/05
Heure 13:00

Echantillon reçu par (nom en lettres moulées et signature)
ABA

Date (AA/MM/JJ) 8/11/19
Heure 13:00

Page 1 de 1
N°: 072305

Quebec parameters:

DSO4 2a (Sunny and Goodwood) environmental monitoring and G.

METALS	CONVENTIONAL	MICROBIOLOGICAL TESTS	PETROLEUM HYDROCARBONS
Mercury (Hg)	BOD5	Total coliforms	Petroleum Hydrocarbons (C10-C50)
Total phosphorous	COD	Fecal coliforms	
Aluminum (Al)	Conductivity		
Antimony (Sb)	Dissolved organic carbon		
Silver (Ag)	Dissolved oxygen		
Arsenic (As)	Fluoride (F)		
Barium (Ba)	Hexavalent Chromium (Cr 6+)		
Boron (B)	Nitrogen ammonia (N-NH3)		
Cadmium (Cd)	pH		
Calcium (Ca)	Reactive silica (SiO2)		
Chromium (Cr)	TKN Total Kjeldahl Nitrogen		
Cobalt (Co)	Total Cyanide (CN)		
Copper (Cu)	Total Organic Carbon		
Total Hardness (CaCO3)	Alkalinity Total (as CaCO3) pH 4.5		
Tin (Sn)	Chloride (Cl)		
Iron (Fe)	Nitrites (N-NO2-)		
Magnesium (Mg)	Nitrates (N-NO3-)		
Manganese (Mn)	Sulfates (SO4)		
Molybdenum (Mo)	Total suspended solids (TSS)		
Nickel (Ni)	Total dissolved solids		
Lead (Pb)	Hydrogen Sulphide		
Potassium (K)	Phenols-4AAP		
Selenium (Se)			
Sodium (Na)			
Thallium (Tl)			
Titanium (Ti)			
Uranium (U)			
Vanadium (V)			
Zinc (Zn)			
Radium 226 (Ra)			



TPH

Interlab à envoyer à

AGAT Dartmouth avec

Critères Atlantique PIRI



Métaux

+ TKN et NH3

Totaux

Sur tous.



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: QC Quarterly Surface Water-Sunny

AGAT WORK ORDER: 19M489628

MICROBIOLOGY ANALYSIS REVIEWED BY: Linda Maille, Superviseur Microbiology

WATER ANALYSIS REVIEWED BY: Jalel Rouissi, Chimiste

DATE REPORTED: 2019-08-30

VERSION*: 1

PAGES (INCLUDING COVER): 13

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M489628

PROJECT: QC Quarterly Surface Water-Sunny

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY: JFD

SAMPLING SITE: DSO4 QC

Microbiology - Surface Water

DATE RECEIVED: 2019-07-08

DATE REPORTED: 2019-08-30

DSO4-ER-SUN-

SAMPLE DESCRIPTION: Q1-2019

SAMPLE TYPE: SW

DATE SAMPLED: 2019-07-04

Parameter	Unit	G / S	RDL	337295
Total Coliforms	CFU/100ml		2	9
Atypical Bacteria	CFU/100ml		2	9
Fecal Coliforms	CFU/100ml		2	<2
Temperature upon receipt	°C		N/A	11.1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
337295 The results are preliminary and subject to change if they are not certified.

Certified By:



Linda Houllé

AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



Certificate of Analysis

AGAT WORK ORDER: 19M489628

PROJECT: QC Quarterly Surface Water-Sunny

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CANADA H4S 1V9
TEL (514)337-1000
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<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY: JFD

SAMPLING SITE: DSO4 QC

Inorganic Analyses

DATE RECEIVED: 2019-07-08

DATE REPORTED: 2019-08-30

		DSO4-ER-SUN-	
SAMPLE DESCRIPTION:		Q1-2019	
SAMPLE TYPE:		SW	
DATE SAMPLED:		2019-07-04	
Parameter	Unit	G / S	RDL
			337295
Alkalinity	mg/L - CaCO3	1.5	15.2
Ammonia Nitrogen	mg/L - N	0.02	0.06
Total Kjeldahl Nitrogen	mg/L - N	0.3	<0.3
Dissolved Organic Carbon	mg/L	0.30	0.53
Total Organic Carbon	mg/L	0.30	0.67
Chloride	mg/L	0.5	<0.5
Hexavalent Chromium	mg/L	0.008	<0.008
Conductivity (25 Celsius)	µmhos/cm	2	33
Total Cyanide	mg/L - CN	0.005	<0.005
BOD5	mg/L - O2	2	<2
Fluoride	mg/L	0.10	<0.10
Total Suspended Solids	mg/L	2	<2
Nitrate	mg/L - N	0.02	0.07
Nitrite	mg/L - N	0.02	<0.02
Dissolved Oxygen	mg/L - O2	3	12
pH	pH	NA	6.91
Total Phosphorus	mg/L - P	0.01	<0.01
Reactive Silica	mg/L	0.05	5.09
Dissolved Solids	mg/L	10	16
Sulfate	mg/L	0.5	1.8
Total Sulfide	mg/L S-2	0.02	<0.02
Nitrite-Nitrate (Montreal) (mg/L -N)	mg/L - N	0.04	0.07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

337295 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M489628

PROJECT: QC Quarterly Surface Water-Sunny

9770 ROUTE TRANSCANADIENNE
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CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JFD

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO4 QC

Subcontracting

DATE RECEIVED: 2019-07-08

DATE REPORTED: 2019-08-30

DSO4-ER-SUN-

SAMPLE DESCRIPTION: Q1-2019

SAMPLE TYPE: SW

DATE SAMPLED: 2019-07-04

Parameter	Unit	G / S	RDL	337295
Radium-226	Bq/L	0.005	0.006	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M489628

PROJECT: QC Quarterly Surface Water-Sunny

9770 ROUTE TRANSCANADIENNE
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CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JFD

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO4 QC

Total Extractable Metals

DATE RECEIVED: 2019-07-08

DATE REPORTED: 2019-08-30

DSO4-ER-SUN-

SAMPLE DESCRIPTION: Q1-2019

SAMPLE TYPE: SW

DATE SAMPLED: 2019-07-04

Parameter	Unit	G / S	RDL	337295
Aluminum	µg/L		5	<5
Antimony	µg/L		1	<1
Silver	µg/L		0.2	<0.2
Arsenic	µg/L		0.3	<0.3
Barium	µg/L		2	<2
Boron	µg/L		40	<40
Cadmium	µg/L		0.2	<0.2
Calcium	µg/L		100	3070
Chromium	µg/L		1	<1
Cobalt	µg/L		2.0	<2.0
Copper	µg/L		1	<1
Tin	µg/L		5	<5
Iron	µg/L		60	<60
Magnesium	µg/L		100	2320
Manganese	µg/L		1	<1
Mercury	µg/L		0.01	0.02
Molybdenum	µg/L		1	<1
Nickel	µg/L		1	<1
Lead	µg/L		0.5	<0.5
Potassium	µg/L		100	196
Selenium	µg/L		1	<1
Sodium	µg/L		200	339
Thallium	µg/L		1	<1
Titanium	µg/L		3	<3
Uranium	µg/L		0.5	<0.5
Vanadium	µg/L		1	<1
Zinc	µg/L		3	<3

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



Certificate of Analysis

AGAT WORK ORDER: 19M489628

PROJECT: QC Quarterly Surface Water-Sunny

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ST. LAURENT, QUEBEC
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TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JFD

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO4 QC

Total Extractable Metals

DATE RECEIVED: 2019-07-08

DATE REPORTED: 2019-08-30

DSO4-ER-SUN-

SAMPLE DESCRIPTION: Q1-2019

SAMPLE TYPE: SW

DATE SAMPLED: 2019-07-04

Parameter	Unit	G / S	RDL	337295
Hardness	µg/L - CaCO3	1000	17200	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

337295 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By: _____



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Quality Assurance

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: QC Quarterly Surface Water-Sunny
 SAMPLED BY: JFD

 AGAT WORK ORDER: 19M489628
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE: DSO4 QC

Water Analysis															
RPT Date: 2019-08-30			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Extractable Metals															
Aluminum	337295	337295	<5	<5	NA	< 5	87%	80%	120%	98%	80%	120%	105%	80%	120%
Antimony	337295	337295	<1	<1	NA	< 1	108%	80%	120%	100%	80%	120%	NA	80%	120%
Silver	337295	337295	<0.2	<0.2	NA	< 0.2	NA	80%	120%	103%	80%	120%	120%	80%	120%
Arsenic	337295	337295	<0.3	<0.3	NA	< 0.3	96%	80%	120%	109%	80%	120%	119%	80%	120%
Barium	337295	337295	<2	<2	NA	< 2	83%	80%	120%	94%	80%	120%	NA	80%	120%
Boron	337295	337295	<40	<40	NA	< 40	97%	80%	120%	108%	80%	120%	NA	80%	120%
Cadmium	337295	337295	<0.2	<0.2	NA	< 0.2	93%	80%	120%	102%	80%	120%	NA	80%	120%
Calcium	337295	337295	3070	3060	0.3%	< 100	88%	80%	120%	102%	80%	120%	NA	80%	120%
Chromium	337295	337295	<1	<1	NA	< 1	99%	80%	120%	107%	80%	120%	115%	80%	120%
Cobalt	337295	337295	<2.0	<2.0	NA	< 0.5	101%	80%	120%	105%	80%	120%	109%	80%	120%
Copper	337295	337295	<1	<1	NA	< 1	99%	80%	120%	111%	80%	120%	118%	80%	120%
Tin	337295	337295	<5	<5	NA	< 5	NA	80%	120%	105%	80%	120%	111%	80%	120%
Iron	337295	337295	<60	<60	NA	< 60	98%	80%	120%	109%	80%	120%	NA	80%	120%
Magnesium	337295	337295	2320	2500	7.5%	< 100	91%	80%	120%	103%	80%	120%	NA	80%	120%
Manganese	337295	337295	<1	<1	NA	< 1	99%	80%	120%	101%	80%	120%	108%	80%	120%
Mercury	1		NA	NA	0.0%	< 0.01	101%	80%	120%	104%	80%	120%	NA	80%	120%
Molybdenum	337295	337295	<1	<1	NA	< 1	97%	80%	120%	106%	80%	120%	110%	80%	120%
Nickel	337295	337295	<1	<1	NA	< 1	95%	80%	120%	101%	80%	120%	114%	80%	120%
Lead	337295	337295	<0.5	<0.5	NA	< 0.5	96%	80%	120%	110%	80%	120%	NA	80%	120%
Potassium	337295	337295	196	209	NA	< 100	96%	80%	120%	99%	80%	120%	NA	80%	120%
Selenium	337295	337295	<1	<1	NA	< 1	98%	80%	120%	109%	80%	120%	NA	80%	120%
Sodium	337295	337295	339	355	NA	< 200	94%	80%	120%	118%	80%	120%	NA	80%	120%
Thallium	337295	337295	<1	<1	NA	< 1	93%	80%	120%	103%	80%	120%	115%	80%	120%
Titanium	337295	337295	<3	<3	NA	< 3	NA	80%	120%	105%	80%	120%	111%	80%	120%
Uranium	337295	337295	<0.5	<0.5	NA	< 0.5	95%	80%	120%	107%	80%	120%	115%	80%	120%
Vanadium	337295	337295	<1	<1	NA	< 1	101%	80%	120%	105%	80%	120%	113%	80%	120%
Zinc	337295	337295	<3	<3	NA	< 3	99%	80%	120%	104%	80%	120%	NA	80%	120%

Comments: NA : Non applicable

If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

NA as the percent recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.

NA in the spiked blank or CRM indicates that it is not required by the procedure.

The percentage of recovery of the CRM may be outside of the acceptability criteria of 80-120%, if conform to the criteria provided on the Certificate of Analysis of the reference material.

Inorganic Analyses

Alkalinity	309314		21.6	24.2	11.4%	< 1.5	95%	80%	120%	93%	80%	120%	NA	80%	120%
Ammonia Nitrogen	316867		0.38	0.42	10.0%	< 0.02	109%	80%	120%	116%	80%	120%	NA	80%	120%
Dissolved Organic Carbon	1		NA	NA	0.0%	< 0.30	111%	80%	120%	111%	80%	120%	NA	80%	120%
Total Organic Carbon	331880		1.26	1.27	NA	< 0.30	111%	80%	120%	111%	80%	120%	98%	80%	120%
Chloride	327076		<0.5	<0.5	NA	< 0.5	95%	80%	120%	84%	80%	120%	111%	80%	120%
Hexavalent Chromium	336978		< 0.008	< 0.008	NA	< 0.008	105%	80%	120%	105%	80%	120%	83%	80%	120%
Conductivity (25 Celsius)	346254		600	602	0.3%	< 2	101%	80%	120%	102%	80%	120%	101%	80%	120%
Total Cyanide	324688		<0.005	<0.005	NA	< 0.005	77%	80%	120%	101%	80%	120%	83%	80%	120%



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: QC Quarterly Surface Water-Sunny
SAMPLED BY: JFD

AGAT WORK ORDER: 19M489628
ATTENTION TO: Mariana Trindade
SAMPLING SITE: DSO4 QC

Water Analysis (Continued)

RPT Date: 2019-08-30			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
BOD5	1		NA	NA	0.0%	< 2	80%	80%	120%	82%	80%	120%	102%	80%	120%
Fluoride	327076		<0.10	<0.10	NA	< 0.10	100%	80%	120%	105%	80%	120%	NA	80%	120%
Total Suspended Solids	331756		73	69	5.6%	< 2	97%	80%	120%	NA			102%	80%	120%
Nitrate	327076		NA	NA	0.0%	< 0.02	96%	80%	120%	96%	80%	120%	96%	80%	120%
Nitrite	327076		<0.02	<0.02	NA	< 0.02	NA	80%	120%	91%	80%	120%	105%	80%	120%
pH	338682		8.01	8.07	0.7%		100%	80%	120%	101%	80%	120%	NA		
Reactive Silica	352891		< 0.05	< 0.05	NA	< 0.05	104%	90%	110%	109%	70%	130%	109%	70%	130%
Dissolved Solids	318088		< 10	< 10	NA	< 10	101%	80%	120%	NA			104%	80%	120%
Sulfate	327076		NA	NA	0.0%	< 0.5	98%	80%	120%	95%	80%	120%	NA	80%	120%
Total Sulfide	325484		0.05	0.05	NA	< 0.02	86%	80%	120%	89%	80%	120%	NA	80%	120%

Comments: NA : Non applicable

If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

NA as the percent recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.

NA in the spiked blank or CRM indicates that it is not required by the procedure.

The percentage of recovery of the CRM may be outside of the acceptability criteria of 80-120%, if conform to the criteria provided on the Certificate of Analysis of the reference material.

Certified By: _____



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Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M489628

PROJECT: QC Quarterly Surface Water-Sunny

ATTENTION TO: Mariana Trindade

SAMPLED BY:JFD

SAMPLING SITE:DSO4 QC

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis					
Total Coliforms	2019-07-10	2019-07-10	MIC-102-7017	MA.700-Col 1.0	N/A
Atypical Bacteria	2019-07-10	2019-07-10	MIC-102-7017	MA.700-Col1.0	N/A
Fecal Coliforms	2019-07-10	2019-07-10	MIC-102-7013	MA.700-Fec.Ec 1.0	N/A
Temperature upon receipt	2019-07-10	2019-07-10	N/A		N/A

Method Summary

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: QC Quarterly Surface Water-Sunny
 SAMPLED BY:JFD

 AGAT WORK ORDER: 19M489628
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE:DSO4 QC

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Alkalinity	2019-07-12	2019-07-12	INOR-101-6000F, unaccredited by MDDELCC	MA. 315 - Alc-Aci 1.0	TITRATION
Ammonia Nitrogen	2019-07-17	2019-07-17	INOR-101-6051F	MA. 303 - N 2.0	COLORIMETRY
Total Kjeldahl Nitrogen		2019-07-30	INOR-101-6048F	MA.300-NTPPT 2.0	COLORIMETRY
Dissolved Organic Carbon	2019-07-11	2019-07-11	INOR-101-6049F, unaccredited by MDDELCC	MA.300-C1.0	INFRARED DETECTION
Total Organic Carbon	2019-07-11	2019-07-11	INOR-101-6049F	MA.300-C1.0	INFRARED DETECTION
Chloride	2019-07-11	2019-07-11	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Hexavalent Chromium	2019-07-10	2019-07-10	INOR-101-6034F	MA. 200 - CrHex 1.1	SPECTROPHOTOMETRY
Conductivity (25 Celsius)	2019-07-18	2019-07-18	INOR-101-6016F	MA.115-Cond. 1.1	CONDUCTIVIMETER
Total Cyanide	2019-07-19	2019-07-19	INOR-101-6061F	MA. 300 - CN 1.2	COLORIMETRY
BOD5	2019-08-02	2019-08-07	INOR-101-6006F	MA. 315 - DBO 1.1	ELECTROMETRIC
Fluoride	2019-07-11	2019-07-11	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Total Suspended Solids	2019-07-11	2019-07-12	INOR-101-6028F	MA. 115 - S.S. 1.2	GRAVIMETRY
Nitrate	2019-07-11	2019-07-11	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrite	2019-07-11	2019-07-11	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Dissolved Oxygen		2019-08-07	INOR-101-6006F, unaccredited by MDDELCC	MA. 315 - DBO 1.1	ELECTROMETRIC
pH	2019-07-10	2019-07-10	INOR-101-6021F	MA. 100 - pH 1.1	ELECTROMETRIC
Total Phosphorus		2019-08-01	INOR-101-6048F	MA.300-NTPPT 2.0	COLORIMETRY
Reactive Silica	2019-08-06	2019-08-06	INOR-101-6071F, unaccredited by MDDELCC	AQ2 EPA-122A Rev 5	COLORIMETRY
Dissolved Solids	2019-07-17	2019-07-18	INOR-101-6054F	MA.115-S.D. 1.0	GRAVIMETRY
Sulfate	2019-07-11	2019-07-11	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Total Sulfide	2019-07-16	2019-07-16	INOR-101-6055F	MA.300-S 1.2	SPECTROPHOTOMETRY
Radium-226		2019-07-08	Subcontracted	Subcontracted	N/A
Aluminum	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Barium	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-07-11	2019-07-12	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Calcium	2019-07-11	2019-07-12	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Chromium	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Cobalt	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Copper	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Tin	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Iron	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Magnesium	2019-07-11	2019-07-12	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Manganese	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Mercury	2019-07-11	2019-07-11	MET-101-6102F	MA. 200 Hg 1.1	COLD VAPOR/AA
Molybdenum	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Lead	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Potassium	2019-07-11	2019-07-12	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Selenium	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M489628

PROJECT: QC Quarterly Surface Water-Sunny

ATTENTION TO: Mariana Trindade

SAMPLED BY:JFD

SAMPLING SITE:DSO4 QC

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Sodium	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Thallium	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Titanium	2019-07-11	2019-07-12	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Uranium	2019-07-11	2019-07-12	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Vanadium	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Zinc	2019-07-11	2019-07-12	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Hardness	2019-07-12	2019-07-12	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS



Chaîne de traçabilité Environnement

Eau potable RQEP (réseau) – Veuillez utiliser le formulaire du MDDELCC

Glace Bloc réfrigérant Aucun
 Scellé légal intact: Oui Non N/A

Information pour le rapport
 Compagnie: Tata Steel Minerals Canada
 Adresse: 1000 Rue Sherbrooke Ouest, Montreal, QC, H3A 3G4
 Téléphone: 514.764.6700 x.765 Téléc.: _____
 Projet: QC Quarterly Surface Water - Sunny
 Lieu de prélèvement: DS04 QC
 Prélevé par: JFD

Rapport envoyé à
 1. Nom: Mariana Trindade
 Courriel: mariana.trindade@tatasteelcanada.com
 2. Nom: TSMC Environment Team
 Courriel: *Team Email List*

Critères à respecter
 PRTC ABC RESC
 CCME
 Eau consommation
 Eau résurg. Surface
 Eau résurg. Salée
 CMM Sanitaire Pluvial
 Autre: _____

Délais d'analyse requis (jours ouvrables)
 Environnemental: Haute Résolution:
 Régulier: 5 à 7 jours Régulier: 10 à 15 jours
 Urgent: Même jour Urgent: < 10 jours
 1 jour Date Requite: _____
 2 jours
 3 jours
 AA/MM/JJ

Facturé à Môme adresse: Oui Non
 Compagnie: _____
 Contact: _____
 Courriel: _____
 Adresse: _____
 Bon de commande: 3000000296 Soumission: _____

Commentaires:

Matrice (légende)

EP	Eau potable	EB	Eau brute	EPI	Eau de piscine
S	Sol	B	Boue	SE	Sédiment
ES	Eau de surface	AF	Affluent		
SL	Solide	EU	Eau usée	EF	Effluent
ST	Eau souterraine	A	Air		

Format de rapport
 Portrait (échantillon/page) Paysage (échantillons/page)

IDENTIFICATION DE L'ÉCHANTILLON	PRÉLÈVEMENT		MATRICE	NB DE CONTENANTS	Hydrocarbures pétroliers C10-C50	HAP	BTEX	HAC-HAM	THM	Chlorobenzènes	Phthalates	COSV	BPC: Congénères	Aroclor	CBNC	Éthylène glycol	Formaldéhyde	Huiles et graisses: Minérales	Totales	Pesticides: OC	OP	Herbicides	Diquat / Paraquat	Glyphosate	Phénols (GC-MS)	Indice phénolique (4AAP)	Métaux - Sol	Hg	Se	CrVI	Métaux - ST	Hg	CrVI	CrIII	U	Métaux: Filtré sur terrain	Filtré au lab	Métaux (spécifier):	Dureté totale	Alcalinité	Bromates	Conductivité	Chlorures	Fluorures	Sulfates	Bromures	Cyanures: Totaux	Disponibles	Oxydables	DCO	COT	NH ₃ + NH ₂	NTK	NO ₂ + NO ₃	P total	MESV	Solides: Totaux	Dissous	MES	Sulfures - Eau	Soufre total - Sol	pH	NO ₂	NO ₃	o-P04	COD	Absorbance UV	Couleur	Turbidité	DBO ₅	DBO ₃	Carbonée	Coliformes: Totaux	Fécès	E. coli	Microbiologie (autre):	HR/MS: Dioxines/Furanes	HAP	BPC	CMM 2008-47: Sanitaire	Pluvial	NP	NPE	RMD	REIMR art.
	DS04 - ER - SUN - Q1 - 2019	(19/07/04)																																																																																			

Echantillon remis par (nom en lettres moulées et signature) <u>Adam Calvert / Adam Calvert</u>	Date (AA/MM/JJ) <u>(19/07/04)</u>	Heure <u>13:00</u>	Echantillon reçu par (nom en lettres moulées et signature) <u>ABa</u>	Date (AA/MM/JJ) <u>08-07-19</u>	Heure <u>13:00</u>	Page <u>1</u> de <u>1</u>
Echantillon remis par (nom en lettres moulées et signature)	Date (AA/MM/JJ)	Heure	Echantillon reçu par (nom en lettres moulées et signature)	Date (AA/MM/JJ)	Heure	N°: <u>072304</u>

Quebec parameters:

DSO4 2a (Sunny and Goodwood) environmental monitoring and G

METALS	CONVENTIONALIS	MICROBIOLOGICAL TESTS	PETROLEUM HYDROCARBONS
Mercury (Hg)	BOD5	Total coliforms	Petroleum Hydrocarbons (C10-C50)
Total phosphorous	COD	Fecal coliforms	
Aluminum (Al)	Conductivity		
Antimony (Sb)	Dissolved organic carbon		
Silver (Ag)	Dissolved oxygen		
Arsenic (As)	Fluoride (F)		
Barium (Ba)	Hexavalent Chromium (Cr 6+)		
Boron (B)	Nitrogen ammonia (N-NH3)		
Cadmium (Cd)	pH		
Calcium (Ca)	Reactive silica (SiO2)		
Chromium (Cr)	TKN Total Kjeldahl Nitrogen		
Cobalt (Co)	Total Cyanide (CN)		
Copper (Cu)	Total Organic Carbon		
Total Hardness (CaCO3)	Alkalinity Total (as CaCO3) pH 4.5		
Tin (Sn)	Chloride (Cl)		
Iron (Fe)	Nitrites (N-NO2-)		
Magnesium (Mg)	Nitrates (N-NO3-)		
Manganese (Mn)	Sulfates (SO4)		
Molybdenum (Mo)	Total suspended solids (TSS)		
Nickel (Ni)	Total dissolved solids		
Lead (Pb)	Hydrogen Sulphide		
Potassium (K)	Phenols-4AAP		
Selenium (Se)			
Sodium (Na)			
Thallium (Tl)			
Titanium (Ti)			
Uranium (U)			
Vanadium (V)			
Zinc (Zn)			
Radium 226 (Ra)			



TPH

Interlab à envoyer à

AGAT Dartmouth avec

Critères Atlantic PIRI



Métaux

Totaux

+ TKN et NH3

Sur tous.



Certificat d'analyse

Client : **AGAT Laboratoires**

Responsable : Sous-traitance Agat-Montréal

Adresse : 9770, route Transcanadienne

St-Laurent Québec H4S 1V9

tél.: (514) 337-1000 (00)

fax.: (514) 333-3046

Numéro de projet : V-90869

Lieu de prélèvement : 419325 (DSO4-EE-SUN)

Date de prélèvement : 05 août 2019

Échantillon : 419325 (DSO4-EE-SUN)

Heure de prélèvement : N/D

Nom du préleveur : n/d

Date de réception : 23 août 2019

Type d'échantillon : Eau

Réseau :

Date d'émission : 12 septembre 2019

Les résultats ne se rapportent qu'aux échantillons soumis pour analyse.

Les échantillons seront conservés pendant 30 jours à partir de la date du rapport à moins d'avis écrit du client.

Sauf indication contraire, tous les échantillons ont été reçus en bon état.

Toute reproduction, sinon en entier, est interdite sans l'autorisation écrite du laboratoire.



Certificat d'analyse

Numéro de projet : V-90869

Échantillon : 419325 (DSO4-EE-SUN)

Date de prélèvement : 05 août 2019

Lieu de prélèvement : 419325 (DSO4-EE-SUN)

Heure de prélèvement : N/D

Paramètres	Résultats	Méthode d'analyse	Date d'analyse
Radium (RA 226)	<0.002 Becquerels/L	M-RA-2.0	12 septembre 2019

Sauf indication contraire, tous les échantillons ont été reçus en bon état.

Toute reproduction, sinon en entier, est interdite sans l'autorisation écrite du laboratoire.



Limite de détection rapportée

Numéro de projet : V-90869

Échantillon : 419325 (DSO4-EE-SUN)

Date de prélèvement : 05 août 2019

Lieu de prélèvement : 419325 (DSO4-EE-SUN)

Heure de prélèvement : N/D

Paramètre	Valeur	Unité	Méthode	Accréditation
Radium (RA 226)	0.002	Becquerels/L	M-RA-2.0	Oui

Sauf indication contraire, tous les échantillons ont été reçus en bon état.

Toute reproduction, sinon en entier, est interdite sans l'autorisation écrite du laboratoire.



Certificat contrôle qualité

Numéro de projet : V-90869

Échantillon : 419325 (DSO4-EE-SUN)

Date de prélèvement : 05 août 2019

Lieu de prélèvement : 419325 (DSO4-EE-SUN)

Heure de prélèvement : N/D

Paramètres

Radium (RA 226) Becquerels/L	Blanc <0.002
	Nom Standard MR 76422
	Valeur obtenue 5.250
	Justesse 86.8%
	Intervalle 5.143 - 6.958

Sauf indication contraire, tous les échantillons ont été reçus en bon état.

Toute reproduction, sinon en entier, est interdite sans l'autorisation écrite du laboratoire.



Informations supplémentaires

Numéro de projet : V-90869

Échantillon : 419325 (DSO4-EE-SUN)

Date de prélèvement : 05 août 2019

Lieu de prélèvement : 419325 (DSO4-EE-SUN)

Heure de prélèvement : N/D

Méthode laboratoire

Méthode de référence

M-RA-2.0

APHA 7500-Ra B et EPA P.13 (EMSL-CI)

Sauf indication contraire, tous les échantillons ont été reçus en bon état.

Toute reproduction, sinon en entier, est interdite sans l'autorisation écrite du laboratoire.



Certificat d'analyse

Client : **AGAT Laboratoires**

Responsable : Sous-traitance Agat-Montréal

Adresse : 9770, route Transcanadienne

St-Laurent Québec H4S 1V9

tél.: (514) 337-1000 (00)

fax.: (514) 333-3046

Numéro de projet : V-90870

Lieu de prélèvement : 419378 (DSO4-ER-SUN)

Date de prélèvement : 05 août 2019

Échantillon : 419378 (DSO4-ER-SUN)

Heure de prélèvement : N/D

Nom du préleveur : n/d

Date de réception : 23 août 2019

Type d'échantillon : Eau

Réseau :

Date d'émission : 12 septembre 2019

Les résultats ne se rapportent qu'aux échantillons soumis pour analyse.

Les échantillons seront conservés pendant 30 jours à partir de la date du rapport à moins d'avis écrit du client.

Sauf indication contraire, tous les échantillons ont été reçus en bon état.

Toute reproduction, sinon en entier, est interdite sans l'autorisation écrite du laboratoire.



Certificat d'analyse

Numéro de projet : V-90870

Échantillon : 419378 (DSO4-ER-SUN)

Date de prélèvement : 05 août 2019

Lieu de prélèvement : 419378 (DSO4-ER-SUN)

Heure de prélèvement : N/D

Paramètres	Résultats	Méthode d'analyse	Date d'analyse
Radium (RA 226)	<0.002 Becquerels/L	M-RA-2.0	12 septembre 2019

Sauf indication contraire, tous les échantillons ont été reçus en bon état.

Toute reproduction, sinon en entier, est interdite sans l'autorisation écrite du laboratoire.



Limite de détection rapportée

Numéro de projet : V-90870

Échantillon : 419378 (DSO4-ER-SUN)

Date de prélèvement : 05 août 2019

Lieu de prélèvement : 419378 (DSO4-ER-SUN)

Heure de prélèvement : N/D

Paramètre	Valeur	Unité	Méthode	Accréditation
Radium (RA 226)	0.002	Becquerels/L	M-RA-2.0	Oui

Sauf indication contraire, tous les échantillons ont été reçus en bon état.

Toute reproduction, sinon en entier, est interdite sans l'autorisation écrite du laboratoire.



Informations supplémentaires

Numéro de projet : V-90870

Échantillon : 419378 (DSO4-ER-SUN)

Date de prélèvement : 05 août 2019

Lieu de prélèvement : 419378 (DSO4-ER-SUN)

Heure de prélèvement : N/D

Méthode laboratoire

Méthode de référence

M-RA-2.0

APHA 7500-Ra B et EPA P.13 (EMSL-CI)

Sauf indication contraire, tous les échantillons ont été reçus en bon état.

Toute reproduction, sinon en entier, est interdite sans l'autorisation écrite du laboratoire.



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: QC-Quarterly Surface Water - Sunny

AGAT WORK ORDER: 19M502165

MICROBIOLOGY ANALYSIS REVIEWED BY: Linda Maille, Superviseur Microbiology

TRACE ORGANICS REVIEWED BY: Manal Seif, Report Writer

WATER ANALYSIS REVIEWED BY: Jalel Rouissi, Chimiste

DATE REPORTED: 2019-09-16

VERSION*: 1

PAGES (INCLUDING COVER): 11

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M502165

PROJECT: QC-Quarterly Surface Water - Sunny

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Package - Microbiological

DATE RECEIVED: 2019-08-07

DATE REPORTED: 2019-09-16

Parameter	Unit	SAMPLE DESCRIPTION:		DSO4-EE-SUN	DSO4-ER-SUN
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-08-05	2019-08-05
		G / S	RDL	419325	419378
Fecal Coliforms	CFU/100ml		2	<2	<2
Total Coliforms	CFU/100ml		2	370	8
Temperature upon receipt	°C		NA	7.0	7.0

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
419325-419378 Analysis performed passed the regulatory conservation time of 48 hours.

Certified By:



Linda Maille

AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



Certificate of Analysis

AGAT WORK ORDER: 19M502165

PROJECT: QC-Quarterly Surface Water - Sunny

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-08-07

DATE REPORTED: 2019-09-16

Parameter	Unit	SAMPLE DESCRIPTION:		DSO4-EE-SUN	DSO4-ER-SUN
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-08-05	2019-08-05
		G / S	RDL	419325	419378
Mercury	µg/L		0.1	<0.1	<0.1
Total Phosphorus	µg/L - P		20	123	246
Aluminum	µg/L		10	13	<10
Antimony	µg/L		1	<1	<1
Silver	µg/L		0.2	<0.2	<0.2
Arsenic	µg/L		1	<1	<1
Barium	µg/L		5	<5	<5
Boron	µg/L		40	<40	<40
Cadmium	µg/L		0.5	<0.5	<0.5
Calcium	µg/L		100	2660	2870
Chromium	µg/L		1	<1	<1
Cobalt	µg/L		0.5	<0.5	<0.5
Copper	µg/L		1	<1	<1
Total hardness	µg/L - CaCO3		1000	13730	14870
Tin	mg/L		0.5	<0.5	<0.5
Iron	µg/L		70	<70	<70
Manganese	µg/L		1	12	<1
Molybdenum	µg/L		1	<1	<1
Nickel	µg/L		1	<1	<1
Lead	µg/L		1	<1	<1
Potassium	µg/L		100	128	154
Thallium	µg/L		1	<1	<1
Titanium	µg/L		3	<3	<3
Uranium	µg/L		0.5	<0.5	<0.5
Vanadium	µg/L		1	<1	<1
Zinc	µg/L		3	<3	<3
Radium-226	Bq/L		0.002	<0.002	<0.002
Report Reviewer Montreal Chem.				J ROUSSI	J ROUSSI

Certified By:



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19M502165

PROJECT: QC-Quarterly Surface Water - Sunny

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-08-07

DATE REPORTED: 2019-09-16

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



Certificate of Analysis

AGAT WORK ORDER: 19M502165

PROJECT: QC-Quarterly Surface Water - Sunny

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Packages - Conventionals

DATE RECEIVED: 2019-08-07

DATE REPORTED: 2019-09-16

Parameter	Unit	SAMPLE DESCRIPTION:		DSO4-EE-SUN	DSO4-ER-SUN
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-08-05	2019-08-05
		G / S	RDL	419325	419378
BOD5	mg/L - O2		2	<2	<2
COD	mg/L - O2		5	<5	<5
Dissolved Organic Carbon	mg/L		0.30	1.12	0.39
Total Organic Carbon	mg/L		0.30	1.20	0.34
Dissolved Oxygen	mg/L		3	9	11
Fluoride	mg/L		0.10	0.21	0.20
chromium VI	mg/L		0.008	<0.008	<0.008
Ammonia Nitrogen	mg/L - N		0.02	0.11	0.17
Reactive silica	mg/L		0.05	5.98	5.42
Total Kjeldahl Nitrogen	mg/L - N		0.3	17.0	0.3
Total Cyanide	mg/L - CN		0.005	<0.005	<0.005
Alkalinity	mg/L - CaCO3		1.5	13.1	14.7
Chloride	mg/L		0.50	<0.50	<0.50
Nitrate	mg/L - N		0.02	<0.02	0.06
Nitrite	mg/L - N		0.02	<0.02	<0.02
Sulfate	mg/L		0.50	1.72	1.29
Total Suspended Solids	mg/L		2	<2	<2
Dissolved Solids	mg/L		10	18	14
Total Sulfide	mg/L S-2		0.02	<0.02	<0.02
Total Phenols (colorimetry)	mg/L		0.002	0.002	0.006
Total Phosphorus	mg/L - P		0.02	0.12	0.25
pH	pH		NA	7.66	7.28

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.

Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: QC-Quarterly Surface Water - Sunny
SAMPLED BY:

AGAT WORK ORDER: 19M502165
ATTENTION TO: Mariana Trindade
SAMPLING SITE:

Water Analysis															
RPT Date: 2019-09-16			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Tata Steel - QC Packages - Conventionals

BOD5	1		NA	NA	0.0%	< 2	77%	80%	120%	93%	80%	120%	98%	80%	120%
COD	419325	419325	<5	<5	NA	< 5	82%	80%	120%	81%	80%	120%	NA	80%	120%
Dissolved Organic Carbon	1		NA	NA	0.0%	< 0.30	95%	80%	120%	88%	80%	120%	NA	80%	120%
Total Organic Carbon	416441		3.32	3.30	0.6%	< 0.30	95%	80%	120%	88%	80%	120%	80%	80%	120%
Fluoride	412945		<0.10	<0.10	NA	< 0.10	90%	80%	120%	91%	80%	120%	NA	80%	120%
chromium VI	409135		< 0.008	< 0.008	NA	< 0.008	100%	80%	120%	102%	80%	120%	NA	80%	120%
Ammonia Nitrogen	425712		0.24	0.27	11.8%	< 0.02	118%	80%	120%	100%	80%	120%	NA	80%	120%
Reactive silica	312168		2.12	2.10	0.9%	< 0.05	102%	90%	110%	111%	70%	130%	113%	70%	130%
Total Kjeldahl Nitrogen	422916		164	162	1.2%	< 0.3	118%	80%	120%	92%	80%	120%	NA	80%	120%
Total Cyanide	429841		<0.005	<0.005	NA	< 0.005	96%	80%	120%	120%	80%	120%	111%	80%	120%
Alkalinity	419378	419378	14.7	14.6	0.7%	< 1.5	96%	80%	120%	94%	80%	120%	93%	80%	120%
Chloride	412945		1.57	1.57	NA	< 0.5	93%	80%	120%	74%	80%	120%	82%	80%	120%
Nitrate	412945		0.08	0.08	NA	< 0.02	89%	80%	120%	93%	80%	120%	96%	80%	120%
Nitrite	412945		<0.02	<0.02	NA	< 0.02	NA	80%	120%	84%	80%	120%	87%	80%	120%
Sulfate	412945		6.77	7.05	4.1%	< 0.5	98%	80%	120%	86%	80%	120%	93%	80%	120%
Total Suspended Solids	411555		11	7	NA	< 2	100%	80%	120%	NA			105%	80%	120%
Dissolved Solids	413936		24	32	NA	< 10	101%	80%	120%	NA			106%	80%	120%
Total Sulfide	402678		< 0.02	< 0.02	NA	< 0.02	109%	80%	120%	86%	80%	120%	95%	80%	120%
Total Phenols (colorimetry)	419325	419325	0.002	0.002	NA	< 0.002	96%	80%	120%	110%	80%	120%	90%	80%	120%
Total Phosphorus	411859		0.28	0.29	3.5%	< 0.02	101%	80%	120%	115%	80%	120%	NA	80%	120%
pH	412279		7.87	7.79	1.0%		103%	80%	120%	103%	80%	120%	NA		

Tata Steel - QC Package - Metals

Mercury	1		NA	NA	0.0%	< 0.1	101%	80%	120%	104%	80%	120%	105%	80%	120%
Total Phosphorus	411859		285	292	2.4%	< 20	101%	80%	120%	115%	80%	120%	NA	80%	120%
Aluminum	413936		<10	<10	NA	< 10	89%	80%	120%	96%	80%	120%	114%	80%	120%
Antimony	413936		<1	<1	NA	< 1	106%	80%	120%	93%	80%	120%	NA	80%	120%
Silver	413936		<0.2	<0.2	NA	< 0.2	NA	80%	120%	104%	80%	120%	97%	80%	120%
Arsenic	413936		<1	<1	NA	< 1	96%	80%	120%	100%	80%	120%	NA	80%	120%
Barium	413936		<5	<5	NA	< 5	91%	80%	120%	96%	80%	120%	NA	80%	120%
Boron	413936		<40	<40	NA	< 40	99%	80%	120%	107%	80%	120%	NA	80%	120%
Cadmium	413936		<0.5	<0.5	NA	< 0.5	95%	80%	120%	102%	80%	120%	NA	80%	120%
Calcium	413936		2520	2510	0.4%	< 100	91%	80%	120%	96%	80%	120%	NA	80%	120%
Chromium	413936		<1	<1	NA	< 1	101%	80%	120%	111%	80%	120%	111%	80%	120%
Cobalt	413936		<0.5	<0.5	NA	< 0.5	102%	80%	120%	108%	80%	120%	112%	80%	120%
Copper	413936		11	10	9.5%	< 1	103%	80%	120%	104%	80%	120%	NA	80%	120%
Tin	413936		<0.5	<0.5	NA	< 0.5	NA	80%	120%	97%	80%	120%	114%	80%	120%
Iron	413936		<70	<70	NA	< 70	102%	80%	120%	110%	80%	120%	NA	80%	120%
Manganese	413936		<1	<1	NA	< 1	94%	80%	120%	101%	80%	120%	115%	80%	120%
Molybdenum	413936		<1	<1	NA	< 1	95%	80%	120%	96%	80%	120%	117%	80%	120%
Nickel	413936		<1	<1	NA	< 1	105%	80%	120%	103%	80%	120%	120%	80%	120%
Lead	413936		<1	<1	NA	< 1	101%	80%	120%	105%	80%	120%	107%	80%	120%



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: QC-Quarterly Surface Water - Sunny
SAMPLED BY:

AGAT WORK ORDER: 19M502165
ATTENTION TO: Mariana Trindade
SAMPLING SITE:

Water Analysis (Continued)

RPT Date: 2019-09-16			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Potassium	413936		<100	<100	NA	< 100	94%	80%	120%	95%	80%	120%	107%	80%	120%
Thallium	413936		<1	<1	NA	< 1	101%	80%	120%	103%	80%	120%	119%	80%	120%
Titanium	413936		<3	<3	NA	< 3	NA	80%	120%	93%	80%	120%	NA	80%	120%
Uranium	413936		<0.5	<0.5	NA	< 0.5	100%	80%	120%	105%	80%	120%	120%	80%	120%
Vanadium	413936		<1	<1	NA	< 1	102%	80%	120%	106%	80%	120%	109%	80%	120%
Zinc	413936		3	<3	NA	< 3	100%	80%	120%	96%	80%	120%	NA	80%	120%

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M502165

PROJECT: QC-Quarterly Surface Water - Sunny

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis					
Fecal Coliforms	2019-08-08	2019-08-08	MIC-102-7013	MA.700-Fec.Ec 1.0	N/A
Total Coliforms	2019-08-08	2019-08-08	MIC-102-7017	MA.700-Col 1.0	N/A
Temperature upon receipt	2019-08-07	2019-08-08	N/A		N/A

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M502165

PROJECT: QC-Quarterly Surface Water - Sunny

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Mercury	2019-08-09	2019-08-09	MET-101-6102F	MA. 200 Hg 1.1	COLD VAPOR/AA
Total Phosphorus	2019-08-21	2019-08-21	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMÉTRIE
Aluminum	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Barium	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-08-08	2019-08-10	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Calcium	2019-08-08	2019-08-10	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Chromium	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Cobalt	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Copper	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Total hardness	2019-08-08	2019-08-09	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Tin	2019-08-08	2019-08-10	MET-101-6107F	MA. 200 - Mét 1.2	ICP/OES
Iron	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Manganese	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Molybdenum	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Lead	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Potassium	2019-08-08	2019-08-10	MET-101-6105F, non accrédité par le MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Thallium	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Titanium	2019-08-08	2019-08-09	MET-101-6105F, non accrédité par le MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Uranium	2019-08-08	2019-08-10	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Vanadium	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Zinc	2019-08-08	2019-08-10	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Radium-226		2019-09-12	Subcontracted	Subcontracted	N/A
Report Reviewer Montreal Chem.			NA	NA	
BOD5	2019-08-22	2019-08-27	INOR-101-6006F	MA. 315 - DBO 1.1	ELECTROMETRY
COD	2019-08-16	2019-08-16	INOR-101-6042F	MA.315-DCO 1.1	SPECTROPHOTOMETRY
Dissolved Organic Carbon	2019-08-12	2019-08-12	INOR-101-6049F, unaccredited by MDDELCC	MA.300-C1.0	INFRARED DETECTION
Total Organic Carbon	2019-08-12	2019-08-12	INOR-101-6049F	MA.300-C1.0	INFRARED DETECTION
Dissolved Oxygen		2019-08-29	Special	SM 4500-O G . 21 ième ed.	DO METER
Fluoride	2019-08-11	2019-08-11	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
chromium VI	2019-08-09	2019-08-09	INOR-101-6034F	MA. 200 - CrHex 1.1	SPECTROPHOTOMETRY
Ammonia Nitrogen	2019-08-15	2019-08-15	INOR-101-6051F	MA. 303 - N 2.0	COLORIMÉTRIE
Reactive silica	2019-08-13	2019-08-13	INOR-101-6071F, non accrédité MDDELCC	AQ2 EPA-122A Rev 5	COLORIMÉTRIE
Total Kjeldahl Nitrogen	2019-08-20	2019-08-20	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMÉTRIE
Total Cyanide	2019-08-14	2019-08-14	INOR-101-6061F	MA. 300 - CN 1.2	COLORIMÉTRIE
Alkalinity	2019-08-12	2019-08-12	INOR-101-6000F, unaccredited by MDDELCC	MA. 315 - Alc-Aci 1.0	TITRATION
Chloride	2019-08-11	2019-08-11	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrate	2019-08-11	2019-08-11	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrite	2019-08-11	2019-08-11	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M502165

PROJECT: QC-Quarterly Surface Water - Sunny

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Sulfate	2019-08-11	2019-08-11	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Total Suspended Solids	2019-08-09	2019-08-10	INOR-101-6028F	MA. 115 - S.S. 1.2	GRAVIMETRY
Dissolved Solids	2019-08-13	2019-08-14	INOR-101-6054F	MA.115-S.D. 1.0	GRAVIMETRY
Total Sulfide	2019-08-13	2019-08-13	INOR-101-6055F	MA.300-S 1.2	SPECTROPHOTOMETRY
Total Phenols (colorimetry)	2019-08-09	2019-08-09	INOR-101-6062F	MA. 404 - I. Phé 2.2	COLORIMÉTRIE
Total Phosphorus	2019-08-21	2019-08-21	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMÉTRIE
pH	2019-08-08	2019-08-08	INOR-101-6021F	MA. 100 - pH 1.1	ELECTROMETRY

197 502165



9770 Route Transcanadienne
St-Laurent, Québec
H4S 1V9
http://webearth.agatlabs.com

Tel.: 514.337.1000
Fax.: 514.333.3046
agatlabs.com

Laboratory use Only

Arrival Condition: Good Poor (complete 'notes')
Arrival Temperature: _____ AGAT Job Number: _____
Notes: _____

Report To:
Company: Tata Steel Minerals Canada
Contact: Mariana Trindade
Address: 1000 Sherbrooke West, Suite 1120
Montreal, QC H3A 3G4

Project #: QC Quarterly Surface Water - Sunny
Quote #: RFQ 20190118

Invoice to: Same (Y/N) - Circle
Company: Tata Steel Minerals Canada
Contact: Jay Adhvaryu
Email: jay.adhvaryu@tatasteelcanada.com
Phone: _____ Fax: _____
PO #: 3000000242

Report Information
1. Name: Mariana Trindade
Email: mariana.trindade@tatasteelcanada.com
2. Name: Jean-Francois Dion
Email: jeanfrancois.dion@tatasteelcanada.com

Regulatory Requirements (Check):
 List Guidelines on Report Do Not List Guidelines on Report
 PIRI Site Info (check all that apply):
 Tier 1 Res. Pot. Coarse
 Tier 2 Com N/Pot. Fine
 Gas Fuel Lube
 CCME CDWQ
 Ind
 Com
 Res/P
 Ag
 FWAL
 Sediment
 Other NL MMER

Report Format
 Single PDF sample per page
 Multiple PDF samples
 Format Included

Turnaround Time (TAT) Business Days
Regular TAT: 5 - 7 days
Rush TAT: 1 day 2 days
 3 - 4 days

SAMPLE IDENTIFICATION	DATE / TIME SAMPLED	SAMPLE MATRIX	# OF CONTAINERS	COMMENTS - Site/Sample Info, Sample Containment	Field Filtered/Preserved	Metals, Total (Including Hardness)	Mercury, Total	BOD5	Total Phosphorous & TKN	Conductivity & pH	TOC & DOC	Dissolved Oxygen	Anions (Cl, F, SO4, NO2, NO3)	Ammonia as N	Reactive Silica	COD	Phenols -4AAP - Mississauga	Hexavalent Chromium	Sulphide as H2S	Alkalinity (pH 4.5)	Total Cyanide	Total Dissolved Solids	Total Suspended Solids	Total Coliforms & Fecal Coliforms	PHC (C10-C50)	Radium-226 - H2Lab
DSO4-EE-SUN	Aug 5 / 17:40	water	15	Q2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
DSO4-ER-SUN	Aug 5 / 14:15	water	15	Q2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Sample Relinquished By (print name & sign) Jean-Francois Dion Date/Time 05/06/13 00 Samples Received By (print name and sign) _____ Date/Time _____ Special Instructions _____

Sample Relinquished By (print name & sign) _____ Date/Time _____ Samples Received By (print name and sign) _____ Date/Time _____ **Tata Steel -QC Effluent**
Page _____ of _____

Noted 190801 T-72



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Goodwood

AGAT WORK ORDER: 19M530908

MICROBIOLOGY ANALYSIS REVIEWED BY: Katia Etienne, Microbiologiste

TRACE ORGANICS REVIEWED BY: Robert Roch, Chimiste

WATER ANALYSIS REVIEWED BY: Marie-Flora Coustou, Report Writer

DATE REPORTED: 2019-12-03

VERSION*: 1

PAGES (INCLUDING COVER): 16

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M530908

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Package - Microbiological

DATE RECEIVED: 2019-10-15

DATE REPORTED: 2019-12-03

DSO4-ER-SUN-

SAMPLE DESCRIPTION: Q3-2019

SAMPLE TYPE: Water

DATE SAMPLED: 2019-10-11

Parameter	Unit	G / S	RDL	619685
Total Coliforms	CFU/100ml		2	56
Fecal Coliforms	CFU/100ml		2	16
Temperature upon receipt	°C		NA	8.9
Analysis started by				1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
619685 Analysis performed passed the regulatory conservation time of 48 hours.

Certified By: _____



Mariana Trindade

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Certificate of Analysis

AGAT WORK ORDER: 19M530908

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Petroleum Hydrocarbons in Water

DATE RECEIVED: 2019-10-15

DATE REPORTED: 2019-12-03

DSO4-ER-SUN-

SAMPLE DESCRIPTION: Q3-2019

SAMPLE TYPE: Water

DATE SAMPLED: 2019-10-11

Parameter	Unit	G / S	RDL	619685
Petroleum Hydrocarbons C10-C50	µg/L		100	140
Surrogate	Unit	Acceptable Limits		
Nonane	%	40-140		61

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

619685 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By: _____



Robert Roch

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Certificate of Analysis

AGAT WORK ORDER: 19M530908

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-10-15

DATE REPORTED: 2019-12-03

DSO4-ER-SUN-

SAMPLE DESCRIPTION: Q3-2019

SAMPLE TYPE: Water

DATE SAMPLED: 2019-10-11

Parameter	Unit	G / S	RDL	619685
Mercury	µg/L		0.1	<0.1
Aluminum	µg/L		10	<10
Antimony	µg/L		1	<1
Silver	µg/L		0.2	<0.2
Arsenic	µg/L		1	<1
Barium	µg/L		5	<5
Boron	µg/L		40	<40
Cadmium	µg/L		0.5	<0.5
Calcium	µg/L		100	3340
Chromium	µg/L		1	<1
Cobalt	µg/L		0.5	<0.5
Copper	µg/L		1	<1
Total hardness	µg/L - CaCO3		1000	18300
Tin	µg/L		5	<5
Iron	µg/L		70	<70
Magnesium	µg/L		100	2420
Manganese	µg/L		1	<1
Molybdenum	µg/L		1	<1
Nickel	µg/L		1	<1
Lead	µg/L		1	<1
Potassium	µg/L		100	220
Selenium	µg/L		1	<1
Sodium	µg/L		200	374
Thallium	µg/L		1	<1
Titanium	µg/L		3	<3
Uranium	µg/L		0.5	<0.5
Vanadium	µg/L		1	<1

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19M530908

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-10-15

DATE REPORTED: 2019-12-03

DSO4-ER-SUN-

SAMPLE DESCRIPTION: Q3-2019

SAMPLE TYPE: Water

DATE SAMPLED: 2019-10-11

Parameter	Unit	G / S	RDL	619685
Zinc	µg/L		3	<3
Radium-226	Bq/L		0.005	0.007
Total Hardness	µg/L - CaCO3		1000	18300

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



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CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

Tata Steel - QC Packages - Conventionals

DATE RECEIVED: 2019-10-15

DATE REPORTED: 2019-12-03

DSO4-ER-SUN-

SAMPLE DESCRIPTION: Q3-2019

SAMPLE TYPE: Water

DATE SAMPLED: 2019-10-11

Parameter	Unit	G / S	RDL	619685
BOD5	mg/L - O2		2	<2
COD	mg/L - O2		5	<5
Conductivité (Salinité - mS/cm)	mS/cm		2	45
Dissolved Organic Carbon	mg/L		0.30	0.46
Dissolved Oxygen	mg/L		3	9
Fluoride	mg/L		0.10	0.15
chromium VI	mg/L		0.008	<0.008
Ammonia Nitrogen	mg/L - N		0.02	0.05
pH	pH		NA	7.42
Reactive silica	mg/L		0.05	4.62
Total Kjeldahl Nitrogen	mg/L - N		0.3	<0.3
Total Cyanide	mg/L - CN		0.005	<0.005
Alkalinity	mg/L - CaCO3		1.5	17.2
Chloride	mg/L		0.5	<0.5
Nitrate	mg/L - N		0.02	0.08
Nitrite	mg/L - N		0.02	<0.02
Sulfate	mg/L		0.5	1.7
Total Suspended Solids	mg/L		2	<2
Dissolved Solids	mg/L		10	36
Total Sulfide	mg/L S-2		0.02	<0.02
Total Phenols (colorimetry)	mg/L		0.002	0.002
Total Phosphorus	mg/L - P		0.02	<0.02
Total Organic Carbon	mg/L		0.30	0.61

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



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ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

DATE RECEIVED: 2019-10-15

DATE REPORTED: 2019-12-03

Parameter	Unit	SAMPLE TYPE:	
		G / S	RDL
			0.02
Aluminum	µg/L		0.5
Antimony	µg/L		0.005
Silver	µg/L		0.03
Arsenic	µg/L		0.08
Barium	µg/L		0.03
Boron	µg/L		0.3
Cadmium	µg/L		0.006
Calcium	µg/L		20
Chromium	µg/L		0.04
Cobalt	µg/L		0.005
Copper	µg/L		0.05
Iron	µg/L		0.5
Magnesium	µg/L		10
Manganese	µg/L		0.03
			0.01
Molybdenum	µg/L		0.01
Nickel	µg/L		0.03
Lead	µg/L		0.01
Potassium	µg/L		10
Selenium	µg/L		0.05
Sodium	µg/L		0.05
			0.02
			0.05
			1
Vanadium	µg/L		0.2
Zinc	µg/L		0.5
			0.01

Certified By:



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Certificate of Analysis

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CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

DATE RECEIVED: 2019-10-15		DATE REPORTED: 2019-12-03	
SAMPLE TYPE:		DATE SAMPLED:	
Parameter	Unit	G / S	RDL
Total Hardness	µg/L - CaCO3		1000

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



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Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: Goodwood
SAMPLED BY:

AGAT WORK ORDER: 19M530908
ATTENTION TO: Mariana Trindade
SAMPLING SITE:

Trace Organics Analysis

RPT Date: 2019-12-03			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE		MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons in Water															
Petroleum Hydrocarbons C10-C50		MR	4420	4240	0.0%	< 100	NA	70%	130%	118%	70%	130%	NA	70%	130%
Nonane		MR	92%	98%	0.0%	68	NA	40%	140%	92%	40%	140%	NA	40%	140%

Comments: NA : Non applicable
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
NA as the percentage of recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.
NA in the spike blank or CRM indicates that it is not required by the procedure.

Certified By: _____



Robert Roch

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Quality Assurance

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Goodwood
 SAMPLED BY:

 AGAT WORK ORDER: 19M530908
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE:

Water Analysis															
RPT Date: 2019-12-03			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Tata Steel - QC Package - Metals															
Mercury	619714		<0.1	<0.1	NA	< 0.1	106%	80%	120%	112%	80%	120%	115%	80%	120%
Aluminum	619537		25	21	NA	< 10	102%	80%	120%	103%	80%	120%	NA	80%	120%
Antimony	619537		<1	<1	NA	< 1	113%	80%	120%	99%	80%	120%	113%	80%	120%
Silver	619537		<0.2	<0.2	NA	< 0.2	NA	80%	120%	99%	80%	120%	102%	80%	120%
Arsenic	619537		1	2	NA	< 1	98%	80%	120%	103%	80%	120%	110%	80%	120%
Barium	619537		58	58	0.0%	< 5	99%	80%	120%	97%	80%	120%	NA	80%	120%
Boron	619537		241	235	NA	< 40	108%	80%	120%	101%	80%	120%	NA	80%	120%
Cadmium	619537		<0.5	<0.5	NA	< 0.5	100%	80%	120%	94%	80%	120%	102%	80%	120%
Calcium	619537		58800	58700	0.0%	< 100	97%	80%	120%	97%	80%	120%	NA	80%	120%
Chromium	619537		<1	<1	NA	< 1	100%	80%	120%	101%	80%	120%	94%	80%	120%
Cobalt	619537		1.2	1.2	NA	< 0.5	101%	80%	120%	103%	80%	120%	89%	80%	120%
Copper	619537		<1	1	NA	< 1	107%	80%	120%	100%	80%	120%	111%	80%	120%
Tin	619537		<5	<5	NA	< 5	NA	80%	120%	102%	80%	120%	102%	80%	120%
Iron	619537		<70	<70	NA	< 70	104%	80%	120%	102%	80%	120%	NA	80%	120%
Magnesium	619537		9800	10100	2.6%	< 100	110%	80%	120%	109%	80%	120%	NA	80%	120%
Manganese	619537		26	26	0.9%	< 1	92%	80%	120%	103%	80%	120%	92%	80%	120%
Molybdenum	619537		48	48	0.2%	< 1	103%	80%	120%	100%	80%	120%	116%	80%	120%
Nickel	619537		13	13	0.7%	< 1	108%	80%	120%	100%	80%	120%	104%	80%	120%
Lead	619537		<1	<1	NA	< 1	101%	80%	120%	102%	80%	120%	NA	80%	120%
Potassium	619537		13100	13400	2.3%	< 100	105%	80%	120%	104%	80%	120%	NA	80%	120%
Selenium	619537		6	7	3.2%	< 1	96%	80%	120%	90%	80%	120%	114%	80%	120%
Sodium	619537		65600	66600	1.4%	< 200	111%	80%	120%	106%	80%	120%	NA	80%	120%
Thallium	619537		<1	<1	NA	< 1	100%	80%	120%	101%	80%	120%	96%	80%	120%
Titanium	619537		<3	<3	NA	< 3	NA	80%	120%	101%	80%	120%	98%	80%	120%
Uranium	619537		<0.5	<0.5	NA	< 0.5	100%	80%	120%	100%	80%	120%	93%	80%	120%
Vanadium	619537		<1	<1	NA	< 1	102%	80%	120%	99%	80%	120%	96%	80%	120%
Zinc	619537		5	6	NA	< 3	99%	80%	120%	98%	80%	120%	NA	80%	120%
Tata Steel - QC Packages - Conventionals															
BOD5	1		NA	NA	NA	< 2	95%	80%	120%	98%	80%	120%	NA	80%	120%
COD	619714		24	20	NA	< 5	107%	80%	120%	94%	80%	120%	85%	80%	120%
Conductivité (Salinité - mS/cm)	619685		45	47	4.3%	< 2	105%	80%	120%	104%	80%	120%	NA	80%	120%
Dissolved Organic Carbon	1		NA	NA	NA	< 0.30	103%	80%	120%	101%	80%	120%	NA	80%	120%
Fluoride	620878		<0.10	<0.10	NA	< 0.10	103%	80%	120%	103%	80%	120%	NA	80%	120%
chromium VI	619685		< 0.008	< 0.008	0.0%	< 0.008	97%	80%	120%	104%	80%	120%	103%	80%	120%
Ammonia Nitrogen	747538		1.02	1.19	15.4%	< 0.02	113%	80%	120%	98%	80%	120%	NA	80%	120%
pH	620150		7.59	7.66	0.9%		100%	80%	120%	100%	80%	120%	NA		
Reactive silica	599418		5.41	5.14	5.1%	< 0.05	95%	90%	110%	98%	70%	130%	109%	70%	130%
Total Kjeldahl Nitrogen	646734		4.0	3.9	0.4%	< 0.3	104%	80%	120%	112%	80%	120%	NA	80%	120%
Total Cyanide	619685	619685	<0.005	<0.005	NA	< 0.005	86%	80%	120%	108%	80%	120%	107%	80%	120%
Alkalinity	619714		10.9	11.3	3.6%	< 1.5	96%	80%	120%	91%	80%	120%	94%	80%	120%
Chloride	620878		<0.5	<0.5	NA	< 0.5	114%	80%	120%	92%	80%	120%	116%	80%	120%

Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: Goodwood
SAMPLED BY:

AGAT WORK ORDER: 19M530908
ATTENTION TO: Mariana Trindade
SAMPLING SITE:

Water Analysis (Continued)

RPT Date: 2019-12-03			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nitrate	620878		<0.02	<0.02	NA	< 0.02	105%	80%	120%	102%	80%	120%	104%	80%	120%
Nitrite	620878		<0.02	<0.02	NA	< 0.02	NA	80%	120%	92%	80%	120%	93%	80%	120%
Sulfate	620878		<0.5	<0.5	NA	< 0.5	110%	80%	120%	100%	80%	120%	100%	80%	120%
Total Suspended Solids	617283		10	10	NA	< 2	101%	80%	120%	NA			105%	80%	120%
Dissolved Solids	619714		50	56	11.3%	< 10	102%	80%	120%	NA			109%	80%	120%
Total Sulfide	610873		0.031	0.033	0.0%	< 0.02	85%	80%	120%	103%	80%	120%	84%	80%	120%
Total Phenols (colorimetry)	619685	619685	0.002	0.003	NA	< 0.002	101%	80%	120%	110%	80%	120%	100%	80%	120%
Total Phosphorus	692461		1.21	1.24	2.4%	< 0.02	89%	80%	120%	105%	80%	120%	NA	80%	120%
Total Organic Carbon	605406		5.26	5.19	1.5%	< 0.30	103%	80%	120%	101%	80%	120%	102%	80%	120%
	610393		<0.02	<0.02	NA	< 0.02	104%	90%	110%	108%	90%	110%	101%	80%	120%
	620546		<0.01	<0.01	NA	< 0.01	100%	85%	115%	97%	90%	110%			
	628363		0.04	<0.02	NA	< 0.02	89%	85%	115%	101%	90%	110%			
	628363		<0.05	<0.05	NA	< 0.05				104%	90%	110%			
	628363		1	1	NA	< 1				100%	90%	110%			
	628363		0.71	0.71	0.0%	< 0.01	89%	85%	115%	98%	90%	110%			
Aluminum	726620		3.2	2.9	10.4%	< 0.5	94%	80%	120%	93%	80%	120%	120%	80%	120%
Antimony	726620		<0.005	<0.005	NA	< 0.005	130%	80%	120%	99%	80%	120%	NA	80%	120%
Silver	726620		<0.003	<0.003	NA	< 0.003	NA	80%	120%	97%	80%	120%	NA	80%	120%
Arsenic	726620		0.17	<0.08	NA	< 0.08	108%	80%	120%	105%	80%	120%	NA	80%	120%
Barium	726620		38.8	42.2	8.4%	< 0.03	111%	80%	120%	95%	80%	120%	NA	80%	120%
Boron	726620		131	147	11.3%	< 0.3	111%	80%	120%	101%	80%	120%	NA	80%	120%
Cadmium	726620		<0.006	<0.006	NA	< 0.006	112%	80%	120%	97%	80%	120%	NA	80%	120%
Calcium	726620		28600	29900	4.4%	< 20	100%	80%	120%	93%	80%	120%	NA	80%	120%
Chromium	726620		0.88	0.79	11.1%	< 0.04	111%	80%	120%	97%	80%	120%	NA	80%	120%
Cobalt	726620		0.014	0.013	NA	< 0.005	112%	80%	120%	98%	80%	120%	NA	80%	120%
Copper	726620		4.46	3.71	18.5%	< 0.05	115%	80%	120%	98%	80%	120%	NA	80%	120%
Iron	726620		595	624	4.7%	< 0.5	118%	80%	120%	105%	80%	120%	NA	80%	120%
Magnesium	726620		3600	3690	2.5%	< 10	106%	80%	120%	95%	80%	120%	NA	80%	120%
Manganese	726620		94.6	98.3	3.8%	< 0.03	118%	80%	120%	106%	80%	120%	NA	80%	120%
Molybdenum	726620		2.49	2.17	13.6%	< 0.01	110%	80%	120%	94%	80%	120%	NA	80%	120%
Nickel	1		0.7	0.3	NA	< 0.03	111%	80%	120%	105%	80%	120%	NA	80%	120%
Lead	726620		0.27	0.20	NA	< 0.01	119%	80%	120%	117%	80%	120%	103%	80%	120%
Potassium	726620		5090	4850	4.7%	< 10	106%	80%	120%	94%	80%	120%	NA	80%	120%
Selenium	726620		0.74	0.45	NA	< 0.05	119%	80%	120%	101%	80%	120%	NA	80%	120%
Sodium	726620		12600	12400	2.3%	< 0.05	110%	80%	120%	96%	80%	120%	NA	80%	120%
Vanadium	726620		<0.02	<0.02	NA	< 0.02	118%	80%	120%	103%	80%	120%	94%	80%	120%
Zinc	726620		12	12	NA	< 0.5	113%	80%	120%	110%	80%	120%	NA	80%	120%



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Goodwood
 SAMPLED BY:

AGAT WORK ORDER: 19M530908
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE:

Water Analysis (Continued)

RPT Date: 2019-12-03			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By: _____



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Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M530908

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis					
Total Coliforms	2019-10-17	2019-10-17	MIC-102-7017	MA.700-Col 1.0	N/A
Fecal Coliforms	2019-10-17	2019-10-17	MIC-102-7013	MA.700-Fec.Ec 1.0	N/A
Temperature upon receipt	2019-10-16	2019-10-16	N/A		N/A
Analysis started by	2019-10-17	2019-10-17			
Trace Organics Analysis					
Petroleum Hydrocarbons C10-C50	2019-10-22	2019-10-22	ORG-100-5104F	MA.400-HYD. 1.1	GC/FID
Nonane	2019-10-22	2019-10-22	ORG-100-5104F	MA.400-HYD. 1.1	GC/FID

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M530908

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Mercury	2019-10-18	2019-10-18	MET-101-6102F	MA. 200 Hg 1.1	COLD VAPOR/AA
Aluminum	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Barium	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-10-17	2019-10-17	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Calcium	2019-10-17	2019-10-17	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Chromium	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Cobalt	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Copper	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Total hardness	2019-10-17	2019-10-17	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Tin	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Iron	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Magnesium	2019-10-17	2019-10-17	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Manganese	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Molybdenum	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Lead	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Potassium	2019-10-17	2019-10-17	MET-101-6105F, non accrédité par le MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Selenium	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Sodium	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Thallium	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Titanium	2019-10-17	2019-10-17	MET-101-6105F, non accrédité par le MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Uranium	2019-10-17	2019-10-17	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Vanadium	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Zinc	2019-10-17	2019-10-17	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Radium-226			Subcontracted	Subcontracted	N/A
BOD5	2019-11-20	2019-11-25	INOR-101-6006F	MA. 315 - DBO 1.1	ELECTROMETRY
COD	2019-10-21	2019-10-21	INOR-101-6042F	MA.315-DCO 1.1	SPECTROPHOTOMETRY
Conductivité (Salinité - mS/cm)	2019-10-21	2019-10-21	INOR-101-6016F	Standard method 2520	CONDUCTIVIMÉTRIE
Dissolved Organic Carbon	2019-10-17	2019-10-17	INOR-101-6049F, unaccredited by MDDELCC	MA.300-C1.0	INFRARED DETECTION
Dissolved Oxygen	2019-10-17	2019-10-17	Special	SM 4500-O G . 21 ième ed.	DO METER
Fluoride	2019-10-24	2019-10-24	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
chromium VI	2019-10-15	2019-10-15	INOR-101-6034F	MA. 200 - CrHex 1.1	SPECTROPHOTOMETRY
Ammonia Nitrogen	2019-12-02	2019-12-02	INOR-101-6051F	MA. 303 - N 2.0	COLORIMETRY
pH	2019-10-16	2019-10-16	INOR-101-6021F	MA. 100 - pH 1.1	ELECTROMETRY
Reactive silica	2019-10-24	2019-10-25	INOR-101-6071F, non accrédité MDDELCC	AQ2 EPA-122A Rev 5	COLORIMÉTRIE
Total Kjeldahl Nitrogen	2019-11-25	2019-11-25	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Total Cyanide	2019-10-17	2019-10-17	INOR-101-6061F	MA. 300 - CN 1.2	SPECTROPHOTOMETER
Alkalinity	2019-10-18	2019-10-18	INOR-101-6000F, unaccredited by MDDELCC	MA. 315 - Alc-Aci 1.0	TITRATION

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M530908

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Chloride	2019-10-24	2019-10-24	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrate	2019-10-24	2019-10-24	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrite	2019-10-24	2019-10-24	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Sulfate	2019-10-24	2019-10-24	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Total Suspended Solids	2019-10-17	2019-10-18	INOR-101-6028F	MA. 115 - S.S. 1.2	GRAVIMETRY
Dissolved Solids	2019-10-18		INOR-101-6054F	MA.115-S.D. 1.0	GRAVIMETRY
Total Sulfide	2019-10-22	2019-10-22	INOR-101-6055F	MA.300-S 1.2	SPECTROPHOTOMETRY
Total Phenols (colorimetry)	2019-10-18	2019-10-18	INOR-101-6062F	MA. 404 - I. Phé 2.2	COLORIMETRY
Total Phosphorus	2019-11-22	2019-11-22	INOR-101-6048F	MA.300-NPPT 2.0	COLORIMETRY
Total Organic Carbon	2019-10-17	2019-10-17	INOR-101-6049F	MA.300-C1.0	INFRARED DETECTION
	2019-10-17	2019-10-22			
Aluminum	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Barium	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-11-22	2019-11-22	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Calcium	2019-11-22	2019-11-22	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Chromium	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Cobalt	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Copper	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Iron	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Magnesium	2019-11-22	2019-11-22	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Manganese	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Molybdenum	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Lead	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Potassium	2019-11-22	2019-11-22	MET-101-6105F, non accrédité par le MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Selenium	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Sodium	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Vanadium	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Zinc	2019-11-22	2019-11-22	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS

AGAT Laboratories

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H4S 1V9
http://webearth.agatlabs.com

Tel.: 514.337.1000
Fax.: 514.333.3046
agatlabs.com

Laboratory use Only

Arrival Condition: Good Poor (complete 'notes')
Arrival Temperature: 11,8 8,9 9,1 AGAT Job Number: 134530908
Notes:

Report To:
Company: Tata Steel Minerals Canada
Contact: Mariana Trindade
Address: 1000 Sherbrooke West, Suite 1120
Montreal, QC H3A 3G4

Project #: Goodwood
Quote #: RFQ 20190118

Invoice to: Same (Y/N) - Circle
Company: Tata Steel Minerals Canada
Contact: Jay Adhvaryu
Email: jay.adhvaryu@tatasteelcanada.com
Phone: _____ Fax: _____
PO #: 3000000242

Report Information
1. Name: Mariana Trindade
Email: mariana.trindade@tatasteelcanada.com
2. Name: Jean-Francois Dion
Email: jeanfrancois.dion@tatasteelcanada.com

Regulatory Requirements (Check):
 List Guidelines on Report Do Not List Guidelines on Report
 PIRI Site Info (check all that apply):
 Tier 1 Res. Pot. Coarse
 Tier 2 Com N/Pot. Fine
 Gas Fuel Lube
 CCME CDWQ
 Ind
 Com
 Res/P
 Ag
 FWAL
 Sediment
 Other NL MMER

Report Format
 Single PDF sample per page
 Multiple PDF samples per page
 Excel Format Included

Turnaround Time (TAT) Business Days
Regular TAT: 5 - 7 days
Rush TAT: 1 day 2 days
 3 - 4 days

SAMPLE IDENTIFICATION	DATE / TIME SAMPLED	SAMPLE MATRIX	# OF CONTAINERS	COMMENTS - Site/Sample Info, Sample Containment	Fecal & Total Coliforms	Metals + Cations, Total	Mercury, Total	Hardness	Total Phosphorous & TKV	Conductivity & Alkalinity	Dissolved Organic Carbon	Dissolved Oxygen	Anions (F ⁻ , NO ₂ ⁻ , NO ₃ ⁻ , Cl ⁻ , SO ₄ ²⁻)	Ammonia as N & Reactive Silica	Chemical Oxygen Demand	BOD5 & pH	Phenols -4AAP - Mississauga	TOC	Sulphide as S ₂ -	Hexavalent Chromium	Cyanide, Total	Total Dissolved Solids & Total Suspended Solids	Radium-226	Petroleum Hydrocarb (C10-C50)
DSO4-EE-SUN		water		Q3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
DSO4-ER-SUN - Q3 - 2019	Oct 11/2019 10:00	water	14	Q3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
DSO4-ER-SUN - ULL - Q3 - 2019	Oct 11/2019 10:00	water	3	Q3	"ULL"																			

Sample Relinquished By (print name & sign) <u>Adam Calvert / Adam Calvert</u>	Date/Time <u>Oct 11/2019 13:00</u>	Samples Received By (print name and sign)	Date/Time	Special Instructions
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time	Tata Steel - Quebec Conventionals
				Page <u>1</u> of <u>1</u>

AB 15/11/2019
19h15



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Goodwood

AGAT WORK ORDER: 19M527928

MICROBIOLOGY ANALYSIS REVIEWED BY: Katia Etienne, Microbiologiste

TRACE ORGANICS REVIEWED BY: Robert Roch, Chimiste

WATER ANALYSIS REVIEWED BY: Marie-Flora Coustou, Report Writer

DATE REPORTED: 2019-12-04

VERSION*: 1

PAGES (INCLUDING COVER): 14

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M527928

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY: JEAN FRANCOIS DION

SAMPLING SITE:

Tata Steel - QC Package - Microbiological

DATE RECEIVED: 2019-10-07

DATE REPORTED: 2019-12-04

SAMPLE DESCRIPTION: DSO4-EE-SUN

SAMPLE TYPE: Water

DATE SAMPLED: 2019-09-27

Parameter	Unit	G / S	RDL	599418
Total Coliforms	CFU/100ml		2	52
Fecal Coliforms	CFU/100ml		2	23
Temperature upon receipt	°C		NA	8.6
Analysis started by				1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
599418 Analysis performed passed the regulatory conservation time of 48 hours.

Certified By: _____



Mariana Trindade

AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



Certificate of Analysis

AGAT WORK ORDER: 19M527928

PROJECT: Goodwood

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ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JEAN FRANCOIS DION

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

Petroleum Hydrocarbons in Water

DATE RECEIVED: 2019-10-07

DATE REPORTED: 2019-12-04

SAMPLE DESCRIPTION: DSO4-EE-SUN

SAMPLE TYPE: Water

DATE SAMPLED: 2019-09-27

Parameter	Unit	G / S	RDL	599418
Petroleum Hydrocarbons C10-C50	µg/L		100	<100
Surrogate	Unit	Acceptable Limits		
Nonane	%	40-140		80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

599418 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By: _____



Robert Roch

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Certificate of Analysis

AGAT WORK ORDER: 19M527928

PROJECT: Goodwood

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JEAN FRANCOIS DION

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-10-07

DATE REPORTED: 2019-12-04

SAMPLE DESCRIPTION: DSO4-EE-SUN

SAMPLE TYPE: Water

DATE SAMPLED: 2019-09-27

Parameter	Unit	G / S	RDL	599418
Mercury	µg/L		0.1	<0.1
Aluminum	µg/L		10	<10
Antimony	µg/L		1	<1
Silver	µg/L		0.2	<0.2
Arsenic	µg/L		1	<1
Barium	µg/L		5	<5
Boron	µg/L		40	<40
Cadmium	µg/L		0.5	<0.5
Calcium	µg/L		100	2590
Chromium	µg/L		1	<1
Cobalt	µg/L		0.5	<0.5
Copper	µg/L		1	<1
Total hardness	µg/L - CaCO3		1000	18000
Tin	µg/L		5	<5
Iron	µg/L		70	<70
Magnesium	µg/L		100	2790
Manganese	µg/L		1	7
Molybdenum	µg/L		1	<1
Nickel	µg/L		1	<1
Lead	µg/L		1	<1
Potassium	µg/L		100	247
Selenium	µg/L		1	<1
Sodium	µg/L		200	826
Thallium	µg/L		1	<1
Titanium	µg/L		3	<3
Uranium	µg/L		0.5	<0.5
Vanadium	µg/L		1	<1
Zinc	µg/L		3	<3

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19M527928

PROJECT: Goodwood

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FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JEAN FRANCOIS DION

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

Tata Steel - QC Package - Metals

DATE RECEIVED: 2019-10-07

DATE REPORTED: 2019-12-04

SAMPLE DESCRIPTION: DSO4-EE-SUN

SAMPLE TYPE: Water

DATE SAMPLED: 2019-09-27

Parameter	Unit	G / S	RDL	599418
Radium-226	Bq/L		0.005	0.01
Total Hardness	µg/L - CaCO3		1000	18000

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19M527928

PROJECT: Goodwood

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ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JEAN FRANCOIS DION

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

Tata Steel - QC Packages - Conventionals

DATE RECEIVED: 2019-10-07

DATE REPORTED: 2019-12-04

SAMPLE DESCRIPTION: DSO4-EE-SUN

SAMPLE TYPE: Water

DATE SAMPLED: 2019-09-27

Parameter	Unit	G / S	RDL	599418
BOD5	mg/L - O2		2	<2
COD	mg/L - O2		5	<5
Conductivité (Salinité - mS/cm)	mS/cm		2	<2
Dissolved Organic Carbon	mg/L		0.30	1.03
Dissolved Oxygen	mg/L		3	8
Fluoride	mg/L		0.10	<0.10
chromium VI	mg/L		0.008	<0.008
Ammonia Nitrogen	mg/L - N		0.02	0.08
pH	pH		NA	7.89
Reactive silica	mg/L		0.1	5.4
Total Kjeldahl Nitrogen	mg/L - N		0.3	<0.3
Total Cyanide	mg/L - CN		0.005	<0.005
Alkalinity	mg/L - CaCO3		1.5	15.0
Chloride	mg/L		0.5	<0.5
Nitrate	mg/L - N		0.02	<0.02
Nitrite	mg/L - N		0.02	<0.02
Sulfate	mg/L		0.5	2.4
Total Suspended Solids	mg/L		2	<2
Dissolved Solids	mg/L		10	46
Total Sulfide	mg/L S-2		0.02	0.06
Total Phenols (colorimetry)	mg/L		0.002	0.002
Total Phosphorus	mg/L - P		0.02	<0.02
Total Organic Carbon	mg/L		0.30	1.20

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



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AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19M527928

PROJECT: Goodwood

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ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: JEAN FRANCOIS DION

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

DATE RECEIVED: 2019-10-07

DATE REPORTED: 2019-12-04

Parameter	Unit	SAMPLE TYPE:	
		G / S	RDL
Total Phosphorus	mg/L		0.002

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



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Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Goodwood
 SAMPLED BY: JEAN FRANCOIS DION

AGAT WORK ORDER: 19M527928
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE:

Trace Organics Analysis

RPT Date: 2019-12-04			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE		MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons in Water															
Petroleum Hydrocarbons C10-C50		MR	2880	2870	0.3%	< 100	NA	70%	130%	77%	70%	130%	NA	70%	130%
Nonane		MR	73%	87%	NR	56	NA	40%	140%	73%	40%	140%	NA	40%	140%

Comments: NA : Non applicable
 If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
 NA as the percentage of recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.
 NA in the spike blank or CRM indicates that it is not required by the procedure.

Certified By: _____



Robert Roch

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Quality Assurance

 CLIENT NAME: TATA STEEL MINERALS CANADA LTD
 PROJECT: Goodwood
 SAMPLED BY: JEAN FRANCOIS DION

 AGAT WORK ORDER: 19M527928
 ATTENTION TO: Mariana Trindade
 SAMPLING SITE:

Water Analysis															
RPT Date: 2019-12-04			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Tata Steel - QC Package - Metals

Mercury	599361		< 0.04	< 0.04	NA	< 0.1	94%	80%	120%	102%	80%	120%	103%	80%	120%
Aluminum	610869		490	520	5.9%	< 10	99%	80%	120%	106%	80%	120%	NA	80%	120%
Antimony	610869		9	10	10.5%	< 1	109%	80%	120%	99%	80%	120%	NA	80%	120%
Silver	610869		<0.2	<0.2	NA	< 0.2	NA	80%	120%	96%	80%	120%	104%	80%	120%
Arsenic	610869		<1	<1	NA	< 1	97%	80%	120%	95%	80%	120%	NA	80%	120%
Barium	610869		22	24	NA	< 5	94%	80%	120%	99%	80%	120%	NA	80%	120%
Boron	610869		2850	2700	5.4%	< 40	108%	80%	120%	105%	80%	120%	NA	80%	120%
Cadmium	610869		331	346	4.4%	< 0.5	95%	80%	120%	96%	80%	120%	NA	80%	120%
Calcium	610869		30900	32200	4.1%	< 100	90%	80%	120%	97%	80%	120%	NA	80%	120%
Chromium	610869		269	287	6.5%	< 1	96%	80%	120%	99%	80%	120%	NA	80%	120%
Cobalt	610869		<0.5	<0.5	NA	< 0.5	96%	80%	120%	100%	80%	120%	98%	80%	120%
Copper	610869		12	13	8.0%	< 1	102%	80%	120%	98%	80%	120%	NA	80%	120%
Tin	610869		<5	<5	NA	< 5	NA	80%	120%	100%	80%	120%	95%	80%	120%
Iron	610869		<70	<70	NA	< 70	95%	80%	120%	108%	80%	120%	NA	80%	120%
Magnesium	610869		9480	10300	8.3%	< 100	115%	80%	120%	113%	80%	120%	NA	80%	120%
Manganese	610869		2	2	NA	< 1	90%	80%	120%	103%	80%	120%	99%	80%	120%
Molybdenum	610869		7	7	0.0%	< 1	96%	80%	120%	97%	80%	120%	109%	80%	120%
Nickel	610869		205	227	10.2%	< 1	103%	80%	120%	101%	80%	120%	NA	80%	120%
Lead	610869		17	18	5.7%	< 1	98%	80%	120%	100%	80%	120%	NA	80%	120%
Potassium	610869		18400	19400	5.3%	< 100	109%	80%	120%	107%	80%	120%	NA	80%	120%
Selenium	610869		<1	1	NA	< 1	105%	80%	120%	90%	80%	120%	118%	80%	120%
Sodium	610869		354000	341000	3.7%	< 200	115%	80%	120%	109%	80%	120%	NA	80%	120%
Thallium	610869		<1	<1	NA	< 1	96%	80%	120%	98%	80%	120%	99%	80%	120%
Titanium	610869		<3	<3	NA	< 3	NA	80%	120%	97%	80%	120%	97%	80%	120%
Uranium	610869		<0.5	<0.5	NA	< 0.5	95%	80%	120%	103%	80%	120%	102%	80%	120%
Vanadium	610869		<1	<1	NA	< 1	96%	80%	120%	98%	80%	120%	NA	80%	120%
Zinc	610869		9	5	NA	< 3	100%	80%	120%	104%	80%	120%	NA	80%	120%

Tata Steel - QC Packages - Conventionals

BOD5	641162		106	119	11.6%	< 2	129%	80%	120%	86%	80%	120%	NA	80%	120%
COD	599418	599418	< 5	< 5	NA	< 5	89%	80%	120%	90%	80%	120%	NA	80%	120%
Conductivité (Salinité - mS/cm)	599418	599418	< 2	< 2	0.0%	< 2	104%	80%	120%	103%	80%	120%	NA	80%	120%
Dissolved Organic Carbon	1		NA	NA	NA	< 0.30	113%	80%	120%	107%	80%	120%	NA	80%	120%
Fluoride	612444		<0.10	<0.10	NA	< 0.10	105%	80%	120%	110%	80%	120%	NA	80%	120%
chromium VI	599418	599418	< 0.008	< 0.008	NA	< 0.008	91%	80%	120%	106%	80%	120%	NA	80%	120%
Ammonia Nitrogen	599418	599418	0.08	0.08	NA	< 0.02	118%	80%	120%	95%	80%	120%	102%	80%	120%
pH	605416		6.42	6.64	3.4%		100%	80%	120%	100%	80%	120%			
Reactive silica	599418	599418	5.4	5.1	5.7%	< 0.05	95%	90%	110%	89%	70%	130%	109%	70%	130%
Total Kjeldahl Nitrogen	602821		3.9	4.1	5.0%	< 0.3	85%	80%	120%	95%	80%	120%	NA	80%	120%
Total Cyanide	604196		<0.005	<0.005	NA	< 0.005	86%	80%	120%	101%	80%	120%	NA	80%	120%
Alkalinity	600339		2	2	NA	< 1.5	99%	80%	120%	91%	80%	120%	97%	80%	120%
Chloride	612444		44.8	44.4	0.9%	< 0.5	104%	80%	120%	93%	80%	120%	NA	80%	120%



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: Goodwood
SAMPLED BY: JEAN FRANCOIS DION

AGAT WORK ORDER: 19M527928
ATTENTION TO: Mariana Trindade
SAMPLING SITE:

Water Analysis (Continued)

RPT Date: 2019-12-04			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nitrate	612444		<0.5	<0.5	NA	< 0.02	100%	80%	120%	104%	80%	120%	106%	80%	120%
Nitrite	612444		<0.5	<0.5	NA	< 0.02	NA	80%	120%	94%	80%	120%	94%	80%	120%
Sulfate	612444		4.2	3.7	12.7%	< 0.5	103%	80%	120%	102%	80%	120%	103%	80%	120%
Total Suspended Solids	607931		6	7	NA	< 2	100%	80%	120%	NA			103%	80%	120%
Dissolved Solids	605406		58	60	3.4%	< 10	103%	80%	120%	NA			107%	80%	120%
Total Sulfide	604155		0.4	0.4	0.0%	< 0.02	99%	80%	120%	94%	80%	120%	NA	80%	120%
Total Phenols (colorimetry)	599418	599418	0.002	0.002	NA	< 0.002	96%	80%	120%	100%	80%	120%	85%	80%	120%
Total Phosphorus	584531		1.19	1.19	0.0%	< 0.02	89%	80%	120%	83%	80%	120%	NA	80%	120%
Total Organic Carbon	599812		9.08	9.04	0.4%	< 0.30	113%	80%	120%	107%	80%	120%	NA	80%	120%
Total Phosphorus	602892		0.020	0.019	5.1%	< 0.002	99%	90%	110%	102%	90%	110%	83%	80%	120%

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M527928

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY: JEAN FRANCOIS DION

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis					
Total Coliforms	2019-10-11	2019-10-11	MIC-102-7017	MA.700-Col 1.0	N/A
Fecal Coliforms	2019-10-11	2019-10-11	MIC-102-7013	MA.700-Fec.Ec 1.0	N/A
Temperature upon receipt	2019-10-08	2019-10-08	N/A		N/A
Analysis started by	2019-10-11	2019-10-11			
Trace Organics Analysis					
Petroleum Hydrocarbons C10-C50	2019-10-15	2019-10-15	ORG-100-5104F	MA.400-HYD. 1.1	GC/FID
Nonane	2019-10-15	2019-10-15	ORG-100-5104F	MA.400-HYD. 1.1	GC/FID

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M527928

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY: JEAN FRANCOIS DION

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Mercury	2019-10-15	2019-10-15	MET-101-6102F	MA. 200 Hg 1.1	COLD VAPOR/AA
Aluminum	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Antimony	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Silver	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Arsenic	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Barium	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Boron	2019-10-12	2019-10-15	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Cadmium	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Calcium	2019-10-12	2019-10-15	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Chromium	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Cobalt	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Copper	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Total hardness	2019-10-15	2019-10-15	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Tin	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Iron	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Magnesium	2019-10-12	2019-10-15	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Met 1.2	ICP/MS
Manganese	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Molybdenum	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Nickel	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Lead	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Potassium	2019-10-12	2019-10-15	MET-101-6105F, non accrédité par le MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Selenium	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Sodium	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Mét 1.2	ICP/MS
Thallium	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Titanium	2019-10-12	2019-10-15	MET-101-6105F, non accrédité par le MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Uranium	2019-10-12	2019-10-15	MET-101-6105F, unaccredited by MDDELCC	MA. 200 - Mét 1.2	ICP/MS
Vanadium	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Zinc	2019-10-12	2019-10-15	MET-101-6105F	MA. 200 - Met 1.2	ICP/MS
Radium-226			Subcontracted	Subcontracted	N/A
BOD5	2019-10-24	2019-10-29	INOR-101-6006F	MA. 315 - DBO 1.1	ELECTROMETRY
COD	2019-10-16	2019-10-16	INOR-101-6042F	MA.315-DCO 1.1	SPECTROPHOTOMETRY
Conductivité (Salinité - mS/cm)	2019-10-21	2019-10-21	INOR-101-6016F	Standard method 2520	CONDUCTIVIMÉTRIE
Dissolved Organic Carbon	2019-10-15	2019-10-15	INOR-101-6049F, unaccredited by MDDELCC	MA.300-C1.0	INFRARED DETECTION
Dissolved Oxygen	2019-11-05	2019-11-05	Special	SM 4500-O G . 21 ième ed.	DO METER
Fluoride	2019-10-16	2019-10-16	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
chromium VI	2019-10-11	2019-10-11	INOR-101-6034F	MA. 200 - CrHex 1.1	SPECTROPHOTOMETRY
Ammonia Nitrogen	2019-10-24	2019-10-24	INOR-101-6051F	MA. 303 - N 2.0	COLORIMETRY
pH	2019-10-11	2019-10-11	INOR-101-6021F	MA. 100 - pH 1.1	ELECTROMETRY
Reactive silica	2019-10-24	2019-10-25	INOR-101-6071F, non accrédité MDDELCC	AQ2 EPA-122A Rev 5	COLORIMÉTRIE
Total Kjeldahl Nitrogen	2019-11-07	2019-11-07	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Total Cyanide	2019-10-11	2019-10-11	INOR-101-6061F	MA. 300 - CN 1.2	SPECTROPHOTOMETER
Alkalinity	2019-10-16	2019-10-16	INOR-101-6000F, unaccredited by MDDELCC	MA. 315 - Alc-Aci 1.0	TITRATION

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M527928

PROJECT: Goodwood

ATTENTION TO: Mariana Trindade

SAMPLED BY: JEAN FRANCOIS DION

SAMPLING SITE:

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Chloride	2019-10-16	2019-10-16	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrate	2019-10-16	2019-10-16	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Nitrite	2019-10-16	2019-10-16	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Sulfate	2019-10-16	2019-10-16	INOR-101-6004F	MA. 300 - Ions 1.3	ION CHROMATOGRAPHY
Total Suspended Solids	2019-10-15	2019-10-16	INOR-101-6028F	MA. 115 - S.S. 1.2	GRAVIMETRY
Dissolved Solids	2019-10-16	2019-10-17	INOR-101-6054F	MA.115-S.D. 1.0	GRAVIMETRY
Total Sulfide	2019-10-17	2019-10-17	INOR-101-6055F	MA.300-S 1.2	SPECTROPHOTOMETRY
Total Phenols (colorimetry)	2019-10-11	2019-10-11	INOR-101-6062F	MA. 404 - I. Phé 2.2	COLORIMETRY
Total Phosphorus	2019-11-06	2019-11-06	INOR-101-6048F	MA.300-NTPT 2.0	COLORIMETRY
Total Organic Carbon	2019-10-15	2019-10-15	INOR-101-6049F	MA.300-C1.0	INFRARED DETECTION
Total Phosphorus	2019-10-15	2019-10-15	INOR-93-1022	SM 4500-P B & E	SPECTROPHOTOMETER

P.6 'C'

AGAT Laboratories

9770 Route Transcanadienne
St-Laurent, Québec
H4S 1V9
http://webearth.agatlabs.com

Tel.: 514.337.1000
Fax.: 514.333.3046
agatlabs.com

Laboratory use Only

Arrival Condition: Good Poor (complete 'notes')

Arrival Temperature: _____ AGAT Job Number: _____

Notes: _____

19M 527928

Report To:
Company: Tata Steel Minerals Canada
Contact: Mariana Trindade
Address: 1000 Sherbrooke West, Suite 1120
Montreal, QC H3A 3G4

Project #: Goodwood
Quote #: RFQ 20190118

Invoice to: Same (Y/N) - Circle
Company: Tata Steel Minerals Canada
Contact: Jay Adhvaryu
Email: jay.adhvaryu@tatasteelcanada.com
Phone: _____ Fax: _____
PO #: 3000000242

Report Information

1. Name: Mariana Trindade
Email: mariana.trindade@tatasteelcanada.com

2. Name: Jean-Francois Dion
Email: jeanfrancois.dion@tatasteelcanada.com

Regulatory Requirements (Check):

List Guidelines on Report Do Not List Guidelines on Report

PIRI Site Info (check all that apply):

Tier 1 Res. PoL Coarse
 Tier 2 Com N/PoL Fine
 Gas Fuel Lube
 CCME CDWQ
 Ind
 Com
 Res/P
 Ag
 FWAL
 Sediment
 Other: NL MMER

Report Format

Single PDF sample per page
 Multiple PDF samples per page
 Excel Format Included

Turnaround Time (TAT) Business Days

Regular TAT: 5 - 7 days
Rush TAT: 1 day 2 days
 3 - 4 days

SAMPLE IDENTIFICATION	DATE / TIME SAMPLED	SAMPLE MATRIX	# OF CONTAINERS	COMMENTS - Site/Sample Info, Sample Containment	Fecal & Total Coliforms	Metals + Cations, Total	Mercury, Total	Hardness	Total Phosphorous & TKN	Conductivity & Alkalinity	Dissolved Organic Carbon	Dissolved Oxygen	Anions (F ⁻ , NO ₂ ⁻ , NO ₃ ⁻ , Cl ⁻ , SO ₄ ²⁻)	Ammonia as N & Reactive Silica	Chemical Oxygen Demand	BOD5 & pH	Phenols -4AAP - Mississauga	TOC	Sulphide as S ₂	Hexavalent Chromium	Cyanide, Total	Total Dissolved Solids & Total Suspended Solids	Radium-226	Petroleum Hydrocarb (C10-C50)
DSO4-EE-SUN	Sep 26/14:38	water	14	Q3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
DSO4-EE-SUN		water		Q3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
DSO4-EE-Sun (UBL / ultra-low metals) metals, Hg, Prot		water	3			X	X	X																

Sample Relinquished By (print name & sign): Jean-Francois Dion / JFD Date/Time: 09/27-11:30

Sample Received By (print name and sign): _____ Date/Time: _____

Special Instructions: _____

Page 1 of 1

AGAT
191007
15430

D. Qualité des sédiments

Your P.O. #: 2200002147
 Your Project #: SEDIMENT GOODWOOD
 Site#: TSMC
 Site Location: DS04 LA
 Your C.O.C. #: 157354-13-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
 1000, RUE SHERBROOKE OUEST
 BUREAU 1120
 MONTRÉAL, QC
 CANADA H3A 3G4

Report Date: 2019/05/01
 Report #: R2437253
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B911218

Received: 2019/04/09, 10:00

Sample Matrix: Sediment
 # Samples Received: 2

Analyses	Quantity	Date	Date	Laboratory Method	Primary Reference
		Extracted	Analyzed		
Anions (1)	2	2019/04/12	2019/04/14	STL SOP-00014	MA.300-Ions 1.3 R3 m
Conductivity (1)	2	2019/04/12	2019/04/13	STL SOP-00038	SM 23 2510-B m
Total Extractable Metals (low level) (1)	2	2019/04/12	2019/04/12	STL SOP-00006	MA.200-Mét. 1.2 R5 m
Ammonia Nitrogen (1)	2	2019/04/12	2019/04/15	STL SOP-00040	MA.300-N 2.0 R2 m
pH (1)	2	2019/04/15	2019/04/15	STL SOP-00016	MA.100-pH 1.1 R3 m
Particle size (pipettes & sieves) (2)	2	N/A	N/A		
Total Phosphorus (1)	2	N/A	2019/04/15	STL SOP-00006	MA.200-Mét. 1.2 R5 m
Sulfur (1)	2	N/A	2019/04/29	STL SOP-00028	MA. 310-CS 1.0 R3 m
Extractable Silica by ICP (1)	2	2019/04/30	2019/04/30	STL SOP-00006	MA.200-Mét. 1.2 R5 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam -Ville St. Laurent

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Your P.O. #: 2200002147
Your Project #: SEDIMENT GOODWOOD
Site#: TSMC
Site Location: DS04 LA
Your C.O.C. #: 157354-13-01

Report Date: 2019/05/01
Report #: R2437253
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B911218

Received: 2019/04/09, 10:00

(2) This test was performed by Maxxam Analytics - Bedford

Note: All parameters included in the present certificate are accredited by the MDDELCC unless stated otherwise.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Martine Lepage, Project Manager

Email: MLepage@maxxam.ca

Phone# (418)543-3788 Ext:7066201

=====
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B911218
Report Date: 2019/05/01

TATA STEEL MINERALS CANADA
Client Project #: SEDIMENT GOODWOOD
Site Location: DS04 LA
Your P.O. #: 2200002147

TOTAL EXTRACTABLE METALS (SEDIMENT)

Maxxam ID					GH8612			GH8629		
Sampling Date					2019/04/06 12:28			2019/04/06 13:19		
COC Number					157354-13-01			157354-13-01		
	Units	A	B	C	FRA-EEGW	RDL	QC Batch	MIGRATION-EEGW	RDL	QC Batch
% MOISTURE	%	-	-	-	82	N/A	N/A	89	N/A	N/A
METALS										
Aluminum (Al) †	mg/kg	-	-	-	14000	20	1981295	16000	20	1981295
Antimony (Sb) †	mg/kg	-	-	-	0.57	0.10	1981295	0.48	0.10	1981295
Silver (Ag) †	mg/kg	2	20	40	0.77	0.50	1981295	1.1	0.50	1981295
Arsenic (As) †	mg/kg	6	30	50	13	2.0	1981295	4.6	2.0	1981295
Barium (Ba) †	mg/kg	340	500	2000	61	4.0	1981295	140	4.0	1981295
Beryllium (Be) †	mg/kg	-	-	-	0.91	0.10	1981295	0.82	0.10	1981295
Bismuth (Bi) †	mg/kg	-	-	-	<2.0	2.0	1981295	<2.0	2.0	1981295
Boron (B) †	mg/kg	-	-	-	2.4	2.0	1981295	2.7	2.0	1981295
Cadmium (Cd) †	mg/kg	1.5	5	20	0.68	0.10	1981295	0.83	0.10	1981295
Calcium (Ca) †	mg/kg	-	-	-	260	20	1981295	560	20	1981295
Chromium (Cr) †	mg/kg	100	250	800	39	1.0	1981295	32	1.0	1981295
Copper (Cu) †	mg/kg	50	100	500	29	1.0	1981295	33	1.0	1981295
Cobalt (Co) †	mg/kg	25	50	300	10	1.0	1981295	5.1	1.0	1981295
Tin (Sn) †	mg/kg	5	50	300	<1.0	1.0	1981295	<1.0	1.0	1981295
Iron (Fe) †	mg/kg	-	-	-	93000	100	1981295	33000	10	1981295
Magnesium (Mg) †	mg/kg	-	-	-	3100	5.0	1981295	3000	5.0	1981295
Manganese (Mn) †	mg/kg	1000	1000	2200	460	2.0	1981295	160	2.0	1981295
Molybdenum (Mo) †	mg/kg	2	10	40	2.3	0.50	1981295	1.9	0.50	1981295
Nickel (Ni) †	mg/kg	50	100	500	24	0.50	1981295	32	0.50	1981295
Mercury (Hg) †	mg/kg	0.2	2	10	0.15	0.010	1981295	0.15	0.010	1981295
Phosphorus (P) †	mg/kg	-	-	-	800	20	1981295	370	20	1981295
Potassium (K) †	mg/kg	-	-	-	810	20	1981295	990	20	1981295
Lead (Pb) †	mg/kg	50	500	1000	14	1.0	1981295	13	1.0	1981295
Silicon (Si) †	mg/kg	-	-	-	430	20	1985190	370	20	1985093
Sodium (Na) †	mg/kg	-	-	-	33	10	1981295	40	10	1981295
Strontium (Sr) †	mg/kg	-	-	-	<5.0	5.0	1981295	5.0	5.0	1981295
Tellurium (Te) †	mg/kg	-	-	-	<0.50	0.50	1981295	<0.50	0.50	1981295
Thallium (Tl) †	mg/kg	-	-	-	0.12	0.10	1981295	0.11	0.10	1981295
Titanium (Ti) †	mg/kg	-	-	-	480	2.0	1981295	310	2.0	1981295
Uranium (U) †	mg/kg	-	-	-	<2.0	2.0	1981295	<2.0	2.0	1981295
Vanadium (V) †	mg/kg	-	-	-	42	2.0	1981295	39	2.0	1981295
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable † Parameter is not accreditable										

Maxxam Job #: B911218
Report Date: 2019/05/01

TATA STEEL MINERALS CANADA
Client Project #: SEDIMENT GOODWOOD
Site Location: DS04 LA
Your P.O. #: 2200002147

TOTAL EXTRACTABLE METALS (SEDIMENT)

Maxxam ID					GH8612			GH8629		
Sampling Date					2019/04/06 12:28			2019/04/06 13:19		
COC Number					157354-13-01			157354-13-01		
	Units	A	B	C	FRA-EEGW	RDL	QC Batch	MIGRATION-EEGW	RDL	QC Batch
Zinc (Zn) †	mg/kg	140	500	1500	110	5.0	1981295	130	5.0	1981295
RDL = Reportable Detection Limit QC Batch = Quality Control Batch † Parameter is not accreditable										

Maxxam Job #: B911218
Report Date: 2019/05/01

TATA STEEL MINERALS CANADA
Client Project #: SEDIMENT GOODWOOD
Site Location: DS04 LA
Your P.O. #: 2200002147

CONVENTIONAL PARAMETERS (SEDIMENT)

Maxxam ID					GH8612	GH8612		GH8629		
Sampling Date					2019/04/06 12:28	2019/04/06 12:28		2019/04/06 13:19		
COC Number					157354-13-01	157354-13-01		157354-13-01		
	Units	A	B	C	FRA-EEGW	FRA-EEGW Lab-Dup	RDL	MIGRATION-EEGW	RDL	QC Batch
% MOISTURE	%	-	-	-	82	82	N/A	89	N/A	N/A
CONVENTIONALS										
Conductivity †	mS/cm	0.7	0.7	1.4	<0.020	N/A	0.020	<0.020	0.020	1981422
Nitrogen ammonia (N-NH3) †	mg/kg	-	-	-	<25	N/A	25	32	5.0	1981421
pH †	pH	-	-	-	8.86	N/A	N/A	7.76	N/A	1981538
Sulfur (S) †	% g/g	0.04	0.2	0.2	0.12	N/A	0.010	0.20	0.010	1984768
Chloride (Cl) †	mg/kg	-	-	-	<1.0	1.2	1.0	<1.0	1.0	1981386
Nitrate (N) and Nitrite(N) †	mg/kg	-	-	-	<1.0	<1.0	1.0	<1.0	1.0	1981386
Sulfates (SO4) †	mg/kg	-	-	-	<5.0	<5.0	5.0	6.1	5.0	1981386
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable † Parameter is not accreditable										

Maxxam Job #: B911218
Report Date: 2019/05/01

TATA STEEL MINERALS CANADA
Client Project #: SEDIMENT GOODWOOD
Site Location: DS04 LA
Your P.O. #: 2200002147

GENERAL COMMENTS

A,B,C: Soil Criteria following appendix 2 of the " Guide d'intervention-Protection des sols et réhabilitation des terrains contaminés. MELCC, 2019." entitled " Grille des critères génériques pour les sols". The soil criteria refer to the St. Lawrence Lowlands Geological Province.

Groundwater criteria A and B follow the appendix 7 entitled "Grille des critères de qualité des eaux souterraines" of the document mentioned above. The criterion A refers to " Drinking Water " and the criterion B refers to "Seepage into Surface Water".

These criteria references are shown for visual aid only, and should not be interpreted otherwise.

- = This parameter is not part of the regulation.

TOTAL EXTRACTABLE METALS (SEDIMENT)

Reported detection limits are multiplied by dilution factors used for sample analysis.

Results relate only to the items tested.

Maxxam Job #: B911218
Report Date: 2019/05/01

TATA STEEL MINERALS CANADA
Client Project #: SEDIMENT GOODWOOD
Site Location: DS04 LA
Your P.O. #: 2200002147

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
1981295	FS	Spiked Blank	Aluminum (Al)	2019/04/12		100	%
			Antimony (Sb)	2019/04/12		118	%
			Silver (Ag)	2019/04/12		116	%
			Arsenic (As)	2019/04/12		103	%
			Barium (Ba)	2019/04/12		105	%
			Beryllium (Be)	2019/04/12		106	%
			Bismuth (Bi)	2019/04/12		106	%
			Boron (B)	2019/04/12		118	%
			Cadmium (Cd)	2019/04/12		104	%
			Calcium (Ca)	2019/04/12		101	%
			Chromium (Cr)	2019/04/12		103	%
			Copper (Cu)	2019/04/12		107	%
			Cobalt (Co)	2019/04/12		102	%
			Tin (Sn)	2019/04/12		109	%
			Iron (Fe)	2019/04/12		89	%
			Magnesium (Mg)	2019/04/12		96	%
			Manganese (Mn)	2019/04/12		103	%
			Molybdenum (Mo)	2019/04/12		104	%
			Nickel (Ni)	2019/04/12		104	%
			Mercury (Hg)	2019/04/12		111	%
			Phosphorus (P)	2019/04/12		99	%
			Potassium (K)	2019/04/12		99	%
			Lead (Pb)	2019/04/12		107	%
			Sodium (Na)	2019/04/12		102	%
			Strontium (Sr)	2019/04/12		98	%
			Tellurium (Te)	2019/04/12		102	%
			Thallium (Tl)	2019/04/12		104	%
			Titanium (Ti)	2019/04/12		100	%
			Uranium (U)	2019/04/12		104	%
			Vanadium (V)	2019/04/12		102	%
			Zinc (Zn)	2019/04/12		104	%
			1981295	FS	Method Blank	Aluminum (Al)	2019/04/12
Antimony (Sb)	2019/04/12	<0.10					mg/kg
Silver (Ag)	2019/04/12	<0.50					mg/kg
Arsenic (As)	2019/04/12	<2.0					mg/kg
Barium (Ba)	2019/04/12	<4.0					mg/kg
Beryllium (Be)	2019/04/12	<0.10					mg/kg
Bismuth (Bi)	2019/04/12	<2.0					mg/kg
Boron (B)	2019/04/12	<2.0					mg/kg
Cadmium (Cd)	2019/04/12	<0.10					mg/kg
Calcium (Ca)	2019/04/12	<20					mg/kg
Chromium (Cr)	2019/04/12	<1.0					mg/kg
Copper (Cu)	2019/04/12	<1.0					mg/kg
Cobalt (Co)	2019/04/12	<1.0					mg/kg
Tin (Sn)	2019/04/12	<1.0					mg/kg
Iron (Fe)	2019/04/12	<10					mg/kg
Magnesium (Mg)	2019/04/12	<5.0					mg/kg
Manganese (Mn)	2019/04/12	<2.0		mg/kg			
Molybdenum (Mo)	2019/04/12	<0.50		mg/kg			
Nickel (Ni)	2019/04/12	<0.50		mg/kg			
Mercury (Hg)	2019/04/12	<0.010		mg/kg			

Maxxam Job #: B911218
Report Date: 2019/05/01

TATA STEEL MINERALS CANADA
Client Project #: SEDIMENT GOODWOOD
Site Location: DS04 LA
Your P.O. #: 2200002147

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Phosphorus (P)	2019/04/12	<20		mg/kg
			Potassium (K)	2019/04/12	<20		mg/kg
			Lead (Pb)	2019/04/12	<1.0		mg/kg
			Sodium (Na)	2019/04/12	<10		mg/kg
			Strontium (Sr)	2019/04/12	<5.0		mg/kg
			Tellurium (Te)	2019/04/12	<0.50		mg/kg
			Thallium (Tl)	2019/04/12	<0.10		mg/kg
			Titanium (Ti)	2019/04/12	<2.0		mg/kg
			Uranium (U)	2019/04/12	<2.0		mg/kg
			Vanadium (V)	2019/04/12	<2.0		mg/kg
			Zinc (Zn)	2019/04/12	<5.0		mg/kg
1981386	JGZ	Spiked Blank	Chloride (Cl)	2019/04/14		98	%
			Nitrate (N) and Nitrite(N)	2019/04/14		96	%
			Sulfates (SO4)	2019/04/14		96	%
1981386	JGZ	Method Blank	Chloride (Cl)	2019/04/14	<1.0		mg/kg
			Nitrate (N) and Nitrite(N)	2019/04/14	<1.0		mg/kg
			Sulfates (SO4)	2019/04/14	<5.0		mg/kg
1981421	ECA	QC Standard	Nitrogen ammonia (N-NH3)	2019/04/15		85	%
1981421	ECA	Spiked Blank	Nitrogen ammonia (N-NH3)	2019/04/15		97	%
1981421	ECA	Method Blank	Nitrogen ammonia (N-NH3)	2019/04/15	<5.0		mg/kg
1981422	MR4	Spiked Blank	Conductivity	2019/04/13		106	%
1981422	MR4	Method Blank	Conductivity	2019/04/13	<0.020		mS/cm
1981538	SRA	QC Standard	pH	2019/04/15		100	%
1981538	SRA	Spiked Blank	pH	2019/04/15		102	%
1984768	GGC	QC Standard	Sulfur (S)	2019/04/29		106	%
1984768	GGC	Method Blank	Sulfur (S)	2019/04/29	<0.010		% g/g
1985093	RNP	Spiked Blank	Silicon (Si)	2019/04/30		92	%
1985093	RNP	Method Blank	Silicon (Si)	2019/04/30	<20		mg/kg
1985190	RNP	Spiked Blank	Silicon (Si)	2019/04/30		92	%
1985190	RNP	Method Blank	Silicon (Si)	2019/04/30	<20		mg/kg

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.


Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Maxxam Job #: B911218
Report Date: 2019/05/01

TATA STEEL MINERALS CANADA
Client Project #: SEDIMENT GOODWOOD
Site Location: DS04 LA
Your P.O. #: 2200002147

VALIDATION SIGNATURE PAGE

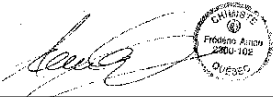
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



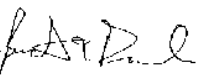
Aurelie Lebel, Project Manager Assistant



Caroline Bougie, B.Sc. Chemist



Frederic Arnau, B.Sc., Chemist, Scientific Service Specialist



Jonathan Fauvel, B.Sc, Chimiste, Supervisor, Inorganics



Myriam Assayag



Veronic Beausejour, B.Sc., Chemist, Supervisor

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

E. Qualité de l'air

Your P.O. #: 2200002147
 Your Project #: PASSIVE NO2 / DS03-4
 Site#: 2019/02/07 - 2019/03/14
 Site Location: Timmins, Newfoundland

Attention: TARA OAK

Tata Steel Mineral Canada
 1000, Sherbrooke St West
 Montreal, QC
 CANADA H3A 3G4

Report Date: 2019/03/28
 Report #: R2703086
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B920821

Received: 2019/03/22, 12:42

Sample Matrix: Air
 # Samples Received: 4

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
NO2 Passive Analysis	4	2019/03/25	2019/03/28	PTC SOP-00148	Passive NO2 in ATM

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 Results relate only to the items tested.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
 Levi Manchak, Project Manager SR
 Email: LManchak@maxxam.ca
 Phone# (780)378-8542

=====

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Maxxam Job #: B920821
Report Date: 2019/03/28

Tata Steel Mineral Canada
Client Project #: PASSIVE NO2 / DS03-4
Site Location: Timmins, Newfoundland
Your P.O. #: 2200002147
Sampler Initials: JFD

RESULTS OF CHEMICAL ANALYSES OF AIR

Maxxam ID		VK2997	VK2998	VK2999	VK3000		
Sampling Date		2019/02/06 09:11	2019/02/06 14:37	2019/02/06 12:23	2019/02/07 11:02		
	UNITS	DS03-AQS6-NO2	DS03-AQS7-NO2	DS03-AQS8-NO2	DS03-AQS9-NO2	RDL	QC Batch
Passive Monitoring							
Calculated NO2	ppb	<0.1	0.4	<0.1	<0.1	0.1	9357868
RDL = Reportable Detection Limit							

Maxxam Job #: B920821
Report Date: 2019/03/28

Tata Steel Mineral Canada
Client Project #: PASSIVE NO2 / DS03-4
Site Location: Timmins, Newfoundland
Your P.O. #: 2200002147
Sampler Initials: JFD

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Job #: B920821
Report Date: 2019/03/28

Tata Steel Mineral Canada
Client Project #: PASSIVE NO2 / DS03-4
Site Location: Timmins, Newfoundland
Your P.O. #: 2200002147
Sampler Initials: JFD

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	9357868	YL6	Spiked Blank	Calculated NO2			99	%	90 - 110
	9357868	YL6	Method Blank	Calculated NO2		<0.1		ppb	

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Maxxam Job #: B920821
Report Date: 2019/03/28

Tata Steel Mineral Canada
Client Project #: PASSIVE NO2 / DS03-4
Site Location: Timmins, Newfoundland
Your P.O. #: 2200002147
Sampler Initials: JFD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Linda Lin, Supervisor, Centre for Passive Sampling Technology

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your P.O. #: 2200002147
 Your Project #: DS03-4
 Site#: TSMC
 Your C.O.C. #: 157354-13-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
 1000, RUE SHERBROOKE OUEST
 BUREAU 1120
 MONTRÉAL, QC
 CANADA H3A 3G4

Report Date: 2019/05/24
 Report #: R2442285
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B911463
Received: 2019/04/10, 09:30

Sample Matrix: Water
 # Samples Received: 9

Analyses	Quantity	Date	Date	Laboratory Method	Primary Reference
		Extracted	Analyzed		
Weight of particles (1)	9	2019/04/12	2019/04/12	STL SOP-00020	MA100–Part. 1.0 R4 m
Extractable Metals in Impinger (1)	9	2019/05/17	2019/05/19	STL SOP-00075	MA.200–Mét. 1.2 R5 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam -Ville St. Laurent

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Your P.O. #: 2200002147
Your Project #: DS03-4
Site#: TSMC
Your C.O.C. #: 157354-13-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2019/05/24
Report #: R2442285
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B911463
Received: 2019/04/10, 09:30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: MLepage@maxxam.ca
Phone# (418)543-3788 Ext:7066201

=====

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METALS (WATER)

Maxxam ID		GH9721	GH9743	GH9744	GH9745		
Sampling Date		2019/04/06 11:50	2019/04/06 10:22	2019/03/31 15:00	2019/03/31 16:00		
COC Number		157354-13-01	157354-13-01	157354-13-01	157354-13-01		
	Units	DS04-AQS1-SN-2019	DS04-AQS2-SN-2019	DS04-AQS3-SN-2019	DS04-AQS4-SN-2019	RDL	QC Batch
METALS							
Antimony (Sb) †	ug	<0.1	<0.1	0.3	<0.1	0.1	1990309
Silver (Ag) †	ug	<0.5	<0.5	<0.5	<0.5	0.5	1990309
Arsenic (As) †	ug	<0.1	<0.1	0.6	0.1	0.1	1990309
Barium (Ba) †	ug	1.75	0.38	5.28	1.36	0.05	1990309
Beryllium (Be) †	ug	<0.05	<0.05	<0.05	<0.05	0.05	1990309
Cadmium (Cd) †	ug	<0.05	<0.05	<0.05	<0.05	0.05	1990309
Calcium (Ca) †	ug	421	46	1140	409	5	1990309
Chromium (Cr) †	ug	0.3	0.1	1.0	0.6	0.1	1990309
Mercury (Hg) †	ug	<0.05	<0.05	<0.05	<0.05	0.05	1990309
Nickel (Ni) †	ug	0.9	0.2	1.7	1.2	0.1	1990309
Lead (Pb) †	ug	0.6	<0.5	0.6	<0.5	0.5	1990309
Thallium (Tl) †	ug	<0.1	<0.1	<0.1	<0.1	0.1	1990309
Vanadium (V) †	ug	<0.2	<0.2	0.4	<0.2	0.2	1990309
Zinc (Zn) †	ug	15.5	4.4	13.1	5.3	0.1	1990309
RDL = Reportable Detection Limit QC Batch = Quality Control Batch † Parameter is not accreditable							

METALS (WATER)

Maxxam ID		GH9746	GH9747	GH9748	GH9749		
Sampling Date		2019/04/06 09:25	2019/04/06 16:04	2019/04/08 07:05	2019/04/06 16:59		
COC Number		157354-13-01	157354-13-01	157354-13-01	157354-13-01		
	Units	DS04-AQS5-SN-2019	DS03-AQS6-SN-2019	DS03-AQS7-SN-2019	DS03-AQS8-SN-2019	RDL	QC Batch
METALS							
Antimony (Sb) †	ug	0.1	<0.1	0.2	<0.1	0.1	1990309
Silver (Ag) †	ug	<0.5	<0.5	<0.5	<0.5	0.5	1990309
Arsenic (As) †	ug	<0.1	0.4	1.3	<0.1	0.1	1990309
Barium (Ba) †	ug	2.02	2.74	3.75	1.33	0.05	1990309
Beryllium (Be) †	ug	<0.05	<0.05	<0.05	<0.05	0.05	1990309
Cadmium (Cd) †	ug	<0.05	<0.05	<0.05	<0.05	0.05	1990309
Calcium (Ca) †	ug	297	423	439	285	5	1990309
Chromium (Cr) †	ug	0.3	0.4	1.6	0.4	0.1	1990309
Mercury (Hg) †	ug	<0.05	<0.05	0.19	<0.05	0.05	1990309
Nickel (Ni) †	ug	0.2	1.2	0.9	0.3	0.1	1990309
Lead (Pb) †	ug	<0.5	0.9	0.8	<0.5	0.5	1990309
Thallium (Tl) †	ug	<0.1	<0.1	<0.1	<0.1	0.1	1990309
Vanadium (V) †	ug	<0.2	0.4	1.0	<0.2	0.2	1990309
Zinc (Zn) †	ug	7.0	8.9	18.4	8.7	0.1	1990309
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							
† Parameter is not accreditable							

METALS (WATER)

Maxxam ID		GH9750		
Sampling Date		2019/04/06 15:32		
COC Number		157354-13-01		
	Units	DS03-AQS9-SN-2019	RDL	QC Batch
METALS				
Antimony (Sb) †	ug	<0.1	0.1	1990309
Silver (Ag) †	ug	<0.5	0.5	1990309
Arsenic (As) †	ug	<0.1	0.1	1990309
Barium (Ba) †	ug	1.84	0.05	1990309
Beryllium (Be) †	ug	<0.05	0.05	1990309
Cadmium (Cd) †	ug	0.46	0.05	1990309
Calcium (Ca) †	ug	299	5	1990309
Chromium (Cr) †	ug	0.3	0.1	1990309
Mercury (Hg) †	ug	<0.05	0.05	1990309
Nickel (Ni) †	ug	0.6	0.1	1990309
Lead (Pb) †	ug	<0.5	0.5	1990309
Thallium (Tl) †	ug	<0.1	0.1	1990309
Vanadium (V) †	ug	<0.2	0.2	1990309
Zinc (Zn) †	ug	25.7	0.1	1990309
RDL = Reportable Detection Limit QC Batch = Quality Control Batch † Parameter is not accreditable				

CONVENTIONAL PARAMETERS (WATER)

Maxxam ID		GH9721	GH9743	GH9744	GH9745		
Sampling Date		2019/04/06 11:50	2019/04/06 10:22	2019/03/31 15:00	2019/03/31 16:00		
COC Number		157354-13-01	157354-13-01	157354-13-01	157354-13-01		
	Units	DS04-AQS1-SN-2019	DS04-AQS2-SN-2019	DS04-AQS3-SN-2019	DS04-AQS4-SN-2019	RDL	QC Batch

CONVENTIONALS							
Weight of particles	g	0.030	0.0022	0.063	0.011	0.0010	1981494
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

Maxxam ID		GH9746	GH9747	GH9748	GH9749		
Sampling Date		2019/04/06 09:25	2019/04/06 16:04	2019/04/08 07:05	2019/04/06 16:59		
COC Number		157354-13-01	157354-13-01	157354-13-01	157354-13-01		
	Units	DS04-AQS5-SN-2019	DS03-AQS6-SN-2019	DS03-AQS7-SN-2019	DS03-AQS8-SN-2019	RDL	QC Batch

CONVENTIONALS							
Weight of particles	g	0.014	0.051	0.083	0.0048	0.0010	1981494
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

Maxxam ID		GH9750		
Sampling Date		2019/04/06 15:32		
COC Number		157354-13-01		
	Units	DS03-AQS9-SN-2019	RDL	QC Batch
CONVENTIONALS				
Weight of particles	g	0.019	0.0010	1981494
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

GENERAL COMMENTS

METALS (WATER)

Please note that due to a manipulation error, there was a loss of sample for GH9743 and GH9747 during the evaporation process. The analysis was done with the highest volume possible.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
	1981494	AHK	Spiked Blank	Weight of particles	2019/04/12		102	%
	1981494	AHK	Method Blank	Weight of particles	2019/04/12	<0.0010		g
	1990309	RNP	Spiked Blank	Antimony (Sb)	2019/05/19		93	%
				Silver (Ag)	2019/05/19		88	%
				Arsenic (As)	2019/05/19		88	%
				Barium (Ba)	2019/05/19		92	%
				Beryllium (Be)	2019/05/19		91	%
				Cadmium (Cd)	2019/05/19		85	%
				Calcium (Ca)	2019/05/19		85	%
				Chromium (Cr)	2019/05/19		84	%
				Mercury (Hg)	2019/05/19		95	%
				Nickel (Ni)	2019/05/19		84	%
				Lead (Pb)	2019/05/19		95	%
				Thallium (Tl)	2019/05/19		92	%
				Vanadium (V)	2019/05/19		84	%
				Zinc (Zn)	2019/05/19		85	%
	1990309	RNP	Method Blank	Antimony (Sb)	2019/05/19	<0.1		ug
				Silver (Ag)	2019/05/19	<0.5		ug
				Arsenic (As)	2019/05/19	<0.1		ug
				Barium (Ba)	2019/05/19	<0.05		ug
				Beryllium (Be)	2019/05/19	<0.05		ug
				Cadmium (Cd)	2019/05/19	<0.05		ug
				Calcium (Ca)	2019/05/19	22,RDL=5		ug
				Chromium (Cr)	2019/05/19	0.6, RDL=0.1		ug
				Mercury (Hg)	2019/05/19	<0.05		ug
				Nickel (Ni)	2019/05/19	0.2, RDL=0.1		ug
				Lead (Pb)	2019/05/19	<0.5		ug
				Thallium (Tl)	2019/05/19	<0.1		ug
				Vanadium (V)	2019/05/19	<0.2		ug
				Zinc (Zn)	2019/05/19	0.7, RDL=0.1		ug

RDL = Reportable Detection Limit

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Caroline Bougie

Caroline Bougie, B.Sc. Chemist



Myriam Assayag

Miryam Assayag

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

NOM DU CLIENT: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

À L'ATTENTION DE: Mariana Trindade

N° DE PROJET: NO2 air Monitoring

N° BON DE TRAVAIL: 19M501597

DATE DU RAPPORT: 2019-08-23

VERSION*: 1

NOMBRE DE PAGES: 5

Si vous désirez de l'information concernant cette analyse, S.V.P. contactez votre chargé de projets au (514) 337-1000.

*NOTES

Nous disposerons des échantillons dans les 30 jours suivants les analyses. S.V.P. Contactez le laboratoire si vous désirez avoir un délai d'entreposage.



NOM DU CLIENT: TATA STEEL MINERALS CANADA LTD

PRÉLEVÉ PAR:

À L'ATTENTION DE: Mariana Trindade

LIEU DE PRÉLÈVEMENT:

Passive Air Quality Sampling

DATE DE RÉCEPTION: 2019-08-06

DATE DU RAPPORT: 2019-08-23

	AQS2- Q1/ 26Jun/19,16:43 27Jul/19,14:50	AQS4- Q1/ 26Jun/19,14:54 26Jul/19,16:55	AQS6- Q1/ 24Jun/19,10:03 26Jul/19,14:06	AQS7- Q1/ 28Jun/19,08:11 28Jul/19,10:19	AQS8- Q1/ 28Jun/19,07:23 26Jul/19,09:54	AQS9- Q1/ 27Jun/19,18:42 28Jul/19,08:58			
IDENTIFICATION DE L'ÉCHANTILLON:	/NO2	/NO2	/NO2	/NO2	/NO2	/NO2			
MATRICE:	Air	Air	Air	Air	Air	Air			
DATE D'ÉCHANTILLONNAGE:									
Paramètre	Unités	C / N	LDR	420781	420782	420783	420784	420785	420786
Ambient Nitrogen Dioxide	ppbv	0.4	<0.4	<0.4	0.8	<0.4	<0.4	<0.4	<0.4

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

420781-420786 All samples are field blank subtracted.

All passives samples have been calculated using the weather data recorded at "MONTREAL INTL A" weather station.

Certifié par: _____

La procédure des Laboratoires AGAT concernant les signatures et les signataires se conforme strictement aux exigences d'accréditation ISO 17025:2005 comme le requiert, lorsque applicable, CALA, CCN et MDDELCC. Toutes les signatures sur les certificats d'AGAT sont protégées par des mots de passe et les signataires rencontrent les exigences des domaines d'accréditation ainsi que les exigences régionales approuvées par CALA, CCN et MDDELCC.



Certificat d'analyse

N° BON DE TRAVAIL: 19M501597

N° DE PROJET: NO2 air Monitoring

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

NOM DU CLIENT: TATA STEEL MINERALS CANADA LTD

PRÉLEVÉ PAR:

À L'ATTENTION DE: Mariana Trindade

LIEU DE PRÉLÈVEMENT:

Passive Quality Assurance

DATE DE RÉCEPTION: 2019-08-06

DATE DU RAPPORT: 2019-08-23

				BLANK/ 26Jun/19,16:43 27Jul/19,14:50
IDENTIFICATION DE L'ÉCHANTILLON:				/NO2
MATRICE:				Air
DATE D'ÉCHANTILLONNAGE:				
Paramètre	Unités	C / N	LDR	420787
Ambient Nitrogen Dioxide	ppbv		0.4	<0.4

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

Certifié par: _____

La procédure des Laboratoires AGAT concernant les signatures et les signataires se conforme strictement aux exigences d'accréditation ISO 17025:2005 comme le requiert, lorsque applicable, CALA, CCN et MDDELCC. Toutes les signatures sur les certificats d'AGAT sont protégées par des mots de passe et les signataires rencontrent les exigences des domaines d'accréditation ainsi que les exigences régionales approuvées par CALA, CCN et MDDELCC.



Contrôle de qualité

NOM DU CLIENT: TATA STEEL MINERALS CANADA LTD

N° BON DE TRAVAIL: 19M501597

N° DE PROJET: NO2 air Monitoring

À L'ATTENTION DE: Mariana Trindade

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Qualité de l'air															
Date du rapport: 2019-08-23			DUPLICATA			MATÉRIAU DE RÉFÉRENCE			BLANC FORTIFIÉ			ÉCH. FORTIFIÉ			
PARAMÈTRE	Lot	N° éch.	Dup #1	Dup #2	% d'écart	Blanc de méthode	% Récup.	Limites		% Récup.	Limites		% Récup.	Limites	
								Inf.	Sup.		Inf.	Sup.		Inf.	Sup.

Passive Air Quality Sampling

Ambient Nitrogen Dioxide	81	NA				< 0.4	99%	90%	110%	94%	80%	120%	105%	80%	120%
--------------------------	----	----	--	--	--	-------	-----	-----	------	-----	-----	------	------	-----	------

Commentaires: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
 Sample spikes and duplicates are not from the same sample.

Certifié par: _____

La procédure des Laboratoires AGAT concernant les signatures et les signataires se conforme strictement aux exigences d'accréditation ISO 17025:2005 comme le requiert, lorsque applicable, CALA, CCN et MDDELCC. Toutes les signatures sur les certificats d'AGAT sont protégées par des mots de passe et les signataires rencontrent les exigences des domaines d'accréditation ainsi que les exigences régionales approuvées par CALA, CCN et MDDELCC. Les pourcentages de différence relative sont calculés à partir des données brutes. Il se peut que le pourcentage de différence relative ne reflète pas les valeurs dupliquées rapportées en raison de l'arrondissement des résultats finaux.

Sommaire de méthode

NOM DU CLIENT: TATA STEEL MINERALS CANADA LTD

N° BON DE TRAVAIL: 19M501597

N° DE PROJET: NO2 air Monitoring

À L'ATTENTION DE: Mariana Trindade

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

PARAMÈTRE	PRÉPARÉ LE	ANALYSÉ LE	AGAT P.O.N.	RÉFÉRENCE DE LITTÉRATURE	TECHNIQUE ANALYTIQUE
Qualité de l'air					
Ambient Nitrogen Dioxide	2019-08-19	2019-08-19	AQM-43-16004	Inhouse Method	ION CHROMATOGRAPH
Ambient Nitrogen Dioxide	2019-08-19	2019-08-19	AQM-43-16004	Inhouse Method	ION CHROMATOGRAPH



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Schefferville

AGAT WORK ORDER: 19C515546

AIR QUALITY MONITORING REVIEWED BY: Carmen Andrei, AQM Lab Coordinator

DATE REPORTED: Sep 18, 2019

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 736-5300

***NOTES**

VERSION 1: No blank has been submitted for analysis. All samples are lab blank subtracted.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



AGAT Laboratories

Air Quality Summary

AGAT WORK ORDER: 19C515546

PROJECT: Schefferville

2420-42 AVE. NE
CALGARY, ALBERTA
CANADA T2E 7T6
TEL (403)736-5300

<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLING SITE:

ATTENTION TO: Mariana Trindade

SAMPLED BY:

Parameter	Unit	Number of Samples	Peak Reading	Network Average
Ambient Nitrogen Dioxide	ppbv	6	1.6	1.0



Certificate of Analysis

AGAT WORK ORDER: 19C515546

PROJECT: Schefferville

2420-42 AVE. NE
CALGARY, ALBERTA
CANADA T2E 7T6
TEL (403)736-5300

<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

SAMPLED BY:

Passive Air Quality Sampling

DATE RECEIVED: 2019-09-09

DATE REPORTED: 2019-09-18

		AQS2-Q2	AQS4-Q2	AQS6-Q2	AQS7-Q2	AQS8-Q2	AQS9-Q2		
		27Jul/19,14:50	26Jul/19,16:56	26Jul/19,14:06	28Jul/19,10:14	28Jul/19,09:54	28Jul/19,08:58		
		26Aug/19,09:30	26Aug/19,10:20	25Aug/19,17:31	31Aug/19,16:59	31Aug/19,14:33	31Aug/19,11:34		
SAMPLE DESCRIPTION:		/NO2	/NO2	/NO2	/NO2	/NO2	/NO2		
SAMPLE TYPE:		FILTER	FILTER	FILTER	FILTER	FILTER	FILTER		
DATE SAMPLED:									
Parameter	Unit	G / S	RDL	511945	511946	511947	511948	511949	511950
Ambient Nitrogen Dioxide	ppbv		0.4	0.9	0.5	1.2	0.7	0.8	1.6

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Alberta Ambient Air Quality Objective
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

511945-511950 No blank has been submitted for analysis. All samples are lab blank subtracted.

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: Schefferville
SAMPLING SITE:

AGAT WORK ORDER: 19C515546
ATTENTION TO: Mariana Trindade
SAMPLED BY:

Air Quality Monitoring

RPT Date: Sep 18, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Passive Air Quality Sampling															
Ambient Nitrogen Dioxide	82	NA				< 0.4	102%	90%	110%	104%	80%	120%	102%	80%	120%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
Sample spikes and duplicates are not from the same sample.

Certified By: _____



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19C515546

PROJECT: Schefferville

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Air Quality Monitoring Ambient Nitrogen Dioxide	AQM-43-16004	Inhouse Method	ION CHROMATOGRAPH



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Sherbrooke

AGAT WORK ORDER: 19C520018

AIR QUALITY MONITORING REVIEWED BY: Carmen Andrei, AQM Lab Coordinator

DATE REPORTED: Sep 19, 2019

PAGES (INCLUDING COVER): 4

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 736-5300

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19C520018

PROJECT: Sherbrooke

2420-42 AVE. NE
CALGARY, ALBERTA
CANADA T2E 7T6
TEL (403)736-5300

<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLING SITE: DSO-3-4

ATTENTION TO: Mariana Trindade

SAMPLED BY: ANY, ANY

Dry Dust Residue

DATE RECEIVED: 2019-08-06

DATE REPORTED: 2019-09-19

		SAMPLE DESCRIPTION: AQS7-Q1-2019 AQS6-Q1-2019 AQS9-Q1-2019 AQS8-Q1-2019 AQS2-Q1-2019 AQS1-Q1-2019 AQS4-Q1-2019 AQS3-Q1-2019											
		SAMPLE TYPE: Liquid		Liquid		Liquid		Liquid		Liquid		Liquid	
		DATE SAMPLED: 2019-07-28 15:55		2019-07-26 14:47		2019-07-28 15:50		2019-07-28 16:54		2019-07-27 14:06		2019-07-26 10:23	
Parameter	Unit	G / S	RDL	542009	542010	542011	542012	542013	542014	542015	542016	542016	542016
Dustfall, Total	mg/sample		20.0	30.5	22.4	21.8	22.1	<20.0	<20.0	30.9	21.2	21.2	21.2
Total Volume of sample	mL		0.5	2290	2240	2190	2210	1890	2310	2320	2120	2120	2120

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by *)

Certified By: _____



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: Sherbrooke
SAMPLING SITE: DSO-3-4

AGAT WORK ORDER: 19C520018
ATTENTION TO: Mariana Trindade
SAMPLED BY: ANY, ANY

Air Quality Monitoring

RPT Date: Sep 19, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Dry Dust Residue															
Dustfall, Total	416858		30.5	45.8	NA	< 20.0	101%	90%	110%						

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: _____



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19C520018

PROJECT: Sherbrooke

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO-3-4

SAMPLED BY: ANY, ANY

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Air Quality Monitoring			
Dustfall, Total	AQM-43-16009	32020 Methods Manual for CAAP	GRAVIMETRIC
Total Volume of sample			N/A

Your P.O. #: 2200002147
 Your Project #: PASSIVE NO2 / DS03-4
 Site#: 2019/01/02 - 2019/02/07
 Site Location: Timmins, Newfoundland

Attention: TARA OAK

Tata Steel Mineral Canada
 1000, Sherbrooke St West
 Montreal, QC
 CANADA H3A 3G4

Report Date: 2019/03/05
 Report #: R2693426
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B914500
Received: 2019/02/28, 10:13

Sample Matrix: Air
 # Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
NO2 Passive Analysis	4	2019/02/28	2019/03/05	PTC SOP-00148	Passive NO2 in ATM

This report shall not be reproduced except in full, without the written approval of the laboratory.
 Results relate only to the items tested.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
 Levi Manchak, Project Manager SR
 Email: LManchak@maxxam.ca
 Phone# (780)378-8542

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B914500
Report Date: 2019/03/05

Tata Steel Mineral Canada
Client Project #: PASSIVE NO2 / DS03-4
Site Location: Timmins, Newfoundland
Your P.O. #: 2200002147
Sampler Initials: PS

RESULTS OF CHEMICAL ANALYSES OF AIR

Maxxam ID		VH2356	VH2361	VH2364	VH2365		
Sampling Date		2019/01/02 13:20	2019/01/02 12:00	2019/01/05 10:57	2019/01/05 09:07		
	UNITS	DS03-AQS6-NO2	DS03-AQS7-NO2	DS03-AQS8-NO2	DS03-AQS9-NO2	RDL	QC Batch
Passive Monitoring							
Calculated NO2	ppb	0.2	0.9	0.1	0.2	0.1	9335114
RDL = Reportable Detection Limit							

Maxxam Job #: B914500
Report Date: 2019/03/05

Tata Steel Mineral Canada
Client Project #: PASSIVE NO2 / DS03-4
Site Location: Timmins, Newfoundland
Your P.O. #: 2200002147
Sampler Initials: PS

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Job #: B914500
Report Date: 2019/03/05

Tata Steel Mineral Canada
Client Project #: PASSIVE NO2 / DS03-4
Site Location: Timmins, Newfoundland
Your P.O. #: 2200002147
Sampler Initials: PS

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	9335114	YL6	Spiked Blank	Calculated NO2			98	%	90 - 110
	9335114	YL6	Method Blank	Calculated NO2		<0.1		ppb	

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Maxxam Job #: B914500
Report Date: 2019/03/05

Tata Steel Mineral Canada
Client Project #: PASSIVE NO2 / DS03-4
Site Location: Timmins, Newfoundland
Your P.O. #: 2200002147
Sampler Initials: PS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Linda Lin, Supervisor, Centre for Passive Sampling Technology

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Sherbrooke

AGAT WORK ORDER: 19C520252

AIR QUALITY MONITORING REVIEWED BY: Carmen Andrei, AQM Lab Coordinator

DATE REPORTED: Sep 20, 2019

PAGES (INCLUDING COVER): 3

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 736-5300

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19C520252

PROJECT: Sherbrooke

2420-42 AVE. NE
CALGARY, ALBERTA
CANADA T2E 7T6
TEL (403)736-5300

<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLING SITE: DSO 3-4

ATTENTION TO: Mariana Trindade

SAMPLED BY:

Particulate on Filter Paper

DATE RECEIVED: 2019-09-06

DATE REPORTED: 2019-09-20

Parameter	Unit	SAMPLE DESCRIPTION:		Q-7304	Q-7316	Q-7310	Q-47-7323	Q-7318	Q-47-7321	Q-7305	Q-7313
		G / S	RDL	(AQS1)	(AQS2)	(AQS2)	(AQS2)	(AQS4)	(AQS4)	(AQS4)	(AQS6)
		SAMPLE TYPE:		FILTER	FILTER	FILTER	FILTER	FILTER	FILTER	FILTER	FILTER
		DATE SAMPLED:		2019-06-07	2019-06-26	2019-07-10	2019-07-25	2019-06-25	2019-07-23	2019-07-08	2019-07-13
Total Suspended Particulate	mg	0.01	0.39	0.42	0.37	0.34	0.27	0.29	0.36	0.35	

Parameter	Unit	SAMPLE DESCRIPTION:		Q-7311	Q-7315	Q-7301	Q-47-7324
		G / S	RDL	(AQS7)	(AQS8)	(AQS9)	(AQS8)
		SAMPLE TYPE:		FILTER	FILTER	FILTER	FILTER
		DATE SAMPLED:		2019-07-03	2019-07-03	2019-05-07	2019-08-02
Total Suspended Particulate	mg	0.01	0.44	0.38	0.47	0.30	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19C520252

PROJECT: Sherbrooke

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO 3-4

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Air Quality Monitoring Total Suspended Particulate	INOR-121-6041	EPA Method 5	GRAVIMETRIC



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Sherbrooke

AGAT WORK ORDER: 19C520268

AIR QUALITY MONITORING REVIEWED BY: Carmen Andrei, AQM Lab Coordinator

DATE REPORTED: Sep 20, 2019

PAGES (INCLUDING COVER): 3

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 736-5300

*NOTES

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Certificate of Analysis

AGAT WORK ORDER: 19C520268

PROJECT: Sherbrooke

2420-42 AVE. NE
CALGARY, ALBERTA
CANADA T2E 7T6
TEL (403)736-5300

<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLING SITE: DSO-3-4

ATTENTION TO: Mariana Trindade

SAMPLED BY:

Particulate on Filter Paper (TSP)

DATE RECEIVED: 2019-08-09

DATE REPORTED: 2019-09-20

Parameter	Unit	Q-7303		Q-7307		Q-7308		Q-47-7326		Q-73-17		Q-7306		Q-47-7319		Q-7309	
		G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL
SAMPLE DESCRIPTION:		(AQ51)		(AQ52)		(AQ52)		(AQ54)		(AQ54)		(AQ54)		(AQ54)		(AQ57)	
SAMPLE TYPE:		FILTER		FILTER		FILTER		FILTER		FILTER		FILTER		FILTER		FILTER	
DATE SAMPLED:		2019-07-06		2019-06-29		2019-07-11		2019-07-25		2019-06-28		2019-07-08		2019-07-23		2019-07-03	
Total Suspended Particulate	mg	0.01	0.02	0.02	0.27	0.02	0.02	0.02	<0.01	0.02	0.36						
SAMPLE DESCRIPTION:		Q-7302 (AQ59)															
SAMPLE TYPE:		FILTER															
DATE SAMPLED:		2019-07-05															
Total Suspended Particulate	mg	0.01	0.03														

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19C520268

PROJECT: Sherbrooke

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO-3-4

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Air Quality Monitoring			
Total Suspended Particulate	INOR-121-6041	EPA Method 5	GRAVIMETRIC



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: TPM Air Monitoring

AGAT WORK ORDER: 19M501574

WATER ANALYSIS REVIEWED BY: Philippe Morneau, chimiste

DATE REPORTED: 2019-09-27

VERSION*: 1

PAGES (INCLUDING COVER): 7

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M501574

PROJECT: TPM Air Monitoring

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: MULTI

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO-3-4

Metals on Filters

DATE RECEIVED: 2019-08-06

DATE REPORTED: 2019-09-27

Parameter	Unit	SAMPLE DESCRIPTION:										
		Q-7303(AQ51)		Q-7307(AQ52)		Q-7308(AQ52)		Q-47-7326 (AQ54)		Q-47-7319 (AQ54)		Q-7309(AQ57)
		Air		Air		Air		Air		Air		Air
		DATE SAMPLED:	2019-07-06	2019-06-29	2019-07-11	2019-07-25	2019-06-28	2019-07-08	2019-07-23	2019-07-03		
G / S	RDL	420416	420437	420438	420439	420440	420441	420442	420443			
Aluminum	ug/Filter	10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0		
Aluminum	ug/m3	10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4		
Arsenic	ug/Filter	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
Arsenic	ug/m3	5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2		
Boron	ug/Filter	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
Boron	ug/m3	5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2		
Cadmium	ug/Filter	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Cadmium	ug/m3	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Copper	ug/Filter	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Copper	ug/m3	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Iron	ug/Filter	5.0	10.0	<5.0	5.0	<5.0	<5.0	<5.0	10.0	15.0		
Iron	ug/m3	5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2		
Lead	ug/Filter	10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0		
Lead	ug/m3	10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4		
Lithium	ug/Filter	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		
Lithium	ug/m3	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		
Magnesium	ug/Filter	10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0		
Magnesium	ug/m3	10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4		
Manganese	ug/Filter	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.5		
Manganese	ug/m3	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		
Molybdenum	ug/Filter	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Molybdenum	ug/m3	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Selenium	ug/Filter	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
Selenium	ug/m3	5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2		
Strontium	ug/Filter	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Strontium	ug/m3	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Titanium	ug/Filter	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5		

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



Certificate of Analysis

AGAT WORK ORDER: 19M501574

PROJECT: TPM Air Monitoring

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: MULTI

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO-3-4

Metals on Filters

DATE RECEIVED: 2019-08-06

DATE REPORTED: 2019-09-27

Parameter	Unit	SAMPLE DESCRIPTION:		Q-7303(AQ51)	Q-7307(AQ52)	Q-7308(AQ52)	Q-47-7326	Q-73-17(AQ54)	Q-7306(AQ54)	Q-47-7319	Q-7309(AQ57)	
		SAMPLE TYPE:		Air	Air	Air	(AQ54)	Air	Air	Air	(AQ54)	Air
		DATE SAMPLED:		2019-07-06	2019-06-29	2019-07-11	2019-07-25	2019-06-28	2019-07-08	2019-07-23	2019-07-03	2019-07-03
		G / S	RDL	420416	420437	420438	420439	420440	420441	420442	420443	
Titanium	ug/m3	2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	
Zinc	ug/Filter	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.5	<1.0	
Zinc	ug/m3	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	

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SAMPLED BY: MULTI

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO-3-4

Metals on Filters

DATE RECEIVED: 2019-08-06

DATE REPORTED: 2019-09-27

SAMPLE DESCRIPTION: Q-7302(AQ59)

SAMPLE TYPE: Air

DATE SAMPLED: 2019-07-05

G / S RDL 420444

Parameter	Unit	G / S	RDL	420444
Aluminum	ug/Filter		10.0	<10.0
Aluminum	ug/m3		10.4	<10.4
Arsenic	ug/Filter		5.0	<5.0
Arsenic	ug/m3		5.2	<5.2
Boron	ug/Filter		5.0	<5.0
Boron	ug/m3		5.2	<5.2
Cadmium	ug/Filter		0.2	<0.2
Cadmium	ug/m3		0.2	<0.2
Copper	ug/Filter		0.5	<0.5
Copper	ug/m3		0.5	<0.5
Iron	ug/Filter		5.0	5.0
Iron	ug/m3		5.2	<5.2
Lead	ug/Filter		10.0	<10.0
Lead	ug/m3		10.4	<10.4
Lithium	ug/Filter		1.0	<1.0
Lithium	ug/m3		1.0	<1.0
Magnesium	ug/Filter		10.0	<10.0
Magnesium	ug/m3		10.4	<10.4
Manganese	ug/Filter		0.3	<0.3
Manganese	ug/m3		0.3	<0.3
Molybdenum	ug/Filter		0.5	<0.5
Molybdenum	ug/m3		0.5	<0.5
Selenium	ug/Filter		5.0	<5.0
Selenium	ug/m3		5.2	<5.2
Strontium	ug/Filter		0.1	<0.1
Strontium	ug/m3		0.1	<0.1
Titanium	ug/Filter		2.5	<2.5
Titanium	ug/m3		2.6	<2.6

Certified By: _____



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PROJECT: TPM Air Monitoring

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<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY: MULTI

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO-3-4

Metals on Filters

DATE RECEIVED: 2019-08-06

DATE REPORTED: 2019-09-27

SAMPLE DESCRIPTION: Q-7302(AQ59)

SAMPLE TYPE: Air

DATE SAMPLED: 2019-07-05

Parameter	Unit	G / S	RDL	420444
Zinc	ug/Filter		1.0	<1.0
Zinc	ug/m3		1	<1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
420416-420444 **Non-accredited test. Inquire with lab for details.

Certified By: _____



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Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD
PROJECT: TPM Air Monitoring
SAMPLED BY: MULTI

AGAT WORK ORDER: 19M501574
ATTENTION TO: Mariana Trindade
SAMPLING SITE: DSO-3-4

Water Analysis															
RPT Date: 2019-09-27			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals on Filters															
Aluminum**			0.40	0.34	NA	< 0.1	99%	80%	120%	99%	80%	120%	85%	80%	120%
Arsenic**			0.2	0.2	NA	< 0.1	100%	80%	120%	97%	80%	120%	92%	80%	120%
Boron**			0.09	0.09	NA	< 0.05	113%	80%	120%	111%	80%	120%	108%	80%	120%
Cadmium**			0.08	0.08	0.0%	< 0.01	107%	80%	120%	99%	80%	120%	98%	80%	120%
Copper**			0.09	0.09	0.0%	< 0.01	102%	80%	120%	109%	80%	120%	110%	80%	120%
Iron**			0.4	0.4	NA	< 0.1	107%	80%	120%	110%	80%	120%	107%	80%	120%
Lead**			0.8	0.8	NA	< 0.2	106%	80%	120%	101%	80%	120%	101%	80%	120%
Lithium**			3.02	3.05	1.0%	< 0.01	102%	80%	120%	110%	80%	120%	102%	80%	120%
Magnesium**			2.4	2.5	4.1%	< 0.2	103%	80%	120%	119%	80%	120%	119%	80%	120%
Manganese**			0.094	0.092	2.2%	< 0.005	107%	80%	120%	117%	80%	120%	115%	80%	120%
Molybdenum**			0.08	0.08	0.0%	< 0.01	108%	80%	120%	101%	80%	120%	100%	80%	120%
Selenium**			0.2	<0.2	NA	< 0.2	107%	80%	120%	120%	80%	120%	98%	80%	120%
Strontium**			0.04	0.04	NA	< 0.01	103%	80%	120%	108%	80%	120%	108%	80%	120%
Titanium**			0.41	0.41	0.0%	< 0.05	114%	80%	120%	103%	80%	120%	103%	80%	120%
Zinc**			0.20	0.20	0.0%	< 0.02	109%	80%	120%	101%	80%	120%	100%	80%	120%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: _____



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AGAT Laboratories
 9770 Route 100, Madeline
 St-Laure, QC H4V 1V6
 Tel: 514.337.1000 Fax: 514.333.3066
 agattabs.com

Chain of Custody - Environmental Chemistry

Client Information
 Company: TSMC
 Address: _____
 Phone: _____ Fax: _____
 Project No: TPM air monitoring
 Sample Location: D50 3-4
 Sampled By: Mu(1)

Report Sent To
 1. Name: TSMC mailing list
 Email: _____
 2. Name: _____
 Email: _____

Report Form
 Portrait (sample/page) Landscape (multi sample/page)

Invoice To
 Company: TSMC
 Contact: _____
 Email: _____
 Address: _____
 PO No: 300000296 Quote No: _____
 Comments: Appendix A P 10/12

Matrix Legend
 S Sol B Sludge EP Drinking Water
 SL Solid EU Wastewater EF Effluent ES Surface Water AF Affluent
 ST Groundwater A Air

SAMPLE IDENTIFICATION	DATE (DD/MM/YY)	TIME	NO. OF CONTAINERS	MATRIX
Q-7307 (A051)	6/7/19	13:35	1	
Q-7307 (A052)	29/6/19	15:45		
Q-7308 (A052)	11/7/19	18:00		
Q-47-7326 (A052)	25/7/19	15:40		
Q-7317 (A054)	28/6/19	13:50		
Q-7306 (A054)	8/7/19	12:00		
Q-47-7319 (A054)	23/7/19	15:30		
Q-7309 (A057)	3/7/19	13:00		
Q-7302 (A059)	5/7/19	9:40		

PARAMETER	DATE (DD/MM/YY)	TIME	REMARKS
FAH			
Petroleum Hydrocarbons C10-C50			
RFA			
Chlorobenzenes			
Phthalates			
PC Congeners			
Aroclor			
Ethylene Glycol			
Glycols (Scan)			
Formaldehyde			
Mineral Oil & Grease			
Total Oil & Grease			
Pesticides (specify):			
Phenols (GC-MS)			
Phenolic Compounds (AAP)			
6 Metals (Cd, Cr, Cu, Ni, Pb, Zn)			
13 Metals TC - Soil			
17 Metals TC - Water			
Metals (specify):			
Mercury			
Selenium - Soil			
Total Hardness			
Alkalinity			
Bicarbonate			
Conductivity			
Chloride			
Fluoride			
Sulfate			
Bromide			
Cyanide			
Total			
Available			
Oxidizable			
COD			
Total			
TOC			
NH ₃			
TKN			
NO ₂ + NO ₃			
YSR			
Solids			
Total			
Dissolved			
YSR			
Suphride - Water			
Total Suphridr - Soil			
Dispersed Metals (deter by laboratory)			
PH			
NO ₂			
NO ₃			
p-P04			
Absorbance			
Colour			
Turbidity			
BOD ₅			
CBOD ₅			
Hexavalent Chromium			
Confirms			
Total			
Facat			
ECOT			
Microbiology (other)			
HRMS - PDD/PDF			
PHL			
PGB			
CMM 2008-47			
Sanitary			
Storm			
RMD			
REMR			

Turn Around Time Required (Business Days)
 Environmental: Regular: 5 to 7 days Ultra Trace: 10 to 15 days
 Rush: < 12 hours 24 hours 48 hours 72 hours
 Bath Required: Yes No N/A

Guideline Criteria
 PRT/ABC RESC Other: _____
 OCME Eau de contamination
 Eau de nettoyage Surface Storm
 Eau de nettoyage Salée

Customer Seal Intact? Yes No N/A

Report Form
 Portrait (sample/page) Landscape (multi sample/page)

Matrix Legend
 S Sol B Sludge EP Drinking Water
 SL Solid EU Wastewater EF Effluent ES Surface Water AF Affluent
 ST Groundwater A Air

Matrix Identification Table

SAMPLE IDENTIFICATION	DATE (DD/MM/YY)	TIME	NO. OF CONTAINERS	MATRIX
Q-7307 (A051)	6/7/19	13:35	1	
Q-7307 (A052)	29/6/19	15:45		
Q-7308 (A052)	11/7/19	18:00		
Q-47-7326 (A052)	25/7/19	15:40		
Q-7317 (A054)	28/6/19	13:50		
Q-7306 (A054)	8/7/19	12:00		
Q-47-7319 (A054)	23/7/19	15:30		
Q-7309 (A057)	3/7/19	13:00		
Q-7302 (A059)	5/7/19	9:40		

Table of Results

PARAMETER	DATE (DD/MM/YY)	TIME	REMARKS
FAH			
Petroleum Hydrocarbons C10-C50			
RFA			
Chlorobenzenes			
Phthalates			
PC Congeners			
Aroclor			
Ethylene Glycol			
Glycols (Scan)			
Formaldehyde			
Mineral Oil & Grease			
Total Oil & Grease			
Pesticides (specify):			
Phenols (GC-MS)			
Phenolic Compounds (AAP)			
6 Metals (Cd, Cr, Cu, Ni, Pb, Zn)			
13 Metals TC - Soil			
17 Metals TC - Water			
Metals (specify):			
Mercury			
Selenium - Soil			
Total Hardness			
Alkalinity			
Bicarbonate			
Conductivity			
Chloride			
Fluoride			
Sulfate			
Bromide			
Cyanide			
Total			
Available			
Oxidizable			
COD			
Total			
TOC			
NH ₃			
TKN			
NO ₂ + NO ₃			
YSR			
Solids			
Total			
Dissolved			
YSR			
Suphride - Water			
Total Suphridr - Soil			
Dispersed Metals (deter by laboratory)			
PH			
NO ₂			
NO ₃			
p-P04			
Absorbance			
Colour			
Turbidity			
BOD ₅			
CBOD ₅			
Hexavalent Chromium			
Confirms			
Total			
Facat			
ECOT			
Microbiology (other)			
HRMS - PDD/PDF			
PHL			
PGB			
CMM 2008-47			
Sanitary			
Storm			
RMD			
REMR			

Signature and Date
 Samples Released by (Print and Sign): _____ Date (DD/MM/YY): 05/05/19 Time: 13:00
 Samples Released by (Print and Sign): _____ Date (DD/MM/YY): _____ Time: _____

Page Information
 Page ____ of ____
 Copies: Red - Client Yellow - AGAT White - AGAT
 Revision Date: 15 November 2014
 Page 8 de 8



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: Shefferville

AGAT WORK ORDER: 19C531119

AIR QUALITY MONITORING REVIEWED BY: Carmen Andrei, AQM Lab Coordinator

DATE REPORTED: Oct 25, 2019

PAGES (INCLUDING COVER): 3

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 736-5300

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19C531119

PROJECT: Shefferville

2420-42 AVE. NE
CALGARY, ALBERTA
CANADA T2E 7T6
TEL (403)736-5300

<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLING SITE: DSO3-DSO4

ATTENTION TO: Mariana Trindade

SAMPLED BY: JDF, AC., JDF, AC.

Particulate on Filter Paper

DATE RECEIVED: 2019-10-16

DATE REPORTED: 2019-10-25

Parameter	Unit	G / S	RDL	Q47-7325 (AQ54) 13:15/610152	Q47-7320 (AQ52) 10:00/610166	Q47-7327 (AQ51) 13:45/610167	Q47-7333 (AQ54) 15:33/610168	Q47-7348 (AQ55) 16:30/610169	Q47-7346 (AQ53) 17:40/610170	Q47-7331 (AQ56) 17:15/610171	Q47-7347 (AQ59) 18:00/610172
		SAMPLE DESCRIPTION:		DSO3-DSO4	DSO3-DSO4	DSO3-DSO4	DSO3-DSO4	DSO3-DSO4	DSO3-DSO4	DSO3-DSO4	DSO3-DSO4
		SAMPLE TYPE:		FILTER	FILTER	FILTER	FILTER	FILTER	FILTER	FILTER	FILTER
		DATE SAMPLED:		2019-08-04	2019-08-07	2019-08-15	2019-08-16	2019-08-17	2019-08-18	2019-08-22	2019-08-23
Total Suspended Particulate	mg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Parameter	Unit	G / S	RDL	Q47-7337 (AQ52) 09:30/610173	Q47-7357 (AQ54) 13:30/610174	Q47-7352 (AQ52) 10:30/610175	Q47-7359 (AQ58) 15:40/610176	Q47-7361 (AQ52) 08:10/610177	Q47-7350 (AQ51) 13:30/610178	Q47-7358 (AQ53) 09:00/610185	Q47-7351 (AQ55) 12:00/610186
		SAMPLE DESCRIPTION:		DSO3-DSO4	DSO3-DSO4	DSO3-DSO4	DSO3-DSO4	DSO3-DSO4	DSO3-DSO4	DSO3-DSO4	DSO3-DSO4
		SAMPLE TYPE:		FILTER	FILTER	FILTER	FILTER	FILTER	FILTER	FILTER	FILTER
		DATE SAMPLED:		2019-08-20	2019-08-28	2019-09-01	2019-09-02	2019-09-13	2019-09-15	2019-09-17	2019-08-18
Total Suspended Particulate	mg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Parameter	Unit	G / S	RDL	Q47-7364 (AQ54) 10:00/610187							
		SAMPLE DESCRIPTION:		DSO3-DSO4							
		SAMPLE TYPE:		FILTER							
		DATE SAMPLED:		2019-09-21							
Total Suspended Particulate	mg		0.01	<0.01							

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
 620051-620068 The condition of samples was satisfactory at the time of arrival in laboratory.
 The Reported Detection Limit RDL is based on the detection limit of the analytical balance used for filters: 0.01mg.
 Analysis performed at AGAT Calgary (unless marked by *)

Certified By: _____



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19C531119

PROJECT: Shefferville

ATTENTION TO: Mariana Trindade

SAMPLING SITE: DSO3-DSO4

SAMPLED BY: JDF,AC.,JDF,AC.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Air Quality Monitoring			
Total Suspended Particulate	AQM-43-16002	NIOSH 0500	GRAVIMETRIC

F. Qualité des stériles



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT: 19M541514

AGAT WORK ORDER: 19T547621

SOLID ANALYSIS REVIEWED BY: Sherin Moussa, Senior Technician

DATE REPORTED: Nov 25, 2019

PAGES (INCLUDING COVER): 5

Should you require any information regarding this analysis please contact your client services representative at (905) 501-9998

*NOTES

All samples are stored at no charge for 90 days. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19T547621

PROJECT: 19M541514

5623 McADAM ROAD
MISSISSAUGA, ONTARIO
CANADA L4Z 1N9
TEL (905)501-9998
FAX (905)501-0589
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

(201-039) LECO (Combustion IR) - Total S

DATE SAMPLED: Nov 22, 2019	DATE RECEIVED: Nov 23, 2019	DATE REPORTED: Nov 25, 2019	SAMPLE TYPE: Other
----------------------------	-----------------------------	-----------------------------	--------------------

Analyte:	S
Unit:	%
Sample ID (AGAT ID)	RDL: 0.005
TSMC-59851 (740642)	<0.005
TSMC-70348 (740643)	<0.005
TSMC-70349 (740644)	<0.005
TSMC-70350 (740645)	<0.005

Comments: RDL - Reported Detection Limit
Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

(201-039) LECO (Combustion IR) - Total S

Parameter	REPLICATE #1				REPLICATE #2											
	Sample ID	Original	Replicate	RPD	Sample ID	Original	Replicate	RPD								
S	740642	< 0.005	<0.005	0.0%	740645	< 0.005	<0.005	0.0%								



AGAT Laboratories

Quality Assurance - Certified Reference materials
 AGAT WORK ORDER: 19T547621
 PROJECT: 19M541514

5623 McADAM ROAD
 MISSISSAUGA, ONTARIO
 CANADA L4Z 1N9
 TEL (905)501-9998
 FAX (905)501-0589
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

(201-039) LECO (Combustion IR) - Total S

Parameter	CRM #1				CRM #2											
	Expect	Actual	Recovery	Limits	Expect	Actual	Recovery	Limits								
S	0.8	0.8	100%	90% - 110%	0.8	0.795	99%	90% - 110%								



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19T547621

PROJECT: 19M541514

ATTENTION TO: Mariana Trindade

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Solid Analysis			
S	MIN-200-12000	ASTM E1915-07a	LECO



CLIENT NAME: TATA STEEL MINERALS CANADA LTD
1000 SHERBROOKE W., SUTE 1120
MONTREAL, QC H3A3G4
(514) 764-6700

ATTENTION TO: Mariana Trindade

PROJECT:

AGAT WORK ORDER: 19M541514

SOIL ANALYSIS REVIEWED BY: Jalel Rouissi, Chimiste

WATER ANALYSIS REVIEWED BY: Jalel Rouissi, Chimiste

DATE REPORTED: 2019-12-20

VERSION*: 1

PAGES (INCLUDING COVER): 19

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19M541514

PROJECT:

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY:

ATTENTION TO: Mariana Trindade

SAMPLING SITE: 5490 rue Raymond, Montréal

ABA Package

DATE RECEIVED: 2019-11-07

DATE REPORTED: 2019-12-20

Parameter	Unit	SAMPLE DESCRIPTION:		TSMC-70348	TSMC-70349	TSMC-70350	TSMC-59851
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		G / S	RDL	696078	696092
Sulphur - Total	%	0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
696078-696094 Total Sulphur analysis performed at AGAT Toronto.

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



Certificate of Analysis

AGAT WORK ORDER: 19M541514

PROJECT:

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

SPLP Mercury							
DATE RECEIVED: 2019-11-07				DATE REPORTED: 2019-12-20			
		SAMPLE DESCRIPTION:		TSMC-70348	TSMC-70349	TSMC-70350	TSMC-59851
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:					
Parameter	Unit	G / S	RDL	696078	696092	696093	696094
Mercury SPLP Leachate	µg/L		0.5	<0.5	<0.5	<0.5	<0.5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M541514

PROJECT:

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY:

ATTENTION TO: Mariana Trindade

SAMPLING SITE: 5490 rue Raymond, Montréal

SPLP Metals

DATE RECEIVED: 2019-11-07

DATE REPORTED: 2019-12-20

Parameter	Unit	SAMPLE DESCRIPTION:		TSMC-70348	TSMC-70349	TSMC-70350	TSMC-59851
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		G / S	RDL	696078	696092
Aluminum, SPLP Leachate	mg/L	0.02	0.03	0.03	0.03	0.03	0.02
Antimony, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Arsenic, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Barium, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Beryllium, SPLP Leachate	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bismuth, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Boron, SPLP Leachate	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium, SPLP Leachate	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Cobalt, SPLP Leachate	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron, SPLP Leachate	mg/L	0.2	0.4	0.3	0.3	0.3	0.5
Lead, SPLP Leachate	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Lithium, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Manganese, SPLP Leachate	mg/L	0.02	0.08	0.04	0.15	0.15	<0.02
Molybdenum, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nickel, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Selenium, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Silver, SPLP Leachate	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Strontium, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium, SPLP Leachate	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Uranium, SPLP Leachate	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc, SPLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: _____



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Certificate of Analysis

AGAT WORK ORDER: 19M541514

PROJECT:

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

TCLP Leachate Metals

DATE RECEIVED: 2019-11-07

DATE REPORTED: 2019-12-20

Parameter	Unit	SAMPLE DESCRIPTION:							
		TSMC-70348		TSMC-70349		TSMC-70350		TSMC-59851	
		Soil		Soil		Soil		Soil	
DATE SAMPLED:		696078		696092		696093		696094	
G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL
Antimony - TCLP Leachate	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - TCLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Barium - TCLP Leachate	mg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Beryllium - TCLP Leachate	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Boron - TCLP Leachate	mg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium - TCLP Leachate	mg/L	0.01	<0.01	0.03	<0.01	<0.01	0.01	<0.01	0.01
Chromium - TCLP Leachate	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt - TCLP Leachate	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper - TCLP Leachate	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron - TCLP Leachate	mg/L	1	<1	<1	<1	<1	<1	<1	<1
Lead - TCLP Leachate	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.02
Mercury - TCLP Leachate	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel - TCLP Leachate	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium - TCLP Leachate	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver - TCLP Leachate	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium - TCLP Leachate	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium - TCLP Leachate	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - TCLP Leachate	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc - TCLP Leachate	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zirconium - TCLP Leachate	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
696078-696094 Analysis based on "as received"

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



Certificate of Analysis

AGAT WORK ORDER: 19M541514

PROJECT:

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

SAMPLED BY:

ATTENTION TO: Mariana Trindade

SAMPLING SITE: 5490 rue Raymond, Montréal

Leachate Analyses CTEU-9

DATE RECEIVED: 2019-11-07

DATE REPORTED: 2019-12-20

Parameter	Unit	SAMPLE DESCRIPTION: TSMC-70348 TSMC-70349 TSMC-70350 TSMC-59851					
		SAMPLE TYPE: Soil Soil Soil Soil					
		DATE SAMPLED: G / S RDL 696078 696092 696093 696094					
Silver	ug/L	0.1	<0.1	<0.1	<0.1	<0.1	
Arsenic	ug/L	0.3	<0.3	<0.3	<0.3	<0.3	
Barium	ug/L	20	<20	<20	<20	<20	
Boron	ug/L	50	<50	<50	<50	<50	
Cadmium	ug/L	1	<1	<1	<1	<1	
Chromium	ug/L	15	<15	<15	<15	<15	
Cobalt	ug/L	5	<5	<5	<5	<5	
Copper	ug/L	1	<1	<1	<1	<1	
Manganese	ug/L	2	21	6	60	3	
Mercury	ug/L	0.1	<0.1	<0.1	<0.1	<0.1	
Molybdenum	ug/L	10	<10	<10	<10	<10	
Nickel	ug/L	10	<10	<10	<10	<10	
Lead	ug/L	1	<1	<1	<1	<1	
Selenium	ug/L	3	<3	<3	<3	<3	
Uranium	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	
Zinc	ug/L	3	<3	<3	<3	<3	
fluorides	mg/L	0.10	0.16	0.15	0.15	0.15	
Nitrites - Nitrates	mg/L - N	1.0	<1.0	<1.0	<1.0	<1.0	
nitrites	mg/L - N	0.5	<0.5	<0.5	<0.5	<0.5	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

696078-696094 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19M541514

PROJECT:

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
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<http://www.agatlabs.com>

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

Shake Flask Extraction - Dissolved Metals

DATE RECEIVED: 2019-11-07

DATE REPORTED: 2019-12-20

Parameter	Unit	SFE Method						
		SAMPLE DESCRIPTION:		Blank	TSMC-70348	TSMC-70349	TSMC-70350	TSMC-59851
		SAMPLE TYPE:		SFE	SFE	SFE	SFE	SFE
		DATE SAMPLED:		710252	710262	710263	710264	710266
		G / S	RDL					
Weight of Dry Sample	g			0	200	250	250	200
Volume of DI Water	mL			750	600	750	750	600
Silver Dissolved	mg/L		0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008
Arsenic Dissolved	mg/L		0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Boron Dissolved	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium Dissolved	mg/L		0.0002	0.0003	0.0060	0.0005	0.0040	0.0023
Cadmium Dissolved	mg/L		0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Cobalt Dissolved	mg/L		0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Chromium Dissolved	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Copper Dissolved	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005
Iron Dissolved	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Mercury Dissolved	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Manganese Dissolved	mg/L		0.0002	<0.0002	0.0248	0.0456	0.120	0.0164
Molybdenum Dissolved	mg/L		0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel Dissolved	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lead Dissolved	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Selenium Dissolved	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Tin Dissolved	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Uranium Dissolved	mg/L		0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Zinc Dissolved	mg/L		0.001	<0.001	0.010	0.001	0.001	0.002
Fluoride	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	mg/L		0.005	<0.005	0.029	0.073	0.020	0.020
Nitrite-N	mg/L		0.005	<0.005	0.034	0.034	0.012	0.017

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



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Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M541514

PROJECT:

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

Soil Analysis

RPT Date: 2019-12-20			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
TCLP Leachate Metals															
Antimony - TCLP Leachate	696078	696078S	2.05	2.01	2.0%	< 0.01				95%	90%	110%	104%	70%	130%
Arsenic - TCLP Leachate	696078	696078S	1.72	2.10	19.5%	< 0.02	79%	50%	150%	103%	90%	110%	105%	70%	130%
Barium - TCLP Leachate	696078	696078S	1.1	1.0	NA	< 0.5	83%	50%	150%	99%	90%	110%	105%	70%	130%
Beryllium - TCLP Leachate	696078	696078S	0.99	0.97	1.6%	< 0.02				100%	90%	110%	102%	70%	130%
Boron - TCLP Leachate	696078	696078S	1.0	1.0	NA	< 0.5				106%	90%	110%	101%	70%	130%
Cadmium - TCLP Leachate	696078	696078S	0.97	0.93	5.1%	< 0.01	104%	50%	150%	97%	90%	110%	101%	70%	130%
Chromium - TCLP Leachate	696078	696078S	0.97	0.84	14.9%	< 0.01	97%	50%	150%	94%	90%	110%	97%	70%	130%
Cobalt - TCLP Leachate	696078	696078S	0.98	0.95	3.1%	< 0.05	54%	50%	150%	101%	90%	110%	103%	70%	130%
Copper - TCLP Leachate	696078	696078S	1.01	0.96	5.2%	< 0.05				101%	90%	110%	99%	70%	130%
Iron - TCLP Leachate	696078	696078S	1	1	NA	< 1				105%	90%	110%	104%	70%	130%
Lead - TCLP Leachate	696078	696078S	1.80	1.81	0.2%	< 0.01	94%	50%	150%	93%	90%	110%	91%	70%	130%
Mercury - TCLP Leachate	696078	696078S	1.41	1.43	1.4%	< 0.01	69%	50%	150%	93%	90%	110%	73%	70%	130%
Nickel - TCLP Leachate	696078	696078S	1.05	0.95	9.3%	< 0.05	55%	50%	150%	99%	90%	110%	100%	70%	130%
Selenium - TCLP Leachate	696078	696078S	1.02	1.01	1.2%	< 0.05	87%	50%	150%	100%	90%	110%	103%	70%	130%
Silver - TCLP Leachate	696078	696078S	0.24	0.24	3.4%	< 0.01	140%	50%	150%	100%	90%	110%	102%	70%	130%
Thallium - TCLP Leachate	696078	696078S	4.61	4.62	0.3%	< 0.01				96%	90%	110%	93%	70%	130%
Uranium - TCLP Leachate	696078	696078S	<0.01	<0.01	NA	< 0.01				94%	90%	110%			
Vanadium - TCLP Leachate	696078	696078S	1.02	0.91	12.1%	< 0.05				93%	90%	110%	99%	70%	130%
Zinc - TCLP Leachate	696078	696078S	1.1	1.0	7.0%	< 0.1	79%	50%	150%	101%	90%	110%	104%	70%	130%
Zirconium - TCLP Leachate	696078	696078S	<0.01	<0.01	NA	< 0.01				100%	90%	110%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

ABA Package

Sulphur - Total 696094 <0.005 <0.005 NA < 0.005 100% 80% 120%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

SPLP Metals

Aluminum, SPLP Leachate	696094	696094	0.02	0.03	NA	< 0.02	107%	80%	120%	104%	80%	120%	106%	70%	130%
Antimony, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	80%	80%	120%	NA	80%	120%	NA	70%	130%
Arsenic, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	100%	80%	120%	97%	80%	120%	96%	70%	130%
Barium, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	97%	80%	120%	99%	80%	120%	103%	70%	130%
Beryllium, SPLP Leachate	696094	696094	<0.05	<0.05	NA	< 0.05	107%	80%	120%	114%	80%	120%	108%	70%	130%
Bismuth, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	100%	80%	120%	110%	80%	120%	114%	70%	130%
Boron, SPLP Leachate	696094	696094	<0.05	<0.05	NA	< 0.05	108%	80%	120%	113%	80%	120%	111%	70%	130%
Cadmium, SPLP Leachate	696094	696094	<0.003	<0.003	NA	< 0.003	99%	80%	120%	99%	80%	120%	99%	70%	130%
Chromium, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	101%	80%	120%	102%	80%	120%	115%	70%	130%
Cobalt, SPLP Leachate	696094	696094	<0.01	<0.01	NA	< 0.01	104%	80%	120%	106%	80%	120%	113%	70%	130%
Copper, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	106%	80%	120%	109%	80%	120%	119%	70%	130%
Iron, SPLP Leachate	696094	696094	0.5	0.4	NA	< 0.2	102%	80%	120%	111%	80%	120%	122%	70%	130%
Lead, SPLP Leachate	696094	696094	<0.005	<0.005	NA	< 0.005	108%	80%	120%	111%	80%	120%	114%	70%	130%
Lithium, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	104%	80%	120%	113%	80%	120%	110%	70%	130%
Manganese, SPLP Leachate	696094	696094	<0.02	0.02	NA	< 0.02	109%	80%	120%	115%	80%	120%	128%	70%	130%



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M541514

PROJECT:

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

Soil Analysis (Continued)

RPT Date: 2019-12-20			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Molybdenum, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	101%	80%	120%	102%	80%	120%	109%	70%	130%
Nickel, SPLP Leachate	696094	696094	<0.02	0.03	NA	< 0.02	102%	80%	120%	107%	80%	120%	115%	70%	130%
Selenium, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	98%	80%	120%	93%	80%	120%	87%	70%	130%
Silver, SPLP Leachate	696094	696094	<0.005	<0.005	NA	< 0.005	104%	80%	120%	104%	80%	120%	100%	70%	130%
Strontium, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	115%	80%	120%	114%	80%	120%	117%	70%	130%
Thallium, SPLP Leachate	696094	696094	<0.001	<0.001	NA	< 0.001	107%	80%	120%	108%	80%	120%	109%	70%	130%
Tin, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	97%	80%	120%	104%	80%	120%	106%	70%	130%
Uranium, SPLP Leachate	696094	696094	<0.001	<0.001	NA	< 0.001	104%	80%	120%	107%	80%	120%	109%	70%	130%
Vanadium, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	100%	80%	120%	103%	80%	120%	111%	70%	130%
Zinc, SPLP Leachate	696094	696094	<0.02	<0.02	NA	< 0.02	102%	80%	120%	104%	80%	120%	103%	70%	130%

Certified By: _____



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Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M541514

PROJECT:

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

Water Analysis															
RPT Date: 2019-12-20			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Shake Flask Extraction - Dissolved Metals

Silver Dissolved	736560		<0.00008	<0.00008	NA	< 0.00008				99%	90%	110%			
Arsenic Dissolved	736560		0.0008	0.0008	NA	< 0.0002				100%	90%	110%			
Boron Dissolved	736560		0.01	0.01	NA	< 0.01				96%	90%	110%			
Barium Dissolved	736560		0.131	0.131	0.3%	< 0.0002				101%	90%	110%			
Cadmium Dissolved	736560		<0.00001	0.00001	NA	< 0.00001				98%	90%	110%			
Cobalt Dissolved	736560		0.0010	0.0012	9.5%	< 0.0001				100%	90%	110%			
Chromium Dissolved	736560		<0.0005	<0.0005	NA	< 0.0005				98%	90%	110%			
Copper Dissolved	736560		0.0016	0.0017	NA	< 0.0005				99%	90%	110%			
Iron Dissolved	736560		0.18	0.19	5.6%	< 0.02				100%	90%	110%			
Mercury Dissolved	736560		<0.0005	<0.0005	NA	< 0.0005				99%	90%	110%			
Manganese Dissolved	736560		0.406	0.396	2.5%	< 0.0002				99%	90%	110%			
Molybdenum Dissolved	736560		0.0061	0.0061	0.8%	< 0.0001				90%	90%	110%			
Nickel Dissolved	736560		0.0008	0.0007	NA	< 0.0005				98%	90%	110%			
Lead Dissolved	736560		<0.0005	<0.0005	NA	< 0.0005				106%	90%	110%			
Selenium Dissolved	736560		<0.0005	<0.0005	NA	< 0.0005				98%	90%	110%			
Tin Dissolved	736560		0.0005	<0.0005	NA	< 0.0005				101%	90%	110%			
Uranium Dissolved	736560		0.00209	0.00207	0.7%	< 0.00005				100%	90%	110%			
Zinc Dissolved	736560		0.005	0.004	NA	< 0.001				100%	90%	110%			
Fluoride	710262		<0.02	<0.02	NA	< 0.02	105%	85%	115%	105%	90%	110%			
Nitrate-N	710262		0.029	0.030	4.1%	< 0.005	103%	85%	115%	105%	90%	110%			
Nitrite-N	710262		0.034	0.034	0.0%	< 0.005				103%	90%	110%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Leachate Analyses CTEU-9

Silver	1	NA	NA	NA	< 0.1	NA	80%	120%	106%	80%	120%	NA	80%	120%	
Arsenic	1	NA	NA	NA	< 0.3	NA	80%	120%	111%	80%	120%	NA	80%	120%	
Barium	1	NA	NA	NA	< 20	NA	80%	120%	104%	80%	120%	NA	80%	120%	
Boron	1	NA	NA	NA	< 50	NA	80%	120%	100%	80%	120%	NA	80%	120%	
Cadmium	1	NA	NA	NA	< 1	NA	80%	120%	110%	80%	120%	NA	80%	120%	
Chromium	1	NA	NA	NA	< 15	NA	80%	120%	103%	80%	120%	NA	80%	120%	
Cobalt	1	NA	NA	NA	< 5	NA	80%	120%	112%	80%	120%	NA	80%	120%	
Copper	1	NA	NA	NA	< 1	NA	80%	120%	98%	80%	120%	NA	80%	120%	
Manganese	1	NA	NA	NA	< 2	NA	80%	120%	117%	80%	120%	NA	80%	120%	
Molybdenum	1	NA	NA	NA	< 10	NA	80%	120%	104%	80%	120%	NA	80%	120%	
Nickel	1	NA	NA	NA	< 10	NA	80%	120%	105%	80%	120%	NA	80%	120%	
Lead	1	NA	NA	NA	< 1	NA	80%	120%	109%	80%	120%	NA	80%	120%	
Selenium	1	NA	NA	NA	< 3	NA	80%	120%	112%	80%	120%	NA	80%	120%	
Uranium	1	NA	NA	NA	< 0.5	NA	80%	120%	104%	80%	120%	NA	80%	120%	
Zinc	1	NA	NA	NA	< 3	NA	80%	120%	97%	80%	120%	NA	80%	120%	
fluorides	807656		0.09	0.09	NA	< 0.10	96%	80%	120%	99%	80%	120%	100%	80%	120%
Nitrites - Nitrates	807656		< 1.0	< 1.0	0.0%	< 1.0	90%	80%	120%	94%	80%	120%	94%	80%	120%
nitrites	807656		< 0.5	< 0.5	0.0%	< 0.5	NA	80%	120%	90%	80%	120%	89%	80%	120%



Quality Assurance

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M541514

PROJECT:

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

Water Analysis (Continued)

RPT Date: 2019-12-20			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: NA : Non applicable

If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

NA as the percentage of recovery for the matrix spike indicates that the result is not provided due to the heterogeneity of the sample or the spiked analyte concentration was lower than the matrix contribution.

NA in the spike blank or CRM indicates that it is not required by the procedure.

The percentage of recovery of the CRM may be outside of the acceptability criteria of 80-120%, if conform to the criteria provided on the Certificate of Analysis of the reference material.

Certified By: _____



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Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M541514

PROJECT:

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis					
Sulphur - Total			INOR-181-6027	Modified from ASTM E1915-11	COMBUSTION
Mercury SPLP Leachate	2019-11-29	2019-11-29	MET-121-6107 & INOR-121-6036	modified from EPA 1312, EPA 245.1, SM 3112 B	CVAAS
Aluminum, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Antimony, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Arsenic, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Barium, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Beryllium, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Bismuth, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Boron, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Cadmium, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Chromium, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Cobalt, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Copper, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Iron, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Lead, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Lithium, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Manganese, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Molybdenum, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Nickel, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Selenium, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M541514

PROJECT:

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Silver, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Strontium, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Thallium, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Tin, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Uranium, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Vanadium, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Zinc, SPLP Leachate	2019-11-28	2019-11-28	INOR-121-6036 and MET-121-6105	modified from EPA SW-846 1312 and SM 3125 and SM 3	ICP-MS
Antimony - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Arsenic - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Barium - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Beryllium - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Boron - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Cadmium - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Chromium - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Cobalt - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Copper - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Iron - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Lead - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Mercury - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP/MS
Nickel - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Selenium - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Silver - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Thallium - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Uranium - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Vanadium - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS
Zinc - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS



Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M541514

PROJECT:

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Zirconium - TCLP Leachate	2019-11-14	2019-11-14	MET-181-6102, LAB-181-4001	EPA 1311 and EPA 6020A	ICP-MS

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M541514

PROJECT:

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis					
Silver	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Arsenic	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Barium	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Boron	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Cadmium	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Chromium	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Cobalt	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Copper	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Manganese	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Mercury	2019-12-20	2019-12-20	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	VAPEUR FROIDE/AA
Molybdenum	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Nickel	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Lead	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Selenium	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Uranium	2019-12-16	2019-12-18	MET-101-6105F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
Zinc	2019-12-16	2019-12-18	INOR-101-6001F	MA.100-Lix.com.1.1, CTEU-9	ICP/MS
fluorides	2019-12-18	2019-12-18	INOR-101-6004F	SM 4500C 21ed 2005	CHROMATO IONIQUE
Nitrites - Nitrates	2019-12-18	2019-12-18	INOR-101-6004F	MA. 300 - Ions 1.3	CHROMATO IONIQUE
nitrites	2019-12-18	2019-12-18	INOR-101-6004F	MA. 300 - Ions 1.3	CHROMATO IONIQUE
Weight of Dry Sample	2019-11-20				ICP-MS
Volume of DI Water	2019-11-20				PH METER
Silver Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Arsenic Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Boron Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Barium Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Cadmium Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Cobalt Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Chromium Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS

Method Summary

CLIENT NAME: TATA STEEL MINERALS CANADA LTD

AGAT WORK ORDER: 19M541514

PROJECT:

ATTENTION TO: Mariana Trindade

SAMPLED BY:

SAMPLING SITE: 5490 rue Raymond, Montréal

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Copper Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Iron Dissolved	2019-11-27	2019-11-27	ARD-181-18006, MET-181-6108	MEND Report 1.20.1 (2009), Modified from SM 3120 B	ICP/OES
Mercury Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Manganese Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Molybdenum Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Nickel Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Lead Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Selenium Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Tin Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Uranium Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Zinc Dissolved	2019-11-26	2019-11-26	ARD-181-18006, MET-181-6107	MEND Report 1.20.1 (2009), Modified from SM 3125 B	ICP-MS
Fluoride	2019-11-21	2019-11-21	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate-N	2019-11-21	2019-11-21	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite-N	2019-11-21	2019-11-21	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH



AGAT Laboratories

120 - 8600 Glenlyon Parkway
Burnaby, BC
V5J 0B6
webearth.agatlabs.com

Laboratory Use Only

Arrival Condition: Good Poor (complete notes)

AGAT WO#: _____

Received: _____

Notes: _____

Chain of Custody Record - ARD - Solids Extracts and Leachates

P: 778.452.4000 - F: 778.452.4074

Report To
 Company: _____
 Contact: _____
 Address: _____
 Phone: _____ Fax: _____
 Project Name: _____
 Project #: _____
 ARD Quote #: _____
 ARD Project #: _____

Report Information
 Name: _____ Name: _____
 Email: _____ Email: _____
 Name: _____ Name: _____
 Email: _____ Email: _____

Storage Policy

Samples are stored for 60 days at no cost and then discarded. If longer storage is required, clients must inform AGAT Laboratories. Storage fees will apply.

TAT Required (Turnaround Time)

Regular Rush*

*Rush surcharges may apply

Report Format

Excel Format
 PDF Format
 Both

Invoice To Same Yes / No
 Company: _____
 Contact: _____
 Address: _____
 Phone: _____ Fax: _____
 PO#: _____

AGAT Analysis Method - Solid Samples

	pH	EC	ORP	Acidity	Alkalinity (total/speciation)	Sulphate	Turbidity	Chemical Oxygen Demand (COD)	Biochemical Oxygen Demand (BOD)	TDS	TSS	Nitrate	Nitrite	Nitrate + Nitrite as N (one result)	TKN	Nitrogen, Total	Ammonia, Total	Flouride	Chloride	Total Organic Carbon (TOC)	Total Cyanide (SAD)	WAD Cyanide	Oil and Grease (Total)	Oil and Grease (Mineral)	Total Metals by ICP-MS/ICP-OES Scans	Dissolved Metals by ICP-MS/ICP-OES Scan	Hg by CVAA method: <input type="checkbox"/> Total <input type="checkbox"/> Dissolved	Dissolved Oxygen		
On SFE extract (MEND method; water extraction)																														
On SPLP extract (US-EPA 1312 method; water extraction)																														
On MWMP extract (EP 1990/STD Method; water extraction)																														
On NAG extract (Egi/MEND Method; H ₂ O ₂ extraction)																														
On HCT leachates																														
On Column leachates (specific port)																														
On SAD Column leachates (surface top port)																														
On SAD Column leachates (solids bottom port)																														

EXTRACT AND LEACHATE ANALYSES REQUIRED

Notes: Total S, Total C and Total Organic C is done by combustion IR.

Samples Received by (print name & sign): _____	Date/Time: _____
Containers Received by (print name & sign): _____	Date/Time: _____

Special Instruction

Courier

Print Name: _____

Date: _____

Page of

TSMC ARD Analyses

Sample IDs TSMC-70348, TSMC-70349, TSMC 70350 and TSMC-59851

- % sulfur
- Essais statiques MABA (Modified Acid Base Accounting)
- Essai de lixiviation TCLP (Must be done following MA.100-Lix.com.1.1 method),
- Essai de lixiviation SPLP
- Essai de lixiviation CTEU-9
- metals: (Ag, As, Ba, Cd, Co, Cr, Cu, Fe, Sn, Mn, Hg, Mo, Ni, Pb, Se, Zn)
- Additional parameters : (B, U, total fluorides, Nitrites and Nitrates)

G. Lettre explicative du laboratoire AGAT



AGAT Laboratoires

9770, route Transcanadienne
St-Laurent, Québec
Canada H4S 1V9
T 514.337.1000
F 517.333.3046
www.agatlabs.com

Le 20-03-2020

Cher Client,

Avec la présente nous vous confirmons que nous n'arrivons pas à retracer les résultats faits en sous-traitance reliés au bon de travail 19M530388 reçu le 11 Octobre 2019.

Cette demande a été gérée par notre succursale d'Halifax et la personne en charge ne fait plus partie d'AGAT.

Nous avons tenté de trouver l'information chez notre sous-traitant mais il lui est impossible de retracer cette demande également.

Nous sommes donc navrés de vous informer que nous n'avons les résultats demandés.

Nous sommes désolés pour les inconvénients.

Merci pour votre compréhension et au plaisir de faire affaire avec vous.

David Ohayon

Ph.D Chemistry

Director – Laboratory Services – Quebec



July 18, 2019

Mariana Trindade, PhD
Corporate Environmental Manager
Tata Steel Minerals Canada Ltd
1000 Sherbrooke West, Suite 1120
Montreal, QC H3A 3G4

RE: Service Issues and Delayed Laboratory Results, May to July 2019

Ms. Trindade,

AGAT Laboratories Ltd (AGAT) was retained in May 2019 by Tata Steel Minerals Canada Ltd (TSMC) to perform analytical chemistry services related to compliance and operational monitoring in Schefferville, Quebec.

The scope of services included analysis of air, effluent, surface water, groundwater, and potable water for various organic and inorganic parameters related to compliance and operational requirements at the mine site. TSMC submitted samples to AGAT for 22 separate monitoring events dating back to May, of which, 17 remained outstanding as of July 18, 2019. TSMC has expressed concern that AGAT's service level and laboratory turnaround time are not meeting expectations. These issues have impacted TSMC's monitoring program schedules and regulatory obligations.

The intent of this letter is to provide TSMC an acknowledgement / explanation for the issues encountered over the last two months, as well as a description of the actions being taken to resolve the outstanding files and to ensure future files are serviced and reported in-line with expectations. Service-level issues include:

- 1) Delays in shipment of properly prepared bottle orders;
- 2) Delays in supply of required materials to facilitate monitoring programs;
- 3) Delays in response on various queries from TSMC;
- 4) Inadequate communication from AGAT to TSMC;
- 5) Delayed / missed results; and
- 6) No regulatory reporting of XML files to Newfoundland and Labrador regulator.

The issues are associated primarily with workload management and resource allocation in our Quebec operations. An unusually high volume of projects (significantly high) is ongoing during a time that is typically a reasonably slow period for the industry. It has resulted in a misalignment of capable resources relative to the demands and training levels on front-line staff, in particular, project management staff. Despite AGAT's best efforts to increase staff compliment, train new staff, and parachute senior resources into Quebec, the project management team is not yet fully equipped to manage the extensive backlog. As a result, there are significant delays in logging samples, preparing confirmations, reviewing confirmations, and issuing work orders to the laboratory and logistics staff (e.g., bottle orders). Furthermore, the support staff for project management are being trained and mentored during peak-season levels of backlog, but they are not proficient as of yet.



AGAT Laboratories

Effective immediately, AGAT has assigned Ms. Janetta Fraser, Client Services Manager in Atlantic Canada, to act as the project manager for all activities between TSMC and AGAT, from bottle orders through to reporting. Ms. Fraser will act as the liaison between TSMC and the laboratories in Quebec. She has extensive experience managing projects of this nature for mine operations in remote (fly-in) geographies such as northern Labrador and central Newfoundland. Ms. Fraser is well-versed on the regulatory requirements and routinely works with the regulators in Newfoundland and Labrador.

Ms. Fraser will be supported by Mr. Phil Morneau, Chief Science Director (resides in Quebec), to complete a detailed review of the current status of TSMC, while facilitating improved service levels moving forward, including but not limited to:

- All outstanding files will be expedited
- XML reports will be issued
- Chain of custody documentation will be customized to TSMC's specific monitoring programs
- TSMC parameter packages will be customized within AGAT's Laboratory Information Management System (LIMS) and Environmental Reporting System (ERS) to reflect the requirements of the monitoring programs, including regulatory detection limits
- And more...

We trust that the information presented herein is of sufficient detail to explain the issues and the impact to TSMC, while demonstrating that we have taken the necessary actions to address the deficiencies such that our delivery of services will meet your expectations as we approach the end of July.

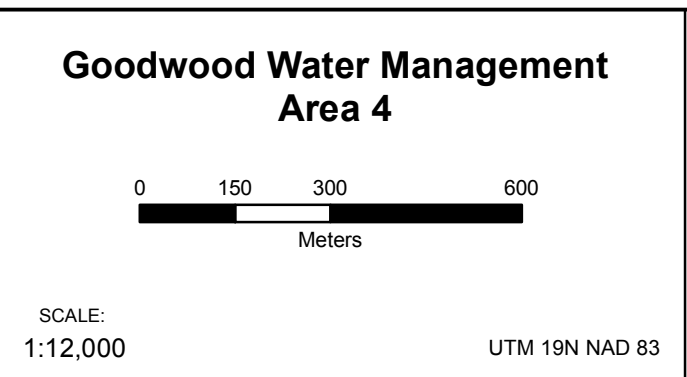
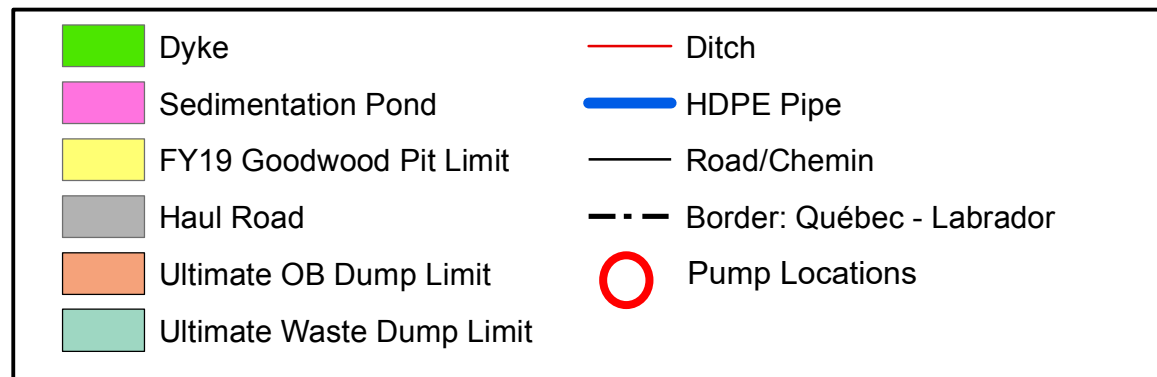
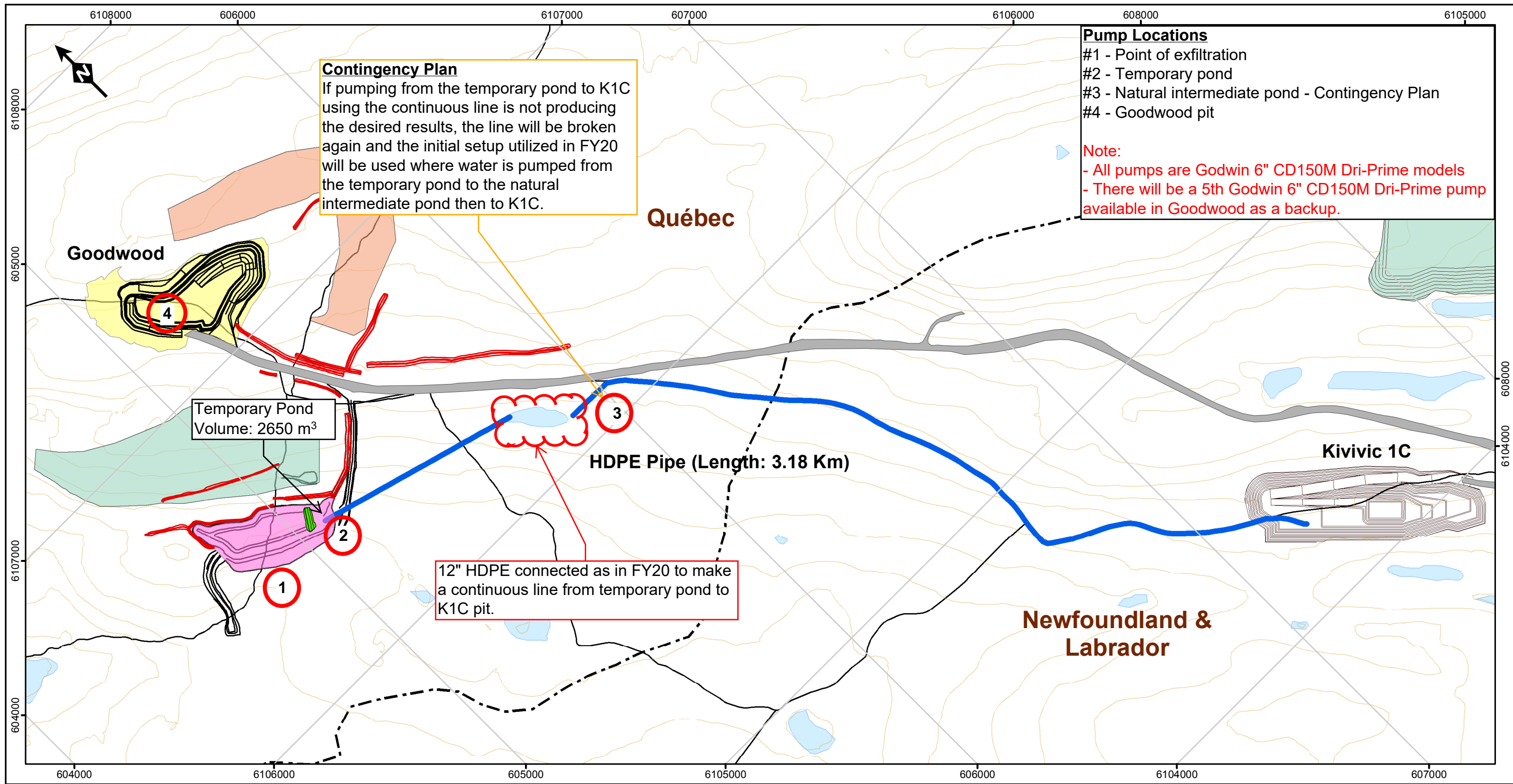
If you have any questions regarding the information herein, please do not hesitate to contact me at any time.

Sincerely,

Scott Preston
Vice President
Office: 902.468.8744
Mobile: 902.830.4635

Annexe III. Bassin d'accumulation des eaux de ruissellement

A. Plan de préparation hivernale 2020



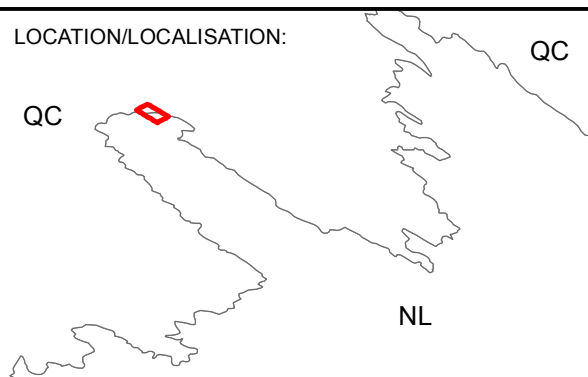
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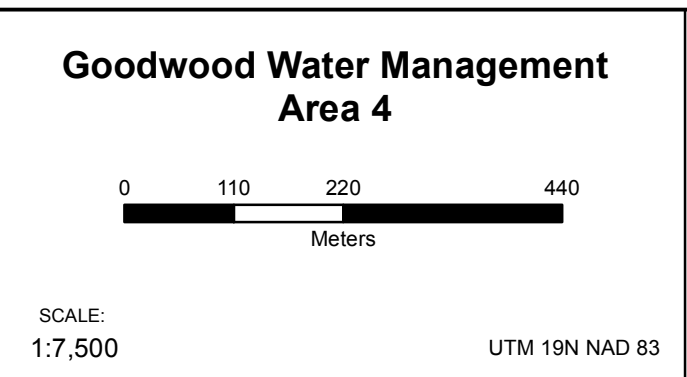
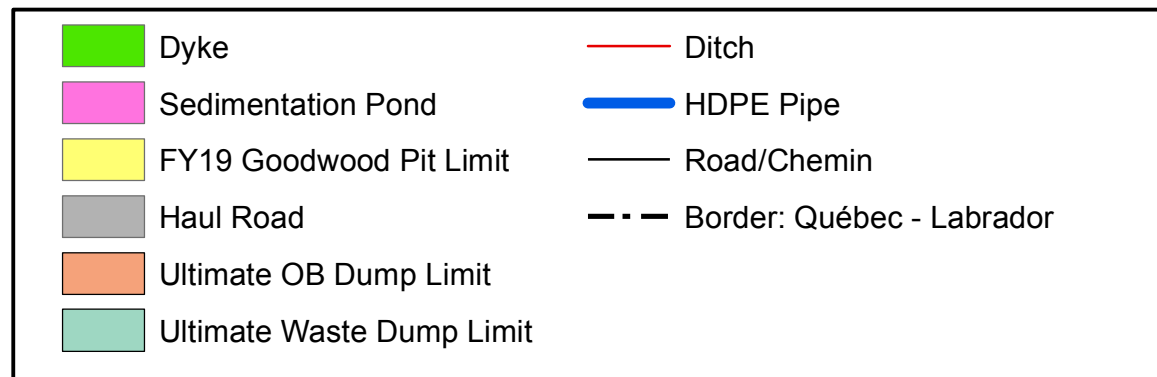
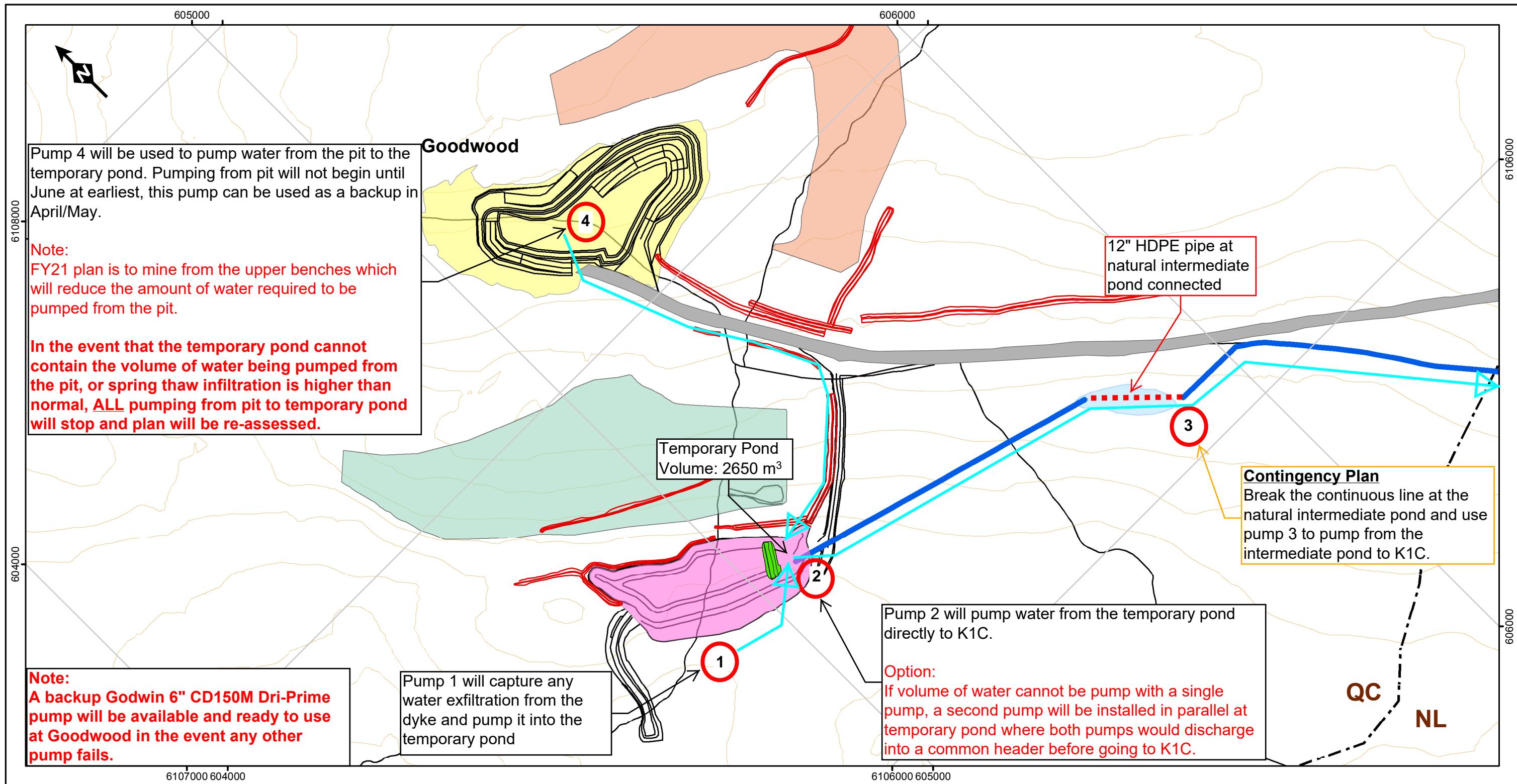
GIS-DEV-83 , 2019-03-18, E.F.

SOURCES:

TATA STEEL MINERALS CANADA

CONFIDENTIAL & COMMERCIALY PROTECTED
 CONFIDENTIEL & PROTÉGÉ COMMERCIALEMENT





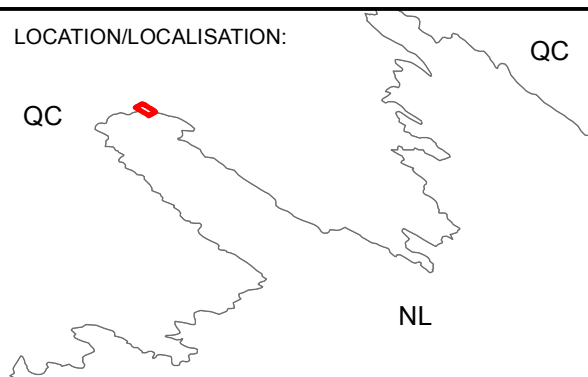
FILE, VERSION, DATE, AUTHOR/
FICHER, VERSION, DATE, AUTEUR:

GIS-DEV-83-01 , 2019-03-18, E.F.

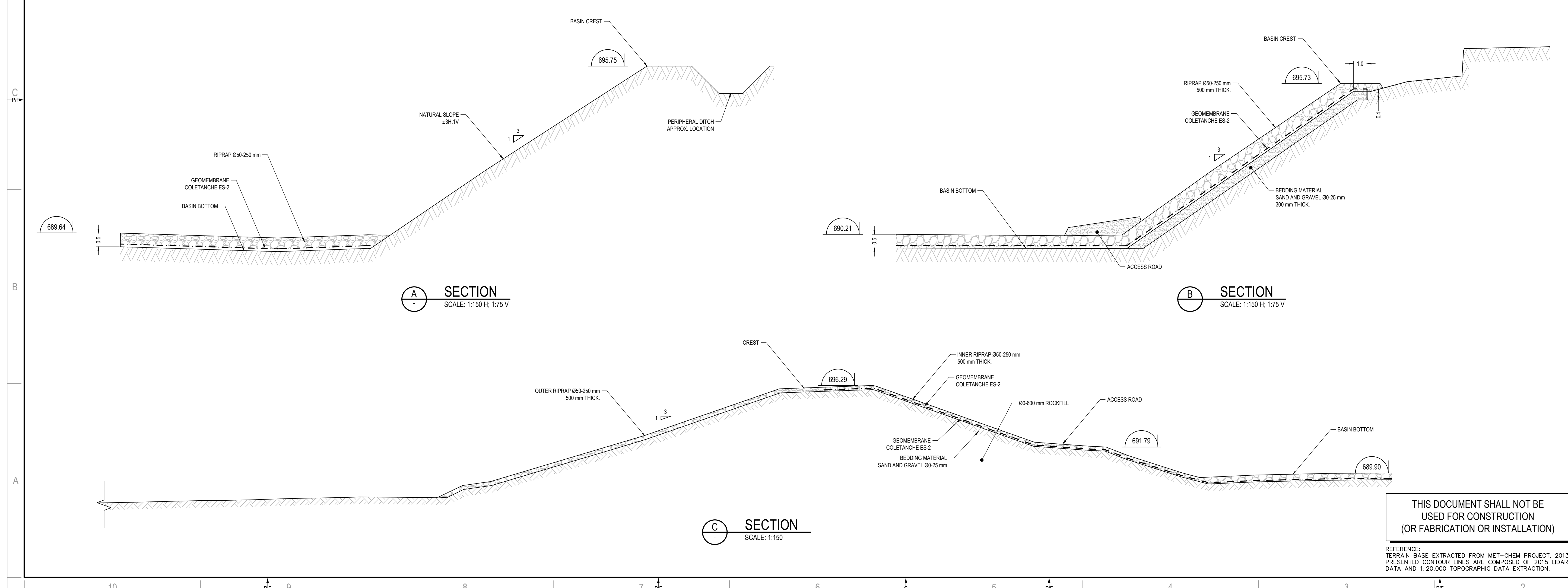
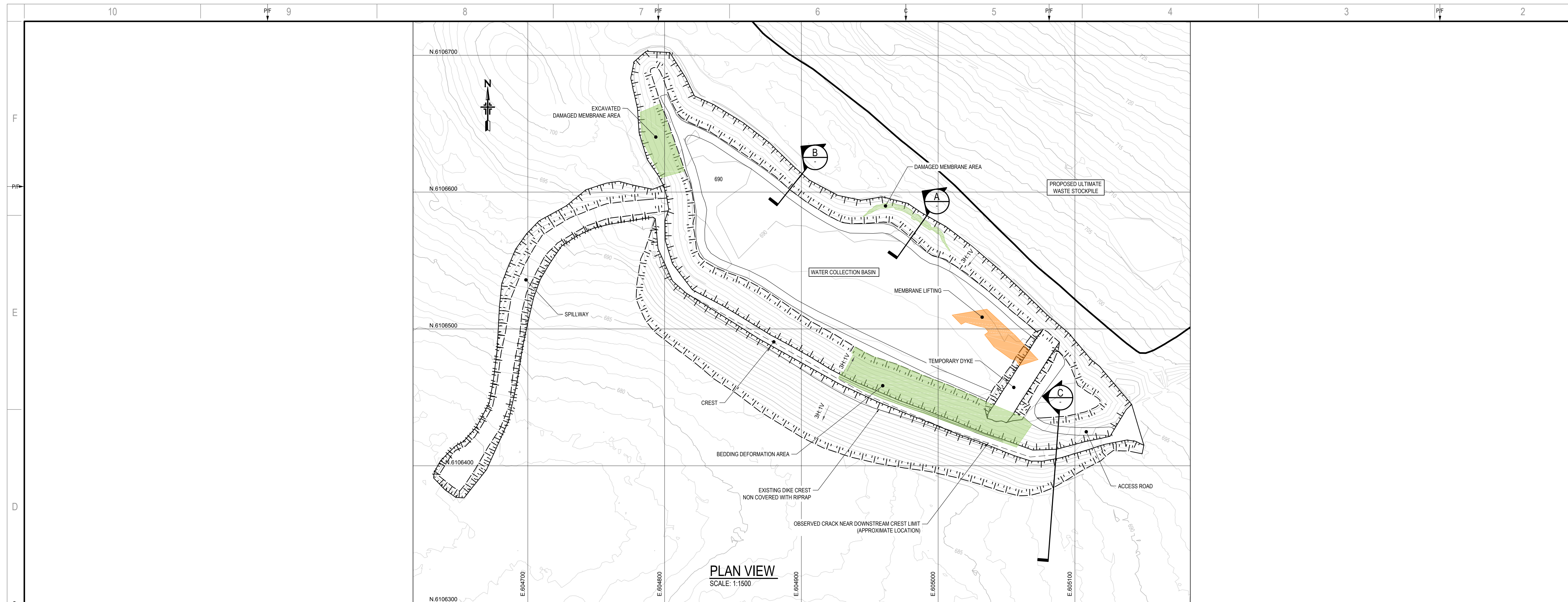
SOURCES:


TATA STEEL MINERALS CANADA

CONFIDENTIAL & COMMERCIALY PROTECTED
CONFIDENTIEL & PROTÉGÉ COMMERCIALEMENT



B. Plans et devis pour la réparation du bassin






1135, BOULEVARD LEBOURGNEUF
QUEBEC (QUEBEC) CANADA G2K 0M5
TEL : 418 623-2254 | TELEG : 418 624-1657 | WWW.WSPGROUP.COM

CONSULTANT - SUB-CONSULTANT

SEAL:



CLIENT REF. #

PROJECT:

**WATER MANAGEMENT
GOODWOOD AREA**

NOTES:
UNLESS SPECIFIED OTHERWISE, MEASURING UNITS ARE IN METERS.
QUEBEC PLANE COORDINATE SYSTEM (QPCS), GEODETIC REFERENCE SYSTEM NAD 83, CARTOGRAPHIC PROJECTION UNIVERSAL TRANSVERSE MERCATOR (UTM) ZONE 19, VERTICAL DATUM CGVD28.
PLAN ORDER IS NOT LINKED TO CONSTRUCTION SEQUENCE.

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ISSUED FOR - REVISION

IS.	RV.	DATE	INFORMATION	DESCRIPTION
A		2019-07-16	INFORMATION	

PROJECT NO.: 181-04013-03 DATE: 2019-07-16

ORIGINAL SCALE: As indicated

DESIGNED BY: Pierre-Olivier Maltais, ing. M. Sc.

DRAWN BY: Étienne Bilodeau

CHECKED BY: Louise Chaput, ing.

DISCIPLINE: **ENVIRONMENT**

TITLE: **ACCUMULATION BASIN
PERMANENT REPAIRS
EXISTING CONDITIONS**

SHEET NUMBER: **181-04013-03-C-001**

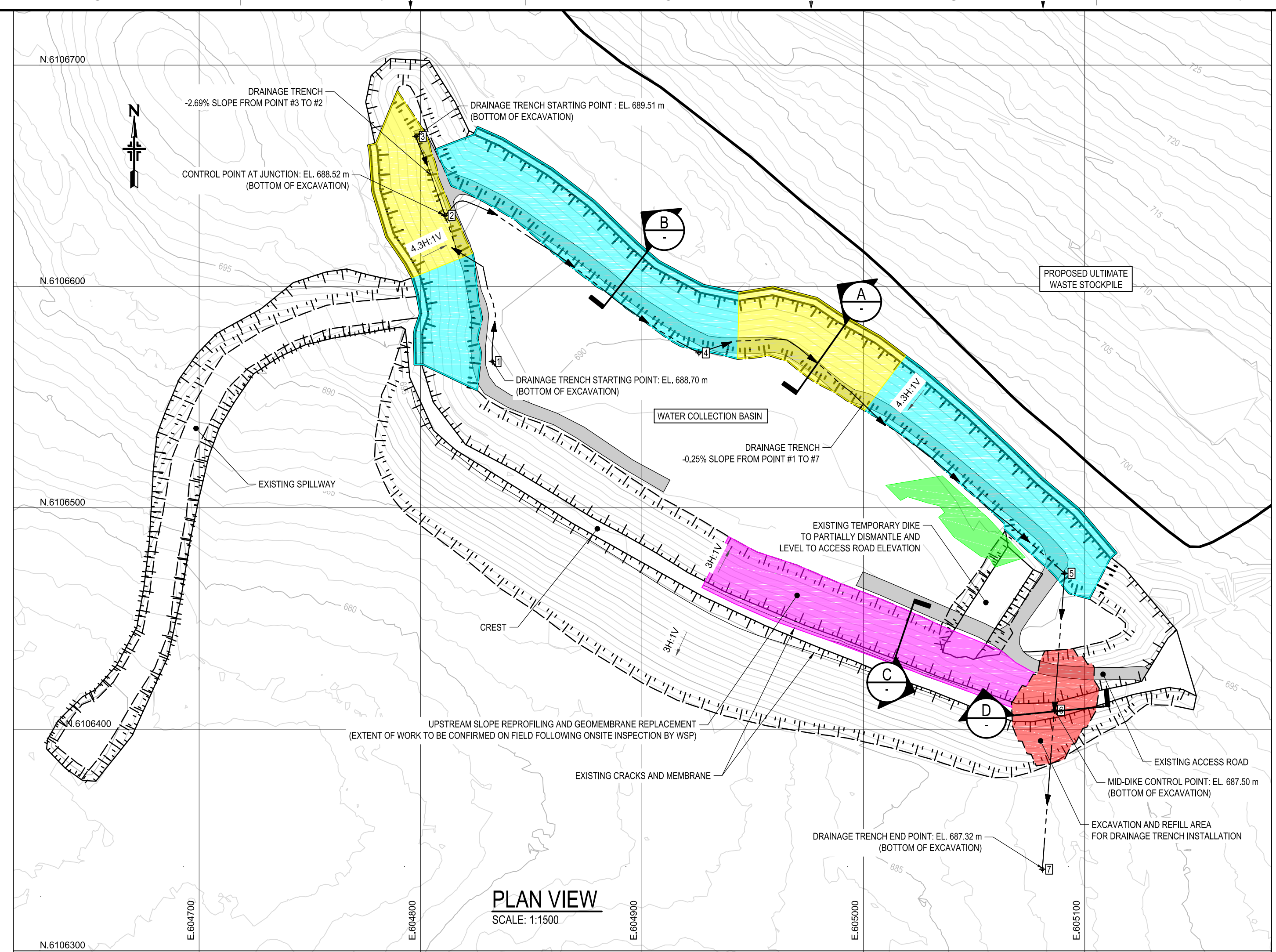
SHEET # 01 OF 01

ISSUE: **INFORMATION**

DATE OF: 2019-07-16

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LEGEND:

- ZONE A - DAMAGED AREA
- ZONE B - UNDAMAGED AREA TO BE REPAIRED
- ZONE C - UPSTREAM DIKE REPROFILING AREA
- MEMBRANE LIFTING AREA
- EXCAVATION AND REFILL AREA
- UNDAMAGED AREA

DRAINAGE EXCAVATION CONTROL POINTS

NUMBER	X	Y	Z
1	604832.433±	6106566.119±	688.700±
2	604811.000±	6106632.097±	688.517±
3	604797.940±	6106667.764±	689.513±
4	604925.748±	6106570.005±	688.109±
5	605090.962±	6106470.392±	687.922±
6	605096.295±	6106408.629±	687.497±
7	605080.878±	6106336.799±	687.317±

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CONSULTANT - SUB-CONSULTANT

SEAL:

CLIENT:

CLIENT REF. #
PROJECT:

**WATER MANAGEMENT
GOODWOOD AREA**

NOTES:
UNLESS SPECIFIED OTHERWISE, MEASURING UNITS ARE IN METERS.
QUEBEC PLANE COORDINATE SYSTEM (QPCS), GEODETIC REFERENCE SYSTEM NAD 83, CARTOGRAPHIC PROJECTION UNIVERSAL TRANSVERSE MERCATOR (UTM) ZONE 19, VERTICAL DATUM CGVD28.
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1	2019-10-31	CONSTRUCTION
B	2019-09-13	CONSTRUCTION
A	2019-07-17	INFORMATION

PROJECT NO.: 181-04013-03
 ORIGINAL SCALE: AS SHOWN
 DESIGNED BY: PIERRE-OLIVIER MALTAIS, ing. M.Sc.
 DRAWN BY: ETIENNE BILODEAU
 CHECKED BY: LOUISE CHAPUT, ing.
 DISCIPLINE: ENVIRONMENT

ENVIRONMENT

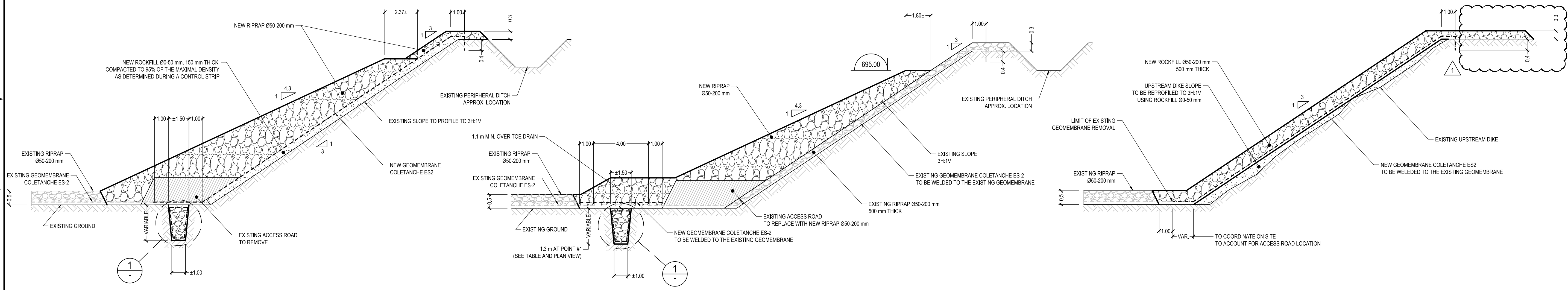
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**ACCUMULATION BASIN
PERMANENT REPAIRS
PROPOSED CONDITIONS**

SHEET NUMBER: **181-04013-03-C-002**

SHEET # 01 OF 01

ISSUE: **CONSTRUCTION**
DATE OF: 2019-10-31

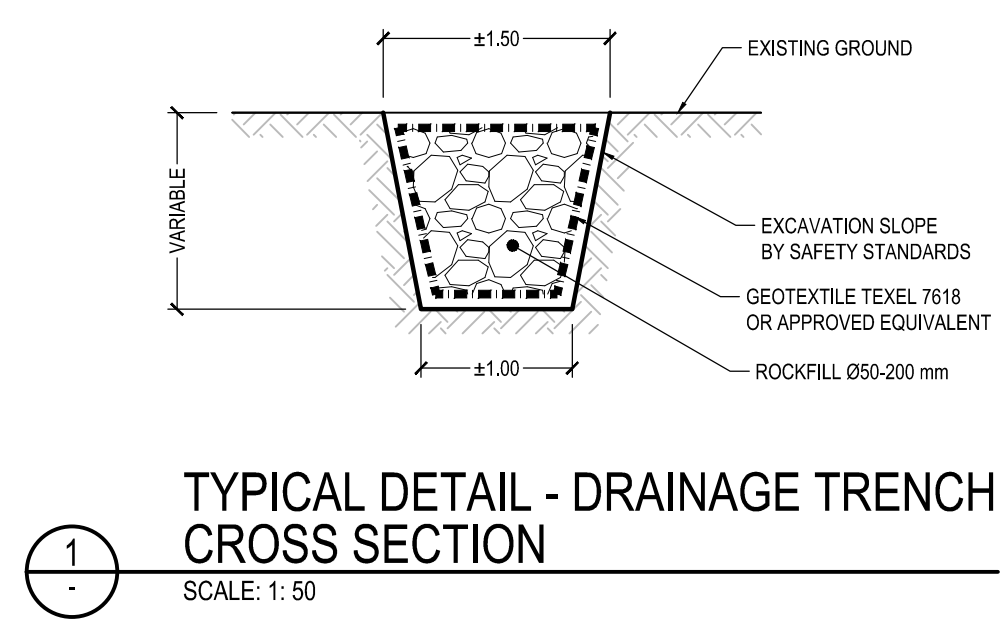
RV # **1**



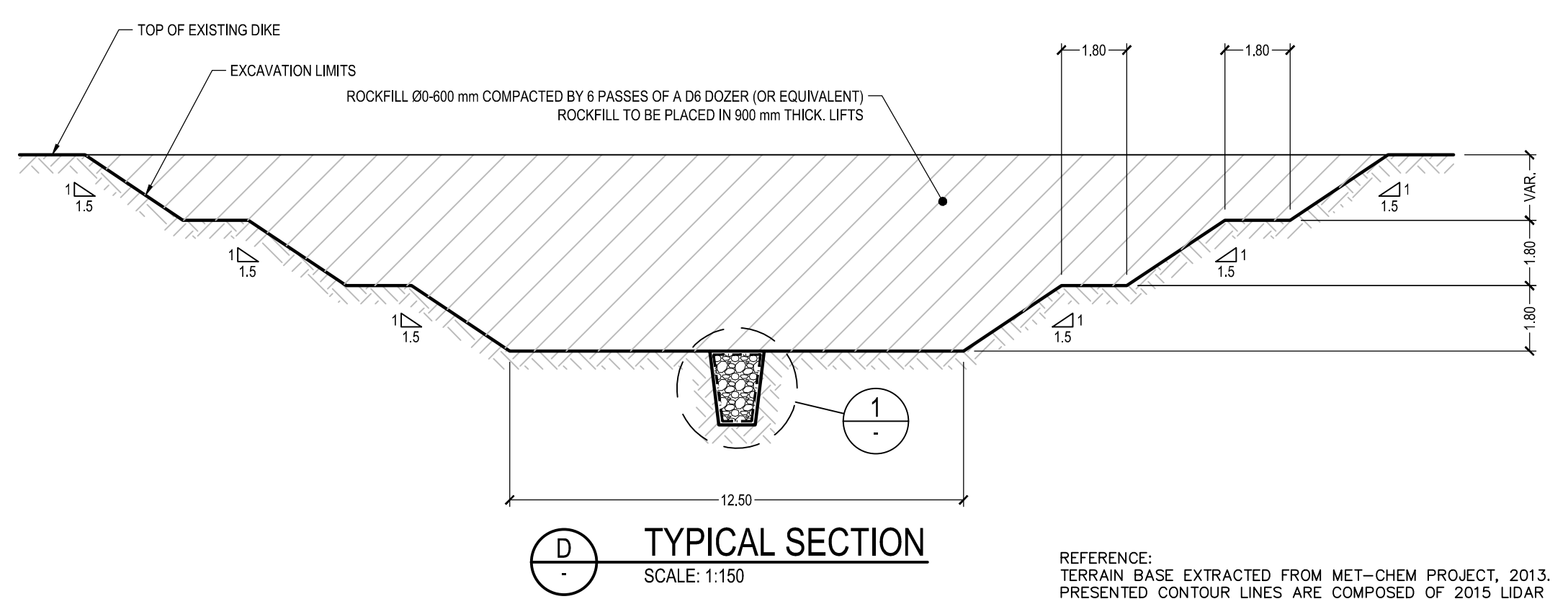
A - TYPICAL SECTION - DAMAGED AREA
SCALE: 1:150 H; 1:75 V

B - TYPICAL SECTION - UNDAMAGED AREA
SCALE: 1:150 H; 1:75 V

C - TYPICAL SECTION - UPSTREAM DIKE SLOPE REPAIRS
SCALE: 1:150 H; 1:75 V



1 - TYPICAL DETAIL - DRAINAGE TRENCH CROSS SECTION
SCALE: 1:50



D - TYPICAL SECTION
SCALE: 1:150

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Annexe IV. Rapport d'inventaire du benthos

Montréal, March 1 2020

Mariana Trindade
Director environment and permitting
Tata Steel Minerals Canada Limited
1000 Sherbrooke West, Suite 1120
Montreal, Qc, H3A 3G4

Subject : Annual benthic community monitoring at the Goodwood site.

N/D : PR185-42-19

Mrs Trindade,

We are pleased to submit the technical report on the above-mentioned project. We hope that it meets your expectations.

1 Introduction

The sediment monitoring program also includes annual sampling for benthic invertebrate communities (BICs) monitoring. The sampling stations are in permanent streams, as close as possible to the sediment sampling stations. The descriptors are:

- Total density of invertebrates
- Richness (number of taxa)
- Simpson's diversity index
- Evenness (Pielou's index)
- Density of each taxon
- Relative taxa abundance
- Absence/presence of taxa
- Dissimilarity (Bray-Curtis coefficient)

TSMC has experienced difficulties is developing a BIC sampling/monitoring program at the Goodwood site due, in part, to the fact that there are no permanent streams in the vicinity. To date, there has been no benthic sampling at the Goodwood site. The outlet of Lake Fra is an intermittent stream along the majority of its path. Eventually it reaches another water course, which then flows into a wetland.

Monitoring of benthic communities was therefore conducted upstream of this junction, which could offer little representativeness of the conditions of Lake Fra’s outlet.

2 Methodology

2.1 Benthic community sampling

Two sampling areas were located along the permanent stream connected to Lake Fra’s discharge. The first one, located upstream of the junction, was considered as a reference site (BER1) whereas the one downstream of the junction was considered as an exposed site (BEE). A second reference area, located at the discharge point of Lake Migration (BER2), was also sampled and compared to the exposed site.

Benthic community samples were taken on July 31, 2019. At each site, three samples were taken using a Hess sampler of 0.086 m² with a mesh size of 500 µm. The method consists of cleaning the entire substrate within the sampler for 1 minute with a soft brush or by hand to allow the material to flow downstream into the sampler net. The content of the net is transferred into an airtight plastic jar and preserved with a 70% alcohol solution for subsequent identification.

Invertebrates within the samples were then identified to the family level using the MDDEP guide (Moisan, 2010).

2.2 Habitat characterization

The habitat of each sampled area was characterized. In order to do so, data on hydrology, chemistry, morphology and habitat were collected in the field (Table 1).

Table 1. Data collected in the field

Hydrology	Chemistry	Habitat	Morphology
Width, depth	Temperature	Substrate cover	Perturbations
Current	pH	Embeddedness	Pattern
Slope	Conductivity	Debris	Islands
Flow facies	Apparent turbidity	Macrophytes cover	Bars
Perrenity		Riparian vegetation	Confinement

2.3 Statistical analyses

All statistical analysis, box plots and ordinations were made using the R software (R Core Team, 2015).

2.3.1 Data preparation

Data distribution was observed to assess normality. Prior to performing data analysis, total density was transformed using the natural logarithm and Simpson’s diversity as well as evenness were transformed using the exponential. Finally, a Hellinger transformation was used on the macroinvertebrate family abundance (Legendre & Gallagher, 2001) prior to performing a principal component analysis (PCA).

2.3.2 ANOVAs

To analyze the effect of the effluent, a one-way ANOVA was performed to assess the difference between exposed and reference areas.

Statistical significance was obtained when $p < 0.1$.

2.3.3 Power Analysis

To assess if a significant result is biologically relevant, the critical effect size (CES) is used. A minimum of two times the standard deviation of the reference area is required for an effect to be considered as biologically relevant (Environment Canada, 2012).

To assess if a non-significant result is due to a weak sample size, a power analysis using Cohen's effect size (d) is made, where d is the difference of index means (μ) divided by the reference area index standard deviation (σ_{ref}), as shown in the Equation 1 (Cohen, 1988).

Equation 1. Cohen's effect size

$$d = \frac{|\mu_{exposed} - \mu_{ref}|}{\sigma_{ref}}$$

2.3.4 Effect Endpoints

Four indices were used to analyze the complex BIC: total density, Simpson's evenness, family richness, and Bray-Curtis coefficient. The indicators were then subjected to calculations to determine the mean, median, standard deviation, standard error, minimum and maximum values for each indicator in exposed and reference areas.

2.3.4.1 Total Density of Invertebrates

The total density is the sum of all invertebrates in an area divided by the sampled area. In this case, all abundances were transformed into a number of individuals per square metre (m²).

2.3.4.2 Taxa richness

The richness is the total number of identified families in the community of the area.

2.3.4.3 Evenness Index

The Simpson evenness index (E) is the ratio of the Simpson diversity index (D) on the mathematical maximum of D in a given area (D_{max}), as shown in the Equation 2. To calculate D , the proportions (p) of species (i) in a community of richness S are squared, summed and then divided from 1 (Simpson, 1949).

Equation 2. Simpson's evenness

$$E = \frac{D}{D_{max}} = \left(\sum_{i=1}^S p_i^2 \right)^{-1} \times S^{-1}$$

2.3.4.4 Similarity index

Bray-Curtis dissimilarity index (BC) was used to represent the difference between all sampled communities (Bray and Curtis, 1957). The dissimilarity between area a and b is calculated using the Equation 3. where y_i is the abundance of taxa i in common between both sites. The area b , in this case is a theoretical reference BIC composed of the median abundance of all taxa in both reference areas (BER1 and BER2).

Equation 3. Bray-Curtis dissimilarity index

$$BC = \frac{\sum_{i=1}^n |y_{ia} - y_{ib}|}{\sum_{i=1}^n (y_{ia} + y_{ib})}$$

Ordinations are useful tools to represent complex data (Legendre and Legendre, 2012). The PCA convert multidimensional (m) data frame, in this case multi-family community, to a simpler n dimensions representation, the principal components (PCs), where $n < m$. In this case, a two dimensions ($n = 2$) approach was chosen.

2.3.4.5 Diversity Index

The Simpson Diversity index (D) represents both the proportion of species (p) in a community and the number of species (S) in it (Krebs, 1985). As with any endpoint, area mean, median, standard deviation, standard error, minimum and maximum were calculated for exposed and reference areas. D is calculated using the Equation 4.

Equation 4. Simpson's diversity

$$D = 1 - \sum_{i=1}^S p_i^2$$

2.3.4.6 Taxa density

Taxa density represents the number of individuals of each taxon (family) in each area per m^2 .

3 Results

3.1 Habitat Description

This section summarizes the habitat characteristics of the three sampled areas. Raw field data can be consulted in Appendix I. Photographs of each area can also be seen in Appendix II.

3.1.1 Exposed Area

The BEE area is a 3.0 m wide intermittent stream. At the time of sampling, the wetted width was 2.0 m and the water 0.31 m deep. This stream is a cascade with a slope of $> 5\%$ (Table 2). The substrate is dominated by boulders and rubble, with a significant proportion of slightly embedded gravel and cobble. The BEE water chemistry was normal for the region (Table 3). The pH was neutral, the conductivity low and the water not turbid.

Table 2. Hydrology and morphology

Area	Perrenity	Channel width		Wet Width		Water Depth		Facies	Slope (%)
		(m)	(m)	(m)	(m)	(m)	(m)		
BEE	Intermittent	3.0	2.0	0.31	Cascade	>5			
BER1	Intermittent	8.0	3.0	0.20	Rapid	5			
BER2	Permanent	2.0	1.0	0.75	Riffle	2			
	Substrate Cover (%)						Embeddedness	Islands	Bars
	Silt	Sand	Gravel	Cobble	Rubble	Boulder			
BEE	-	-	10	20	40	30	Some	None	None
BER1	-	-	10	20	40	30	-	None	None
BER2	-	10	15	30	30	15	-	None	None

The habitat cover is low and mainly composed of large woody debris, overhanging vegetation and overhanging banks. The riparian vegetation is composed of a mature coniferous forest with a somewhat thick canopy for the region (Table 5).

3.1.2 Reference Area 1

The BER1 area is located upstream of the exposed area and the junction with Lake Fra's discharge. It is an 8.0 m wide intermittent stream. At the time of sampling, the wetted width was 3.0 m and the water 0.20 m deep. This stream is a rapid with a slope of 5% (Table 2). The substrate is similar to BEE and is dominated by boulders and rubble, with a significant proportion of gravel and cobble. However, no embeddedness was observed. The BER1 water chemistry was normal for the region and similar to BEE (Table 3). The pH was neutral, the conductivity low and the water not turbid.

The habitat cover is low and mainly composed of large woody debris, overhanging vegetation and overhanging banks. The riparian vegetation is a mature coniferous forest with a scarce canopy (Table 5).

Table 3. Water Chemistry

Area	Water Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity
BEE	6.0	6.8	30	None
BER1	5.0	6.8	30	None
BER2	8.0	6.8	0	None

3.1.3 Reference area 2

The BER2 area is located at the discharge point of Lake Migration. It is a 2.0 m wide permanent stream. At the time of sampling, the wetted width was 1.0 m and the water 0.75 m deep. This stream is a riffle with a slope of 2% (Table 2). The substrate is dominated by rubble and cobble, with a significant proportion of boulders, gravel and sand. No embeddedness was observed. The BER2 water chemistry was normal for the region and also similar to BEE (Table 3). The pH was neutral, the conductivity low and the water not turbid.

The habitat cover is medium and mainly composed of overhanging vegetation. The riparian vegetation is composed of a mature coniferous forest and a wetland with a scarce canopy (Table 5).

Table 4. Habitat characterization

Area	Habitat Cover	Canopy	Woody debris	Aquatic Vegetation	Riparian vegetation	
					Type	Stage
BEE	15%	21-40%	Present, not functional	None	Shrubs & coniferous	Mature
BER1	10%	1-20%	Present, not functional	Moss & thick periphyton	Shrubs & coniferous	Mature
BER2	20%	1-20%	Not present	None	Coniferous & wetland	Mature

3.2 Benthic community

3.2.1 Total density

The total density of sampled areas was highest in BER1 with 3438 ± 1441 ind./m², and lowest in BEE with 186 ± 121 ind./m². High standard deviations suggest that both sites possess heterogeneous habitats, with some zones supporting a more abundant community than others (Table 2).

Results of the one-way ANOVA present a statistically significant difference between exposed and reference areas, with the exposed area having a reduced total density in comparison to the reference areas. The effect on the environment is also considered as strong since the measured effect is above the CES (exposed mean = 186 ind./m², reference mean = 1909 ind./m²).

Table 5. Total density of benthic invertebrates

	Area	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Ind./m ²	BEE	186	128	121	70	105	326
	BER1	3438	4151	1441	832	1779	4384
	BER2	380	326	169	98	244	570
1 - Way ANOVA	<i>P</i>	Effluent	0.005				
	CES	Effluent	± 1610				
	Power		2.14 (huge)				

3.2.2 Density of each taxon

Higher density was observed for the Chironomidae family at the BER1 and BER2 stations. The density of this family, although much lower than in the reference areas, remains the highest in BEE are (Table 7).

Table 6. Density of each taxon

Taxa	BEE		BRE1		BRE2	
	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.
Simuliidae	15.5	13.4	166.7	191.2	31.0	35.5
Chironomidae	158.9	96.8	2992.2	1140.5	282.9	158.7
Hydracarina	11.6	20.1	182.2	124.3	15.5	17.8
Nematoda	-	-	42.6	64.0	0.0	0.0
Tipulidae	-	-	11.6	20.1	7.8	6.7
Perlodidae	-	-	42.6	26.9	0.0	0.0
Oligochaeta	-	-	-	-	19.4	24.2
Ceratopogonidae	-	-	-	-	3.9	6.7
Plecoptera	-	-	-	-	3.9	6.7
Copepoda	-	-	-	-	11.6	20.1
Ostracoda	-	-	-	-	3.9	6.7

3.2.3 Richness

BIC richness is at its maximum in both reference areas (BER1 and BER2), with 4 to 6 families observed, and at its minimum in the exposed area (BEE), with 1 to 3 families observed (Table 3).

The one-way ANOVA indicates that exposed stations possess a significantly lower richness than reference stations. In addition, the magnitude of effect is above the CES suggesting a high risk to the environment.

Table 7. Family richness

	Area	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Number of families	BEE	2	2	1	1	1	3
	BER1	5	5	1	1	4	6
	BER2	5	5	1	1	4	6
1 - Way ANOVA	<i>P</i>	Effluent	0.016				
	CES	Effluent	± 2				
	Power		3 (huge)				

3.2.4 Evenness

The sampled BICs were not even with BEE presenting the highest evenness (0.39 ± 0.15) and BER1 the lowest (0.13 ± 0.07) (Table 4). Standard deviation and error were very variable from one site to another.

The one-way ANOVA indicates a significant difference in BIC evenness between exposed and reference areas. In addition, the magnitude of effect is above the CES suggesting a high risk to the environment.

Table 8. Evenness

	Area	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Values	BEE	0.39	0.39	0.15	0.11	0.28	0.50
	BER1	0.13	0.14	0.07	0.04	0.06	0.20
	BER2	0.28	0.30	0.07	0.04	0.20	0.33
1 - Way ANOVA	<i>P</i>	Effluent	0.08				
	CES	Effluent	± 0.14				
		Power	2.64 (huge)				

3.2.5 Similarity

Table 10 present dissimilarities between areas and a median reference BIC. This index ranges from 0 (two identical areas) and 1 (two totally different areas). The analysis indicates that the exposed area possesses the highest dissimilarity, whereas the two reference areas contain relatively similar communities. However, the difference is not statistically significant.

Table 9. Bray-Curtis dissimilarities

	Area	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Values	BEE	0.74	0.80	0.15	0.09	0.57	0.84
	BER1	0.47	0.56	0.22	0.13	0.22	0.64
	BER2	0.59	0.64	0.11	0.07	0.46	0.67
1 - Way ANOVA	<i>P</i>	Effluent	0.20				
	CES	Effluent	± 0.192				
		Power	1.22 (very large)				

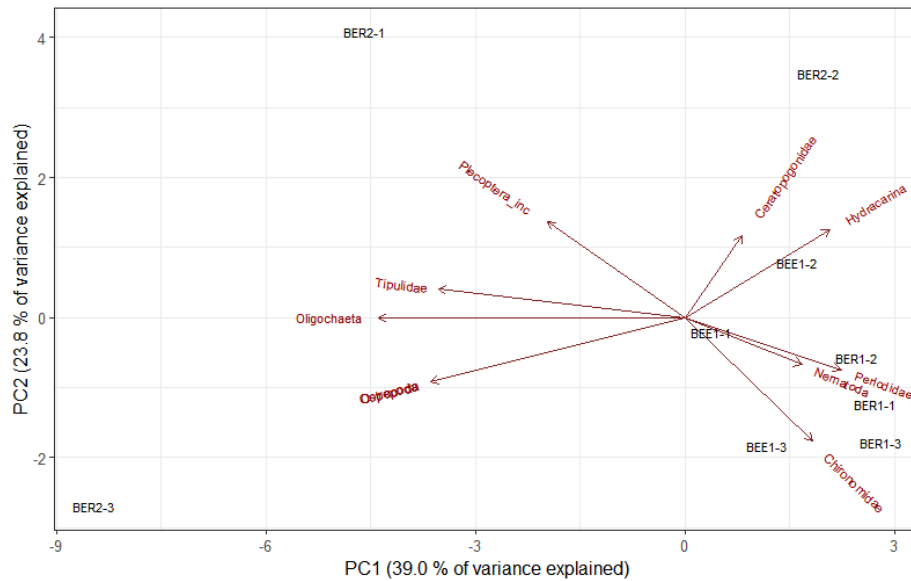


Figure 1. Principal Component Analysis of families

The PCA of the BIC explains 62.8 % of the variance (strong relationship) between nine samples using two principal components (PC1 = 39.0 %; PC2 = 23.8 %).

The reference area BER2, which is located in Lake Migration, presents a BIC more diverse than all other areas. In addition, the community in this area varies greatly among the three samples. That is why these stations are dispersed on the opposite side of BEE and BER1 stations even though Chironomidae is the most abundant family present at all stations. In general, the other two taxa of importance are Simuliidae and Hydracarina. The latter two are the only other taxa present in BEE area. BER1's community is the closest to the BEE area but contains three other taxa (Nematoda, Tipulidae and Perlodidae).

3.2.6 Diversity Index

Simpson's diversity index incorporates richness and evenness to create an index estimating the chance that two individuals picked randomly belong to different species. Higher values indicate that there is a low probability that two individuals are from the same species. Among the three sampled areas, the reference site BER2 possesses the highest score. Therefore, the probability that two individuals sampled randomly belong to the same species is lower in this area than in BEE and BER1 areas (Table 6).

The one-way ANOVA, on the other hand, does not show any significant difference between areas.

Table 10. Simpson's diversity

	Area	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Values	BEE	0.22	0.31	0.19	0.11	0.00	0.35
	BER1	0.21	0.25	0.09	0.05	0.10	0.28
	BER2	0.44	0.46	0.11	0.06	0.32	0.54
1 - Way ANOVA	P	Effluent	0.11				
	CES	Effluent	± 0.20				
		Power	0.53 (Medium)				

4 Conclusion

Significant differences in three of the four effect endpoints, namely total density, richness and evenness, were observed between exposed and reference areas. The exposed BIC (BEE) comprises 1,723 fewer individuals per square metre than reference BICs (BER1 and BER2). This reduction of 90.3 % from the mean total density is larger than the CES value, indicating a considerable effect to the environment. This very high CES also indicates that the variation in density between reference areas is important. Similarly, BIC richness also drops significantly in the exposed area (by 60 %). Furthermore, the magnitude is above the CES, suggesting, here again, that several ecological functions of the community might be reduced in this area. A gain in evenness, most likely attributed to the reduction in abundance of otherwise-dominating taxa (Groupe Hémisphères, 2015), was observed in BIC exposed area. In fact, only three families were observed in this area in comparison to the reference areas which comprised up to 11 different families (Table 12).

Table 11. Overview of BIC Response Endpoints to mining

Endpoint	Mining		
	p-value	Magnitude	CES
Total Density	<0.01	-1723	± 1610
Richness	<0.05	-0.105	± 2
Evenness	<0.1	0.185	± 0.14
Bray-Curtis dissimilarity	0.20	0.21	± 0.192

The exposed BIC possessed the lowest diversity which caused it to be the most dissimilar of all sampling areas. However, this change in dissimilarity was not considered as being statistically significant.

The link between the loss of density and diversity of BICs pertaining to mining activities is yet to be determined. While efforts were deployed to find sites that would allow to assess the impacts of mining effluents on BICs, several confounding factors exist that could explain this loss.

The presence of macrophytes and periphyton in BER1 only could be a major confounding factor explaining BIC density and diversity. Indeed, vegetation and periphyton are both essential resources for many species and can be linked to a more productive BIC. Furthermore, the high BIC density could favour a more diverse assemblage of species. For instance, predators, like Trichoptera and Plecoptera require a large density of prey to compensate for their low motility.

5 Quality assurance

Groupe Hémisphères possesses an internal quality control program which is derived from ISO 9001 standards. This is based on a review and approval of all concepts and document production by a senior professional. The program considers the management, the control of documentation, the personnel's continuous training, as well as the quality assurance of the deliverables. The system also includes a tight control of the field work and the prevention and safety measures specific to the project.

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6 References

- Bray, J.R., and Curtis, J.T. (1957). An ordination of upland forest communities of southern Wisconsin. *Ecological Monograph*, 27, 325–349.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. New York, NY: Routledge Academic, 400 pages.
- Environment Canada (2002). *Revised Guidance for Sample Sorting and Subsampling Protocols for EEM Benthic Invertebrate Community Surveys*. National Environmental Effects Monitoring Office. National Water Institute, 28 pages.
- Environment Canada (2012). *Metal Mining Technical Guidance for Environmental Effect Monitoring*. 550 pages.
- Groupe Hémisphères (2015). *ELAIOM First Cycle Environmental Effect Monitoring Interpretative Report*. Technical Report Submitted to Tata Steel Minerals Canada Ltd., 35 pages and 6 appendices.
- Krebs, C.J. (1985). *The Experimental Analysis of Distribution and Abundance*. Ecology. Third edition. New York (NY), Harper and Row, 800 pages.
- Legendre, P., and Gallagher, E.D. (2001). Ecologically meaningful transformations for ordination of species data, *Oecologia*, 129, 271–280.
- Legendre, P., and Legendre, L.F.J. (2012). *Numerical Ecology: third edition*. Elsevier: Amsterdam, 990 pages.
- Moisan, J. (2010). *Guide d'identification des principaux macroinvertébrés benthiques d'eau douce du Québec, 2010 — Surveillance volontaire des cours d'eau peu profonds*, Direction du suivi de l'état de l'environnement, ministère du Développement durable, de l'Environnement et des Parcs, 82 pages.
- R Core Team (2015). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria.
- Simpson, E.H. (1949). Measurement of diversity. *Nature*, 163, 688.

Annexe I

Raw field data

Identificateur	Échantillon	Simuliidae	Chironomidae	Hydracarina	Nematoda	Tipulidae
VT, LF	BEE1-GW1	2	7	0	0	0
VT, LF	BEE1-GW2	2	23	3	0	0
VT, LF	BEE1-GW3	0	11	0	0	0
VT, LF	BER1-GW1	8	326	25	10	3
VT, LF	BER1-GW2	33	301	18	0	0
VT, LF	BER1-GW3	2	145	4	1	0
VT, LF	BER2-GW1	6	18	1	0	1
VT, LF	BER2-GW2	2	15	3	0	0
VT, LF	BER2-GW3	0	40	0	0	1

Perlodidae	Oligochaeta	Ceratopogonidae	Plecoptera_inc	Copepoda	Ostracoda
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
5	0	0	0	0	0
5	0	0	0	0	0
1	0	0	0	0	0
0	1	0	1	0	0
0	0	1	0	0	0
0	4	0	0	3	1

Annexe II

Photographs



BEE area



Junction with the intermittent stream (lake Fra's outlet)



Downstream view of BEE area



Sampling of BEE stations



Upstream view of BEE area



Water in BEE area



Road fording



Upstream view of BER1 area



Downstream view of BER1 area



Wetland surrounding BER1 area



Upstream view of BER2 area



Downstream view of BER2 area



Water in BER2 area

Annexe V. Tableaux de calcul pour la qualité de l'air

Calcul de la concentration en NO₂

Station	Date in	Date out	Calculated NO2 (ppbv)	NO2 (µg/m3)	Annual value (µg/m3)
AQS2-Q1	2019-06-26 16:43	2019-07-27 14:50	<0.4	0.752	9.024
AQS4-Q1	2019-06-26 16:54	2019-07-26 16:55	<0.4	0.752	9.024
AQS6-Q1	2019-06-24 10:03	2019-07-26 14:06	0.8	1.504	18.048
AQS7-Q1	2019-06-28 08:11	2019-07-28 10:14	<0.4	0.752	9.024
AQS8-Q1	2019-06-28 07:23	2019-07-28 09:54	<0.4	0.752	9.024
AQS9-Q1	2019-06-27 18:42	2019-07-28 08:58	<0.4	0.752	9.024
AQS2-Q2	2019-07-27 14:50	2019-08-26 09:30	0.9	1.692	20.304
AQS4-Q2	2019-07-26 16:56	2019-08-26 10:20	0.5	0.94	11.28
AQS6-Q2	2019-07-26 14:06	2019-08-25 17:31	1.2	2.256	27.072
AQS7-Q2	2019-07-28 10:14	2019-08-31 16:59	0.7	1.316	15.792
AQS8-Q2	2019-07-28 09:54	2019-08-31 14:33	0.8	1.504	18.048
AQS9-Q2	2019-07-28 08:58	2019-08-31 11:34	1.6	3.008	36.096

Retombées de poussières

Période hivernale – poussières et métaux

Sampling Date		2019-04-06 11:50	2019-04-06 10:22	2019-03-31 15:00	2019-03-31 16:00	2019-04-06 09:25	
COC Number		157354-13-01	157354-13-01	157354-13-01	157354-13-01	157354-13-01	
	Units	DS04-AQS1-SN-2019	DS04-AQS2-SN-2019	DS04-AQS3-SN-2019	DS04-AQS4-SN-2019	DS04-AQS5-SN-2019	RDL
METALS							
Antimony (Sb) †	ug	<0.1	<0.1	0.3	<0.1	0.1	0.1
Silver (Ag) †	ug	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Arsenic (As) †	ug	<0.1	<0.1	0.6	0.1	<0.1	0.1
Barium (Ba) †	ug	1.75	0.38	5.28	1.36	2.02	0.05
Beryllium (Be) †	ug	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Cadmium (Cd) †	ug	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Calcium (Ca) †	ug	421	46	1140	409	297	5
Chromium (Cr) †	ug	0.3	0.1	1.0	0.6	0.3	0.1
Mercury (Hg) †	ug	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Nickel (Ni) †	ug	0.9	0.2	1.7	1.2	0.2	0.1
Lead (Pb) †	ug	0.6	<0.5	0.6	<0.5	<0.5	0.5
Thallium (Tl) †	ug	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Vanadium (V) †	ug	<0.2	<0.2	0.4	<0.2	<0.2	0.2
Zinc (Zn) †	ug	15.5	4.4	13.1	5.3	7.0	0.1
CONVENTIONALS							
Weight of particles	g	0.030	0.0022	0.063	0.011	0.014	0.0010
CONVENTIONALS							
Antimony (Sb) †	ug/m2/month	0.96	0.96	2.98	0.99	0.96	
Silver (Ag) †	ug/m2/month	4.80	4.81	4.97	4.97	4.81	
Arsenic (As) †	ug/m2/month	0.96	0.96	5.97	0.99	0.96	
Barium (Ba) †	ug/m2/month	16.81	3.65	52.50	13.52	19.42	
Beryllium (Be) †	ug/m2/month	0.48	0.48	0.50	0.50	0.48	
Cadmium (Cd) †	ug/m2/month	0.48	0.48	0.50	0.50	0.48	
Calcium (Ca) †	ug/m2/month	4044.64	442.09	11335.65	4065.90	2855.00	
Chromium (Cr) †	ug/m2/month	2.88	0.96	9.94	5.96	2.88	
Mercury (Hg) †	ug/m2/month	0.48	0.48	0.50	0.50	0.48	
Nickel (Ni) †	ug/m2/month	8.65	1.92	16.90	11.93	1.92	
Lead (Pb) †	ug/m2/month	5.76	4.81	5.97	4.97	4.81	
Thallium (Tl) †	ug/m2/month	0.96	0.96	0.99	0.99	0.96	
Vanadium (V) †	ug/m2/month	1.92	1.92	3.98	1.99	1.92	
Zinc (Zn) †	ug/m2/month	148.91	42.29	130.26	52.69	67.29	
CONVENTIONALS							
Weight of particles	g/m2/month	0.29	0.02	0.63	0.11	0.13	

Période estivale – Poussières

Sample ID	start time	end time	# of days sampled	Area sampled (m ²)	dust weight (g)	Dust deposition rate (g/m ² /30d)
AQS1-Q1-2019	6-26-19 5:30 PM	7-26-19 3:55 PM	29.93402778	0.017672	<0.02	<1.13422
AQS2-Q1-2019	6-26-19 4:40 PM	7-27-19 2:47 PM	30.92152778	0.017672	<0.02	<1.09800
AQS3-Q1-2019	6-27-19 3:40 PM	7-27-19 3:50 PM	30.00694444	0.017672	0.0212	1.19936
AQS4-Q1-2019	6-26-19 3:06 PM	7-27-19 4:54 PM	31.075	0.017672	0.0309	1.68804
AQS1-Q2-2019	7-26-19 3:55 PM	8-25-19 1:55 PM	29.91666667	0.017672	0.028	1.58884
AQS2-Q2-2019	7-27-19 2:47 PM	8-26-19 9:45 AM	29.79027778	0.017672	0.0412	2.34778
AQS3-Q2-2019	7-27-19 3:50 PM	8-26-19 9:00 AM	29.71527778	0.017672	0.0144	0.82266
AQS4-Q2-2019	7-27-19 4:54 PM	8-26-19 10:30 AM	29.73333333	0.017672	0.0266	1.51871

Période estivale – Métaux

Metals deposition rate (g/m²/30d)

	AQS1-Q1-2019	AQS2-Q1-2019	AQS3-Q1-2019	AQS4-Q1-2019
Mercury (Hg)	< 0.00001	< 0.00001	< 0.00001	< 0.000011
Total Antimony (Sb)	< 0.00006	< 0.00006	< 0.00006	< 0.000060
Total Arsenic (As)	< 0.00013	< 0.00012	< 0.00012	< 0.000120
Total Barium (Ba)	0.00043	0.00071	0.00164	0.002404
Total Beryllium (Be)	< 0.00006	< 0.00006	< 0.00006	< 0.000060
Total Cadmium (Cd)	< 0.00001	< 0.00001	< 0.00001	< 0.000011
Total Chromium (Cr)	< 0.00062	< 0.00060	< 0.00062	< 0.000601
Total Copper (Cu)	0.00013	< 0.00012	0.00020	0.000339
Total Lead (Pb)	< 0.00006	0.00010	0.00018	0.000060
Total Manganese (Mn)	0.00062	0.00099	0.00147	0.000929
Total Nickel (Ni)	< 0.00013	< 0.00012	< 0.00012	< 0.000120
Total Silver (Ag)	< 0.00001	< 0.00001	< 0.00001	< 0.000011
Total Thallium (Tl)	< 0.00001	< 0.00001	< 0.00001	< 0.000005
Total Vanadium (V)	< 0.00006	< 0.00006	< 0.00006	< 0.000060
Total Zinc (Zn)	< 0.00062	0.00088	0.00102	0.000874

	AQS1-Q2-2019	AQS2-Q2-2019	AQS3-Q2-2019	AQS4-Q2-2019
Mercury (Hg)	< 0.00002	< 0.00002	< 0.00001	< 0.00002
Total Antimony (Sb)	< 0.00011	< 0.00009	< 0.00007	< 0.00009
Total Arsenic (As)	< 0.00022	< 0.00017	< 0.00013	< 0.00018
Total Barium (Ba)	< 0.00044	0.00039	0.00130	0.00219
Total Beryllium (Be)	< 0.00011	< 0.00009	< 0.00007	< 0.00009
Total Cadmium (Cd)	< 0.00002	< 0.00002	< 0.00001	< 0.00002
Total Chromium (Cr)	< 0.00111	< 0.00088	< 0.00068	< 0.00093
Total Copper (Cu)	< 0.00022	< 0.00017	< 0.00013	0.00023
Total Lead (Pb)	< 0.00011	0.00022	0.00025	0.00023
Total Manganese (Mn)		0.00041	0.00044	0.00060
Total Nickel (Ni)	< 0.00022	< 0.00017	< 0.00013	< 0.00018
Total Silver (Ag)	< 0.00002	< 0.00002	< 0.00001	< 0.00002
Total Thallium (Tl)	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Total Vanadium (V)	< 0.00011	< 0.00009	< 0.00007	< 0.00009
Total Zinc (Zn)	< 0.00111	0.00121	< 0.00068	< 0.00093

Particules

PM2.5

	Date	dust weigh		average conc./24hrs	
		mg		mg/M3	µg/m3
AQS1	2019-07-06	0.39		0.0162176	16.217565
AQS2	2019-06-26	0.42		0.0174651	17.46507
AQS2	2019-07-10	0.37		0.0153859	15.385895
AQS2	2019-07-25	0.34		0.0141384	14.13839
AQS4	2019-06-25	0.27		0.0112275	11.227545
AQS4	2019-07-23	0.29		0.0120592	12.059215
AQS4	2019-07-08	0.36		0.0149701	14.97006
AQS6	2019-07-13	0.35		0.0145542	14.554225
AQS7	2019-07-03	0.44		0.0182967	18.29674
AQS8	2019-06-30	0.38		0.0158017	15.80173
AQS8	2019-08-02	0.3		0.012475	12.47505
AQS9	2019-07-05	0.47		0.0195442	19.544245

Date improperly reported by AGAT

PMT

Station	Unit	RDL	Q-7303(AQS1)	Q-7307(AQS2)	Q-7308(AQS2)	Q-47-7326 (AQS4)	Q-73-17(AQS4)	Q-7306(AQS4)	Q-47-7319(AQS4)	Q-7309(AQ57)	Q-7302(AQ59)
Date			06/07/2019	06/29/2019	07/11/2019	07/25/2019	06/28/2019	08/07/2019	07/23/2019	07/03/2019	07/05/2019
dust weight	mg	0.01	0.02	0.02	0.027	0.02	0.02	0.01	0.02	0.36	0.03
average conc./24hrs	mg/M3		0.00083167	0.00083167	0.001122754	0.00083167	0.00083167	0.000415835	0.00083167	0.01497006	0.001247505
Sample Description	Unit	RDL	Q-7303(AQS1)	Q-7307(AQS2)	Q-7308(AQS2)	Q-47-7326 (AQS4)	Q-73-17(AQS4)	Q-7306(AQS4)	Q-47-7319(AQS4)	Q-7309(AQ57)	Q-7302(AQ59)
Date Sampled			06/07/2019	06/29/2019	07/11/2019	07/25/2019	06/28/2019	08/07/2019	07/23/2019	07/03/2019	07/05/2019
Parameter	Unit	RDL	420416	420437	420438	420439	420440	420441	420442	420443	420444
Arsenic	ug/m3	5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
Magnesium	ug/Filter	10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Copper	ug/Filter	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Lithium	ug/m3	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/Filter	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Selenium	ug/m3	5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
Titanium	ug/m3	2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6
Cadmium	ug/Filter	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Strontium	ug/Filter	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	ug/Filter	10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Molybdenum	ug/m3	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	ug/m3	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Iron	ug/m3	5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
Manganese	ug/m3	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Strontium	ug/m3	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	ug/m3	5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
Lead	ug/m3	10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4
Zinc	ug/Filter	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.5	<1.0	<1.0
Aluminum	ug/Filter	10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Arsenic	ug/Filter	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Iron	ug/Filter	5.0	10.0	<5.0	5.0	<5.0	<5.0	<5.0	10.0	15.0	5.0
Lithium	ug/Filter	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Magnesium	ug/m3	10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4
Manganese	ug/Filter	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.5	<0.3
Molybdenum	ug/Filter	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium	ug/Filter	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Aluminum	ug/m3	10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4	<10.4
Cadmium	ug/m3	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Copper	ug/m3	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	ug/Filter	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Date improperly reported by AGAT

Cells with reported value



Annexe VI. Note technique sur le suivi géotechnique

EXECUTIVE SUMMARY

TSMC mandated WSP Canada Inc. (WSP) in September 2019 to perform the geotechnical inspection. The objective of this inspection was to observe the geotechnical integrity of the settling Pond, Waste rock dump, Overburden stock piles, Area for the water treatment plan, Open pit, Runoff water ditches (clean water) and Access and hauling road and site culverts.

This mandate is not a review of the geotechnical practices of the operations of this site, nor a verification between previous recommendations and / or design criteria. The mandate is not a due diligence or an audit. The mandate is to note and record everything in an inspection report.

INSPECTION

The inspection was carried out by Jean-Sébastien Houle, engineer (OIQ 129263), on October 16, 2019. He was accompanied by MM. Martin Simon and Adam Calvert, respectively foreman and junior environmental technician. During the visit, the sky was cloudy, it was lightly snowing and with strong winds, with a temperature varying from 0 ° C to 4 ° C. The weather conditions (snow and wind) slightly reduced the visibility and there was approximately 1-2 centimetres of snow on the ground at the time of the inspection.

CONCLUSIONS AND DISCUSSION

The main active and potential instabilities are as follows:

- **Settling pond:**
 - The pond was empty at the time of the visit
 - There are no signs of instability apart from the crack in the south ditch (observed by others) where a completed geotechnical assessment including geotechnical investigation was planned at the time of the visit
 - The areas of damaged geomembranes are planned to be repaired in 2020
- **Waste Rock Dump:**
 - Although no signs of instability have been observed, the face angle of the lifts and the inter-ramp angle are steeper than the proposed design.
 - The foundation (footprint) of the Waste Rock Dump was not stripped to the bedrock as stated in its design (WSP 2017).
- **Overburden stockpile:**
 - Although no signs of instability have been observed, the face angle of the lifts and the inter-ramp angle, if any, are steeper than the original design.
 - The foundation (footprint) of the Waste Rock Dump was not stripped to the bedrock as stated in its design (WSP 2017).
- **Open pit:**
 - Signs of bench scale instability (material collected on catch benches)
 - Breakback is excessive impacting the catch berm sizing;
 - No sign of overall wall instability was observed.
 - Some overburden material is left close to the crest and could eventually fall into the pit
- **Run-off water ditch:**
 - No observable damage of risk to its integrity
- **Access road and culvert:**

- Minor damages to one culvert under the access/haulage road at the entrance to the site by backfill pebble. A failure of the culvert could affect the water flow and eventually damage the road and even cause it to fail completely (washout)
- The weather during the visit did not significantly affect the observations made during the current inspection. However, it is preferable to carry out inspections when the slope and ground surfaces are not covered with snow.

RECOMMENDATIONS

Following the observations made and instabilities and risks identified, WSP recommends that TSMC take the following actions:

- Carry out the annual geotechnical inspection by a geotechnical expert scheduled towards the end of the summer period before the snow begins to fall, typically before mid-September.
- **Settling pond:**
 - Complete the ongoing geotechnical assessment of the south dyke crack
 - Proceed with the repairs of the damaged geomembrane areas and the recommend reprofiling presented by WSP in October 2019
 - Due to its proximity, the waste rock dump should be integrated into the stability assessments
- **Waste rock dump:**
 - As the foundation is not as the design stated, a review of the geotechnical data of this area must be conducted to identify if additional geotechnical investigations are required and if stability assessment should be revisited. The geotechnical investigation would typically be aimed at characterizing the properties of the foundation (potentially natural overburden). Due to its proximity, the settling pond should be integrated into the stability assessments. The existing plan for the waste dump should be considered, including proposed height and required storage requirements. The assessment should also consider the current geometry as it was observed that the inter-ramp angle and slope face are steeper than the original design.
 - Decrease the overall slope angle by widening the berms and / or by reduction of the face slope angle (WSP 2018).
 - Always keep the top of the waste rock pile leveled and sloped so as to prevent water accumulation on the surface and direct the flow towards the access ramp or the lowest part of the waste pile in question and away from the embankments.
- **Overburden stockpiles:**
 - Decrease overall slope angle by decreasing the face angle and adding / keeping large berms.
 - Drain out or channel out the accumulated water north of the access ramp to the North sector.
 - Always keep the top of the surfaces leveled and sloped to prevent water accumulation on the surface and direct the flow towards the access ramp or the lowest part of the dump in question, far from the slope edges.
- **Open pit:**
 - Implement a controlled blasting program (e.g. pre-splitting) for the final walls, to minimize blast damage and microfracturing of the rock mass and minimize back break at the edge of the bench width. This program should be coupled with performance monitoring of the controlled blasting program to adjust practices as needed.
 - Decrease the inter-ramp angle of the pit by cleaning and / or widening the berms (catch bench) (WSP 2018).
 - Remove material accumulated on catch bench
 - Remove the overhanging rock masses generally located at height at the crest of the pit slopes.

- Regularly assess the rock mass quality by a qualified engineer or geologist and revisit the geotechnical design should the rock mass conditions change during mining. The assessment of the rock mass quality and validation of the geotechnical design should be supervised and signed-off by a qualified engineer.
- **Access / haulage road and culverts**
 - Monitor the integrity of the culverts by regular measurements and photos and keep records.

In addition to the recommendations presented above, WSP has identified several opportunities for business improvement at the Goodwood site. Thus, it is recommended that TSMC takes the following actions by the end of next season (i.e.: September 31, 2020):

- Set up a geotechnical inspection and monitoring program to detect movement, tension cracks and other potential instabilities and document it. Conduct such inspection regularly (i.e. monthly) while the site is active. This would provide better operational security for both staff and equipment. Monitoring program should at least include regular survey of prism of targets and photos. Monitoring systems and triggers should be design by an engineer or geologist specialized in geotechnics. The geotechnical expert should also receive, review and interpret the data regularly and propose mitigation measures in lights of his/her assessment.
- Install instruments for measuring permafrost in the bedrock and this, in the immediate periphery of the pit as well as further, in areas little or not affected by extraction. This would also complete the information about the hydrogeological regime and reduce the uncertainties about the available water level data. This would allow better knowledge of the recharge of the water table, its seasonal fluctuation and the permafrost profile.

Jean-Sébastien Houle, ing.

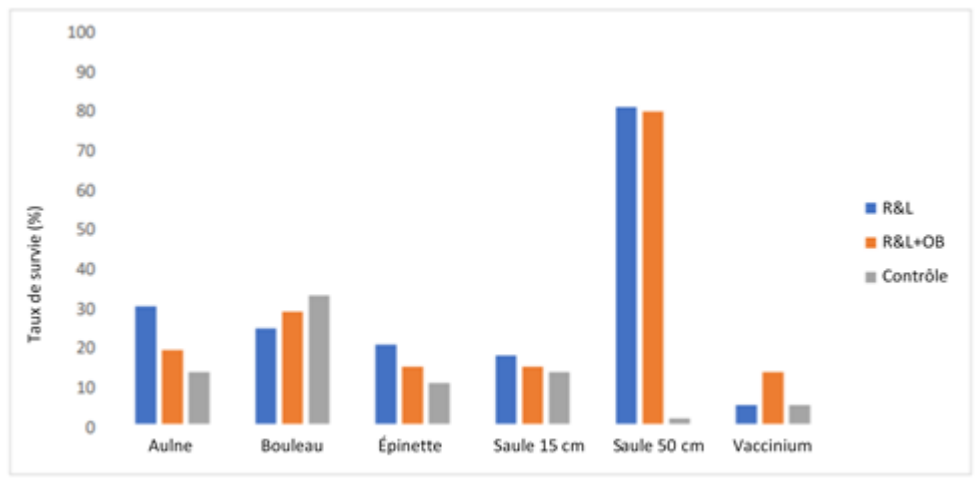
Chef d'équipe, Mécanique des roches



171, rue Léger
Sherbrooke (Québec)
J1L 1M2 Canada

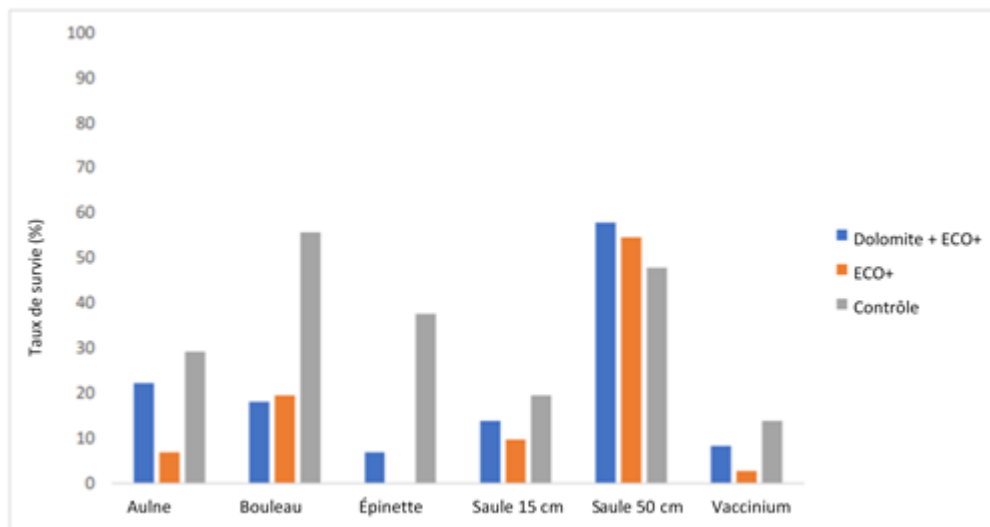
Annexe VII. Résultats du projet de recherche en restauration

Taux de survie des espèces plantées à T4 – deux ans de croissance, un hiver

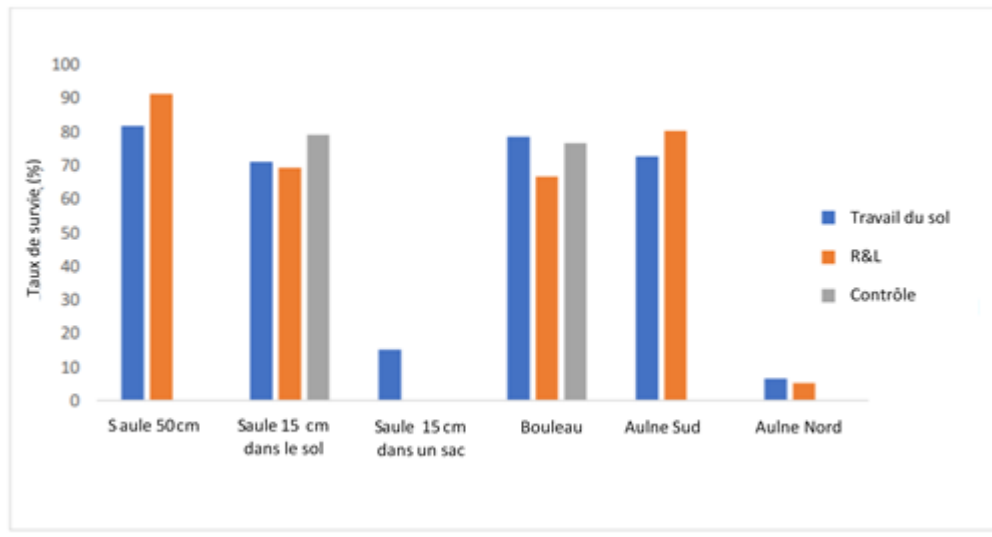


Taux de survie des différentes espèces plantées à T4 en fonction de la préparation du site

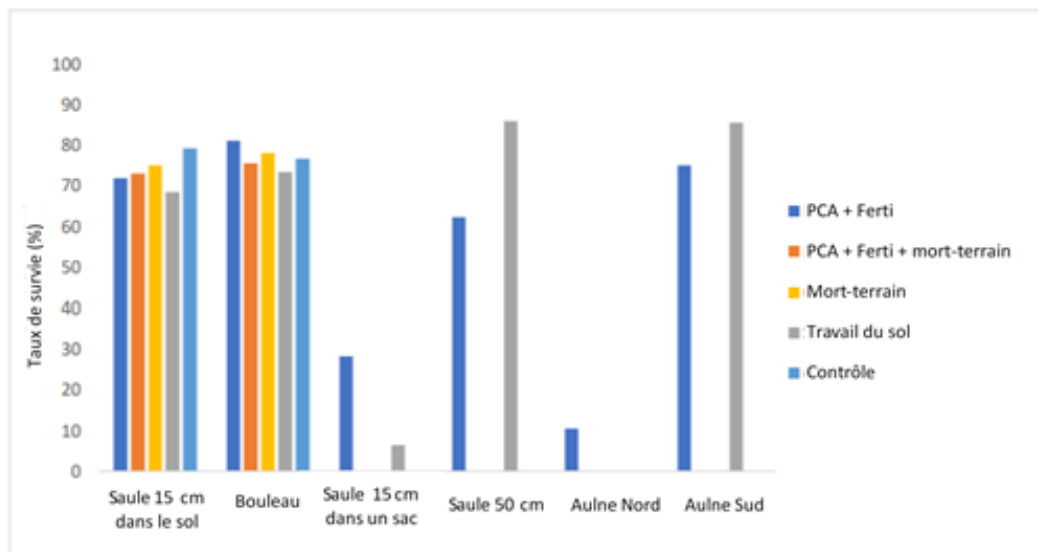
Taux de survie des espèces plantées à T6 – un an de croissance, sans hivernage



Taux de survie des différentes espèces plantées à T4 en fonction de l'amendement du sol

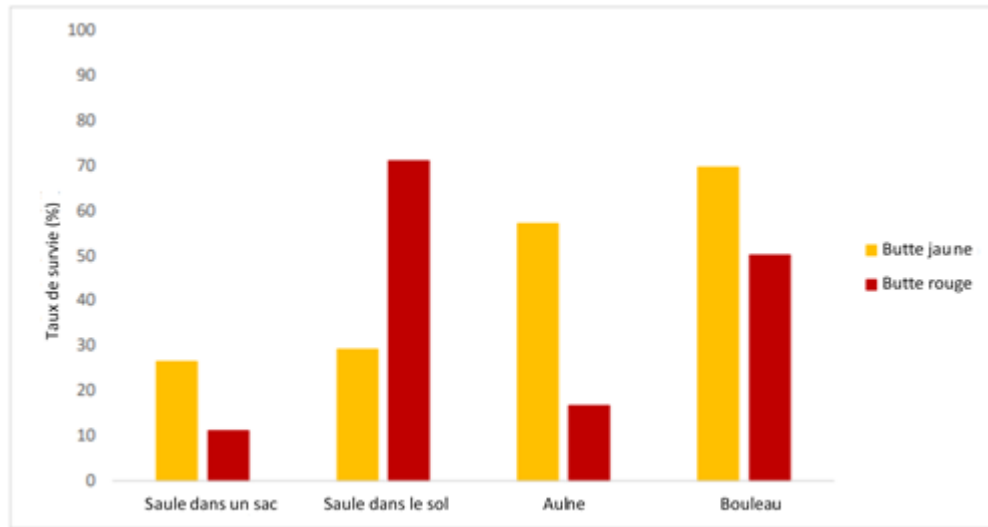


Taux de survie des différentes espèces plantées à T6 en fonction de la préparation du site



Taux de survie des différentes espèces plantées à T6 en fonction de l'amendement du sol

Taux de survie des espèces plantées au ruisseau Elross - un an de croissance, sans hivernage



Taux de survie des différentes espèces plantées sur des buttes en fonction de la couleur de la butte

Analyses physico-chimiques des sols du secteur de Goodwood

Écorégion/Site		Goodwood Mûrt-Terain				Goodwood HS T03 ²		Goodwood HS T01 ²		
GPS ³		GH6				GW-HS T01-9		GW-HS T03-10		
Échantillon ³		GW-TS O-6				GW-TS O-7		GW-TS O-8		
Analyte ¹		Unité	LDD ⁴	GW-TS O-6	GW-TS O-7	GW-TS O-8	GW-HS T1-9	GW-HS T1-10	GW-HS T03-11	GW-HS T03-12
Granulométrie	Sand	%	2.0	42	45	44	46	44	46	44
	Silt	%	2.0	17	20	18	25	23	23	23
	Clay	%	2.0	18	15	16	13	13	15	18
	Gravel	%	2.0	23	21	22	16	20	17	16
Total	C	%	0.050	0.16	0.13	2.3	2.3	0.82	2.5	1.6
	N	%	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	P	mg/kg		320	270	290	350	240	460	350
Soluble	Na	mg/kg	1.4 to 3.0	4.5	2.2	4.8	<2.5	2.9	3.1	<2.4
	Ca	mg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Non Soluble	Mg	mg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	K	mg/L	20	<20	<20	<20	<20	<20	<20	<20
	NA	mg/L	5.0	12.6	7.0	13.2	<5.0	6.7	5.1	<5.0
	S	mg/L	30	<30	<30	<30	<30	<30	<30	<30
		%	N/A	35.8	30.8	36.0	50.2	43.4	60.2	48.0
Saturation		%	N/A	10	10	10	17	16	22	19
Humidité		%	N/A	5.45	5.38	5.21	4.17	4.42	3.89	4.25
pH		pH	N/A	5.45	5.38	5.21	4.17	4.42	3.89	4.25
Métaux totaux extractibles par ICP-MS	Al	mg/kg	20	7 800	7 600	8 500	9 800	9 500	9 000	12 000
	Ag	mg/kg	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	As ⁵	mg/kg	2.0	9.1	9.1	10	9.1	7.6	11	11
	Ba	mg/kg	4.0	67	74	65	53	60	61	90
	Be	mg/kg	0.10	0.61	0.63	0.74	0.68	0.59	0.44	0.64
	Cd	mg/kg	0.10	0.50	0.58	0.53	0.31	0.28	0.21	0.20
	Ca	mg/kg	20	700	600	590	120	82	440	110
	Cr	mg/kg	1.0	25	27	31	24	25	23	30
	Cu	mg/kg	1.0	24	25	28	23	17	12	21
	Co	mg/kg	1.0	10	13	11	12	10	9.0	14
	Fe	mg/kg	10	54 000	58 000	63 000	60 000	55 000	69 000	64 000
	Mg	mg/kg	5.0	3 500	3 500	3 400	2 500	2 500	2 200	3 600
	Mn ⁵	mg/kg	2.0	2 600	3 400	2 900	3 200	2 600	2 700	3 500
	Mo	mg/kg	0.50	1.4	1.6	1.7	1.5	1.2	1.7	1.7
	Ni	mg/kg	0.50	22	26	24	18	16	12	20
	Hg	mg/kg	0.010	0.084	0.071	0.099	0.097	0.067	0.064	0.091
	P	mg/kg	20	290	290	330	290	260	660	340
	K	mg/kg	20	710	740	740	540	510	480	660
	Pb	mg/kg	1.0	9.5	9.7	10	14	10	14	12
	Se	mg/kg	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.73	<0.50
Na	mg/kg	20	31	29	27	21	17	23	22	
Zn	mg/kg	5.0	72	68	74	55	46	41	62	

1. Analyses physico-chimique du sol ont été réalisées en septembre et octobre 2018 par MAXXAM ANALYTIQUE, Québec, Canada;

2. HST = Écorégion de la toundra subarctique supérieure (High Subarctic Tundra);

3. Numéro d'échantillons et de GPS; ne représentent pas l'écorégion ou le site;

4. Limite de détection;

5. Les nombres en surbrillance sont ceux qui ont un dépassement pour un critère selon l'annexe II Grille des critères génériques pour les sols du Guide d'intervention-Protection des sols et réhabilitation des terrains contaminés Beaulieu (2019). Bleu est un dépassement pour le critère A, jaune pour le critère B et Vert pour le critère C.

Composition minérale des sols du secteur de Goodwood

Écorégion/Site	GPS ³	Samples ³	Goodwood Mor-Terrain			Goodwood HS T03 ²		Goodwood HS T01 ²	
			GH6			GW-HS T01-9		GW-HS T03-10	
Analyte ¹	Unit	MDL	GW-TS O-6	GW-TS O-7	GW-TS O-8	GW-HS T1-9	GW-HS T1-10	GW-HS T03-11	GW-HS T03-11
Mo	ppm	0.05	2.54	2.36	2.72	2.06	1.84	2.77	2.37
Cu	ppm	0.1	24.1	26.8	25.7	21.0	18.5	15.4	25.3
Pb	ppm	0.02	13.22	14.33	13.63	15.19	13.69	16.89	16.37
Zn	ppm	0.2	78.4	79.8	80.1	67.2	59.9	54.2	80.0
Ag	ppm	20	205	189	237	164	173	182	210
Ni	ppm	0.1	24.6	25.2	25.2	20.7	21.4	16.9	25.6
Co	ppm	0.2	12.1	13.8	11.7	10.8	10.7	10.5	14.4
Mn	ppm	1	3 631	4 431	3 960	3 082	2 743	2 541	3 409
Fe	%	0.01	16.84	17.13	17.17	21.71	15.93	16.82	12.41
As	ppm	0.2	20.3	20.0	20.6	18.7	18.2	16.4	17.9
U	ppm	0.1	3.1	2.8	3.1	2.4	2.4	2.5	2.8
Th	ppm	0.1	5.9	5.9	5.8	5.8	6.3	7.2	7.9
Sr	ppm	1	97	109	100	80	98	83	100
Cd	ppm	0.02	0.43	0.46	0.45	0.28	0.31	0.12	0.20
Sb	ppm	0.02	1.08	1.08	1.06	0.89	0.83	0.95	1.09
Bi	ppm	0.04	0.10	0.09	0.09	0.07	0.09	0.13	0.12
V	ppm	1	86	81	83	69	68	80	88
Ca	%	0.01	0.30	0.31	0.30	0.20	0.26	0.20	0.26
P	%	0.001	0.038	0.042	0.042	0.041	0.045	0.069	0.056
La	ppm	0.1	22.1	23.0	22.4	19.3	20.0	21.4	21.6
Cr	ppm	1	42	45	43	39	42	47	53
Mg	%	0.01	0.56	0.61	0.57	0.47	0.60	0.48	0.66
Ba	ppm	1	447	483	440	358	421	440	494
Ti	%	0.001	0.155	0.169	0.161	0.153	0.160	0.188	0.193
Al	%	0.01	3.86	3.97	3.74	3.46	4.02	4.07	4.78
Na	%	0.001	0.685	0.806	0.701	0.535	0.762	0.547	0.690
K	%	0.01	1.45	1.51	1.37	1.21	1.38	1.63	1.81
W	ppm	0.1	1.0	1.1	1.0	0.9	0.9	1.0	0.9
Zr	ppm	0.2	89.4	87.1	92.2	76.9	83.2	103.5	99.7
Sn	ppm	0.1	1.1	0.9	0.8	0.8	0.9	1.4	1.1
Be	ppm	1	1	2	2	2	2	2	2
Sc	ppm	0.1	6.1	6.5	6.2	5.8	6.2	6.3	7.1
S	%	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Y	ppm	0.1	14.3	13.8	14.9	11.6	11.1	10.6	11.4
Ce	ppm	0.02	44.23	46.62	44.88	45.56	43.87	43.85	49.69
Pr	ppm	0.1	4.8	5.2	5.2	4.3	4.1	4.6	4.8
Nd	ppm	0.1	18.1	19.5	19.1	15.3	15.5	17.0	17.6
Sm	ppm	0.1	3.4	3.3	3.5	2.9	2.7	3.0	3.0
Eu	ppm	0.1	0.7	0.7	0.7	0.6	0.6	0.5	0.7
Gd	ppm	0.1	3.2	2.6	2.7	2.6	2.5	2.5	2.2
Tb	ppm	0.1	0.4	0.4	0.4	0.3	0.3	0.3	0.3
Dy	ppm	0.1	2.6	2.4	2.4	1.9	2.0	1.7	1.8
Ho	ppm	0.1	0.5	0.5	0.5	0.4	0.4	0.4	0.4
Er	ppm	0.1	1.4	1.4	1.6	1.3	1.2	1.2	1.2
Tm	ppm	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2
Yb	ppm	0.1	1.4	1.4	1.4	1.1	1.1	1.3	1.3
Lu	ppm	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2
Hf	ppm	0.02	2.26	2.37	2.36	1.98	2.25	2.71	2.71
Li	ppm	0.1	20.3	21.4	20.3	17.0	19.9	18.5	24.4
Rb	ppm	0.1	57.7	56.2	53.4	45.5	52.9	64.0	67.5
Ta	ppm	0.1	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Nb	ppm	0.04	6.81	7.24	7.48	6.75	6.60	8.21	7.91
Cs	ppm	0.1	2.4	2.2	2.3	1.7	1.9	2.5	2.8
Ga	ppm	0.02	10.13	10.49	10.05	8.70	10.44	12.41	13.16
In	ppm	0.01	0.04	0.03	0.03	0.02	0.05	0.03	0.03
Re	ppm	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Se	ppm	0.3	0.4	<0.3	<0.3	0.4	0.7	0.5	0.7
Te	ppm	0.05	0.09	0.08	0.12	0.09	0.11	0.09	0.07
Tl	ppm	0.05	0.40	0.39	0.38	0.32	0.37	0.43	0.45

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