Appendix X. Dustfall and metals results and calculation

Votre # du projet: C117642
Votre # Bordereau: C117642-NONT-01-01

Attention: Martine Lepage

Bureau Veritas Laboratories
889 Montée de Liesse
Ville St-Laurent, QC
CANADA H4T 1P5

Date du rapport: 2021/05/12
Rapport: R6631546
Version: 1 - Finale

CERTIFICAT D'ANALYSES

 # DE DOSSIER BV LABS: C1B1520
Reçu: 2021/04/27, 09:30

Matrice: Eau
Nombre d'échantillons reçus: 9

Analyses	Quantité	Date de l' extraction	Date Analysé	Méthode de laboratoire	Méthode d'analyse
MERCURE PAR VAPEUR FROIDE AA	9	2021/05/10	2021/05/10	CAM SOP-00453	
Total Metals Analysis by ICPMS	8	N/A	2021/05/10	CAM SOP-00447	
Total Metals Analysis by ICPMS	1	N/A	2021/05/12	CAM SOP-00447	
Insoluble Part. in Dustfall (D1739mod)	9	2021/05/06	2021/05/06	BRL SOP-00121	ASTM D1739 m
Soluble Part. in Dustfall (D1739mod)	9	2021/05/10	2021/05/06	BRL SOP-00121	ASTM D1739 m
Volume of Sample Received	9	2021/05/06	2021/05/06		

Lorsque la méthode de référence comprend un suffixe « m », cela signifie que la méthode d'analyse du laboratoire contient des modifications validées et appliquées afin d'améliorer la performance de la méthode de référence.

clé de cryptage

Marinela Sim
Chargée de projets
13 May 2021 16:30:09

Veuillez adresser toute question concernant ce certificat d'analyse à votre chargé(e) de projets
Marinela Sim, Chargée de projets
Courriel: Marinela.Sim@bureauveritas.com
Téléphone (905)817-5828
==========
Lab BV a mis en place des procédures qui protègent contre l'utilisation non autorisée de la signature électronique et emploie les <<signataires>> requis, conformément à l'ISO/CEI 17025. Veuillez vous référer à la page des signatures de validation pour obtenir les détails des validations pour chaque division.

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Les essais microbiologiques sont réalisés au 6660, chemin Campobello, tandis que les analyses chimiques le sont au 6740, chemin Campobello.

Dossier BV Labs: C1B1520
Date du rapport: 2021/05/12

Bureau Veritas Laboratories
Votre # du projet: C117642
Initiales du préleveur: JFD

RÉSULTATS D'ANALYSES POUR LES ÉCHANTILLONS D' EAU

Identification BV Labs		PKO877	PKO878	PKO879	PKO880		
Date d'échantillonnage		2021/04/16 12:16	2021/04/16 13:07	2021/04/17 15:56	2021/04/10 15:20		
# Bordereau		C117642-NONT-01-01	C117642-NONT-01-01	C117642-NONT-01-01	C117642-NONT-01-01		
	Unités	**JA6438-AQS1-SN**	**JA6438-AQS2-SN**	**JA6438-AQS3-SN**	**JA6438-AQS4-SN**	**LDR**	**Lot CQ**
Particules Totales Insoluble	mg	16.2	119	4.40	7.20	0.60	7337068
Particules Totales Soluble	mg	17.6	22.0	16.8	22.4	4.0	7342616
Charge/Prep Analysis							
Volume de l'échantillon	ml	4000	3700	2700	2900	1	7337025

LDR = limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

Identification BV Labs		PKO881	PKO882	PKO883	PKO884		
Date d'échantillonnage		2021/04/10 16:35	2021/04/04 15:17	2021/04/19 08:05	2021/04/19 09:37		
# Bordereau		C117642-NONT-01-01	C117642-NONT-01-01	C117642-NONT-01-01	C117642-NONT-01-01		
	Unités	**JA6438-AQS5-SN**	**JA6438-AQS6-SN**	**JA6438-AQS7-SN**	**JA6438-AQS8-SN**	**LDR**	**Lot CQ**
Particules Totales Insoluble	mg	6.20	52.2	47.0	13.6	0.60	7337068
Particules Totales Soluble	mg	16.8	14.0	10.4	34.4	4.0	7342616
Charge/Prep Analysis							
Volume de l'échantillon	ml	4000	2400	2500	3500	1	7337025

LDR = limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

Identification BV Labs		PKO885		
Date d'échantillonnage		2021/04/07 16:23		
# Bordereau		C117642-NONT-01-01		
	Unités	**JA6438-AQS9-SN**	**LDR**	**Lot CQ**
Particules Totales Insoluble	mg	8.40	0.60	7337068
Particules Totales Soluble	mg	21.6	4.0	7342616
Charge/Prep Analysis				
Volume de l'échantillon	ml	4500	1	7337025

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Dossier BV Labs: C1B1520
Date du rapport: 2021/05/12

Bureau Veritas Laboratories
Votre # du projet: C117642
Initiales du préleveur: JFD

ELEMENTS BY ATOMIC SPECTROSCOPY (EAU)

Identification BV Labs		PKO877		PKO878		PKO879		
Date d'échantillonnage		2021/04/16 12:16		2021/04/16 13:07		2021/04/17 15:56		
# Bordereau		C117642-NONT-01-01		C117642-NONT-01-01		C117642-NONT-01-01		
	Unités	**JA6438-AQS1-SN**	**Lot CQ**	**JA6438-AQS2-SN**	**Lot CQ**	**JA6438-AQS3-SN**	**LDR**	**Lot CQ**
MÉTAUX								
Mercure (Hg)	mg/L	<0.00010	7342985	<0.00010	7342985	<0.00010	0.00010	7342985
Arsenic (As) totaux	ug/L	<1.0	7343107	<1.0	7347229	<1.0	1.0	7343107
Baryum (Ba) totaux	ug/L	<2.0	7343107	<2.0	7347229	<2.0	2.0	7343107
Béryllium (Be) totaux	ug/L	<0.40	7343107	<0.40	7347229	<0.40	0.40	7343107
Cadmium (Cd) totaux	ug/L	<0.090	7343107	<0.090	7347229	<0.090	0.090	7343107
Chrome (Cr) totaux	ug/L	<5.0	7343107	<5.0	7347229	<5.0	5.0	7343107
Cuivre (Cu) totaux	ug/L	<0.90	7343107	<0.90	7347229	<0.90	0.90	7343107
Fer (Fe) totaux	ug/L	<100	7343107	<100	7347229	<100	100	7343107
Plomb (Pb) totaux	ug/L	<0.50	7343107	<0.50	7347229	<0.50	0.50	7343107
Nickel (Ni) totaux	ug/L	<1.0	7343107	<1.0	7347229	<1.0	1.0	7343107
Argent (Ag) totaux	ug/L	<0.090	7343107	<0.090	7347229	<0.090	0.090	7343107
Thallium (Tl) totaux	ug/L	<0.050	7343107	<0.050	7347229	<0.050	0.050	7343107
Vanadium (V) totaux	ug/L	<0.50	7343107	<0.50	7347229	<0.50	0.50	7343107
Zinc (Zn) totaux	ug/L	<5.0	7343107	6.2	7347229	<5.0	5.0	7343107

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Dossier BV Labs: C1B1520
Date du rapport: 2021/05/12

Bureau Veritas Laboratories
Votre # du projet: C117642
Initiales du préleveur: JFD

ELEMENTS BY ATOMIC SPECTROSCOPY (EAU)

Identification BV Labs		PKO879			PKO880	PKO881		
Date d'échantillonnage		2021/04/17 15:56			2021/04/10 15:20	2021/04/10 16:35		
# Bordereau		C117642-NONT-01-01			C117642-NONT-01-01	C117642-NONT-01-01		
	Unités	**JA6438-AQS3-SN Dup. de Lab.**	**LDR**	**Lot CQ**	**JA6438-AQS4-SN**	**JA6438-AQS5-SN**	**LDR**	**Lot CQ**
MÉTAUX								
Mercure (Hg)	mg/L				<0.00010	<0.00010	0.00010	7342985
Arsenic (As) totaux	ug/L	<1.0	1.0	7343107	<1.0	<1.0	1.0	7343107
Baryum (Ba) totaux	ug/L	<2.0	2.0	7343107	<2.0	<2.0	2.0	7343107
Béryllium (Be) totaux	ug/L	<0.40	0.40	7343107	<0.40	<0.40	0.40	7343107
Cadmium (Cd) totaux	ug/L	<0.090	0.090	7343107	<0.090	<0.090	0.090	7343107
Chrome (Cr) totaux	ug/L	<5.0	5.0	7343107	<5.0	<5.0	5.0	7343107
Cuivre (Cu) totaux	ug/L	<0.90	0.90	7343107	<0.90	<0.90	0.90	7343107
Fer (Fe) totaux	ug/L	<100	100	7343107	<100	<100	100	7343107
Plomb (Pb) totaux	ug/L	<0.50	0.50	7343107	<0.50	<0.50	0.50	7343107
Nickel (Ni) totaux	ug/L	<1.0	1.0	7343107	<1.0	<1.0	1.0	7343107
Argent (Ag) totaux	ug/L	<0.090	0.090	7343107	<0.090	<0.090	0.090	7343107
Thallium (Tl) totaux	ug/L	<0.050	0.050	7343107	<0.050	<0.050	0.050	7343107
Vanadium (V) totaux	ug/L	<0.50	0.50	7343107	<0.50	<0.50	0.50	7343107
Zinc (Zn) totaux	ug/L	<5.0	5.0	7343107	<5.0	<5.0	5.0	7343107

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Duplicata de laboratoire

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Dossier BV Labs: C1B1520
Date du rapport: 2021/05/12

Bureau Veritas Laboratories
Votre # du projet: C117642
Initiales du préleveur: JFD

ELEMENTS BY ATOMIC SPECTROSCOPY (EAU)

Identification BV Labs		PKO882	PKO883	PKO884		
Date d'échantillonnage		2021/04/04 15:17	2021/04/19 08:05	2021/04/19 09:37		
# Bordereau		C117642-NONT-01-01	C117642-NONT-01-01	C117642-NONT-01-01		
	Unités	**JA6438-AQS6-SN**	**JA6438-AQS7-SN**	**JA6438-AQS8-SN**	**LDR**	**Lot CQ**
MÉTAUX						
Mercure (Hg)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	7342985
Arsenic (As) totaux	ug/L	<1.0	<1.0	<1.0	1.0	7343107
Baryum (Ba) totaux	ug/L	<2.0	<2.0	<2.0	2.0	7343107
Béryllium (Be) totaux	ug/L	<0.40	<0.40	<0.40	0.40	7343107
Cadmium (Cd) totaux	ug/L	<0.090	<0.090	<0.090	0.090	7343107
Chrome (Cr) totaux	ug/L	<5.0	<5.0	<5.0	5.0	7343107
Cuivre (Cu) totaux	ug/L	<0.90	<0.90	<0.90	0.90	7343107
Fer (Fe) totaux	ug/L	<100	160	<100	100	7343107
Plomb (Pb) totaux	ug/L	<0.50	<0.50	<0.50	0.50	7343107
Nickel (Ni) totaux	ug/L	<1.0	<1.0	<1.0	1.0	7343107
Argent (Ag) totaux	ug/L	<0.090	<0.090	<0.090	0.090	7343107
Thallium (Tl) totaux	ug/L	<0.050	<0.050	<0.050	0.050	7343107
Vanadium (V) totaux	ug/L	<0.50	<0.50	<0.50	0.50	7343107
Zinc (Zn) totaux	ug/L	<5.0	<5.0	<5.0	5.0	7343107

LDR = limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

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Bureau Veritas Laboratories
Votre # du projet: C117642
Initiales du préleveur: JFD

ELEMENTS BY ATOMIC SPECTROSCOPY (EAU)

Identification BV Labs		PKO885		
Date d'échantillonnage		2021/04/07 16:23		
# Bordereau		C117642-NONT-01-01		
	Unités	**JA6438-AQS9-SN**	**LDR**	**Lot CQ**
MÉTAUX				
Mercure (Hg)	mg/L	<0.00010	0.00010	7342985
Arsenic (As) totaux	ug/L	<1.0	1.0	7343107
Baryum (Ba) totaux	ug/L	<2.0	2.0	7343107
Béryllium (Be) totaux	ug/L	<0.40	0.40	7343107
Cadmium (Cd) totaux	ug/L	<0.090	0.090	7343107
Chrome (Cr) totaux	ug/L	<5.0	5.0	7343107
Cuivre (Cu) totaux	ug/L	<0.90	0.90	7343107
Fer (Fe) totaux	ug/L	<100	100	7343107
Plomb (Pb) totaux	ug/L	<0.50	0.50	7343107
Nickel (Ni) totaux	ug/L	<1.0	1.0	7343107
Argent (Ag) totaux	ug/L	<0.090	0.090	7343107
Thallium (Tl) totaux	ug/L	<0.050	0.050	7343107
Vanadium (V) totaux	ug/L	<0.50	0.50	7343107
Zinc (Zn) totaux	ug/L	<5.0	5.0	7343107

LDR = limite de détection rapportée
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REMARQUES GÉNÉRALES

Bench Level Deviation Attached,50% of Volume post seperation filtered and all residues(With DLs) for insoluble and soluble are multiplied by 2.
Raw data Attached

Les résultats s'appliquent seulement pour les paramètres analysés.

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Dossier BV Labs: C1B1520
Date du rapport: 2021/05/12

Bureau Veritas Laboratories
Votre # du projet: C117642
Initiales du préleveur: JFD

RAPPORT ASSURANCE QUALITÉ

Lot Lot	Init	Type CQ	Groupe	Date Analysé	Valeur	Réc	Unités	Limites CQ
7337068	DPN	Blanc fortifié	Particules Totales Insoluble	2021/05/06		95	%	85 - 115
7337068	DPN	Blanc de méthode	Particules Totales Insoluble	2021/05/06	<0.30		mg	
7342616	DPN	Blanc fortifié	Particules Totales Soluble	2021/05/06		100	%	85 - 115
7342616	DPN	Blanc de méthode	Particules Totales Soluble	2021/05/06	<2.0		mg	
7342985	PBA	Échantillon fortifié	Mercure (Hg)	2021/05/10		98	%	75 - 125
7342985	PBA	Blanc fortifié	Mercure (Hg)	2021/05/10		100	%	80 - 120
7342985	PBA	Blanc de méthode	Mercure (Hg)	2021/05/10	<0.00010		mg/L	
7342985	PBA	RPD	Mercure (Hg)	2021/05/10	NC		%	20
7343107	AFZ	Échantillon fortifié [PKO879-01]	Arsenic (As) totaux	2021/05/10		96	%	80 - 120
			Baryum (Ba) totaux	2021/05/10		95	%	80 - 120
			Béryllium (Be) totaux	2021/05/10		94	%	80 - 120
			Cadmium (Cd) totaux	2021/05/10		97	%	80 - 120
			Chrome (Cr) totaux	2021/05/10		93	%	80 - 120
			Cuivre (Cu) totaux	2021/05/10		97	%	80 - 120
			Fer (Fe) totaux	2021/05/10		93	%	80 - 120
			Plomb (Pb) totaux	2021/05/10		93	%	80 - 120
			Nickel (Ni) totaux	2021/05/10		93	%	80 - 120
			Argent (Ag) totaux	2021/05/10		97	%	80 - 120
			Thallium (Tl) totaux	2021/05/10		94	%	80 - 120
			Vanadium (V) totaux	2021/05/10		94	%	80 - 120
			Zinc (Zn) totaux	2021/05/10		100	%	80 - 120
7343107	AFZ	Blanc fortifié	Arsenic (As) totaux	2021/05/10		98	%	80 - 120
			Baryum (Ba) totaux	2021/05/10		96	%	80 - 120
			Béryllium (Be) totaux	2021/05/10		94	%	80 - 120
			Cadmium (Cd) totaux	2021/05/10		98	%	80 - 120
			Chrome (Cr) totaux	2021/05/10		94	%	80 - 120
			Cuivre (Cu) totaux	2021/05/10		98	%	80 - 120
			Fer (Fe) totaux	2021/05/10		94	%	80 - 120
			Plomb (Pb) totaux	2021/05/10		92	%	80 - 120
			Nickel (Ni) totaux	2021/05/10		95	%	80 - 120
			Argent (Ag) totaux	2021/05/10		96	%	80 - 120
			Thallium (Tl) totaux	2021/05/10		93	%	80 - 120
			Vanadium (V) totaux	2021/05/10		96	%	80 - 120
			Zinc (Zn) totaux	2021/05/10		102	%	80 - 120
7343107	AFZ	Blanc de méthode	Arsenic (As) totaux	2021/05/10	<1.0		ug/L	
			Baryum (Ba) totaux	2021/05/10	<2.0		ug/L	
			Béryllium (Be) totaux	2021/05/10	<0.40		ug/L	
			Cadmium (Cd) totaux	2021/05/10	<0.090		ug/L	
			Chrome (Cr) totaux	2021/05/10	<5.0		ug/L	
			Cuivre (Cu) totaux	2021/05/10	<0.90		ug/L	
			Fer (Fe) totaux	2021/05/10	<100		ug/L	
			Plomb (Pb) totaux	2021/05/10	<0.50		ug/L	
			Nickel (Ni) totaux	2021/05/10	2.8, LDR=1.0		ug/L	
			Argent (Ag) totaux	2021/05/10	<0.090		ug/L	
			Thallium (Tl) totaux	2021/05/10	<0.050		ug/L	
			Vanadium (V) totaux	2021/05/10	<0.50		ug/L	
			Zinc (Zn) totaux	2021/05/10	5.6, LDR=5.0		ug/L	
7343107	AFZ	RPD [PKO879-01]	Arsenic (As) totaux	2021/05/10	NC		%	20
			Baryum (Ba) totaux	2021/05/10	NC		%	20

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RAPPORT ASSURANCE QUALITÉ(CONT'D)

Lot Lot	Init	Type CQ	Groupe	Date Analysé	Valeur	Réc	Unités	Limites CQ
			Béryllium (Be) totaux	2021/05/10	NC		%	20
			Cadmium (Cd) totaux	2021/05/10	NC		%	20
			Chrome (Cr) totaux	2021/05/10	NC		%	20
			Cuivre (Cu) totaux	2021/05/10	NC		%	20
			Fer (Fe) totaux	2021/05/10	NC		%	20
			Plomb (Pb) totaux	2021/05/10	NC		%	20
			Nickel (Ni) totaux	2021/05/10	NC		%	20
			Argent (Ag) totaux	2021/05/10	NC		%	20
			Thallium (Tl) totaux	2021/05/10	NC		%	20
			Vanadium (V) totaux	2021/05/10	NC		%	20
			Zinc (Zn) totaux	2021/05/10	NC		%	20
7347229	AFZ	Échantillon fortifié	Arsenic (As) totaux	2021/05/12		100	%	80 - 120
			Baryum (Ba) totaux	2021/05/12		94	%	80 - 120
			Béryllium (Be) totaux	2021/05/12		95	%	80 - 120
			Cadmium (Cd) totaux	2021/05/12		97	%	80 - 120
			Chrome (Cr) totaux	2021/05/12		97	%	80 - 120
			Cuivre (Cu) totaux	2021/05/12		99	%	80 - 120
			Fer (Fe) totaux	2021/05/12		95	%	80 - 120
			Plomb (Pb) totaux	2021/05/12		92	%	80 - 120
			Nickel (Ni) totaux	2021/05/12		93	%	80 - 120
			Argent (Ag) totaux	2021/05/12		96	%	80 - 120
			Thallium (Tl) totaux	2021/05/12		90	%	80 - 120
			Vanadium (V) totaux	2021/05/12		101	%	80 - 120
			Zinc (Zn) totaux	2021/05/12		95	%	80 - 120
7347229	AFZ	Blanc fortifié	Arsenic (As) totaux	2021/05/12		100	%	80 - 120
			Baryum (Ba) totaux	2021/05/12		97	%	80 - 120
			Béryllium (Be) totaux	2021/05/12		99	%	80 - 120
			Cadmium (Cd) totaux	2021/05/12		100	%	80 - 120
			Chrome (Cr) totaux	2021/05/12		96	%	80 - 120
			Cuivre (Cu) totaux	2021/05/12		99	%	80 - 120
			Fer (Fe) totaux	2021/05/12		96	%	80 - 120
			Plomb (Pb) totaux	2021/05/12		95	%	80 - 120
			Nickel (Ni) totaux	2021/05/12		97	%	80 - 120
			Argent (Ag) totaux	2021/05/12		98	%	80 - 120
			Thallium (Tl) totaux	2021/05/12		94	%	80 - 120
			Vanadium (V) totaux	2021/05/12		98	%	80 - 120
			Zinc (Zn) totaux	2021/05/12		103	%	80 - 120
7347229	AFZ	Blanc de méthode	Arsenic (As) totaux	2021/05/12	<1.0		ug/L	
			Baryum (Ba) totaux	2021/05/12	<2.0		ug/L	
			Béryllium (Be) totaux	2021/05/12	<0.40		ug/L	
			Cadmium (Cd) totaux	2021/05/12	<0.090		ug/L	
			Chrome (Cr) totaux	2021/05/12	<5.0		ug/L	
			Cuivre (Cu) totaux	2021/05/12	<0.90		ug/L	
			Fer (Fe) totaux	2021/05/12	<100		ug/L	
			Plomb (Pb) totaux	2021/05/12	<0.50		ug/L	
			Nickel (Ni) totaux	2021/05/12	<1.0		ug/L	
			Argent (Ag) totaux	2021/05/12	<0.090		ug/L	
			Thallium (Tl) totaux	2021/05/12	<0.050		ug/L	
			Vanadium (V) totaux	2021/05/12	<0.50		ug/L	
			Zinc (Zn) totaux	2021/05/12	<5.0		ug/L	
7347229	AFZ	RPD	Arsenic (As) totaux	2021/05/12	NC		%	20
			Baryum (Ba) totaux	2021/05/12	4.3		%	20

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Dossier BV Labs: C1B1520
Date du rapport: 2021/05/12

Bureau Veritas Laboratories
Votre # du projet: C117642
Initiales du préleveur: JFD

RAPPORT ASSURANCE QUALITÉ(CONT'D)

Lot Lot	Init	Type CQ	Groupe	Date Analysé	Valeur	Réc	Unités	Limites CQ
			Béryllium (Be) totaux	2021/05/12	NC		%	20
			Cadmium (Cd) totaux	2021/05/12	NC		%	20
			Chrome (Cr) totaux	2021/05/12	NC		%	20
			Cuivre (Cu) totaux	2021/05/12	2.5		%	20
			Fer (Fe) totaux	2021/05/12	2.8		%	20
			Plomb (Pb) totaux	2021/05/12	NC		%	20
			Nickel (Ni) totaux	2021/05/12	4.1		%	20
			Argent (Ag) totaux	2021/05/12	NC		%	20
			Thallium (Tl) totaux	2021/05/12	NC		%	20
			Vanadium (V) totaux	2021/05/12	NC		%	20
			Zinc (Zn) totaux	2021/05/12	NC		%	20

Duplicata: Deux parties aliquotes distinctes obtenues à partir d'un même échantillon et soumises en même temps au même processus analytique du prétraitement au dosage. Les duplicatas servent à vérifier la variance de la mesure.

Échantillon fortifié: Échantillon auquel a été ajouté une quantité connue d'un ou de plusieurs composés chimiques d'intérêt. Sert à évaluer les interférences dues à la matrice.

Blanc fortifié: Un blanc, d'une matrice exempte de contaminants, auquel a été ajouté une quantité connue d'analyte provenant généralement d'une deuxième source. Utilisé pour évaluer la précision de la méthode.

Blanc de méthode: Une partie aliquote de matrice pure soumise au même processus analytique que les échantillons, du prétraitement au dosage. Sert à évaluer toutes contaminations du laboratoire.

NC (RPD du duplicata) : La RPD du duplicata n'a pas été calculée. La concentration de l'échantillon ou du duplicata était trop faible pour permettre le calcul de la RPD (différence absolue <= 2x LDR)

Réc = Récupération

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PAGE DES SIGNATURES DE VALIDATION

Les résultats analytiques ainsi que les données de contrôle-qualité contenus dans ce rapport furent vérifiés et validés par les personnes suivantes:

Anastassia Hamanov

Brenda Moore

Lab BV a mis en place des procédures qui protègent contre l'utilisation non autorisée de la signature électronique et emploie les <<signataires>> requis, conformément à l'ISO/CEI 17025. Veuillez vous référer à la page des signatures de validation pour obtenir les détails des validations pour chaque division.

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Your P.O. #: 3000000997
Your Project #: DUSTFALL
Site Location: DS03 & DS04
Your C.O.C. #: N/A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/10/01
Report #: R2694392
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C140041
Received: 2021/08/05, 12:50

Sample Matrix: Water
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dustfall Parameters (1)	7	N/A	N/A		
Insoluble Dustfall (1)	7	N/A	N/A		
Soluble Dustfall (1)	7	N/A	N/A		
Dustfall (1)	7	N/A	N/A		
Mercury in water by CVAA (1)	7	N/A	N/A		
Total Metals by ICP (1)	7	N/A	N/A	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Insoluble Part.in dustfall (D1739mod) (1)	7	N/A	N/A		
Soluble Part.in dustfall (D1739mod) (1)	7	N/A	N/A		
Volume of sample received (1)	7	N/A	N/A		

Remarks:

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Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas - Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8

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Your P.O. #: 3000000997
Your Project #: DUSTFALL
Site Location: DS03 & DS04
Your C.O.C. #: N/A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/10/01
Report #: R2694392
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C140041
Received: 2021/08/05, 12:50

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Martine Lepage
Project Manager and Account Manager
01 Oct 2021 15:49:32

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
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Lab BV Job #: C140041
Report Date: 2021/10/01

TATA STEEL MINERALS CANADA
Client Project #: DUSTFALL
Site Location: DS03 & DS04
Your P.O. #: 3000000997
Sampler Initials: AC

GENERAL COMMENTS

Results relate only to the items tested.

2021/10/01 10:37

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Lab BV Job #: C140041
Report Date: 2021/10/01

TATA STEEL MINERALS CANADA
Client Project #: DUSTFALL
Site Location: DS03 & DS04
Your P.O. #: 3000000997
Sampler Initials: AC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

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Your P.O. #: 3000000997
Your Project #: DUSTFALL
Site Location: DS03-4
Your C.O.C. #: n/a

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/10/13
Report #: R2704036
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C150524
Received: 2021/09/22, 16:45

Sample Matrix: Impinger Solution
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Weight of particles	6	2021/09/29	2021/10/12	STL SOP-00020	MA100–Part. 1.0 R4 m
Extractable Metals in Impinger	6	2021/10/13	2021/10/13	STL SOP-00075	MA.200–Mét. 1.2 R5 m

Remarks:

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Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

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Your P.O. #: 3000000997
Your Project #: DUSTFALL
Site Location: DS03-4
Your C.O.C. #: n/a

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/10/13
Report #: R2704036
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C150524
Received: 2021/09/22, 16:45

Encryption Key

Josue Moran
Project Manager
20 Dec 2021 12:16:59

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
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Lab BV Job #: C150524
Report Date: 2021/10/13

TATA STEEL MINERALS CANADA
Client Project #: DUSTFALL
Site Location: DS03-4
Your P.O. #: 3000000997
Sampler Initials: JFD

METALS (IMPINGER SOLUTION)

Lab BV ID		JS2207	JS2208	JS2209	JS2210	JS2211	JS2212		
Sampling Date		2021/09/14 14:51	2021/09/14 16:25	2021/09/14 17:10	2021/09/14 17:36	2021/09/14 18:42	2021/09/15 08:42		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	Units	AQS1	AQS3	AQS4	AQS5	AQS6	AQS9	RDL	QC Batch
METALS									
Antimony (Sb) †	ug	<0.1	0.2	0.1	<0.1	0.1	0.2	0.1	2239545
Silver (Ag) †	ug	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	2239545
Arsenic (As) †	ug	<0.1	0.2	0.1	0.1	0.2	0.2	0.1	2239545
Barium (Ba) †	ug	9.22	20.7	33.0	15.0	11.4	27.8	0.05	2239545
Beryllium (Be) †	ug	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2239545
Cadmium (Cd) †	ug	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2239545
Chromium (Cr) †	ug	0.6	0.4	0.5	0.5	0.6	0.8	0.1	2239545
Copper (Cu) †	ug	3.6	4.0	2.9	4.9	14.9	5.0	0.1	2239545
Manganese (Mn) †	ug	31.9	14.2	16.9	12.7	21.6	11.9	0.1	2239545
Mercury (Hg) †	ug	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2239545
Nickel (Ni) †	ug	0.8	0.7	0.4	1.0	0.5	0.3	0.1	2239545
Lead (Pb) †	ug	2.0	0.8	0.9	0.8	<0.5	2.1	0.5	2239545
Thallium (Tl) †	ug	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	2239545
Vanadium (V) †	ug	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	2239545
Zinc (Zn) †	ug	5.3	4.9	11.9	5.3	7.3	6.2	0.1	2239545

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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Lab BV Job #: C150524
Report Date: 2021/10/13

TATA STEEL MINERALS CANADA
Client Project #: DUSTFALL
Site Location: DS03-4
Your P.O. #: 3000000997
Sampler Initials: JFD

CONVENTIONAL PARAMETERS (IMPINGER SOLUTION)

Lab BV ID		JS2207	JS2208	JS2209	JS2210	JS2211	JS2212		
Sampling Date		2021/09/14 14:51	2021/09/14 16:25	2021/09/14 17:10	2021/09/14 17:36	2021/09/14 18:42	2021/09/15 08:42		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	Units	**AQS1**	**AQS3**	**AQS4**	**AQS5**	**AQS6**	**AQS9**	**RDL**	**QC Batch**
CONVENTIONALS									
Weight of particles	g	0.043	0.022	0.021	0.021	0.016	0.021	0.0010	2235121

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Results relate only to the items tested.

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Lab BV Job #: C150524
Report Date: 2021/10/13

TATA STEEL MINERALS CANADA
Client Project #: DUSTFALL
Site Location: DS03-4
Your P.O. #: 3000000997
Sampler Initials: JFD

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2235121	PS5	Spiked Blank	Weight of particles	2021/10/12		102	%
2235121	PS5	Spiked Blank DUP	Weight of particles	2021/10/12		102	%
2235121	PS5	Method Blank	Weight of particles	2021/10/12	<0.0010		g
2239545	AT7	Spiked Blank	Antimony (Sb)	2021/10/13		87	%
			Silver (Ag)	2021/10/13		86	%
			Arsenic (As)	2021/10/13		89	%
			Barium (Ba)	2021/10/13		86	%
			Beryllium (Be)	2021/10/13		98	%
			Cadmium (Cd)	2021/10/13		87	%
			Chromium (Cr)	2021/10/13		86	%
			Copper (Cu)	2021/10/13		83	%
			Manganese (Mn)	2021/10/13		83	%
			Mercury (Hg)	2021/10/13		87	%
			Nickel (Ni)	2021/10/13		86	%
			Lead (Pb)	2021/10/13		82	%
			Thallium (Tl)	2021/10/13		83	%
			Vanadium (V)	2021/10/13		86	%
			Zinc (Zn)	2021/10/13		88	%
2239545	AT7	Method Blank	Antimony (Sb)	2021/10/13	<0.1		ug
			Silver (Ag)	2021/10/13	<0.5		ug
			Arsenic (As)	2021/10/13	<0.1		ug
			Barium (Ba)	2021/10/13	<0.05		ug
			Beryllium (Be)	2021/10/13	<0.05		ug
			Cadmium (Cd)	2021/10/13	<0.05		ug
			Chromium (Cr)	2021/10/13	<0.1		ug
			Copper (Cu)	2021/10/13	0.3, RDL=0.1		ug
			Manganese (Mn)	2021/10/13	<0.1		ug
			Mercury (Hg)	2021/10/13	<0.05		ug
			Nickel (Ni)	2021/10/13	<0.1		ug
			Lead (Pb)	2021/10/13	<0.5		ug
			Thallium (Tl)	2021/10/13	<0.1		ug
			Vanadium (V)	2021/10/13	<0.2		ug
			Zinc (Zn)	2021/10/13	0.4, 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.

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Lab BV Job #: C150524
Report Date: 2021/10/13

TATA STEEL MINERALS CANADA
Client Project #: DUSTFALL
Site Location: DS03-4
Your P.O. #: 3000000997
Sampler Initials: JFD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

CHIMISTE
Shu Yang
2008-014
QUÉBEC

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Your P.O. #: 3000000997
Your Project #: DUSTFALL
Site#: DS03 + DS04
Your C.O.C. #: N/A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/01/26
Report #: R2730692
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C200221
Received: 2021/12/16, 08:45

Sample Matrix: Impinger Solution
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Weight of particles	5	2022/01/19	2022/01/24	STL SOP-00020	MA100–Part. 1.0 R4 m
Extractable Metals in Impinger	5	2022/01/25	2022/01/25	STL SOP-00075	MA.200–Mét. 1.2 R5 m

Remarks:

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Your P.O. #: 3000000997
Your Project #: DUSTFALL
Site#: DS03 + DS04
Your C.O.C. #: N/A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/01/26
Report #: R2730692
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C200221
Received: 2021/12/16, 08:45

Encryption Key

Martine Lepage
Project Manager and Account Manager
27 Jan 2022 15:05:28

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
==========
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Lab BV Job #: C200221
Report Date: 2022/01/26

TATA STEEL MINERALS CANADA
Client Project #: DUSTFALL
Your P.O. #: 3000000997
Sampler Initials: JMC

METALS (IMPINGER SOLUTION)

Lab BV ID		KB0926	KB0927	KB0928	KB0929	KB0930		
Sampling Date		2021/11/21 10:52	2021/11/21 12:57	2021/11/24 09:42	2021/11/15 16:18	2021/11/20 11:43		
	Units	**AQS2**	**AQS3**	**AQS4**	**AQS6**	**AQS9**	**RDL**	**QC Batch**
METALS								
Antimony (Sb) †	ug	0.1	0.1	0.1	<0.1	0.1	0.1	2266550
Silver (Ag) †	ug	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	2266550
Arsenic (As) †	ug	0.3	0.7	0.3	<0.1	0.3	0.1	2266550
Barium (Ba) †	ug	13.1	12.0	19.8	10.4	16.1	0.05	2266550
Beryllium (Be) †	ug	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2266550
Cadmium (Cd) †	ug	0.07	<0.05	0.08	<0.05	<0.05	0.05	2266550
Chromium (Cr) †	ug	0.7	1.6	1.5	1.0	1.4	0.1	2266550
Copper (Cu) †	ug	3.4	3.5	3.8	9.3	3.2	0.1	2266550
Manganese (Mn) †	ug	60.9	113	30.8	11.5	30.8	0.1	2266550
Mercury (Hg) †	ug	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2266550
Nickel (Ni) †	ug	3.1	1.1	1.4	1.3	1.1	0.1	2266550
Lead (Pb) †	ug	1.9	3.9	4.0	1.0	5.1	0.5	2266550
Thallium (Tl) †	ug	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	2266550
Vanadium (V) †	ug	0.2	0.6	0.3	<0.2	0.4	0.2	2266550
Zinc (Zn) †	ug	10.2	10.8	20.7	17.2	18.8	0.1	2266550

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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Lab BV Job #: C200221
Report Date: 2022/01/26

TATA STEEL MINERALS CANADA
Client Project #: DUSTFALL
Your P.O. #: 3000000997
Sampler Initials: JMC

CONVENTIONAL PARAMETERS (IMPINGER SOLUTION)

Lab BV ID		KB0926	KB0927	KB0928	KB0929	KB0930		
Sampling Date		2021/11/21 10:52	2021/11/21 12:57	2021/11/24 09:42	2021/11/15 16:18	2021/11/20 11:43		
	Units	**AQS2**	**AQS3**	**AQS4**	**AQS6**	**AQS9**	**RDL**	**QC Batch**
CONVENTIONALS								
Weight of particles in liquid †	g	0.032	0.034	0.046	0.0031	0.036	0.0010	2265212

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

2022/01/26 17:32

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GENERAL COMMENTS

Extractable Metals in Impinger: Holding time for mercury already passed upon reception.: KB0926, KB0927, KB0928, KB0929, KB0930

Results relate only to the items tested.

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Lab BV Job #: C200221
Report Date: 2022/01/26

TATA STEEL MINERALS CANADA
Client Project #: DUSTFALL
Your P.O. #: 3000000997
Sampler Initials: JMC

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2265212	SAT	Spiked Blank	Weight of particles in liquid	2022/01/24		101	%
2265212	SAT	Method Blank	Weight of particles in liquid	2022/01/24	<0.0010		g
2266550	EBO	Spiked Blank	Antimony (Sb)	2022/01/25		101	%
			Silver (Ag)	2022/01/25		54 (1)	%
			Arsenic (As)	2022/01/25		95	%
			Barium (Ba)	2022/01/25		93	%
			Beryllium (Be)	2022/01/25		97	%
			Cadmium (Cd)	2022/01/25		92	%
			Chromium (Cr)	2022/01/25		93	%
			Copper (Cu)	2022/01/25		93	%
			Manganese (Mn)	2022/01/25		93	%
			Mercury (Hg)	2022/01/25		95	%
			Nickel (Ni)	2022/01/25		94	%
			Lead (Pb)	2022/01/25		98	%
			Thallium (Tl)	2022/01/25		100	%
			Vanadium (V)	2022/01/25		93	%
			Zinc (Zn)	2022/01/25		96	%
2266550	EBO	Method Blank	Antimony (Sb)	2022/01/25	<0.1		ug
			Silver (Ag)	2022/01/25	<0.5		ug
			Arsenic (As)	2022/01/25	<0.1		ug
			Barium (Ba)	2022/01/25	<0.05		ug
			Beryllium (Be)	2022/01/25	<0.05		ug
			Cadmium (Cd)	2022/01/25	<0.05		ug
			Chromium (Cr)	2022/01/25	0.2, RDL=0.1		ug
			Copper (Cu)	2022/01/25	0.5, RDL=0.1		ug
			Manganese (Mn)	2022/01/25	<0.1		ug
			Mercury (Hg)	2022/01/25	<0.05		ug
			Nickel (Ni)	2022/01/25	<0.1		ug
			Lead (Pb)	2022/01/25	1.6, RDL=0.5		ug
			Thallium (Tl)	2022/01/25	<0.1		ug
			Vanadium (V)	2022/01/25	<0.2		ug
			Zinc (Zn)	2022/01/25	0.8, 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.

(1) Recovery or relative percent difference (RPD) for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria

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Lab BV Job #: C200221
Report Date: 2022/01/26

TATA STEEL MINERALS CANADA
Client Project #: DUSTFALL
Your P.O. #: 3000000997
Sampler Initials: JMC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

CHIMISTE
Shu Yang
2008-014
QUÉBEC

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Sample ID	Start date – time (mm-dd)	End date – time (mm-dd)	# of days sampled	Area sampled (m²)	Insoluble dust (mg)	Soluble dust (mg)	Total dust (mg)	Insoluble dust deposition (g/m²/30d)	Soluble dust deposition (g/m²/30d)	Total Dust deposition rate (g/m²/30d)	Comments
AQS1	6-28 - 12:45 PM	8-1 - 9:22 AM	34	0.017672	5.8	15.2	21	0.29080	0.76209	1.05288	
AQS2	6-28 - 12:15 PM	8-1 - 9:54 AM	34	0.017672	17.4	7.2	24.6	0.87128	0.36053	1.23181	
AQS3	6-28 - 1:35 PM	8-1 - 1:11 PM	34	0.017672	17.2	9.6	26.8	0.85921	0.47956	1.33877	
AQS4	6-28- 2:25 PM	8-1 - 4:00 PM	34	0.017672	2.2	9.2	11.4	0.10963	0.45846	0.56809	
AQS5	6-28 - 3:15 PM	8-1 - 3:39 PM	34	0.017672	0	6.4	6.4	0.00000	0.31939	0.31939	
AQS6	6-30 - 5:40 PM	8-1 - 5:15 PM	32	0.017672	3	4	7	0.15924	0.21232	0.37155	
AQS9	6-28 - 9:45 AM	8-2 - 8:24 AM	35	0.017672	4.2	8.4	12.6	0.20404	0.40808	0.61212	
AQS1	8-1 - 9:22 AM	9-14 - 2:51 PM	44	0.017672			43.0	0.00000	0.00000	1.65045	
AQS2	8-1 - 9:54 AM			0.017672							Bear damaged
AQS3	8-1 - 1:11 PM	9-14 - 4:25 PM	44	0.017672			22.0	0.00000	0.00000	0.84621	
AQS4	8-1 - 4:00 PM	9-14 - 5:10 PM	44	0.017672			21.0	0.00000	0.00000	0.80932	
AQS5	8-1 - 3:39 PM	9-14 - 5:36 PM	44	0.017672			21.0	0.00000	0.00000	0.80873	
AQS6	8-1 - 5:15 PM	9-14 - 6:42 PM	44	0.017672			12.0	0.00000	0.00000	0.46235	
AQS9	8-2 - 8:24 AM	9-15 - 8:42 AM	44	0.017672			21.0	0.00000	0.00000	0.80999	
AQS1-	9-14 - 2:51 PM										Inaccessible
AQS2	9-15 - 3:52 PM	10-10 - 12:00 PM	25	0.017672			32.0	0.00000	0.00000	2.18702	
AQS3	9-14 - 4:25 PM	10-10 - 12:00 PM	25	0.017672			34.0	0.00000	0.00000	2.23576	
AQS4	9-14 - 5:10 PM	10-10 - 12:00 PM	25	0.017672			46.0	0.00000	0.00000	3.02852	
AQS5	9-14 - 5:36 PM	10-10 - 12:00 PM	26	0.017672			0.0	0.00000	0.00000	0.00000	
AQS6	9-14 - 6:42 PM	10-10 - 12:00 PM	26	0.017672			3.1	0.00000	0.00000	0.20460	
AQS9	9-15 - 8:42 AM	10-10 - 12:00 PM	25	0.017672			36.0	0.00000	0.00000	2.43117	

Notes: AQ : Air Quality, # : number

Appendix XI. Certificates of analysis – PM2.5 and total particulate matter

Your P.O. #: 3000000997
Site#: DSO3-4
Site Location: TPM - AIR MONITORING
Your C.O.C. #: N/A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/07/22
Report #: R2675586
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C136209
Received: 2021/07/15, 09:00

Sample Matrix: Filter
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Particulate	5	2021/07/22	2021/07/22	STL SOP-00045	MA100– Part 1.0 R4 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas 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 Bureau Veritas, 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.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

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Your P.O. #: 3000000997
Site#: DSO3-4
Site Location: TPM - AIR MONITORING
Your C.O.C. #: N/A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/07/22
Report #: R2675586
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C136209
Received: 2021/07/15, 09:00

Encryption Key

Martine Lepage
Project Manager and Account Manager
23 Jul 2021 08:42:08

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
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Lab BV Job #: C136209
Report Date: 2021/07/22

TATA STEEL MINERALS CANADA
Site Location: TPM - AIR MONITORING
Your P.O. #: 3000000997
Sampler Initials: JM

CONVENTIONAL PARAMETERS (FILTER)

Lab BV ID		JK3625	JK3626	JK3627		
Sampling Date		2021/06/28 12:15	2021/06/29 16:35	2021/06/30 17:50		
	Units	AQS2-TPM (JB3321-01)	AQS4-TPM (JB3312-01)	AQS6-TPM (JB3306-01)	RDL	QC Batch
CONVENTIONALS						
Weight of filter	g	0.0177	0.0163	0.0209	0.0002	2210906
Weight of filter and sample	g	0.0175	0.0165	0.0210	0.0002	2210906
Total particles	g	<0.0002	0.0002	<0.0002	0.0002	2210906

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Lab BV ID		JK3628	JK3629		
Sampling Date		2021/07/10 16:15	2021/07/11 18:00		
	Units	AQS2-TPM (JB3300-01)	AQS4-TPM (JB3316-01)	RDL	QC Batch
CONVENTIONALS					
Weight of filter	g	0.0191	0.0166	0.0002	2210906
Weight of filter and sample	g	0.0196	0.0166	0.0002	2210906
Total particles	g	0.0005	<0.0002	0.0002	2210906

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

TATA STEEL MINERALS CANADA
Site Location: TPM - AIR MONITORING
Your P.O. #: 3000000997
Sampler Initials: JM

GENERAL COMMENTS

CONVENTIONAL PARAMETERS (FILTER)

sample jk3625-01 and jk3626-01 are damage it may change the result.

Results relate only to the items tested.

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Lab BV Job #: C136209
Report Date: 2021/07/22

TATA STEEL MINERALS CANADA
Site Location: TPM - AIR MONITORING
Your P.O. #: 3000000997
Sampler Initials: JM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

CHIMISTE
Shu Yang
2008-014
QUÉBEC

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Your P.O. #: 3000000997
Your Project #: TPM MONITORING
Site#: DS03-4
Your C.O.C. #: C#808542-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/09/01
Report #: R2686802
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C145330
Received: 2021/08/30, 12:00

Sample Matrix: Filter
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Particulate	3	2021/09/01	2021/09/01	STL SOP-00045	MA100– Part 1.0 R4 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas 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 Bureau Veritas, 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.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

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Your P.O. #: 3000000997
Your Project #: TPM MONITORING
Site#: DS03-4
Your C.O.C. #: C#808542-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/09/01
Report #: R2686802
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C145330
Received: 2021/08/30, 12:00

Encryption Key

Martine Lepage
Project Manager and Account Manager
02 Sep 2021 14:37:14

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
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Lab BV Job #: C145330
Report Date: 2021/09/01

TATA STEEL MINERALS CANADA
Client Project #: TPM MONITORING
Your P.O. #: 3000000997
Sampler Initials: JFO

CONVENTIONAL PARAMETERS (FILTER)

Lab BV ID		JP3013	JP3014	JP3015		
Sampling Date		2021/08/02 17:00	2021/08/09 08:35	2021/08/07 17:25		
COC Number		C#808542-01-01	C#808542-01-01	C#808542-01-01		
	Units	**AQS6-TPM (JB3296-01)**	**AQS4-TPM (JL1823-01)**	**AQS2-TPM (JB3299-01)**	**RDL**	**QC Batch**
CONVENTIONALS						
Weight of filter	g	0.0190	0.0157	0.0193	0.0002	2225657
Weight of filter and sample	g	0.0192	0.0152	0.0198	0.0002	2225657
Total particles	g	0.0002	<0.0002	0.0005	0.0002	2225657

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

GENERAL COMMENTS

CONVENTIONAL PARAMETERS (FILTER)

Total Particules: Damaged filter, possible results underestimation for JP3015.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Lab BV Job #: C145330
Report Date: 2021/09/01

TATA STEEL MINERALS CANADA
Client Project #: TPM MONITORING
Your P.O. #: 3000000997
Sampler Initials: JFO

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

CHIMISTE
Shu Yang
2008-014
QUÉBEC

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Appendix XII. Certificates of analysis – acid rock drainage

Your P.O. #: 3000000730
Your Project #: GOOWOOD
Site Location: ARD
Your C.O.C. #: 789989-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/04/19
Report #: R2649285
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C103861
Received: 2021/01/29, 09:30

Sample Matrix: Soil
Samples Received: 15

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acid Base Accounting (Sobek modified) (1)	5	N/A	N/A		
Grinding	5	N/A	N/A	STL SOP-00019	N/A
Fluoride (free)	5	2021/02/02	2021/02/03	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	5	N/A	2021/02/12	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	10	N/A	2021/02/08	STL SOP-00038	SM 23 4500-F m
Water Leachate (CTEU - 9)	5	2021/02/05	2021/02/12	STL SOP-00024	MA100-Lixcom1.1 R1 m
Acid rain simulation leachate (EPA 1312)	5	2021/02/04	2021/02/05	STL SOP-00024	MA100-Lixcom1.1 R1 m
Total Extractable Metals (low level)	5	2021/02/02	2021/02/03	STL SOP-00069	MA.200–Mét. 1.2 R5 m
Metals - Leached	5	2021/02/12	2021/02/14	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Metals - Leached	5	2021/02/04	2021/02/05	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Metals - Leached	2	2021/02/05	2021/02/08	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Metals - Leached	3	2021/02/05	2021/02/09	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Nitrate and/or Nitrite- Leached	5	N/A	2021/02/14	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	10	N/A	2021/02/05	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	5	2021/02/02	2021/02/03	STL SOP-00014	MA.300–Ions 1.3 R3 m
Toxicity Charact. Leach. Proc.(EPA 1311)	5	2021/02/03	2021/02/04	STL SOP-00024	MA100-Lixcom1.1 R1 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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Your P.O. #: 3000000730
Your Project #: GOOWOOD
Site Location: ARD
Your C.O.C. #: 789989-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/04/19
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CERTIFICATE OF ANALYSIS

LAB BV JOB #: C103861
Received: 2021/01/29, 09:30

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 Bureau Veritas, 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 Laboratoires Bureau Veritas - Burnaby

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Martine Lepage
Project Manager and Account Manager
26 Apr 2021 10:05:35

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
==========
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Lab BV Job #: C103861
Report Date: 2021/04/19

TATA STEEL MINERALS CANADA
Client Project #: GOOWOOD
Site Location: ARD
Your P.O. #: 3000000730
Sampler Initials: CS

TOTAL EXTRACTABLE METALS (SOIL)

Lab BV ID					IU3150		IU3219		IU3220		IU3221		
Sampling Date					2021/01/03		2021/01/03		2021/01/26		2021/01/26		
COC Number					789989-01-01		789989-01-01		789989-01-01		789989-01-01		
	Units	**A**	**B**	**C**	**TCMC-37467**	**RDL**	**TCMC-37468**	**RDL**	**TCMC-81073**	**RDL**	**TCMC-81074**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	16	N/A	13	N/A	0.2	N/A	3.3	N/A	N/A
METALS													
Silver (Ag)	mg/kg	**2**	20	40	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	2162013
Arsenic (As)	mg/kg	**6**	30	50	3.0	2.0	2.1	2.0	**6.8**	2.0	4.4	2.0	2162013
Barium (Ba)	mg/kg	**340**	500	2000	<4.0	4.0	<4.0	4.0	5.0	4.0	<4.0	4.0	2162013
Boron (B)	mg/kg	**-**	-	-	4.3	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	2162013
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	2162013
Chromium (Cr)	mg/kg	**100**	250	800	1.5	1.0	1.5	1.0	1.4	1.0	1.9	1.0	2162013
Copper (Cu)	mg/kg	**50**	100	500	3.1	1.0	1.9	1.0	2.2	1.0	2.9	1.0	2162013
Cobalt (Co)	mg/kg	**25**	50	300	3.1	1.0	2.6	1.0	4.1	1.0	4.9	1.0	2162013
Tin (Sn)	mg/kg	**5**	50	300	4.2	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	2162013
Iron (Fe) †	mg/kg	**-**	-	-	130000	100	66000	10	110000	100	81000	10	2162013
Manganese (Mn)	mg/kg	**1000**	1000	2200	380	2.0	320	2.0	590	2.0	400	2.0	2162013
Molybdenum (Mo)	mg/kg	**2**	10	40	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	2162013
Nickel (Ni)	mg/kg	**50**	100	500	1.0	0.50	0.83	0.50	0.77	0.50	0.81	0.50	2162013
Lead (Pb)	mg/kg	**50**	500	1000	1.6	1.0	1.5	1.0	1.3	1.0	1.7	1.0	2162013
Selenium (Se)	mg/kg	**1**	3	10	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	2162013
Uranium (U) †	mg/kg	**-**	-	-	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	2162013
Zinc (Zn)	mg/kg	**140**	500	1500	6.2	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	2162013

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C103861
Report Date: 2021/04/19

TATA STEEL MINERALS CANADA
Client Project #: GOOWOOD
Site Location: ARD
Your P.O. #: 3000000730
Sampler Initials: CS

TOTAL EXTRACTABLE METALS (SOIL)

Lab BV ID					IU3222		
Sampling Date					2021/01/26		
COC Number					789989-01-01		
	Units	**A**	**B**	**C**	**TCMC-81075**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	4.8	N/A	N/A
METALS							
Silver (Ag)	mg/kg	**2**	20	40	<0.50	0.50	2162013
Arsenic (As)	mg/kg	**6**	30	50	**17**	2.0	2162013
Barium (Ba)	mg/kg	**340**	500	2000	<4.0	4.0	2162013
Boron (B)	mg/kg	**-**	-	-	3.0	2.0	2162013
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	0.10	2162013
Chromium (Cr)	mg/kg	**100**	250	800	2.1	1.0	2162013
Copper (Cu)	mg/kg	**50**	100	500	1.6	1.0	2162013
Cobalt (Co)	mg/kg	**25**	50	300	1.1	1.0	2162013
Tin (Sn)	mg/kg	**5**	50	300	<1.0	1.0	2162013
Iron (Fe) †	mg/kg	**-**	-	-	140000	100	2162013
Manganese (Mn)	mg/kg	**1000**	1000	2200	210	2.0	2162013
Molybdenum (Mo)	mg/kg	**2**	10	40	<0.50	0.50	2162013
Nickel (Ni)	mg/kg	**50**	100	500	1.4	0.50	2162013
Lead (Pb)	mg/kg	**50**	500	1000	4.4	1.0	2162013
Selenium (Se)	mg/kg	**1**	3	10	<0.50	0.50	2162013
Uranium (U) †	mg/kg	**-**	-	-	<2.0	2.0	2162013
Zinc (Zn)	mg/kg	**140**	500	1500	9.1	5.0	2162013

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C103861
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TATA STEEL MINERALS CANADA
Client Project #: GOOWOOD
Site Location: ARD
Your P.O. #: 3000000730
Sampler Initials: CS

METALS-LAB LEACHATE (SOIL)

Lab BV ID		IU3150	IU3219	IU3220	IU3221	IU3222		
Sampling Date		2021/01/03	2021/01/03	2021/01/26	2021/01/26	2021/01/26		
COC Number		789989-01-01	789989-01-01	789989-01-01	789989-01-01	789989-01-01		
	Units	**TCMC-37467**	**TCMC-37468**	**TCMC-81073**	**TCMC-81074**	**TCMC-81075**	**RDL**	**QC Batch**
% MOISTURE	%	16	13	0.2	3.3	4.8	N/A	N/A
METALS								
Silver (Ag) †	ug/L	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	2162696
Arsenic (As)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2162696
Barium (Ba)	ug/L	5.6	7.3	8.1	10	8.6	5.0	2162696
Boron (B)	ug/L	<50	<50	<50	<50	<50	50	2162696
Cadmium (Cd)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2162696
Chromium (Cr)	ug/L	<7.0	<7.0	<7.0	<7.0	<7.0	7.0	2162696
Cobalt (Co)	ug/L	<10	<10	<10	<10	<10	10	2162696
Copper (Cu)	ug/L	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	2162696
Tin (Sn) †	ug/L	<50	<50	<50	<50	<50	50	2162696
Iron (Fe)	ug/L	110	<100	<100	<100	<100	100	2162696
Manganese (Mn)	ug/L	68	86	310	260	67	3.0	2162696
Molybdenum (Mo)	ug/L	<10	<10	<10	<10	<10	10	2162696
Nickel (Ni)	ug/L	<6.0	<6.0	<6.0	<6.0	<6.0	6.0	2162696
Lead (Pb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2162696
Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2162696
Uranium (U)	ug/L	<0.60	<0.60	<0.60	<0.60	<0.60	0.60	2162696
Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	2162696

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C103861
Report Date: 2021/04/19

TATA STEEL MINERALS CANADA
Client Project #: GOOWOOD
Site Location: ARD
Your P.O. #: 3000000730
Sampler Initials: CS

METALS-LAB LEACHATE (SOIL)

Lab BV ID		IU3223	IU3363	IU3364	IU3365		
Sampling Date		2021/01/03	2021/01/03	2021/01/03	2021/01/03		
COC Number		789989-01-01	789989-01-01	789989-01-01	789989-01-01		
	Units	TCMC-37467-CTEU-9	TCMC-37468-CTEU-9	TCMC-81073-CTEU-9	TCMC-81074-CTEU-9	RDL	QC Batch
METALS							
Silver (Ag) †	ug/L	<0.30	<0.30	<0.30	<0.30	0.30	2164537
Arsenic (As)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2164537
Barium (Ba)	ug/L	<5.0	<5.0	<5.0	8.1	5.0	2164537
Boron (B)	ug/L	<50	57	<50	<50	50	2164537
Cadmium (Cd)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2164537
Chromium (Cr)	ug/L	<7.0	<7.0	<7.0	<7.0	7.0	2164537
Cobalt (Co)	ug/L	<10	<10	<10	<10	10	2164537
Copper (Cu)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	2164537
Tin (Sn) †	ug/L	<50	<50	<50	<50	50	2164537
Iron (Fe)	ug/L	<100	<100	<100	<100	100	2164537
Manganese (Mn)	ug/L	13	100	71	42	3.0	2164537
Molybdenum (Mo)	ug/L	<10	<10	<10	<10	10	2164537
Nickel (Ni)	ug/L	<6.0	<6.0	<6.0	<6.0	6.0	2164537
Lead (Pb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2164537
Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2164537
Uranium (U)	ug/L	<0.60	<0.60	<0.60	<0.60	0.60	2164537
Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	2164537

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

2021/04/19 12:07

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Lab BV Job #: C103861
Report Date: 2021/04/19

TATA STEEL MINERALS CANADA
Client Project #: GOOWOOD
Site Location: ARD
Your P.O. #: 3000000730
Sampler Initials: CS

METALS-LAB LEACHATE (SOIL)

Lab BV ID		IU3366		IU3378	IU3388		
Sampling Date		2021/01/03		2021/01/03	2021/01/03		
COC Number		789989-01-01		789989-01-01	789989-01-01		
	Units	TCMC-81075-CTEU-9	QC Batch	TCMC-37467- (SPLP1312)	TCMC-37468- (SPLP1312)	RDL	QC Batch
METALS							
Silver (Ag) †	ug/L	<0.30	2164537	<0.30	<0.30	0.30	2162995
Arsenic (As)	ug/L	<2.0	2164537	<2.0	<2.0	2.0	2162995
Barium (Ba)	ug/L	<5.0	2164537	<5.0	<5.0	5.0	2162995
Boron (B)	ug/L	<50	2164537	<50	<50	50	2162995
Cadmium (Cd)	ug/L	<1.0	2164537	<1.0	<1.0	1.0	2162995
Chromium (Cr)	ug/L	<7.0	2164537	<7.0	<7.0	7.0	2162995
Cobalt (Co)	ug/L	<10	2164537	<10	<10	10	2162995
Copper (Cu)	ug/L	<3.0	2164537	<3.0	<3.0	3.0	2162995
Tin (Sn) †	ug/L	<50	2164537	<50	<50	50	2162995
Iron (Fe)	ug/L	<100	2164537	<100	<100	100	2162995
Manganese (Mn)	ug/L	<3.0	2164537	12	17	3.0	2162995
Molybdenum (Mo)	ug/L	<10	2164537	<10	<10	10	2162995
Nickel (Ni)	ug/L	<6.0	2164537	<6.0	<6.0	6.0	2162995
Lead (Pb)	ug/L	<1.0	2164537	<1.0	<1.0	1.0	2162995
Selenium (Se)	ug/L	<1.0	2164537	<1.0	<1.0	1.0	2162995
Uranium (U)	ug/L	<0.60	2164537	<0.60	<0.60	0.60	2162995
Zinc (Zn)	ug/L	<5.0	2164537	<5.0	<5.0	5.0	2162995

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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TATA STEEL MINERALS CANADA
Client Project #: GOOWOOD
Site Location: ARD
Your P.O. #: 3000000730
Sampler Initials: CS

METALS-LAB LEACHATE (SOIL)

Lab BV ID		IU3389	IU3390	IU3391		
Sampling Date		2021/01/03	2021/01/03	2021/01/03		
COC Number		789989-01-01	789989-01-01	789989-01-01		
	Units	**TCMC-81073- (SPLP1312)**	**TCMC-81074- (SPLP1312)**	**TCMC-81075- (SPLP1312)**	**RDL**	**QC Batch**
METALS						
Silver (Ag) †	ug/L	<0.30	<0.30	<0.30	0.30	2162995
Arsenic (As)	ug/L	<2.0	<2.0	<2.0	2.0	2162995
Barium (Ba)	ug/L	<5.0	<5.0	<5.0	5.0	2162995
Boron (B)	ug/L	<50	<50	<50	50	2162995
Cadmium (Cd)	ug/L	<1.0	<1.0	<1.0	1.0	2162995
Chromium (Cr)	ug/L	<7.0	<7.0	<7.0	7.0	2162995
Cobalt (Co)	ug/L	<10	<10	<10	10	2162995
Copper (Cu)	ug/L	<3.0	<3.0	<3.0	3.0	2162995
Tin (Sn) †	ug/L	<50	<50	<50	50	2162995
Iron (Fe)	ug/L	<100	<100	<100	100	2162995
Manganese (Mn)	ug/L	57	73	10	3.0	2162995
Molybdenum (Mo)	ug/L	<10	<10	<10	10	2162995
Nickel (Ni)	ug/L	<6.0	<6.0	<6.0	6.0	2162995
Lead (Pb)	ug/L	<1.0	<1.0	<1.0	1.0	2162995
Selenium (Se)	ug/L	<1.0	<1.0	<1.0	1.0	2162995
Uranium (U)	ug/L	<0.60	<0.60	<0.60	0.60	2162995
Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	5.0	2162995

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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Lab BV Job #: C103861
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TATA STEEL MINERALS CANADA
Client Project #: GOOWOOD
Site Location: ARD
Your P.O. #: 3000000730
Sampler Initials: CS

CONVENTIONAL PARAMETERS (SOIL)

Lab BV ID					IU3150	IU3219	IU3220	IU3221	IU3222		
Sampling Date					2021/01/03	2021/01/03	2021/01/26	2021/01/26	2021/01/26		
COC Number					789989-01-01	789989-01-01	789989-01-01	789989-01-01	789989-01-01		
	Units	**A**	**B**	**C**	**TCMC-37467**	**TCMC-37468**	**TCMC-81073**	**TCMC-81074**	**TCMC-81075**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	16	13	0.2	3.3	4.8	N/A	N/A
CONVENTIONALS											
Fluoride (F)	mg/kg	**200**	400	2000	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2162023
Nitrates (N-NO3-) †	mg/kg	-	-	-	1.0	1.6	<1.0	2.1	<1.0	1.0	2162025
Nitrites (N-NO2-) †	mg/kg	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	2162025
Nitrate (N) and Nitrite(N)	mg/kg	-	-	-	1.0	1.6	<1.0	2.1	<1.0	1.0	2162025

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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TATA STEEL MINERALS CANADA
Client Project #: GOOWOOD
Site Location: ARD
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Sampler Initials: CS

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Lab BV ID		IU3150	IU3219	IU3220	IU3221	IU3222		
Sampling Date		2021/01/03	2021/01/03	2021/01/26	2021/01/26	2021/01/26		
COC Number		789989-01-01	789989-01-01	789989-01-01	789989-01-01	789989-01-01		
	Units	**TCMC-37467**	**TCMC-37468**	**TCMC-81073**	**TCMC-81074**	**TCMC-81075**	**RDL**	**QC Batch**
% MOISTURE	%	16	13	0.2	3.3	4.8	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2162851
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	2162847
Nitrates (N-NO3-)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	2162847
Nitrate (N) and Nitrite(N)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	2162847

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Lab BV ID		IU3223	IU3363	IU3364	IU3365		
Sampling Date		2021/01/03	2021/01/03	2021/01/03	2021/01/03		
COC Number		789989-01-01	789989-01-01	789989-01-01	789989-01-01		
	Units	**TCMC-37467-CTEU-9**	**TCMC-37468-CTEU-9**	**TCMC-81073-CTEU-9**	**TCMC-81074-CTEU-9**	**RDL**	**QC Batch**
CONVENTIONALS							
Fluoride (F)	mg/L	<1.0	<1.0	<1.0	<1.0	1.0	2164627
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	2164731
Nitrates (N-NO3-)	mg/L	0.47	<0.20	<0.20	0.45	0.20	2164731
Nitrate (N) and Nitrite(N)	mg/L	0.47	<0.20	<0.20	0.45	0.20	2164731

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Lab BV ID		IU3366		IU3378	IU3388		
Sampling Date		2021/01/03		2021/01/03	2021/01/03		
COC Number		789989-01-01		789989-01-01	789989-01-01		
	Units	**TCMC-81075-CTEU-9**	**QC Batch**	**TCMC-37467- (SPLP1312)**	**TCMC-37468- (SPLP1312)**	**RDL**	**QC Batch**
CONVENTIONALS							
Fluoride (F)	mg/L	<1.0	2164627	<1.0	<1.0	1.0	2162957
Nitrites (N-NO2-)	mg/L	<0.20	2164731	<0.20	<0.20	0.20	2162953
Nitrates (N-NO3-)	mg/L	<0.20	2164731	N/A	N/A	0.20	N/A
Nitrate (N) and Nitrite(N)	mg/L	<0.20	2164731	N/A	N/A	0.20	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Lab BV ID		IU3389	IU3390	IU3391		
Sampling Date		2021/01/03	2021/01/03	2021/01/03		
COC Number		789989-01-01	789989-01-01	789989-01-01		
	Units	**TCMC-81073- (SPLP1312)**	**TCMC-81074- (SPLP1312)**	**TCMC-81075- (SPLP1312)**	**RDL**	**QC Batch**
CONVENTIONALS						
Fluoride (F)	mg/L	<1.0	<1.0	<1.0	1.0	2162957
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	<0.20	0.20	2162953

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TCLP-EPA 1311 (SOIL)

Lab BV ID		IU3150	IU3219	IU3220	IU3221	IU3222	
Sampling Date		2021/01/03	2021/01/03	2021/01/26	2021/01/26	2021/01/26	
COC Number		789989-01-01	789989-01-01	789989-01-01	789989-01-01	789989-01-01	
	Units	**TCMC-37467**	**TCMC-37468**	**TCMC-81073**	**TCMC-81074**	**TCMC-81075**	**QC Batch**
% MOISTURE	%	16	13	0.2	3.3	4.8	N/A
Leachates							
Weight of sample (g)	n/a	20.1	20.0	20.0	20.0	20.1	2162338
pH of pre-test	n/a	<1.68	<1.68	<1.68	<1.68	<1.68	2162338
pH end of leaching	n/a	4.95	4.93	4.86	4.97	4.96	2162338
Volume extracting fluid 1 (ml)	n/a	400	400	400	400	400	2162338

QC Batch = Quality Control Batch
N/A = Not Applicable

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SPLP-EPA 1312 (SOIL)

Lab BV ID		IU3378	IU3388	IU3389	
Sampling Date		2021/01/03	2021/01/03	2021/01/03	
COC Number		789989-01-01	789989-01-01	789989-01-01	
	Units	**TCMC-37467- (SPLP1312)**	**TCMC-37468- (SPLP1312)**	**TCMC-81073- (SPLP1312)**	**QC Batch**
Leachates					
Weight of sample (g)	n/a	25.0	25.0	25.0	2162721
Volume of extracting fluid (mL)	n/a	500	500	500	2162721
pH after 18 hours leaching	n/a	5.69	5.63	5.39	2162721
QC Batch = Quality Control Batch					

Lab BV ID		IU3390	IU3391	
Sampling Date		2021/01/03	2021/01/03	
COC Number		789989-01-01	789989-01-01	
	Units	**TCMC-81074- (SPLP1312)**	**TCMC-81075- (SPLP1312)**	**QC Batch**
Leachates				
Weight of sample (g)	n/a	25.0	25.0	2162721
Volume of extracting fluid (mL)	n/a	500	500	2162721
pH after 18 hours leaching	n/a	5.60	5.43	2162721
QC Batch = Quality Control Batch				

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WATER LEACHATE-CTEU-9 (SOIL)

Lab BV ID		IU3223	IU3363	IU3364	IU3365	
Sampling Date		2021/01/03	2021/01/03	2021/01/03	2021/01/03	
COC Number		789989-01-01	789989-01-01	789989-01-01	789989-01-01	
	Units	**TCMC-37467-CTEU-9**	**TCMC-37468-CTEU-9**	**TCMC-81073-CTEU-9**	**TCMC-81074-CTEU-9**	**QC Batch**
Leachates						
Weight of sample (g)	n/a	40.1	40.0	40.1	40.0	2162852
pH Deionized water	n/a	5.45	5.45	5.45	5.45	2162852
Date extraction fluid added	n/a	2021/02/05	2021/02/05	2021/02/05	2021/02/05	2162852
Date leaching terminated	n/a	2021/02/12	2021/02/12	2021/02/12	2021/02/12	2162852
Volume of extracting fluid (mL)	n/a	160	160	160	160	2162852
pH after 7 days of leaching	n/a	6.74	6.86	6.89	6.95	2162852
QC Batch = Quality Control Batch						

Lab BV ID		IU3366	
Sampling Date		2021/01/03	
COC Number		789989-01-01	
	Units	**TCMC-81075-CTEU-9**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	40.0	2162852
pH Deionized water	n/a	5.45	2162852
Date extraction fluid added	n/a	2021/02/05	2162852
Date leaching terminated	n/a	2021/02/12	2162852
Volume of extracting fluid (mL)	n/a	160	2162852
pH after 7 days of leaching	n/a	7.31	2162852
QC Batch = Quality Control Batch			

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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 mentionned 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 (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

TCLP-EPA 1311 (SOIL)

pH du pré-test: Veuillez noter que le résultat de l'échantillon est en dehors de la courbe de calibration (pH 4 - 10), et aussi dehors des limites de la linéarité (pH 1.68 - 13.0).

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2162013	KK	Spiked Blank	Silver (Ag)	2021/02/03		82	%
			Arsenic (As)	2021/02/03		95	%
			Barium (Ba)	2021/02/03		93	%
			Boron (B)	2021/02/03		104	%
			Cadmium (Cd)	2021/02/03		90	%
			Chromium (Cr)	2021/02/03		92	%
			Copper (Cu)	2021/02/03		93	%
			Cobalt (Co)	2021/02/03		92	%
			Tin (Sn)	2021/02/03		96	%
			Iron (Fe)	2021/02/03		96	%
			Manganese (Mn)	2021/02/03		93	%
			Molybdenum (Mo)	2021/02/03		91	%
			Nickel (Ni)	2021/02/03		93	%
			Lead (Pb)	2021/02/03		93	%
			Selenium (Se)	2021/02/03		94	%
			Uranium (U)	2021/02/03		91	%
			Zinc (Zn)	2021/02/03		93	%
2162013	KK	Method Blank	Silver (Ag)	2021/02/03	<0.50		mg/kg
			Arsenic (As)	2021/02/03	<2.0		mg/kg
			Barium (Ba)	2021/02/03	<4.0		mg/kg
			Boron (B)	2021/02/03	<2.0		mg/kg
			Cadmium (Cd)	2021/02/03	<0.10		mg/kg
			Chromium (Cr)	2021/02/03	<1.0		mg/kg
			Copper (Cu)	2021/02/03	<1.0		mg/kg
			Cobalt (Co)	2021/02/03	<1.0		mg/kg
			Tin (Sn)	2021/02/03	<1.0		mg/kg
			Iron (Fe)	2021/02/03	<10		mg/kg
			Manganese (Mn)	2021/02/03	<2.0		mg/kg
			Molybdenum (Mo)	2021/02/03	<0.50		mg/kg
			Nickel (Ni)	2021/02/03	<0.50		mg/kg
			Lead (Pb)	2021/02/03	<1.0		mg/kg
			Selenium (Se)	2021/02/03	<0.50		mg/kg
			Uranium (U)	2021/02/03	<2.0		mg/kg
			Zinc (Zn)	2021/02/03	<5.0		mg/kg
2162023	SBD	Spiked Blank	Fluoride (F)	2021/02/03		100	%
2162023	SBD	Method Blank	Fluoride (F)	2021/02/03	<1.0		mg/kg
2162025	VPA	Spiked Blank	Nitrates (N-NO3-)	2021/02/03		104	%
			Nitrites (N-NO2-)	2021/02/03		100	%
			Nitrate (N) and Nitrite(N)	2021/02/03		102	%
2162025	VPA	Method Blank	Nitrates (N-NO3-)	2021/02/03	<1.0		mg/kg
			Nitrites (N-NO2-)	2021/02/03	<0.20		mg/kg
			Nitrate (N) and Nitrite(N)	2021/02/03	<1.0		mg/kg
2162338	ABJ	Method Blank	pH end of leaching	2021/02/04	4.96		n/a
			Volume extracting fluid 1 (ml)	2021/02/04	400		n/a
2162696	ZEO	LEACH. BLANK	Silver (Ag)	2021/02/05	<0.30		ug/L
			Arsenic (As)	2021/02/05	<2.0		ug/L
			Barium (Ba)	2021/02/05	<5.0		ug/L
			Boron (B)	2021/02/05	<50		ug/L
			Cadmium (Cd)	2021/02/05	<1.0		ug/L
			Chromium (Cr)	2021/02/05	<7.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Cobalt (Co)	2021/02/05	<10		ug/L
			Copper (Cu)	2021/02/05	8.3, RDL=3.0		ug/L
			Tin (Sn)	2021/02/05	<50		ug/L
			Iron (Fe)	2021/02/05	<100		ug/L
			Manganese (Mn)	2021/02/05	<3.0		ug/L
			Molybdenum (Mo)	2021/02/05	<10		ug/L
			Nickel (Ni)	2021/02/05	<6.0		ug/L
			Lead (Pb)	2021/02/05	<1.0		ug/L
			Selenium (Se)	2021/02/05	<1.0		ug/L
			Uranium (U)	2021/02/05	<0.60		ug/L
			Zinc (Zn)	2021/02/05	<5.0		ug/L
2162696	ZEO	Spiked Blank	Silver (Ag)	2021/02/05		98	%
			Arsenic (As)	2021/02/05		92	%
			Barium (Ba)	2021/02/05		92	%
			Boron (B)	2021/02/05		89	%
			Cadmium (Cd)	2021/02/05		87	%
			Chromium (Cr)	2021/02/05		87	%
			Cobalt (Co)	2021/02/05		87	%
			Copper (Cu)	2021/02/05		90	%
			Tin (Sn)	2021/02/05		97	%
			Iron (Fe)	2021/02/05		92	%
			Manganese (Mn)	2021/02/05		90	%
			Molybdenum (Mo)	2021/02/05		92	%
			Nickel (Ni)	2021/02/05		86	%
			Lead (Pb)	2021/02/05		88	%
			Selenium (Se)	2021/02/05		155 (1)	%
			Uranium (U)	2021/02/05		89	%
			Zinc (Zn)	2021/02/05		85	%
2162721	ABJ	Method Blank	Volume of extracting fluid (mL)	2021/02/05	500		n/a
			pH after 18 hours leaching	2021/02/05	4.16		n/a
2162847	VPA	LEACH. BLANK	Nitrites (N-NO2-)	2021/02/05	<0.20		mg/L
			Nitrates (N-NO3-)	2021/02/05	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/02/05	<0.20		mg/L
2162847	VPA	Spiked Blank	Nitrites (N-NO2-)	2021/02/05		103	%
			Nitrates (N-NO3-)	2021/02/05		103	%
			Nitrate (N) and Nitrite(N)	2021/02/05		103	%
2162851	AJ1	LEACH. BLANK	Fluoride (F)	2021/02/08	<1.0		mg/L
2162851	AJ1	Spiked Blank	Fluoride (F)	2021/02/09		103	%
2162852	SMD	Method Blank	pH Deionized water	2021/02/12	5.45		n/a
			Date extraction fluid added	2021/02/12	2021/02/05		n/a
			Date leaching terminated	2021/02/12	2021/02/12		n/a
			Volume of extracting fluid (mL)	2021/02/12	160		n/a
			pH after 7 days of leaching	2021/02/12	6.77		n/a
2162953	VPA	LEACH. BLANK	Nitrites (N-NO2-)	2021/02/05	<0.20		mg/L
2162953	VPA	Spiked Blank	Nitrites (N-NO2-)	2021/02/05		107	%
2162957	AJ1	LEACH. BLANK	Fluoride (F)	2021/02/08	<1.0		mg/L
2162957	AJ1	Spiked Blank	Fluoride (F)	2021/02/08		109	%
2162995	ZEO	LEACH. BLANK	Silver (Ag)	2021/02/08	<0.30		ug/L
			Arsenic (As)	2021/02/08	<2.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Barium (Ba)	2021/02/08	<5.0		ug/L
			Boron (B)	2021/02/08	<50		ug/L
			Cadmium (Cd)	2021/02/08	<1.0		ug/L
			Chromium (Cr)	2021/02/08	<7.0		ug/L
			Cobalt (Co)	2021/02/08	<10		ug/L
			Copper (Cu)	2021/02/08	8.1, RDL=3.0		ug/L
			Tin (Sn)	2021/02/08	<50		ug/L
			Iron (Fe)	2021/02/08	<100		ug/L
			Manganese (Mn)	2021/02/08	<3.0		ug/L
			Molybdenum (Mo)	2021/02/08	<10		ug/L
			Nickel (Ni)	2021/02/08	<6.0		ug/L
			Lead (Pb)	2021/02/08	<1.0		ug/L
			Selenium (Se)	2021/02/08	<1.0		ug/L
			Uranium (U)	2021/02/08	<0.60		ug/L
			Zinc (Zn)	2021/02/08	<5.0		ug/L
2162995	ZEO	Spiked Blank	Silver (Ag)	2021/02/08		99	%
			Arsenic (As)	2021/02/08		104	%
			Barium (Ba)	2021/02/08		101	%
			Boron (B)	2021/02/08		96	%
			Cadmium (Cd)	2021/02/08		101	%
			Chromium (Cr)	2021/02/08		99	%
			Cobalt (Co)	2021/02/08		98	%
			Copper (Cu)	2021/02/08		98	%
			Tin (Sn)	2021/02/08		108	%
			Iron (Fe)	2021/02/08		94	%
			Manganese (Mn)	2021/02/08		103	%
			Molybdenum (Mo)	2021/02/08		101	%
			Nickel (Ni)	2021/02/08		99	%
			Lead (Pb)	2021/02/08		100	%
			Selenium (Se)	2021/02/08		99	%
			Uranium (U)	2021/02/08		100	%
			Zinc (Zn)	2021/02/08		97	%
2164537	JGZ	LEACH. BLANK	Silver (Ag)	2021/02/14	<0.30		ug/L
			Arsenic (As)	2021/02/14	<2.0		ug/L
			Barium (Ba)	2021/02/14	<5.0		ug/L
			Boron (B)	2021/02/14	<50		ug/L
			Cadmium (Cd)	2021/02/14	<1.0		ug/L
			Chromium (Cr)	2021/02/14	<7.0		ug/L
			Cobalt (Co)	2021/02/14	<10		ug/L
			Copper (Cu)	2021/02/14	<3.0		ug/L
			Tin (Sn)	2021/02/14	<50		ug/L
			Iron (Fe)	2021/02/14	<100		ug/L
			Manganese (Mn)	2021/02/14	<3.0		ug/L
			Molybdenum (Mo)	2021/02/14	<10		ug/L
			Nickel (Ni)	2021/02/14	<6.0		ug/L
			Lead (Pb)	2021/02/14	<1.0		ug/L
			Selenium (Se)	2021/02/14	<1.0		ug/L
			Uranium (U)	2021/02/14	<0.60		ug/L
			Zinc (Zn)	2021/02/14	<5.0		ug/L

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Lab BV Job #: C103861
Report Date: 2021/04/19

TATA STEEL MINERALS CANADA
Client Project #: GOOWOOD
Site Location: ARD
Your P.O. #: 3000000730
Sampler Initials: CS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2164537	JGZ	Spiked Blank	Silver (Ag)	2021/02/16		97	%
			Arsenic (As)	2021/02/16		99	%
			Barium (Ba)	2021/02/16		96	%
			Boron (B)	2021/02/16		97	%
			Cadmium (Cd)	2021/02/16		96	%
			Chromium (Cr)	2021/02/16		91	%
			Cobalt (Co)	2021/02/16		92	%
			Copper (Cu)	2021/02/16		89	%
			Tin (Sn)	2021/02/16		105	%
			Iron (Fe)	2021/02/16		91	%
			Manganese (Mn)	2021/02/16		95	%
			Molybdenum (Mo)	2021/02/16		97	%
			Nickel (Ni)	2021/02/16		90	%
			Lead (Pb)	2021/02/16		92	%
			Selenium (Se)	2021/02/16		95	%
			Uranium (U)	2021/02/16		94	%
			Zinc (Zn)	2021/02/16		91	%
2164627	VPA	LEACH. BLANK	Fluoride (F)	2021/02/12	<1.0		mg/L
2164627	VPA	Spiked Blank	Fluoride (F)	2021/02/12		99	%
2164731	VPA	LEACH. BLANK	Nitrites (N-NO2-)	2021/02/14	<0.20		mg/L
			Nitrates (N-NO3-)	2021/02/14	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/02/14	<0.20		mg/L
2164731	VPA	Spiked Blank	Nitrites (N-NO2-)	2021/02/14		104	%
			Nitrates (N-NO3-)	2021/02/14		103	%
			Nitrate (N) and Nitrite(N)	2021/02/14		103	%
2164731	VPA	Method Blank	Nitrites (N-NO2-)	2021/02/14	<0.020		mg/L
			Nitrates (N-NO3-)	2021/02/14	<0.020		mg/L
			Nitrate (N) and Nitrite(N)	2021/02/14	<0.020		mg/L

RDL = Reportable Detection Limit

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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.

(1) Recovery or relative percent difference (RPD) for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria

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Lab BV Job #: C103861
Report Date: 2021/04/19

TATA STEEL MINERALS CANADA
Client Project #: GOOWOOD
Site Location: ARD
Your P.O. #: 3000000730
Sampler Initials: CS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Audrey Mélissa Benoit, B.Sc., Montréal, Team Leader

Faouzi Sarsi, B.Sc. Chemist, Montréal, SR Analyst

Miryam Assayag, B.Sc. Chemist, Montréal, Team Leader

Sameh Bouguedoura, B.Sc., Chemist, Montréal, Analyst II

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Your P.O. #: 3000000730
Site#: DS04
Site Location: GOODWOOD ARD
Your C.O.C. #: N/A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/04/12
Report #: R2647964
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C107257
Received: 2021/02/19, 09:00

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acid Base Accounting (Sobek modified) (1)	1	N/A	N/A		
Grinding	1	N/A	2021/02/25	STL SOP-00019	N/A
Fluoride (free)	1	2021/02/25	2021/02/25	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	2	N/A	2021/02/26	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	1	N/A	2021/03/05	STL SOP-00038	SM 23 4500-F m
Water Leachate (CTEU - 9)	1	2021/02/26	2021/03/05	STL SOP-00024	MA100-Lixcom1.1 R1 m
Acid rain simulation leachate (EPA 1312)	1	2021/02/23	2021/02/24	STL SOP-00024	MA100-Lixcom1.1 R1 m
Total Extractable Metals (low level)	1	2021/02/24	2021/02/24	STL SOP-00069	MA.200–Mét. 1.2 R5 m
Metals - Leached	2	2021/02/24	2021/02/25	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Metals - Leached	1	2021/03/05	2021/03/08	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Nitrate and/or Nitrite- Leached	2	N/A	2021/02/26	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	1	N/A	2021/03/06	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	1	2021/02/25	2021/02/25	STL SOP-00014	MA.300–Ions 1.3 R3 m
Toxicity Charact. Leach. Proc.(EPA 1311)	1	2021/02/23	2021/02/24	STL SOP-00024	MA100-Lixcom1.1 R1 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas 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

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Your P.O. #: 3000000730
Site#: DS04
Site Location: GOODWOOD ARD
Your C.O.C. #: N/A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/04/12
Report #: R2647964
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C107257
Received: 2021/02/19, 09:00

dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
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BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, 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 Laboratoires Bureau Veritas - Burnaby

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Martine Lepage
Project Manager and Account Manager
14 Apr 2021 10:54:32

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
==========
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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

TOTAL EXTRACTABLE METALS (SOIL)

Lab BV ID					IV8523		
Sampling Date					2021/02/01		
	Units	**A**	**B**	**C**	**TSMC-75262**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	4.0	N/A	N/A
METALS							
Silver (Ag)	mg/kg	**2**	20	40	<0.50	0.50	2166711
Arsenic (As)	mg/kg	**6**	30	50	<2.0	2.0	2166711
Barium (Ba)	mg/kg	**340**	500	2000	<4.0	4.0	2166711
Boron (B)	mg/kg	**-**	-	-	<2.0	2.0	2166711
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	0.10	2166711
Chromium (Cr)	mg/kg	**100**	250	800	8.0	1.0	2166711
Copper (Cu)	mg/kg	**50**	100	500	1.3	1.0	2166711
Cobalt (Co)	mg/kg	**25**	50	300	1.8	1.0	2166711
Tin (Sn)	mg/kg	**5**	50	300	<1.0	1.0	2166711
Iron (Fe) †	mg/kg	**-**	-	-	42000	10	2166711
Manganese (Mn)	mg/kg	**1000**	1000	2200	390	2.0	2166711
Molybdenum (Mo)	mg/kg	**2**	10	40	0.97	0.50	2166711
Nickel (Ni)	mg/kg	**50**	100	500	1.7	0.50	2166711
Mercury (Hg)	mg/kg	**0.2**	2	10	0.022	0.010	2166711
Lead (Pb)	mg/kg	**50**	500	1000	1.0	1.0	2166711
Selenium (Se)	mg/kg	**1**	3	10	<0.50	0.50	2166711
Uranium (U) †	mg/kg	**-**	-	-	<2.0	2.0	2166711
Zinc (Zn)	mg/kg	**140**	500	1500	<5.0	5.0	2166711

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

METALS-LAB LEACHATE (SOIL)

Lab BV ID		IV8523			IV8524			IV8525		
Sampling Date		2021/02/01			2021/02/01			2021/02/01		
	Units	**TSMC-75262**	**RDL**	**QC Batch**	**TSMC-75262 (CTEU-9)**	**RDL**	**QC Batch**	**TSMC-75262 (SPLP1312)**	**RDL**	**QC Batch**
% MOISTURE	%	4.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
METALS										
Silver (Ag) †	ug/L	<0.30	0.30	2166884	<0.30	0.30	2168988	<0.30	0.30	2166888
Arsenic (As)	ug/L	<2.0	2.0	2166884	<2.0	2.0	2168988	<2.0	2.0	2166888
Barium (Ba)	ug/L	11	5.0	2166884	<5.0	5.0	2168988	<5.0	5.0	2166888
Boron (B)	ug/L	<50	50	2166884	<50	50	2168988	<50	50	2166888
Cadmium (Cd)	ug/L	<1.0	1.0	2166884	<1.0	1.0	2168988	<1.0	1.0	2166888
Chromium (Cr)	ug/L	<7.0	7.0	2166884	<7.0	7.0	2168988	<7.0	7.0	2166888
Cobalt (Co)	ug/L	<10	10	2166884	<10	10	2168988	<10	10	2166888
Copper (Cu)	ug/L	<3.0	3.0	2166884	<10	10	2168988	<3.0	3.0	2166888
Tin (Sn) †	ug/L	<50	50	2166884	<50	50	2168988	<50	50	2166888
Iron (Fe)	ug/L	180	100	2166884	190	100	2168988	<100	100	2166888
Manganese (Mn)	ug/L	370	3.0	2166884	13	3.0	2168988	93	3.0	2166888
Mercury (Hg)	ug/L	<0.50	0.50	2166884	<0.50	0.50	2168988	<0.50	0.50	2166888
Molybdenum (Mo)	ug/L	<10	10	2166884	<10	10	2168988	<10	10	2166888
Nickel (Ni)	ug/L	<6.0	6.0	2166884	<6.0	6.0	2168988	<6.0	6.0	2166888
Lead (Pb)	ug/L	<1.0	1.0	2166884	<1.0	1.0	2168988	<1.0	1.0	2166888
Selenium (Se)	ug/L	<1.0	1.0	2166884	<1.0	1.0	2168988	<1.0	1.0	2166888
Uranium (U)	ug/L	<0.60	0.60	2166884	<0.60	0.60	2168988	<0.60	0.60	2166888
Zinc (Zn)	ug/L	<5.0	5.0	2166884	<5.0	5.0	2168988	<5.0	5.0	2166888

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

CONVENTIONAL PARAMETERS (SOIL)

Lab BV ID					IV8523		
Sampling Date					2021/02/01		
	Units	**A**	**B**	**C**	**TSMC-75262**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	4.0	N/A	N/A
CONVENTIONALS							
Fluoride (F)	mg/kg	**200**	400	2000	<1.0	1.0	2167036
Nitrates (N-NO3-) †	mg/kg	**-**	-	-	<1.0	1.0	2167033
Nitrites (N-NO2-) †	mg/kg	**-**	-	-	<0.20	0.20	2167033
Nitrate (N) and Nitrite(N)	mg/kg	**-**	-	-	<1.0	1.0	2167033

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

2021/04/12 15:46

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Lab BV ID		IV8523		IV8524		IV8525		
Sampling Date		2021/02/01		2021/02/01		2021/02/01		
	Units	**TSMC-75262**	**QC Batch**	**TSMC-75262 (CTEU-9)**	**QC Batch**	**TSMC-75262 (SPLP1312)**	**RDL**	**QC Batch**
% MOISTURE	%	4.0	N/A	N/A	N/A	N/A	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	2167455	<1.0	2168998	<1.0	1.0	2167465
Nitrites (N-NO2-)	mg/L	<0.20	2167273	<0.20	2169001	<0.20	0.20	2167285
Nitrate (N) and Nitrite(N)	mg/L	<0.20	2167273	<0.20	2169001	<0.20	0.20	2167285

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

TCLP-EPA 1311 (SOIL)

Lab BV ID		IV8523	
Sampling Date		2021/02/01	
	Units	**TSMC-75262**	**QC Batch**
% MOISTURE	%	4.0	N/A
Leachates			
Weight of sample (g)	n/a	20.0	2166459
pH of pre-test	n/a	<1.68	2166459
pH end of leaching	n/a	4.93	2166459
Volume extracting fluid 1 (ml)	n/a	400	2166459

QC Batch = Quality Control Batch
N/A = Not Applicable

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

SPLP-EPA 1312 (SOIL)

Lab BV ID		IV8525	
Sampling Date		2021/02/01	
	Units	**TSMC-75262 (SPLP1312)**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	25.1	2166625
Volume of extracting fluid (mL)	n/a	500	2166625
pH after 18 hours leaching	n/a	6.43	2166625
pH of extracting fluid	n/a	4.18	2166625
QC Batch = Quality Control Batch			

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

WATER LEACHATE-CTEU-9 (SOIL)

Lab BV ID		IV8524	
Sampling Date		2021/02/01	
	Units	**TSMC-75262 (CTEU-9)**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	40.0	2167383
pH Deionized water	n/a	5.37	2167383
Date extraction fluid added	n/a	2021/02/26	2167383
Date leaching terminated	n/a	2021/03/05	2167383
Volume of extracting fluid (mL)	n/a	160	2167383
pH after 7 days of leaching	n/a	8.75	2167383
QC Batch = Quality Control Batch			

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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 mentionned 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.

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Les limites de détections indiquées sont multipliées par les facteurs de dilution utilisés pour l'analyse des échantillons.

TCLP-EPA 1311 (SOIL)

pH du pré-test: Veuillez noter que le résultat de l'échantillon est en dehors de la courbe de calibration (pH 4 - 10), et certains d'entre eux aussi dehors des limites de la linéarité (pH 1.68 - 13.0). IV8523

Results relate only to the items tested.

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2166459	SMD	Method Blank	pH end of leaching	2021/02/24	4.93/2.84		n/a
			Volume extracting fluid 1 (ml)	2021/02/24	400		n/a
2166625	SMD	Method Blank	Volume of extracting fluid (mL)	2021/02/24	500		n/a
			pH after 18 hours leaching	2021/02/24	4.23		n/a
			pH of extracting fluid	2021/02/24	4.18		n/a
2166711	KK	Spiked Blank	Silver (Ag)	2021/02/24		86	%
			Arsenic (As)	2021/02/24		94	%
			Barium (Ba)	2021/02/24		92	%
			Boron (B)	2021/02/24		103	%
			Cadmium (Cd)	2021/02/24		91	%
			Chromium (Cr)	2021/02/24		91	%
			Copper (Cu)	2021/02/24		91	%
			Cobalt (Co)	2021/02/24		91	%
			Tin (Sn)	2021/02/24		96	%
			Iron (Fe)	2021/02/24		92	%
			Manganese (Mn)	2021/02/24		91	%
			Molybdenum (Mo)	2021/02/24		90	%
			Nickel (Ni)	2021/02/24		91	%
			Mercury (Hg)	2021/02/24		95	%
			Lead (Pb)	2021/02/24		93	%
			Selenium (Se)	2021/02/24		88	%
			Uranium (U)	2021/02/24		95	%
			Zinc (Zn)	2021/02/24		89	%
2166711	KK	Method Blank	Silver (Ag)	2021/02/24	<0.50		mg/kg
			Arsenic (As)	2021/02/24	<2.0		mg/kg
			Barium (Ba)	2021/02/24	<4.0		mg/kg
			Boron (B)	2021/02/24	<2.0		mg/kg
			Cadmium (Cd)	2021/02/24	<0.10		mg/kg
			Chromium (Cr)	2021/02/24	<1.0		mg/kg
			Copper (Cu)	2021/02/24	<1.0		mg/kg
			Cobalt (Co)	2021/02/24	<1.0		mg/kg
			Tin (Sn)	2021/02/24	<1.0		mg/kg
			Iron (Fe)	2021/02/24	<10		mg/kg
			Manganese (Mn)	2021/02/24	<2.0		mg/kg
			Molybdenum (Mo)	2021/02/24	<0.50		mg/kg
			Nickel (Ni)	2021/02/24	<0.50		mg/kg
			Mercury (Hg)	2021/02/24	<0.010		mg/kg
			Lead (Pb)	2021/02/24	<1.0		mg/kg
			Selenium (Se)	2021/02/24	<0.50		mg/kg
			Uranium (U)	2021/02/24	<2.0		mg/kg
			Zinc (Zn)	2021/02/24	<5.0		mg/kg
2166884	NET	LEACH. BLANK	Silver (Ag)	2021/02/25	<0.30		ug/L
			Arsenic (As)	2021/02/25	<2.0		ug/L
			Barium (Ba)	2021/02/25	<5.0		ug/L
			Boron (B)	2021/02/25	<50		ug/L
			Cadmium (Cd)	2021/02/25	<1.0		ug/L
			Chromium (Cr)	2021/02/25	<7.0		ug/L
			Cobalt (Co)	2021/02/25	<10		ug/L
			Copper (Cu)	2021/02/25	<20		ug/L
			Tin (Sn)	2021/02/25	<50		ug/L
			Iron (Fe)	2021/02/25	<100		ug/L

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Manganese (Mn)	2021/02/25	<3.0		ug/L
			Mercury (Hg)	2021/02/25	<0.50		ug/L
			Molybdenum (Mo)	2021/02/25	<10		ug/L
			Nickel (Ni)	2021/02/25	<6.0		ug/L
			Lead (Pb)	2021/02/25	<1.0		ug/L
			Selenium (Se)	2021/02/25	<1.0		ug/L
			Uranium (U)	2021/02/25	<0.60		ug/L
			Zinc (Zn)	2021/02/25	<5.0		ug/L
2166884	NET	Spiked Blank	Silver (Ag)	2021/02/25		88	%
			Arsenic (As)	2021/02/25		93	%
			Barium (Ba)	2021/02/25		87	%
			Boron (B)	2021/02/25		101	%
			Cadmium (Cd)	2021/02/25		93	%
			Chromium (Cr)	2021/02/25		86	%
			Cobalt (Co)	2021/02/25		85	%
			Copper (Cu)	2021/02/25		84	%
			Tin (Sn)	2021/02/25		97	%
			Iron (Fe)	2021/02/25		91	%
			Manganese (Mn)	2021/02/25		89	%
			Mercury (Hg)	2021/02/25		89	%
			Molybdenum (Mo)	2021/02/25		91	%
			Nickel (Ni)	2021/02/25		85	%
			Lead (Pb)	2021/02/25		84	%
			Selenium (Se)	2021/02/25		92	%
			Uranium (U)	2021/02/25		85	%
			Zinc (Zn)	2021/02/25		87	%
2166888	NET	LEACH. BLANK	Silver (Ag)	2021/02/25	<0.30		ug/L
			Arsenic (As)	2021/02/25	<2.0		ug/L
			Barium (Ba)	2021/02/25	<5.0		ug/L
			Boron (B)	2021/02/25	<50		ug/L
			Cadmium (Cd)	2021/02/25	<1.0		ug/L
			Chromium (Cr)	2021/02/25	<7.0		ug/L
			Cobalt (Co)	2021/02/25	<10		ug/L
			Copper (Cu)	2021/02/25	<10		ug/L
			Tin (Sn)	2021/02/25	<50		ug/L
			Iron (Fe)	2021/02/25	<100		ug/L
			Manganese (Mn)	2021/02/25	<3.0		ug/L
			Mercury (Hg)	2021/02/25	<0.50		ug/L
			Molybdenum (Mo)	2021/02/25	<10		ug/L
			Nickel (Ni)	2021/02/25	<6.0		ug/L
			Lead (Pb)	2021/02/25	<1.0		ug/L
			Selenium (Se)	2021/02/25	<1.0		ug/L
			Uranium (U)	2021/02/25	<0.60		ug/L
			Zinc (Zn)	2021/02/25	5.1, RDL=5.0		ug/L
2166888	NET	Spiked Blank	Silver (Ag)	2021/02/25		88	%
			Arsenic (As)	2021/02/25		94	%
			Barium (Ba)	2021/02/25		87	%
			Boron (B)	2021/02/25		101	%
			Cadmium (Cd)	2021/02/25		91	%
			Chromium (Cr)	2021/02/25		86	%

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Cobalt (Co)	2021/02/25		87	%
			Copper (Cu)	2021/02/25		84	%
			Tin (Sn)	2021/02/25		96	%
			Iron (Fe)	2021/02/25		91	%
			Manganese (Mn)	2021/02/25		89	%
			Mercury (Hg)	2021/02/25		91	%
			Molybdenum (Mo)	2021/02/25		92	%
			Nickel (Ni)	2021/02/25		87	%
			Lead (Pb)	2021/02/25		85	%
			Selenium (Se)	2021/02/25		92	%
			Uranium (U)	2021/02/25		84	%
			Zinc (Zn)	2021/02/25		87	%
2167033	TGU	Spiked Blank	Nitrates (N-NO3-)	2021/02/25		109	%
			Nitrites (N-NO2-)	2021/02/25		103	%
			Nitrate (N) and Nitrite(N)	2021/02/25		106	%
2167033	TGU	Method Blank	Nitrates (N-NO3-)	2021/02/25	<1.0		mg/kg
			Nitrites (N-NO2-)	2021/02/25	<0.20		mg/kg
			Nitrate (N) and Nitrite(N)	2021/02/25	<1.0		mg/kg
2167036	SBD	Spiked Blank	Fluoride (F)	2021/02/25		116	%
2167036	SBD	Method Blank	Fluoride (F)	2021/02/25	<1.0		mg/kg
2167273	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/02/26	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/02/26	<0.20		mg/L
2167273	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/02/26		106	%
			Nitrate (N) and Nitrite(N)	2021/02/26		105	%
2167285	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/02/26	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/02/26	<0.20		mg/L
2167285	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/02/26		106	%
			Nitrate (N) and Nitrite(N)	2021/02/26		107	%
2167383	SMD	Method Blank	pH Deionized water	2021/03/05	5.37		n/a
			Date extraction fluid added	2021/03/05	2021/02/26		n/a
			Date leaching terminated	2021/03/05	2021/03/05		n/a
			Volume of extracting fluid (mL)	2021/03/05	160		n/a
			pH after 7 days of leaching	2021/03/05	7.49		n/a
2167455	ANB	LEACH. BLANK	Fluoride (F)	2021/02/26	<1.0		mg/L
2167455	ANB	Spiked Blank	Fluoride (F)	2021/02/26		103	%
2167465	ANB	LEACH. BLANK	Fluoride (F)	2021/02/26	<1.0		mg/L
2167465	ANB	Spiked Blank	Fluoride (F)	2021/02/26		103	%
2168988	JGZ	LEACH. BLANK	Silver (Ag)	2021/03/08	<0.30		ug/L
			Arsenic (As)	2021/03/08	<2.0		ug/L
			Barium (Ba)	2021/03/08	<5.0		ug/L
			Boron (B)	2021/03/08	<50		ug/L
			Cadmium (Cd)	2021/03/08	<1.0		ug/L
			Chromium (Cr)	2021/03/08	<7.0		ug/L
			Cobalt (Co)	2021/03/08	<10		ug/L
			Copper (Cu)	2021/03/08	<10		ug/L
			Tin (Sn)	2021/03/08	<50		ug/L
			Iron (Fe)	2021/03/08	<100		ug/L
			Manganese (Mn)	2021/03/08	<3.0		ug/L
			Mercury (Hg)	2021/03/08	<0.50		ug/L
			Molybdenum (Mo)	2021/03/08	<10		ug/L
			Nickel (Ni)	2021/03/08	<6.0		ug/L

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Lead (Pb)	2021/03/08	<1.0		ug/L
			Selenium (Se)	2021/03/08	<1.0		ug/L
			Uranium (U)	2021/03/08	<0.60		ug/L
			Zinc (Zn)	2021/03/08	<5.0		ug/L
2168988	JGZ	Spiked Blank	Silver (Ag)	2021/03/08		91	%
			Arsenic (As)	2021/03/08		95	%
			Barium (Ba)	2021/03/08		97	%
			Boron (B)	2021/03/08		91	%
			Cadmium (Cd)	2021/03/08		95	%
			Chromium (Cr)	2021/03/08		90	%
			Cobalt (Co)	2021/03/08		89	%
			Copper (Cu)	2021/03/08		87	%
			Tin (Sn)	2021/03/08		98	%
			Iron (Fe)	2021/03/08		95	%
			Manganese (Mn)	2021/03/08		94	%
			Mercury (Hg)	2021/03/08		96	%
			Molybdenum (Mo)	2021/03/08		93	%
			Nickel (Ni)	2021/03/08		90	%
			Lead (Pb)	2021/03/08		92	%
			Selenium (Se)	2021/03/08		91	%
			Uranium (U)	2021/03/08		94	%
			Zinc (Zn)	2021/03/08		90	%
2168998	VPA	LEACH. BLANK	Fluoride (F)	2021/03/05	<1.0		mg/L
2168998	VPA	Spiked Blank	Fluoride (F)	2021/03/05		110	%
2169001	ABT	LEACH. BLANK	Nitrites (N-NO2-)	2021/03/06	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/03/06	<0.20		mg/L
2169001	ABT	Spiked Blank	Nitrites (N-NO2-)	2021/03/06		101	%
			Nitrate (N) and Nitrite(N)	2021/03/06		102	%

RDL = Reportable Detection Limit

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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.

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Lab BV Job #: C107257
Report Date: 2021/04/12

TATA STEEL MINERALS CANADA
Site Location: GOODWOOD ARD
Your P.O. #: 3000000730
Sampler Initials: EF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Faouzi Sarsi, B.Sc. Chemist, Montréal, SR Analyst

Miryam Assayag, B.Sc. Chemist, Montréal, Team Leader

Michelina Cinquino, Analyst II

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Your P.O. #: 3000000730
Your Project #: GOODWOOD ARD
Site Location: GOODWOOD
Your C.O.C. #: 789989-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/06/01
Report #: R2661102
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C113725
Received: 2021/04/06, 10:30

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acid Base Accounting (Sobek modified) (1)	3	2021/06/01	N/A		
Grinding	3	N/A	2021/04/07	STL SOP-00019	N/A
Fluoride (free)	3	2021/05/01	2021/05/01	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	6	N/A	2021/04/08	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	3	N/A	2021/05/05	STL SOP-00038	SM 23 4500-F m
Mercury by ICP-MS	3	2021/04/06	2021/04/08	III-105 rév.10 03/09/25	MA.200–Mét. 1.2 R7
Water Leachate (CTEU - 9)	3	2021/04/28	2021/05/05	STL SOP-00024	MA100-Lixcom1.1 R1 m
Acid rain simulation leachate (EPA 1312)	3	2021/04/07	2021/04/08	STL SOP-00024	MA100-Lixcom1.1 R1 m
Total Extractable Metals (low level)	3	2021/04/30	2021/04/30	STL SOP-00069	MA.200–Mét. 1.2 R7
Metals - Leached	6	2021/04/08	2021/04/09	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	3	2021/05/05	2021/05/06	STL SOP-00062	MA.200–Mét. 1.2 R7
Nitrate and/or Nitrite- Leached	6	N/A	2021/04/08	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	3	N/A	2021/05/06	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	3	2021/05/01	2021/05/01	STL SOP-00014	MA.300–Ions 1.3 R3 m
Toxicity Charact. Leach. Proc.(EPA 1311)	3	2021/04/07	2021/04/08	STL SOP-00024	MA100-Lixcom1.1 R1 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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Your P.O. #: 3000000730
Your Project #: GOODWOOD ARD
Site Location: GOODWOOD
Your C.O.C. #: 789989-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/06/01
Report #: R2661102
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C113725
Received: 2021/04/06, 10:30

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 Bureau Veritas, 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 Bureau Veritas - Burnaby

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Martine Lepage
Project Manager and Account Manager
02 Jun 2021 11:52:38

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
==========
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Lab BV Job #: C113725
Report Date: 2021/06/01

TATA STEEL MINERALS CANADA
Client Project #: GOODWOOD ARD
Site Location: GOODWOOD
Your P.O. #: 3000000730

TOTAL EXTRACTABLE METALS (SOIL)

Lab BV ID					IY8892		IY8893		IY8894		
Sampling Date					2021/03/17 17:05		2021/03/26 17:45		2021/03/28 16:55		
COC Number					789989-01-01		789989-01-01		789989-01-01		
	Units	**A**	**B**	**C**	**TSMC-81334**	**RDL**	**TSMC-81462**	**RDL**	**TSMC-81470**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	12	N/A	18	N/A	13	N/A	N/A
METALS											
Silver (Ag)	mg/kg	**2**	20	40	<0.50	0.50	<0.50	0.50	<0.50	0.50	2181808
Arsenic (As)	mg/kg	**6**	30	50	**6.2**	2.0	2.5	2.0	3.6	2.0	2181808
Barium (Ba)	mg/kg	**340**	500	2000	<4.0	4.0	<4.0	4.0	<4.0	4.0	2181808
Boron (B)	mg/kg	**-**	-	-	3.8	2.0	2.7	2.0	<2.0	2.0	2181808
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	0.10	<0.10	0.10	<0.10	0.10	2181808
Chromium (Cr)	mg/kg	**100**	250	800	4.6	1.0	<1.0	1.0	<1.0	1.0	2181808
Copper (Cu)	mg/kg	**50**	100	500	1.9	1.0	<1.0	1.0	<1.0	1.0	2181808
Cobalt (Co)	mg/kg	**25**	50	300	7.7	1.0	1.2	1.0	<1.0	1.0	2181808
Tin (Sn)	mg/kg	**5**	50	300	<1.0	1.0	<1.0	1.0	<1.0	1.0	2181808
Iron (Fe) †	mg/kg	**-**	-	-	75000	10	120000	100	74000	10	2181808
Manganese (Mn)	mg/kg	**1000**	1000	2200	500	2.0	290	2.0	170	2.0	2181808
Molybdenum (Mo)	mg/kg	**2**	10	40	<0.50	0.50	<0.50	0.50	<0.50	0.50	2181808
Nickel (Ni)	mg/kg	**50**	100	500	2.5	0.50	<0.50	0.50	<0.50	0.50	2181808
Mercury (Hg)	mg/kg	**0.2**	2	10	<0.010	0.010	<0.010	0.010	<0.010	0.010	2181808
Lead (Pb)	mg/kg	**50**	500	1000	1.7	1.0	<1.0	1.0	1.4	1.0	2181808
Selenium (Se)	mg/kg	**1**	3	10	<0.50	0.50	<0.50	0.50	<0.50	0.50	2181808
Uranium (U) †	mg/kg	**-**	-	-	<2.0	2.0	<2.0	2.0	<2.0	2.0	2181808
Zinc (Zn)	mg/kg	**140**	500	1500	<5.0	5.0	7.2	5.0	<5.0	5.0	2181808

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C113725
Report Date: 2021/06/01

TATA STEEL MINERALS CANADA
Client Project #: GOODWOOD ARD
Site Location: GOODWOOD
Your P.O. #: 3000000730

METALS-LAB LEACHATE (SOIL)

Lab BV ID		IY8892	IY8893	IY8894		IY8897		
Sampling Date		2021/03/17 17:05	2021/03/26 17:45	2021/03/28 16:55		2021/03/17 17:05		
COC Number		789989-01-01	789989-01-01	789989-01-01		789989-01-01		
	Units	**TSMC-81334**	**TSMC-81462**	**TSMC-81470**	**QC Batch**	**TSMC-81334-CTEU-9**	**RDL**	**QC Batch**
% MOISTURE	%	12	18	13	N/A	N/A	N/A	N/A
METALS								
Silver (Ag) †	ug/L	<0.30	<0.30	<0.30	2175952	<0.30	0.30	2182991
Arsenic (As)	ug/L	<2.0	<2.0	<2.0	2175952	<2.0	2.0	2182991
Barium (Ba)	ug/L	<5.0	27	18	2175952	<5.0	5.0	2182991
Boron (B)	ug/L	<50	<50	<50	2175952	<50	50	2182991
Cadmium (Cd)	ug/L	<1.0	<1.0	<1.0	2175952	<1.0	1.0	2182991
Chromium (Cr)	ug/L	<7.0	<7.0	<7.0	2175952	<7.0	7.0	2182991
Cobalt (Co)	ug/L	<10	<10	<10	2175952	<10	10	2182991
Copper (Cu)	ug/L	<3.0	<3.0	<3.0	2175952	<3.0	3.0	2182991
Tin (Sn) †	ug/L	<50	<50	<50	2175952	<50	50	2182991
Iron (Fe)	ug/L	<100	2300	550	2175952	<100	100	2182991
Manganese (Mn)	ug/L	82	87	190	2175952	<3.0	3.0	2182991
Mercury (Hg)	ug/L	<0.50	<0.50	<0.50	2175952	<0.50	0.50	2182991
Molybdenum (Mo)	ug/L	<10	<10	<10	2175952	<10	10	2182991
Nickel (Ni)	ug/L	<6.0	<6.0	<6.0	2175952	<6.0	6.0	2182991
Lead (Pb)	ug/L	<1.0	<1.0	<1.0	2175952	<1.0	1.0	2182991
Selenium (Se)	ug/L	<1.0	<1.0	<1.0	2175952	<1.0	1.0	2182991
Uranium (U)	ug/L	<0.60	<0.60	<0.60	2175952	<0.60	0.60	2182991
Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	2175952	<5.0	5.0	2182991

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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TATA STEEL MINERALS CANADA
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Site Location: GOODWOOD
Your P.O. #: 3000000730

METALS-LAB LEACHATE (SOIL)

Lab BV ID		IY8897	IY8898	IY8899		
Sampling Date		2021/03/17 17:05	2021/03/26 17:45	2021/03/28 16:55		
COC Number		789989-01-01	789989-01-01	789989-01-01		
	Units	**TSMC-81334-CTEU-9 Lab-Dup**	**TSMC-81462-CTEU-9**	**TSMC-81470-CTEU-9**	**RDL**	**QC Batch**
METALS						
Silver (Ag) †	ug/L	<0.30	<0.30	<0.30	0.30	2182991
Arsenic (As)	ug/L	<2.0	<2.0	<2.0	2.0	2182991
Barium (Ba)	ug/L	<5.0	7.5	<5.0	5.0	2182991
Boron (B)	ug/L	<50	<50	<50	50	2182991
Cadmium (Cd)	ug/L	<1.0	<1.0	<1.0	1.0	2182991
Chromium (Cr)	ug/L	<7.0	<7.0	<7.0	7.0	2182991
Cobalt (Co)	ug/L	<10	<10	<10	10	2182991
Copper (Cu)	ug/L	<3.0	<3.0	<3.0	3.0	2182991
Tin (Sn) †	ug/L	<50	<50	<50	50	2182991
Iron (Fe)	ug/L	<100	280	180	100	2182991
Manganese (Mn)	ug/L	<3.0	<3.0	4.6	3.0	2182991
Mercury (Hg)	ug/L	<0.50	<0.50	<0.50	0.50	2182991
Molybdenum (Mo)	ug/L	<10	<10	<10	10	2182991
Nickel (Ni)	ug/L	<6.0	<6.0	<6.0	6.0	2182991
Lead (Pb)	ug/L	<1.0	<1.0	<1.0	1.0	2182991
Selenium (Se)	ug/L	<1.0	<1.0	<1.0	1.0	2182991
Uranium (U)	ug/L	<0.60	<0.60	<0.60	0.60	2182991
Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	5.0	2182991

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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Site Location: GOODWOOD
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METALS-LAB LEACHATE (SOIL)

Lab BV ID		IY8902	IY8903	IY8904		
Sampling Date		2021/03/17 17:05	2021/03/26 17:45	2021/03/28 16:55		
COC Number		789989-01-01	789989-01-01	789989-01-01		
	Units	**TSMC-81334- (SPLP1312)**	**TSMC-81462- (SPLP1312)**	**TSMC-81470- (SPLP1312)**	**RDL**	**QC Batch**
METALS						
Silver (Ag) †	ug/L	<0.30	<0.30	<0.30	0.30	2175947
Arsenic (As)	ug/L	<2.0	<2.0	<2.0	2.0	2175947
Boron (B)	ug/L	<50	<50	<50	50	2175947
Cadmium (Cd)	ug/L	<1.0	<1.0	<1.0	1.0	2175947
Chromium (Cr)	ug/L	<7.0	<7.0	<7.0	7.0	2175947
Cobalt (Co)	ug/L	<10	<10	<10	10	2175947
Copper (Cu)	ug/L	<3.0	<3.0	<3.0	3.0	2175947
Tin (Sn) †	ug/L	<50	<50	<50	50	2175947
Iron (Fe)	ug/L	<100	<100	<100	100	2175947
Manganese (Mn)	ug/L	58	<3.0	110	3.0	2175947
Mercury (Hg)	ug/L	<0.50	<0.50	<0.50	0.50	2175947
Molybdenum (Mo)	ug/L	<10	<10	<10	10	2175947
Nickel (Ni)	ug/L	<6.0	<6.0	<6.0	6.0	2175947
Lead (Pb)	ug/L	<1.0	<1.0	<1.0	1.0	2175947
Selenium (Se)	ug/L	<1.0	<1.0	<1.0	1.0	2175947
Uranium (U)	ug/L	<0.60	<0.60	<0.60	0.60	2175947
Zinc (Zn)	ug/L	<5.0	<5.0	9.2	5.0	2175947

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SOIL)

Lab BV ID					IY8892	IY8893	IY8894		
Sampling Date					2021/03/17 17:05	2021/03/26 17:45	2021/03/28 16:55		
COC Number					789989-01-01	789989-01-01	789989-01-01		
	Units	**A**	**B**	**C**	**TSMC-81334**	**TSMC-81462**	**TSMC-81470**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	12	18	13	N/A	N/A
CONVENTIONALS									
Fluoride (F)	mg/kg	**200**	400	2000	<1.0	<1.0	<1.0	1.0	2182030
Nitrates (N-NO3-) †	mg/kg	-	-	-	1.5	<1.0	<1.0	1.0	2182029
Nitrites (N-NO2-) †	mg/kg	-	-	-	<0.20	<0.20	<0.20	0.20	2182029
Nitrate (N) and Nitrite(N)	mg/kg	-	-	-	1.5	<1.0	<1.0	1.0	2182029

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Lab BV ID		IY8892	IY8893	IY8894		IY8897		
Sampling Date		2021/03/17 17:05	2021/03/26 17:45	2021/03/28 16:55		2021/03/17 17:05		
COC Number		789989-01-01	789989-01-01	789989-01-01		789989-01-01		
	Units	TSMC-81334	TSMC-81462	TSMC-81470	QC Batch	TSMC-81334-CTEU-9	RDL	QC Batch
% MOISTURE	%	12	18	13	N/A	N/A	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	<1.0	<1.0	2176039	<1.0	1.0	2182954
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	<0.20	2176041	<0.20	0.20	2182958
Nitrates (N-NO3-)	mg/L	<0.20	<0.20	<0.20	2176041	0.37	0.20	2182958
Nitrate (N) and Nitrite(N)	mg/L	<0.20	<0.20	<0.20	2176041	0.37	0.20	2182958

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Lab BV ID		IY8898	IY8899		IY8902		
Sampling Date		2021/03/26 17:45	2021/03/28 16:55		2021/03/17 17:05		
COC Number		789989-01-01	789989-01-01		789989-01-01		
	Units	TSMC-81462-CTEU-9	TSMC-81470-CTEU-9	QC Batch	TSMC-81334- (SPLP1312)	RDL	QC Batch
CONVENTIONALS							
Fluoride (F)	mg/L	<1.0	2.0	2182954	<1.0	1.0	2176034
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	2182958	<0.20	0.20	2176044
Nitrates (N-NO3-)	mg/L	<0.20	<0.20	2182958	N/A	0.20	N/A
Nitrate (N) and Nitrite(N)	mg/L	<0.20	<0.20	2182958	N/A	0.20	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Lab BV ID		IY8903	IY8904		
Sampling Date		2021/03/26 17:45	2021/03/28 16:55		
COC Number		789989-01-01	789989-01-01		
	Units	TSMC-81462- (SPLP1312)	TSMC-81470- (SPLP1312)	RDL	QC Batch
CONVENTIONALS					
Fluoride (F)	mg/L	<1.0	<1.0	1.0	2176034
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	0.20	2176044

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TCLP-EPA 1311 (SOIL)

Lab BV ID		IY8892	IY8893	IY8894	IY8894	
Sampling Date		2021/03/17 17:05	2021/03/26 17:45	2021/03/28 16:55	2021/03/28 16:55	
COC Number		789989-01-01	789989-01-01	789989-01-01	789989-01-01	
	Units	**TSMC-81334**	**TSMC-81462**	**TSMC-81470**	**TSMC-81470 Lab-Dup**	**QC Batch**
% MOISTURE	%	12	18	13	13	N/A
Leachates						
Weight of sample (g)	n/a	20.1	20.0	20.2	20.2	2175413
pH of pre-test	n/a	<1.68	<1.68	<1.68	<1.68	2175413
pH end of leaching	n/a	4.93	4.95	4.94	5.07	2175413
Volume extracting fluid 1 (ml)	n/a	400	400	400	400	2175413

QC Batch = Quality Control Batch
N/A = Not Applicable

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Site Location: GOODWOOD
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SPLP-EPA 1312 (SOIL)

Lab BV ID		IY8902	IY8903	IY8904	
Sampling Date		2021/03/17 17:05	2021/03/26 17:45	2021/03/28 16:55	
COC Number		789989-01-01	789989-01-01	789989-01-01	
	Units	**TSMC-81334- (SPLP1312)**	**TSMC-81462- (SPLP1312)**	**TSMC-81470- (SPLP1312)**	**QC Batch**
Leachates					
Weight of sample (g)	n/a	25.1	25.0	25.1	2175595
Volume of extracting fluid (mL)	n/a	500	500	500	2175595
pH after 18 hours leaching	n/a	5.10	6.50	5.49	2175595
pH of extracting fluid	n/a	4.16	4.16	4.16	2175595
QC Batch = Quality Control Batch					

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WATER LEACHATE-CTEU-9 (SOIL)

Lab BV ID		IY8897	IY8898	IY8899	
Sampling Date		2021/03/17 17:05	2021/03/26 17:45	2021/03/28 16:55	
COC Number		789989-01-01	789989-01-01	789989-01-01	
	Units	**TSMC-81334-CTEU-9**	**TSMC-81462-CTEU-9**	**TSMC-81470-CTEU-9**	**QC Batch**
Leachates					
Weight of sample (g)	n/a	40.1	40.1	40.0	2180972
pH Deionized water	n/a	5.45	5.45	5.45	2180972
Date extraction fluid added	n/a	2021/04/28	2021/04/28	2021/04/28	2180972
Date leaching terminated	n/a	2021/05/05	2021/05/05	2021/05/05	2180972
Volume of extracting fluid (mL)	n/a	160	160	160	2180972
pH after 7 days of leaching	n/a	8.15	7.76	9.00	2180972
QC Batch = Quality Control Batch					

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GENERAL COMMENTS

A,B,C: Soil Criteria following appendix 2 of the " Guide d'intervention-Protection des sols et réhabilitation des terrains contaminés. MELCC, May 2021." 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 mentionned 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 (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

Results relate only to the items tested.

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TATA STEEL MINERALS CANADA
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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2175413	SMD	Method Blank	pH end of leaching	2021/04/08	4.90/2.90		n/a
			Volume extracting fluid 1 (ml)	2021/04/08	400		n/a
2175595	SMD	Method Blank	Volume of extracting fluid (mL)	2021/04/08	500		n/a
			pH after 18 hours leaching	2021/04/08	4.23		n/a
			pH of extracting fluid	2021/04/08	4.16		n/a
2175947	NET	LEACH. BLANK	Silver (Ag)	2021/04/09	<0.30		ug/L
			Arsenic (As)	2021/04/09	<2.0		ug/L
			Boron (B)	2021/04/09	<50		ug/L
			Cadmium (Cd)	2021/04/09	<1.0		ug/L
			Chromium (Cr)	2021/04/09	<7.0		ug/L
			Cobalt (Co)	2021/04/09	<10		ug/L
			Copper (Cu)	2021/04/09	8.5, RDL=3.0		ug/L
			Tin (Sn)	2021/04/09	<50		ug/L
			Iron (Fe)	2021/04/09	<100		ug/L
			Manganese (Mn)	2021/04/09	<3.0		ug/L
			Mercury (Hg)	2021/04/09	<0.50		ug/L
			Molybdenum (Mo)	2021/04/09	<10		ug/L
			Nickel (Ni)	2021/04/09	<6.0		ug/L
			Lead (Pb)	2021/04/09	<1.0		ug/L
			Selenium (Se)	2021/04/09	<1.0		ug/L
			Uranium (U)	2021/04/09	<0.60		ug/L
			Zinc (Zn)	2021/04/09	<5.0		ug/L
2175947	NET	Spiked Blank	Silver (Ag)	2021/04/09		96	%
			Arsenic (As)	2021/04/09		101	%
			Boron (B)	2021/04/09		102	%
			Cadmium (Cd)	2021/04/09		102	%
			Chromium (Cr)	2021/04/09		95	%
			Cobalt (Co)	2021/04/09		95	%
			Copper (Cu)	2021/04/09		93	%
			Tin (Sn)	2021/04/09		111	%
			Iron (Fe)	2021/04/09		100	%
			Manganese (Mn)	2021/04/09		100	%
			Mercury (Hg)	2021/04/09		94	%
			Molybdenum (Mo)	2021/04/09		102	%
			Nickel (Ni)	2021/04/09		93	%
			Lead (Pb)	2021/04/09		96	%
			Selenium (Se)	2021/04/09		99	%
			Uranium (U)	2021/04/09		99	%
			Zinc (Zn)	2021/04/09		93	%
2175952	NET	LEACH. BLANK	Silver (Ag)	2021/04/09	<0.30		ug/L
			Arsenic (As)	2021/04/09	<2.0		ug/L
			Barium (Ba)	2021/04/09	<5.0		ug/L
			Boron (B)	2021/04/09	<50		ug/L
			Cadmium (Cd)	2021/04/09	<1.0		ug/L
			Chromium (Cr)	2021/04/09	<7.0		ug/L
			Cobalt (Co)	2021/04/09	<10		ug/L
			Copper (Cu)	2021/04/09	5.7, RDL=3.0		ug/L
			Tin (Sn)	2021/04/09	<50		ug/L
			Iron (Fe)	2021/04/09	<100		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Manganese (Mn)	2021/04/09	<3.0		ug/L
			Mercury (Hg)	2021/04/09	<0.50		ug/L
			Molybdenum (Mo)	2021/04/09	<10		ug/L
			Nickel (Ni)	2021/04/09	<6.0		ug/L
			Lead (Pb)	2021/04/09	<1.0		ug/L
			Selenium (Se)	2021/04/09	<1.0		ug/L
			Uranium (U)	2021/04/09	<0.60		ug/L
			Zinc (Zn)	2021/04/09	<5.0		ug/L
2175952	NET	Spiked Blank	Silver (Ag)	2021/04/09		98	%
			Arsenic (As)	2021/04/09		104	%
			Barium (Ba)	2021/04/09		99	%
			Boron (B)	2021/04/09		104	%
			Cadmium (Cd)	2021/04/09		100	%
			Chromium (Cr)	2021/04/09		99	%
			Cobalt (Co)	2021/04/09		98	%
			Copper (Cu)	2021/04/09		97	%
			Tin (Sn)	2021/04/09		111	%
			Iron (Fe)	2021/04/09		103	%
			Manganese (Mn)	2021/04/09		103	%
			Mercury (Hg)	2021/04/09		97	%
			Molybdenum (Mo)	2021/04/09		102	%
			Nickel (Ni)	2021/04/09		98	%
			Lead (Pb)	2021/04/09		99	%
			Selenium (Se)	2021/04/09		102	%
			Uranium (U)	2021/04/09		103	%
			Zinc (Zn)	2021/04/09		98	%
2176034	AJ1	LEACH. BLANK	Fluoride (F)	2021/04/08	<1.0		mg/L
2176034	AJ1	Spiked Blank	Fluoride (F)	2021/04/08		103	%
2176039	AJ1	LEACH. BLANK	Fluoride (F)	2021/04/08	<1.0		mg/L
2176039	AJ1	Spiked Blank	Fluoride (F)	2021/04/08		103	%
2176041	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/04/08	<0.20		mg/L
			Nitrates (N-NO3-)	2021/04/08	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/04/08	<0.20		mg/L
2176041	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/04/08		97	%
			Nitrates (N-NO3-)	2021/04/08		94	%
			Nitrate (N) and Nitrite(N)	2021/04/08		95	%
2176044	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/04/08	<0.20		mg/L
2176044	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/04/08		95	%
2180972	SMD	Method Blank	pH Deionized water	2021/05/05	5.45		n/a
			Date extraction fluid added	2021/05/05	2021/04/28		n/a
			Date leaching terminated	2021/05/05	2021/05/05		n/a
			Volume of extracting fluid (mL)	2021/05/05	160		n/a
			pH after 7 days of leaching	2021/05/05	7.14		n/a
2181808	NET	Spiked Blank	Silver (Ag)	2021/04/30		83	%
			Arsenic (As)	2021/04/30		92	%
			Barium (Ba)	2021/04/30		95	%
			Boron (B)	2021/04/30		108	%
			Cadmium (Cd)	2021/04/30		91	%
			Chromium (Cr)	2021/04/30		90	%
			Copper (Cu)	2021/04/30		91	%
			Cobalt (Co)	2021/04/30		85	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Tin (Sn)	2021/04/30		91	%
			Iron (Fe)	2021/04/30		95	%
			Manganese (Mn)	2021/04/30		91	%
			Molybdenum (Mo)	2021/04/30		90	%
			Nickel (Ni)	2021/04/30		93	%
			Mercury (Hg)	2021/04/30		101	%
			Lead (Pb)	2021/04/30		95	%
			Selenium (Se)	2021/04/30		97	%
			Uranium (U)	2021/04/30		96	%
			Zinc (Zn)	2021/04/30		92	%
2181808	NET	Method Blank	Silver (Ag)	2021/04/30	<0.50		mg/kg
			Arsenic (As)	2021/04/30	<2.0		mg/kg
			Barium (Ba)	2021/04/30	<4.0		mg/kg
			Boron (B)	2021/04/30	<2.0		mg/kg
			Cadmium (Cd)	2021/04/30	<0.10		mg/kg
			Chromium (Cr)	2021/04/30	<1.0		mg/kg
			Copper (Cu)	2021/04/30	<1.0		mg/kg
			Cobalt (Co)	2021/04/30	<1.0		mg/kg
			Tin (Sn)	2021/04/30	<1.0		mg/kg
			Iron (Fe)	2021/04/30	<10		mg/kg
			Manganese (Mn)	2021/04/30	<2.0		mg/kg
			Molybdenum (Mo)	2021/04/30	<0.50		mg/kg
			Nickel (Ni)	2021/04/30	<0.50		mg/kg
			Mercury (Hg)	2021/04/30	<0.010		mg/kg
			Lead (Pb)	2021/04/30	<1.0		mg/kg
			Selenium (Se)	2021/04/30	<0.50		mg/kg
			Uranium (U)	2021/04/30	<2.0		mg/kg
			Zinc (Zn)	2021/04/30	<5.0		mg/kg
2182029	VPA	Spiked Blank	Nitrates (N-NO3-)	2021/05/01		98	%
			Nitrites (N-NO2-)	2021/05/01		98	%
			Nitrate (N) and Nitrite(N)	2021/05/01		98	%
2182029	VPA	Method Blank	Nitrates (N-NO3-)	2021/05/01	<1.0		mg/kg
			Nitrites (N-NO2-)	2021/05/01	<0.20		mg/kg
			Nitrate (N) and Nitrite(N)	2021/05/01	<1.0		mg/kg
2182030	VPA	Spiked Blank	Fluoride (F)	2021/05/01		98	%
2182030	VPA	Method Blank	Fluoride (F)	2021/05/01	<1.0		mg/kg
2182954	SBD	LEACH. BLANK	Fluoride (F)	2021/05/05	<1.0		mg/L
2182954	SBD	Spiked Blank	Fluoride (F)	2021/05/05		100	%
2182958	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/05/06	<0.20		mg/L
			Nitrates (N-NO3-)	2021/05/06	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/05/06	<0.20		mg/L
2182958	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/05/06		99	%
			Nitrates (N-NO3-)	2021/05/06		99	%
			Nitrate (N) and Nitrite(N)	2021/05/06		99	%
2182991	RB2	LEACH. BLANK	Silver (Ag)	2021/05/06	<0.30		ug/L
			Arsenic (As)	2021/05/06	<2.0		ug/L
			Barium (Ba)	2021/05/06	<5.0		ug/L
			Boron (B)	2021/05/06	<50		ug/L
			Cadmium (Cd)	2021/05/06	<1.0		ug/L
			Chromium (Cr)	2021/05/06	<7.0		ug/L
			Cobalt (Co)	2021/05/06	<10		ug/L

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Lab BV Job #: C113725
Report Date: 2021/06/01

TATA STEEL MINERALS CANADA
Client Project #: GOODWOOD ARD
Site Location: GOODWOOD
Your P.O. #: 3000000730

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Copper (Cu)	2021/05/06	<3.0		ug/L
			Tin (Sn)	2021/05/06	<50		ug/L
			Iron (Fe)	2021/05/06	<100		ug/L
			Manganese (Mn)	2021/05/06	<3.0		ug/L
			Mercury (Hg)	2021/05/06	<0.50		ug/L
			Molybdenum (Mo)	2021/05/06	<10		ug/L
			Nickel (Ni)	2021/05/06	<6.0		ug/L
			Lead (Pb)	2021/05/06	<1.0		ug/L
			Selenium (Se)	2021/05/06	<1.0		ug/L
			Uranium (U)	2021/05/06	<0.60		ug/L
			Zinc (Zn)	2021/05/06	<5.0		ug/L
2182991	RB2	Spiked Blank	Silver (Ag)	2021/05/06		93	%
			Arsenic (As)	2021/05/06		103	%
			Barium (Ba)	2021/05/06		97	%
			Boron (B)	2021/05/06		103	%
			Cadmium (Cd)	2021/05/06		98	%
			Chromium (Cr)	2021/05/06		99	%
			Cobalt (Co)	2021/05/06		98	%
			Copper (Cu)	2021/05/06		97	%
			Tin (Sn)	2021/05/06		111	%
			Iron (Fe)	2021/05/06		101	%
			Manganese (Mn)	2021/05/06		103	%
			Mercury (Hg)	2021/05/06		101	%
			Molybdenum (Mo)	2021/05/06		102	%
			Nickel (Ni)	2021/05/06		97	%
			Lead (Pb)	2021/05/06		95	%
			Selenium (Se)	2021/05/06		93	%
			Uranium (U)	2021/05/06		99	%
			Zinc (Zn)	2021/05/06		100	%

RDL = Reportable Detection Limit

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Alex Thibert
Membre OCQ #2020-05

Alex Thibert, B.Sc., Chemist, Montréal, Analyst II, Chemist in Training

Frédéric Arnau, B.Sc., Chemist, Montreal, Scientific Service Specialist

Faouzi Sarsi, B.Sc. Chemist, Montréal, SR Analyst

Miryam Assayag, B.Sc. Chemist, Montréal, Team Leader

Michelina Cinquino, Analyst II

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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For Service Group specific validation please refer to the Validation Signature Page.

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Your P.O. #: 3000000997
Your Project #: ARD
Site Location: GOODWOOD
Your C.O.C. #: 808542-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/06/07
Report #: R2662731
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C117583
Received: 2021/04/23, 16:30

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acid Base Accounting (Sobek modified) (1)	3	2021/06/07	N/A		
Grinding	3	N/A	2021/04/28	STL SOP-00019	N/A
Fluoride (free)	3	2021/04/30	2021/04/30	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	3	N/A	2021/04/30	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	3	N/A	2021/05/01	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	3	N/A	2021/05/14	STL SOP-00038	SM 23 4500-F m
Mercury by ICP-MS	3	2021/04/26	2021/04/30	III-105 rév.10 03/09/25	MA.200–Mét. 1.2 R7
Water Leachate (CTEU - 9)	3	2021/05/04	2021/05/11	STL SOP-00024	MA100-Lixcom1.1 R1 m
Acid rain simulation leachate (EPA 1312)	3	2021/04/29	2021/04/30	STL SOP-00024	MA100-Lixcom1.1 R1 m
Total Extractable Metals (low level)	3	2021/04/30	2021/04/30	STL SOP-00069	MA.200–Mét. 1.2 R7
Metals - Leached	6	2021/04/30	2021/04/30	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	3	2021/05/11	2021/05/13	STL SOP-00062	MA.200–Mét. 1.2 R7
Nitrate and/or Nitrite- Leached	3	N/A	2021/05/12	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	3	N/A	2021/05/02	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	3	N/A	2021/05/06	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	3	2021/04/30	2021/05/01	STL SOP-00014	MA.300–Ions 1.3 R3 m
Toxicity Charact. Leach. Proc.(EPA 1311)	3	2021/05/03	2021/05/04	STL SOP-00024	MA100-Lixcom1.1 R1 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

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Your P.O. #: 3000000997
Your Project #: ARD
Site Location: GOODWOOD
Your C.O.C. #: 808542-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/06/07
Report #: R2662731
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C117583
Received: 2021/04/23, 16:30
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 Bureau Veritas, 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 Bureau Veritas - Burnaby

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Martine Lepage
Project Manager and Account Manager
09 Jun 2021 08:25:52

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
==========
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Lab BV Job #: C117583
Report Date: 2021/06/07

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD
Your P.O. #: 3000000997
Sampler Initials: CS

TOTAL EXTRACTABLE METALS (SOIL)

Lab BV ID					JA6221	JA6222	JA6223		
Sampling Date					2021/02/20	2021/04/04	2021/04/12		
COC Number					808542-01-01	808542-01-01	808542-01-01		
	Units	**A**	**B**	**C**	**TSMC-81181**	**TSMC-81539**	**TSMC-81655**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	0.2	3.6	7.4	N/A	N/A
METALS									
Silver (Ag)	mg/kg	**2**	20	40	<0.50	<0.50	<0.50	0.50	2181623
Arsenic (As)	mg/kg	**6**	30	50	**11**	3.3	5.2	2.0	2181623
Barium (Ba)	mg/kg	**340**	500	2000	<4.0	<4.0	<4.0	4.0	2181623
Boron (B)	mg/kg	**-**	-	-	4.7	3.2	2.5	2.0	2181623
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	<0.10	<0.10	0.10	2181623
Chromium (Cr)	mg/kg	**100**	250	800	1.8	<1.0	1.6	1.0	2181623
Copper (Cu)	mg/kg	**50**	100	500	7.4	1.4	7.2	1.0	2181623
Cobalt (Co)	mg/kg	**25**	50	300	5.4	4.3	9.6	1.0	2181623
Tin (Sn)	mg/kg	**5**	50	300	<1.0	<1.0	<1.0	1.0	2181623
Iron (Fe) †	mg/kg	**-**	-	-	150000	170000	140000	100	2181623
Manganese (Mn)	mg/kg	**1000**	1000	2200	420	420	290	2.0	2181623
Molybdenum (Mo)	mg/kg	**2**	10	40	<0.50	<0.50	<0.50	0.50	2181623
Nickel (Ni)	mg/kg	**50**	100	500	1.5	<0.50	1.2	0.50	2181623
Mercury (Hg)	mg/kg	**0.2**	2	10	0.10	0.025	0.019	0.010	2181623
Lead (Pb)	mg/kg	**50**	500	1000	1.3	1.5	3.4	1.0	2181623
Selenium (Se)	mg/kg	**1**	3	10	<0.50	<0.50	<0.50	0.50	2181623
Uranium (U) †	mg/kg	**-**	-	-	<2.0	<2.0	<2.0	2.0	2181623
Zinc (Zn)	mg/kg	**140**	500	1500	<5.0	<5.0	6.2	5.0	2181623

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

2021/06/07 15:21

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Lab BV Job #: C117583
Report Date: 2021/06/07

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD
Your P.O. #: 3000000997
Sampler Initials: CS

METALS-LAB LEACHATE (SOIL)

Lab BV ID		JA6221	JA6222	JA6223		JA6334		
Sampling Date		2021/02/20	2021/04/04	2021/04/12		2021/02/20		
COC Number		808542-01-01	808542-01-01	808542-01-01		808542-01-01		
	Units	**TSMC-81181**	**TSMC-81539**	**TSMC-81655**	**QC Batch**	**TSMC-81181-CTEU-9**	**RDL**	**QC Batch**
% MOISTURE	%	0.2	3.6	7.4	N/A	N/A	N/A	N/A
METALS								
Silver (Ag) †	ug/L	<0.30	<0.30	<0.30	2181778	<0.30	0.30	2184801
Arsenic (As)	ug/L	<2.0	<2.0	<2.0	2181778	<2.0	2.0	2184801
Barium (Ba)	ug/L	16	<5.0	5.0	2181778	15	5.0	2184801
Boron (B)	ug/L	<50	<50	<50	2181778	<50	50	2184801
Cadmium (Cd)	ug/L	<1.0	<1.0	<1.0	2181778	<1.0	1.0	2184801
Chromium (Cr)	ug/L	<7.0	<7.0	<7.0	2181778	<7.0	7.0	2184801
Cobalt (Co)	ug/L	<10	<10	<10	2181778	<10	10	2184801
Copper (Cu)	ug/L	<3.0	<3.0	<3.0	2181778	<3.0	3.0	2184801
Tin (Sn) †	ug/L	<50	<50	<50	2181778	<50	50	2184801
Iron (Fe)	ug/L	110	160	<100	2181778	<100	100	2184801
Manganese (Mn)	ug/L	320	100	63	2181778	11	3.0	2184801
Mercury (Hg)	ug/L	<0.50	<0.50	<0.50	2181778	<0.50	0.50	2184801
Molybdenum (Mo)	ug/L	<10	<10	<10	2181778	<10	10	2184801
Nickel (Ni)	ug/L	<6.0	<6.0	<6.0	2181778	<6.0	6.0	2184801
Lead (Pb)	ug/L	<1.0	<1.0	<1.0	2181778	<1.0	1.0	2184801
Selenium (Se)	ug/L	2.8	<1.0	<1.0	2181778	<1.0	1.0	2184801
Uranium (U)	ug/L	<0.60	<0.60	<0.60	2181778	<0.60	0.60	2184801
Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	2181778	<5.0	5.0	2184801

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

2021/06/07 15:21

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Lab BV Job #: C117583
Report Date: 2021/06/07

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD
Your P.O. #: 3000000997
Sampler Initials: CS

METALS-LAB LEACHATE (SOIL)

Lab BV ID		JA6344	JA6346		JA6387		
Sampling Date		2021/04/04	2021/04/12		2021/02/20		
COC Number		808542-01-01	808542-01-01		808542-01-01		
	Units	TSMC-81539-CTEU-9	TSMC-81655-CTEU-9	QC Batch	TSMC-81181-(SPLP1312)	RDL	QC Batch
METALS							
Silver (Ag) †	ug/L	<0.30	<0.30	2184801	<0.30	0.30	2181852
Arsenic (As)	ug/L	<2.0	<2.0	2184801	<2.0	2.0	2181852
Barium (Ba)	ug/L	<5.0	<5.0	2184801	<5.0	5.0	2181852
Boron (B)	ug/L	<50	<50	2184801	<50	50	2181852
Cadmium (Cd)	ug/L	<1.0	<1.0	2184801	<1.0	1.0	2181852
Chromium (Cr)	ug/L	<7.0	<7.0	2184801	<7.0	7.0	2181852
Cobalt (Co)	ug/L	<10	<10	2184801	<10	10	2181852
Copper (Cu)	ug/L	<3.0	<3.0	2184801	<3.0	3.0	2181852
Tin (Sn) †	ug/L	<50	<50	2184801	<50	50	2181852
Iron (Fe)	ug/L	<100	310	2184801	<100	100	2181852
Manganese (Mn)	ug/L	<3.0	<3.0	2184801	130	3.0	2181852
Mercury (Hg)	ug/L	<0.50	<0.50	2184801	<0.50	0.50	2181852
Molybdenum (Mo)	ug/L	<10	<10	2184801	<10	10	2181852
Nickel (Ni)	ug/L	<6.0	<6.0	2184801	<6.0	6.0	2181852
Lead (Pb)	ug/L	<1.0	<1.0	2184801	<1.0	1.0	2181852
Selenium (Se)	ug/L	<1.0	<1.0	2184801	<1.0	1.0	2181852
Uranium (U)	ug/L	<0.60	<0.60	2184801	<0.60	0.60	2181852
Zinc (Zn)	ug/L	<5.0	<5.0	2184801	<5.0	5.0	2181852

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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METALS-LAB LEACHATE (SOIL)

Lab BV ID		JA6388	JA6389		
Sampling Date		2021/04/04	2021/04/12		
COC Number		808542-01-01	808542-01-01		
	Units	**TSMC-81539-(SPLP1312)**	**TSMC-81655-(SPLP1312)**	**RDL**	**QC Batch**
METALS					
Silver (Ag) †	ug/L	<0.30	<0.30	0.30	2181852
Arsenic (As)	ug/L	<2.0	<2.0	2.0	2181852
Barium (Ba)	ug/L	<5.0	<5.0	5.0	2181852
Boron (B)	ug/L	<50	<50	50	2181852
Cadmium (Cd)	ug/L	<1.0	<1.0	1.0	2181852
Chromium (Cr)	ug/L	<7.0	<7.0	7.0	2181852
Cobalt (Co)	ug/L	<10	<10	10	2181852
Copper (Cu)	ug/L	<3.0	<3.0	3.0	2181852
Tin (Sn) †	ug/L	<50	<50	50	2181852
Iron (Fe)	ug/L	<100	<100	100	2181852
Manganese (Mn)	ug/L	13	23	3.0	2181852
Mercury (Hg)	ug/L	<0.50	<0.50	0.50	2181852
Molybdenum (Mo)	ug/L	<10	<10	10	2181852
Nickel (Ni)	ug/L	<6.0	<6.0	6.0	2181852
Lead (Pb)	ug/L	<1.0	<1.0	1.0	2181852
Selenium (Se)	ug/L	<1.0	<1.0	1.0	2181852
Uranium (U)	ug/L	<0.60	<0.60	0.60	2181852
Zinc (Zn)	ug/L	<5.0	<5.0	5.0	2181852

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SOIL)

Lab BV ID					JA6221	JA6222	JA6223		
Sampling Date					2021/02/20	2021/04/04	2021/04/12		
COC Number					808542-01-01	808542-01-01	808542-01-01		
	Units	**A**	**B**	**C**	**TSMC-81181**	**TSMC-81539**	**TSMC-81655**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	0.2	3.6	7.4	N/A	N/A
CONVENTIONALS									
Fluoride (F)	mg/kg	**200**	400	2000	<1.0	<1.0	<1.0	1.0	2181625
Nitrates (N-NO3-) †	mg/kg	-	-	-	<1.0	1.2	96	1.0	2181649
Nitrites (N-NO2-) †	mg/kg	-	-	-	<0.20	<0.20	<0.20	0.20	2181649
Nitrate (N) and Nitrite(N)	mg/kg	-	-	-	<1.0	1.2	96	1.0	2181649

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Lab BV ID		JA6221	JA6222	JA6223		JA6334		
Sampling Date		2021/02/20	2021/04/04	2021/04/12		2021/02/20		
COC Number		808542-01-01	808542-01-01	808542-01-01		808542-01-01		
	Units	**TSMC-81181**	**TSMC-81539**	**TSMC-81655**	**QC Batch**	**TSMC-81181-CTEU-9**	**RDL**	**QC Batch**
% MOISTURE	%	0.2	3.6	7.4	N/A	N/A	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	<1.0	<1.0	2181795	<1.0	1.0	2184906
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	<0.20	2182591	<0.20	0.20	2184909
Nitrate (N) and Nitrite(N)	mg/L	<0.20	<0.20	2.9	2182591	<0.20	0.20	2184909

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Lab BV ID		JA6344	JA6346		JA6387		
Sampling Date		2021/04/04	2021/04/12		2021/02/20		
COC Number		808542-01-01	808542-01-01		808542-01-01		
	Units	**TSMC-81539-CTEU-9**	**TSMC-81655-CTEU-9**	**QC Batch**	**TSMC-81181-(SPLP1312)**	**RDL**	**QC Batch**
CONVENTIONALS							
Fluoride (F)	mg/L	<1.0	<1.0	2184906	<1.0	1.0	2182027
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	2184909	<0.20	0.20	2182026
Nitrate (N) and Nitrite(N)	mg/L	<0.20	4.4	2184909	<0.20	0.20	2182026

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Lab BV ID		JA6388	JA6389		
Sampling Date		2021/04/04	2021/04/12		
COC Number		808542-01-01	808542-01-01		
	Units	**TSMC-81539-(SPLP1312)**	**TSMC-81655-(SPLP1312)**	**RDL**	**QC Batch**
CONVENTIONALS					
Fluoride (F)	mg/L	<1.0	<1.0	1.0	2182027
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	0.20	2182026
Nitrate (N) and Nitrite(N)	mg/L	0.21	2.9	0.20	2182026

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TCLP-EPA 1311 (SOIL)

Lab BV ID		JA6221	JA6222	JA6223	
Sampling Date		2021/02/20	2021/04/04	2021/04/12	
COC Number		808542-01-01	808542-01-01	808542-01-01	
	Units	**TSMC-81181**	**TSMC-81539**	**TSMC-81655**	**QC Batch**
% MOISTURE	%	0.2	3.6	7.4	N/A
Leachates					
Weight of sample (g)	n/a	20.1	20.1	20.0	2182160
pH end of leaching	n/a	5.14	5.08	4.92	2182160
Volume extracting fluid 1 (ml)	n/a	400	400	400	2182160

QC Batch = Quality Control Batch
N/A = Not Applicable

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SPLP-EPA 1312 (SOIL)

Lab BV ID		JA6387	JA6388	JA6389	
Sampling Date		2021/02/20	2021/04/04	2021/04/12	
COC Number		808542-01-01	808542-01-01	808542-01-01	
	Units	**TSMC-81181-(SPLP1312)**	**TSMC-81539-(SPLP1312)**	**TSMC-81655-(SPLP1312)**	**QC Batch**
Leachates					
Weight of sample (g)	n/a	25.1	25.0	25.0	2181332
Volume of extracting fluid (mL)	n/a	500	500	500	2181332
pH after 18 hours leaching	n/a	6.37	5.69	5.24	2181332
pH of extracting fluid	n/a	4.15	4.15	4.15	2181332
QC Batch = Quality Control Batch					

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WATER LEACHATE-CTEU-9 (SOIL)

Lab BV ID		JA6334	JA6344	JA6346	
Sampling Date		2021/02/20	2021/04/04	2021/04/12	
COC Number		808542-01-01	808542-01-01	808542-01-01	
	Units	**TSMC-81181-CTEU-9**	**TSMC-81539-CTEU-9**	**TSMC-81655-CTEU-9**	**QC Batch**
Leachates					
Weight of sample (g)	n/a	40.1	40.0	40.1	2182500
pH Deionized water	n/a	5.83	5.83	5.83	2182500
Date extraction fluid added	n/a	2021/05/04	2021/05/04	2021/05/04	2182500
Date leaching terminated	n/a	2021/05/11	2021/05/11	2021/05/11	2182500
Volume of extracting fluid (mL)	n/a	160	160	160	2182500
pH after 7 days of leaching	n/a	6.83	6.80	7.65	2182500
QC Batch = Quality Control Batch					

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GENERAL COMMENTS

Total Extractable Metals (low level): Holding time already past upon reception.: JA6221

A,B,C: Soil Criteria following appendix 2 of the " Guide d'intervention-Protection des sols et réhabilitation des terrains contaminés. MELCC, May 2021." 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 mentionned 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 (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

Nitrites and Nitrates: Due to the sample matrix, a better detection limit cannot be reported.

TCLP-EPA 1311 (SOIL)

pH du pré-test: Veuillez noter que le résultat de l'échantillon est en dehors de la courbe de calibration (pH 4 - 10), et aussi dehors des limites de la linéarité (pH 1.68 - 13.0).

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2181332	SMD	Method Blank	Volume of extracting fluid (mL)	2021/04/30	500		n/a
			pH after 18 hours leaching	2021/04/30	4.22		n/a
			pH of extracting fluid	2021/04/30	4.15		n/a
2181623	AT7	Spiked Blank	Silver (Ag)	2021/04/30		86	%
			Arsenic (As)	2021/04/30		95	%
			Barium (Ba)	2021/04/30		96	%
			Boron (B)	2021/04/30		111	%
			Cadmium (Cd)	2021/04/30		94	%
			Chromium (Cr)	2021/04/30		94	%
			Copper (Cu)	2021/04/30		93	%
			Cobalt (Co)	2021/04/30		86	%
			Tin (Sn)	2021/04/30		93	%
			Iron (Fe)	2021/04/30		98	%
			Manganese (Mn)	2021/04/30		93	%
			Molybdenum (Mo)	2021/04/30		86	%
			Nickel (Ni)	2021/04/30		95	%
			Mercury (Hg)	2021/04/30		94	%
			Lead (Pb)	2021/04/30		97	%
			Selenium (Se)	2021/04/30		98	%
			Uranium (U)	2021/04/30		98	%
			Zinc (Zn)	2021/04/30		94	%
2181623	AT7	Method Blank	Silver (Ag)	2021/04/30	<0.50		mg/kg
			Arsenic (As)	2021/04/30	<2.0		mg/kg
			Barium (Ba)	2021/04/30	<4.0		mg/kg
			Boron (B)	2021/04/30	<2.0		mg/kg
			Cadmium (Cd)	2021/04/30	<0.10		mg/kg
			Chromium (Cr)	2021/04/30	<1.0		mg/kg
			Copper (Cu)	2021/04/30	<1.0		mg/kg
			Cobalt (Co)	2021/04/30	<1.0		mg/kg
			Tin (Sn)	2021/04/30	<1.0		mg/kg
			Iron (Fe)	2021/04/30	<10		mg/kg
			Manganese (Mn)	2021/04/30	<2.0		mg/kg
			Molybdenum (Mo)	2021/04/30	<0.50		mg/kg
			Nickel (Ni)	2021/04/30	<0.50		mg/kg
			Mercury (Hg)	2021/04/30	<0.010		mg/kg
			Lead (Pb)	2021/04/30	<1.0		mg/kg
			Selenium (Se)	2021/04/30	<0.50		mg/kg
			Uranium (U)	2021/04/30	<2.0		mg/kg
			Zinc (Zn)	2021/04/30	<5.0		mg/kg
2181625	VPA	Spiked Blank	Fluoride (F)	2021/04/30		101	%
2181625	VPA	Method Blank	Fluoride (F)	2021/04/30	<1.0		mg/kg
2181649	TGU	Spiked Blank	Nitrates (N-NO3-)	2021/05/01		103	%
			Nitrites (N-NO2-)	2021/05/01		100	%
			Nitrate (N) and Nitrite(N)	2021/05/01		101	%
2181649	TGU	Method Blank	Nitrates (N-NO3-)	2021/05/01	<1.0		mg/kg
			Nitrites (N-NO2-)	2021/05/01	<0.20		mg/kg
			Nitrate (N) and Nitrite(N)	2021/05/01	<1.0		mg/kg
2181778	NET	LEACH. BLANK	Silver (Ag)	2021/04/30	<0.30		ug/L
			Arsenic (As)	2021/04/30	<2.0		ug/L
			Barium (Ba)	2021/04/30	<5.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Boron (B)	2021/04/30	<50		ug/L
			Cadmium (Cd)	2021/04/30	<1.0		ug/L
			Chromium (Cr)	2021/04/30	<7.0		ug/L
			Cobalt (Co)	2021/04/30	<10		ug/L
			Copper (Cu)	2021/04/30	<3.0		ug/L
			Tin (Sn)	2021/04/30	<50		ug/L
			Iron (Fe)	2021/04/30	<100		ug/L
			Manganese (Mn)	2021/04/30	<3.0		ug/L
			Mercury (Hg)	2021/04/30	<0.50		ug/L
			Molybdenum (Mo)	2021/04/30	<10		ug/L
			Nickel (Ni)	2021/04/30	<6.0		ug/L
			Lead (Pb)	2021/04/30	<1.0		ug/L
			Selenium (Se)	2021/04/30	<1.0		ug/L
			Uranium (U)	2021/04/30	<0.60		ug/L
			Zinc (Zn)	2021/04/30	<5.0		ug/L
2181778	NET	Spiked Blank	Silver (Ag)	2021/04/30		92	%
			Arsenic (As)	2021/04/30		100	%
			Barium (Ba)	2021/04/30		96	%
			Boron (B)	2021/04/30		107	%
			Cadmium (Cd)	2021/04/30		100	%
			Chromium (Cr)	2021/04/30		95	%
			Cobalt (Co)	2021/04/30		96	%
			Copper (Cu)	2021/04/30		94	%
			Tin (Sn)	2021/04/30		107	%
			Iron (Fe)	2021/04/30		101	%
			Manganese (Mn)	2021/04/30		96	%
			Mercury (Hg)	2021/04/30		100	%
			Molybdenum (Mo)	2021/04/30		99	%
			Nickel (Ni)	2021/04/30		94	%
			Lead (Pb)	2021/04/30		95	%
			Selenium (Se)	2021/04/30		99	%
			Uranium (U)	2021/04/30		94	%
			Zinc (Zn)	2021/04/30		96	%
2181795	VPA	LEACH. BLANK	Fluoride (F)	2021/04/30	<1.0		mg/L
2181795	VPA	Spiked Blank	Fluoride (F)	2021/04/30		107	%
2181852	NET	LEACH. BLANK	Silver (Ag)	2021/04/30	<0.30		ug/L
			Arsenic (As)	2021/04/30	<2.0		ug/L
			Barium (Ba)	2021/04/30	<5.0		ug/L
			Boron (B)	2021/04/30	<50		ug/L
			Cadmium (Cd)	2021/04/30	<1.0		ug/L
			Chromium (Cr)	2021/04/30	<7.0		ug/L
			Cobalt (Co)	2021/04/30	<10		ug/L
			Copper (Cu)	2021/04/30	<3.0		ug/L
			Tin (Sn)	2021/04/30	<50		ug/L
			Iron (Fe)	2021/04/30	<100		ug/L
			Manganese (Mn)	2021/04/30	<3.0		ug/L
			Mercury (Hg)	2021/04/30	<0.50		ug/L
			Molybdenum (Mo)	2021/04/30	<10		ug/L
			Nickel (Ni)	2021/04/30	<6.0		ug/L
			Lead (Pb)	2021/04/30	<1.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Selenium (Se)	2021/04/30	1.2, RDL=1.0		ug/L
			Uranium (U)	2021/04/30	<0.60		ug/L
			Zinc (Zn)	2021/04/30	<5.0		ug/L
2181852	NET	Spiked Blank	Silver (Ag)	2021/04/30		98	%
			Arsenic (As)	2021/04/30		100	%
			Barium (Ba)	2021/04/30		98	%
			Boron (B)	2021/04/30		106	%
			Cadmium (Cd)	2021/04/30		107	%
			Chromium (Cr)	2021/04/30		95	%
			Cobalt (Co)	2021/04/30		96	%
			Copper (Cu)	2021/04/30		94	%
			Tin (Sn)	2021/04/30		113	%
			Iron (Fe)	2021/04/30		100	%
			Manganese (Mn)	2021/04/30		99	%
			Mercury (Hg)	2021/04/30		100	%
			Molybdenum (Mo)	2021/04/30		106	%
			Nickel (Ni)	2021/04/30		93	%
			Lead (Pb)	2021/04/30		95	%
			Selenium (Se)	2021/04/30		108	%
			Uranium (U)	2021/04/30		94	%
			Zinc (Zn)	2021/04/30		96	%
2182026	JGZ	LEACH. BLANK	Nitrites (N-NO2-)	2021/05/02	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/05/02	<0.20		mg/L
2182026	JGZ	Spiked Blank	Nitrites (N-NO2-)	2021/05/02		101	%
			Nitrate (N) and Nitrite(N)	2021/05/02		103	%
2182027	VPA	LEACH. BLANK	Fluoride (F)	2021/05/01	<1.0		mg/L
2182027	VPA	Spiked Blank	Fluoride (F)	2021/05/01		101	%
2182160	SMD	Method Blank	pH end of leaching	2021/05/04	4.96		n/a
			Volume extracting fluid 1 (ml)	2021/05/04	400		n/a
2182500	SMD	Method Blank	pH Deionized water	2021/05/11	5.83		n/a
			Date extraction fluid added	2021/05/11	2021/05/04		n/a
			Date leaching terminated	2021/05/11	2021/05/11		n/a
			Volume of extracting fluid (mL)	2021/05/11	160		n/a
			pH after 7 days of leaching	2021/05/11	6.79		n/a
2182591	VPA	LEACH. BLANK	Nitrites (N-NO2-)	2021/05/05	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/05/05	<0.20		mg/L
2182591	VPA	Spiked Blank	Nitrites (N-NO2-)	2021/05/05		99	%
			Nitrate (N) and Nitrite(N)	2021/05/05		101	%
2184801	NET	LEACH. BLANK	Silver (Ag)	2021/05/13	<0.30		ug/L
			Arsenic (As)	2021/05/13	<2.0		ug/L
			Barium (Ba)	2021/05/13	<5.0		ug/L
			Boron (B)	2021/05/13	<50		ug/L
			Cadmium (Cd)	2021/05/13	<1.0		ug/L
			Chromium (Cr)	2021/05/13	<7.0		ug/L
			Cobalt (Co)	2021/05/13	<10		ug/L
			Copper (Cu)	2021/05/13	<3.0		ug/L
			Tin (Sn)	2021/05/13	<50		ug/L
			Iron (Fe)	2021/05/13	<100		ug/L
			Manganese (Mn)	2021/05/13	<3.0		ug/L

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Lab BV Job #: C117583
Report Date: 2021/06/07

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD
Your P.O. #: 3000000997
Sampler Initials: CS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Mercury (Hg)	2021/05/13	<0.50		ug/L
			Molybdenum (Mo)	2021/05/13	<10		ug/L
			Nickel (Ni)	2021/05/13	<6.0		ug/L
			Lead (Pb)	2021/05/13	<1.0		ug/L
			Selenium (Se)	2021/05/13	<1.0		ug/L
			Uranium (U)	2021/05/13	<0.60		ug/L
			Zinc (Zn)	2021/05/13	<5.0		ug/L
2184801	NET	Spiked Blank	Silver (Ag)	2021/05/13		107	%
			Arsenic (As)	2021/05/13		107	%
			Barium (Ba)	2021/05/13		112	%
			Boron (B)	2021/05/13		113	%
			Cadmium (Cd)	2021/05/13		111	%
			Chromium (Cr)	2021/05/13		99	%
			Cobalt (Co)	2021/05/13		100	%
			Copper (Cu)	2021/05/13		94	%
			Tin (Sn)	2021/05/13		114	%
			Iron (Fe)	2021/05/13		104	%
			Manganese (Mn)	2021/05/13		104	%
			Mercury (Hg)	2021/05/13		95	%
			Molybdenum (Mo)	2021/05/13		118	%
			Nickel (Ni)	2021/05/13		98	%
			Lead (Pb)	2021/05/13		103	%
			Selenium (Se)	2021/05/13		104	%
			Uranium (U)	2021/05/13		105	%
			Zinc (Zn)	2021/05/13		100	%
2184906	VPA	LEACH. BLANK	Fluoride (F)	2021/05/14	<1.0		mg/L
2184906	VPA	Spiked Blank	Fluoride (F)	2021/05/14		102	%
2184909	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/05/12	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/05/12	<0.20		mg/L
2184909	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/05/12		103	%
			Nitrate (N) and Nitrite(N)	2021/05/12		104	%

RDL = Reportable Detection Limit

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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.

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Lab BV Job #: C117583
Report Date: 2021/06/07

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD
Your P.O. #: 3000000997
Sampler Initials: CS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Alex Thibert
Membre OCQ #2020-05

Alex Thibert, B.Sc., Chemist, Montréal, Analyst II, Chemist in Training

Frederic Arnau, B.Sc., Chemist, Montreal, Scientific Service Specialist

Miryam Assayag, B.Sc. Chemist, Montréal, Team Leader

Michelina Cinquino, Analyst II

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Your P.O. #: 3000000997
Your Project #: GOODWOOD-ARD
Your C.O.C. #: 817816-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/06/18
Report #: R2666968
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C121681
Received: 2021/05/14, 08:45

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acid Base Accounting (Sobek modified) (1)	1	2021/06/18	N/A		
Grinding	1	N/A	2021/05/17	STL SOP-00019	N/A
Fluoride (free)	1	2021/05/19	2021/05/20	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	1	N/A	2021/05/21	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	1	N/A	2021/05/22	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	1	N/A	2021/05/28	STL SOP-00038	SM 23 4500-F m
Mercury by ICP-MS	1	2021/05/14	2021/05/20	III-105 rév.10 03/09/25	MA.200–Mét. 1.2 R7
Water Leachate (CTEU - 9)	1	2021/05/19	2021/05/26	STL SOP-00024	MA100-Lixcom1.1 R1 m
Acid rain simulation leachate (EPA 1312)	1	2021/05/19	2021/05/20	STL SOP-00024	MA100-Lixcom1.1 R1 m
Total Extractable Metals (low level)	1	2021/05/19	2021/05/20	STL SOP-00069	MA.200–Mét. 1.2 R7
Metals - Leached	1	2021/05/21	2021/05/25	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	1	2021/05/21	2021/05/27	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	1	2021/05/27	2021/05/28	STL SOP-00062	MA.200–Mét. 1.2 R7
Nitrate and/or Nitrite- Leached	2	N/A	2021/05/22	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	1	N/A	2021/05/28	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	1	2021/05/19	2021/05/22	STL SOP-00014	MA.300–Ions 1.3 R3 m
Toxicity Charact. Leach. Proc.(EPA 1311)	1	2021/05/19	2021/05/20	STL SOP-00024	MA100-Lixcom1.1 R1 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

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Your P.O. #: 3000000997
Your Project #: GOODWOOD-ARD
Your C.O.C. #: 817816-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/06/18
Report #: R2666968
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C121681
Received: 2021/05/14, 08:45
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 Bureau Veritas, 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 Bureau Veritas - Burnaby

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Martine Lepage
Project Manager and Account Manager
21 Jun 2021 14:12:39

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
==========
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Lab BV Job #: C121681
Report Date: 2021/06/18

TATA STEEL MINERALS CANADA
Client Project #: GOODWOOD-ARD
Your P.O. #: 3000000997

TOTAL EXTRACTABLE METALS (SOIL)

Lab BV ID					JC6686		
Sampling Date					2021/05/09		
COC Number					817816-01-01		
	Units	**A**	**B**	**C**	**TSMC-81181**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	13	N/A	N/A
METALS							
Silver (Ag)	mg/kg	**2**	20	40	<0.50	0.50	2187617
Arsenic (As)	mg/kg	**6**	30	50	5.2	2.0	2187617
Barium (Ba)	mg/kg	**340**	500	2000	<4.0	4.0	2187617
Boron (B)	mg/kg	**-**	-	-	6.1	2.0	2187617
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	0.10	2187617
Chromium (Cr)	mg/kg	**100**	250	800	18	1.0	2187617
Copper (Cu)	mg/kg	**50**	100	500	1.6	1.0	2187617
Cobalt (Co)	mg/kg	**25**	50	300	1.9	1.0	2187617
Tin (Sn)	mg/kg	**5**	50	300	<1.0	1.0	2187617
Iron (Fe) †	mg/kg	**-**	-	-	78000	10	2187617
Manganese (Mn)	mg/kg	**1000**	1000	2200	99	2.0	2187617
Molybdenum (Mo)	mg/kg	**2**	10	40	<0.50	0.50	2187617
Nickel (Ni)	mg/kg	**50**	100	500	1.4	0.50	2187617
Mercury (Hg)	mg/kg	**0.2**	2	10	0.042	0.010	2187617
Lead (Pb)	mg/kg	**50**	500	1000	7.6	1.0	2187617
Selenium (Se)	mg/kg	**1**	3	10	<0.50	0.50	2187617
Uranium (U) †	mg/kg	**-**	-	-	<2.0	2.0	2187617
Zinc (Zn)	mg/kg	**140**	500	1500	<5.0	5.0	2187617

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C121681
Report Date: 2021/06/18

TATA STEEL MINERALS CANADA
Client Project #: GOODWOOD-ARD
Your P.O. #: 3000000997

METALS-LAB LEACHATE (SOIL)

Lab BV ID		JC6686		JC6689		JC6692		
Sampling Date		2021/05/09		2021/05/09		2021/05/09		
COC Number		817816-01-01		817816-01-01		817816-01-01		
	Units	**TSMC-81181**	**QC Batch**	**TSMC-81181-CTEU-9**	**QC Batch**	**TSMC-81181-(SPLP1312)**	**RDL**	**QC Batch**
% MOISTURE	%	13	N/A	N/A	N/A	N/A	N/A	N/A
METALS								
Silver (Ag) †	ug/L	<0.30	2188538	<0.30	2190353	<0.30	0.30	2188573
Arsenic (As)	ug/L	<2.0	2188538	<2.0	2190353	<2.0	2.0	2188573
Barium (Ba)	ug/L	<5.0	2188538	<5.0	2190353	<5.0	5.0	2188573
Boron (B)	ug/L	<50	2188538	<50	2190353	<50	50	2188573
Cadmium (Cd)	ug/L	<1.0	2188538	<1.0	2190353	<1.0	1.0	2188573
Chromium (Cr)	ug/L	<7.0	2188538	<7.0	2190353	<7.0	7.0	2188573
Cobalt (Co)	ug/L	<10	2188538	<10	2190353	<10	10	2188573
Copper (Cu)	ug/L	<3.0	2188538	<3.0	2190353	<3.0	3.0	2188573
Tin (Sn) †	ug/L	<50	2188538	<50	2190353	<50	50	2188573
Iron (Fe)	ug/L	<100	2188538	110	2190353	<100	100	2188573
Manganese (Mn)	ug/L	11	2188538	<3.0	2190353	<3.0	3.0	2188573
Mercury (Hg)	ug/L	<0.50	2188538	<0.50	2190353	<0.50	0.50	2188573
Molybdenum (Mo)	ug/L	<10	2188538	<10	2190353	<10	10	2188573
Nickel (Ni)	ug/L	<6.0	2188538	<6.0	2190353	<6.0	6.0	2188573
Lead (Pb)	ug/L	<1.0	2188538	<1.0	2190353	<1.0	1.0	2188573
Selenium (Se)	ug/L	<1.0	2188538	<1.0	2190353	<1.0	1.0	2188573
Uranium (U)	ug/L	<0.60	2188538	<0.60	2190353	<0.60	0.60	2188573
Zinc (Zn)	ug/L	<5.0	2188538	15	2190353	<5.0	5.0	2188573

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

2021/06/18 17:55

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CONVENTIONAL PARAMETERS (SOIL)

Lab BV ID					JC6686		
Sampling Date					2021/05/09		
COC Number					817816-01-01		
	Units	**A**	**B**	**C**	**TSMC-81181**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	13	N/A	N/A
CONVENTIONALS							
Fluoride (F)	mg/kg	**200**	400	2000	<1.0	1.0	2187839
Nitrates (N-NO3-) †	mg/kg	-	-	-	<1.0	1.0	2187847
Nitrites (N-NO2-) †	mg/kg	-	-	-	<0.20	0.20	2187847
Nitrate (N) and Nitrite(N)	mg/kg	-	-	-	<1.0	1.0	2187847

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C121681
Report Date: 2021/06/18

TATA STEEL MINERALS CANADA
Client Project #: GOODWOOD-ARD
Your P.O. #: 3000000997

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Lab BV ID		JC6686		JC6689		JC6692		
Sampling Date		2021/05/09		2021/05/09		2021/05/09		
COC Number		817816-01-01		817816-01-01		817816-01-01		
	Units	**TSMC-81181**	**QC Batch**	**TSMC-81181-CTEU-9**	**QC Batch**	**TSMC-81181-(SPLP1312)**	**RDL**	**QC Batch**
% MOISTURE	%	13	N/A	N/A	N/A	N/A	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	2188741	<1.0	2190331	<1.0	1.0	2188870
Nitrites (N-NO2-)	mg/L	<0.20	2188885	<0.20	2190336	<0.20	0.20	2189028
Nitrate (N) and Nitrite(N)	mg/L	<0.20	2188885	<0.20	2190336	<0.20	0.20	2189028

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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TCLP-EPA 1311 (SOIL)

Lab BV ID		JC6686	
Sampling Date		2021/05/09	
COC Number		817816-01-01	
	Units	**TSMC-81181**	**QC Batch**
% MOISTURE	%	13	N/A
Leachates			
Weight of sample (g)	n/a	20.0	2187567
pH of pre-test	n/a	<1.68	2187567
pH end of leaching	n/a	4.98	2187567
Volume extracting fluid 1 (ml)	n/a	400	2187567

QC Batch = Quality Control Batch
N/A = Not Applicable

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SPLP-EPA 1312 (SOIL)

Lab BV ID		JC6692	
Sampling Date		2021/05/09	
COC Number		817816-01-01	
	Units	**TSMC-81181-(SPLP1312)**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	25.1	2187637
Volume of extracting fluid (mL)	n/a	500	2187637
pH after 18 hours leaching	n/a	11.5	2187637
pH of extracting fluid	n/a	4.20	2187637
QC Batch = Quality Control Batch			

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WATER LEACHATE-CTEU-9 (SOIL)

Lab BV ID		JC6689	
Sampling Date		2021/05/09	
COC Number		817816-01-01	
	Units	**TSMC-81181-CTEU-9**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	40.1	2187651
pH Deionized water	n/a	5.51	2187651
Date extraction fluid added	n/a	2021/05/19	2187651
Date leaching terminated	n/a	2021/05/26	2187651
Volume of extracting fluid (mL)	n/a	160	2187651
pH after 7 days of leaching	n/a	7.52	2187651
QC Batch = Quality Control Batch			

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

GENERAL COMMENTS

A,B,C: Soil Criteria following appendix 2 of the " Guide d'intervention-Protection des sols et réhabilitation des terrains contaminés. MELCC, May 2021." 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 mentionned 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.

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

SPLP-EPA 1312 (SOIL)

pH de lixiviation final: Veuillez noter que le résultat de l'échantillon est en dehors de la courbe de calibration(pH 4 - 10), mais à l'intérieur des limites de la linéarité (pH 1.68 - 13.0).

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Lab BV Job #: C121681
Report Date: 2021/06/18

TATA STEEL MINERALS CANADA
Client Project #: GOODWOOD-ARD
Your P.O. #: 3000000997

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2187567	SMD	Method Blank	pH end of leaching	2021/05/20	4.88/2.84		n/a
			Volume extracting fluid 1 (ml)	2021/05/20	400		n/a
2187617	AT7	Spiked Blank	Silver (Ag)	2021/05/20		106	%
			Arsenic (As)	2021/05/20		121	%
			Barium (Ba)	2021/05/20		116	%
			Boron (B)	2021/05/20		120	%
			Cadmium (Cd)	2021/05/20		116	%
			Chromium (Cr)	2021/05/20		120	%
			Copper (Cu)	2021/05/20		119	%
			Cobalt (Co)	2021/05/20		119	%
			Tin (Sn)	2021/05/20		120	%
			Iron (Fe)	2021/05/20		108	%
			Manganese (Mn)	2021/05/20		118	%
			Molybdenum (Mo)	2021/05/20		112	%
			Nickel (Ni)	2021/05/20		119	%
			Mercury (Hg)	2021/05/20		113	%
			Lead (Pb)	2021/05/20		108	%
			Selenium (Se)	2021/05/20		130 (1)	%
			Uranium (U)	2021/05/20		116	%
			Zinc (Zn)	2021/05/20		119	%
2187617	AT7	Method Blank	Silver (Ag)	2021/05/20	<0.50		mg/kg
			Arsenic (As)	2021/05/20	<2.0		mg/kg
			Barium (Ba)	2021/05/20	<4.0		mg/kg
			Boron (B)	2021/05/20	<2.0		mg/kg
			Cadmium (Cd)	2021/05/20	<0.10		mg/kg
			Chromium (Cr)	2021/05/20	<1.0		mg/kg
			Copper (Cu)	2021/05/20	<1.0		mg/kg
			Cobalt (Co)	2021/05/20	<1.0		mg/kg
			Tin (Sn)	2021/05/20	<1.0		mg/kg
			Iron (Fe)	2021/05/20	<10		mg/kg
			Manganese (Mn)	2021/05/20	<2.0		mg/kg
			Molybdenum (Mo)	2021/05/20	<0.50		mg/kg
			Nickel (Ni)	2021/05/20	<0.50		mg/kg
			Mercury (Hg)	2021/05/20	<0.010		mg/kg
			Lead (Pb)	2021/05/20	<1.0		mg/kg
			Selenium (Se)	2021/05/20	<0.50		mg/kg
			Uranium (U)	2021/05/20	<2.0		mg/kg
			Zinc (Zn)	2021/05/20	<5.0		mg/kg
2187637	SMD	Method Blank	Volume of extracting fluid (mL)	2021/05/20	500		n/a
			pH after 18 hours leaching	2021/05/20	4.22		n/a
			pH of extracting fluid	2021/05/20	4.20		n/a
2187651	SMD	Method Blank	pH Deionized water	2021/05/26	5.51		n/a
			Date extraction fluid added	2021/05/26	2021/05/19		n/a
			Date leaching terminated	2021/05/26	2021/05/26		n/a
			Volume of extracting fluid (mL)	2021/05/26	160		n/a
			pH after 7 days of leaching	2021/05/26	6.99		n/a
2187839	SBD	Spiked Blank	Fluoride (F)	2021/05/20		96	%
2187839	SBD	Method Blank	Fluoride (F)	2021/05/20	<1.0		mg/kg
2187847	TGU	Spiked Blank	Nitrates (N-NO3-)	2021/05/22		99	%
			Nitrites (N-NO2-)	2021/05/22		100	%
			Nitrate (N) and Nitrite(N)	2021/05/22		99	%
2187847	TGU	Method Blank	Nitrates (N-NO3-)	2021/05/22	<1.0		mg/kg

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Nitrites (N-NO2-)	2021/05/22	<0.20		mg/kg
			Nitrate (N) and Nitrite(N)	2021/05/22	<1.0		mg/kg
2188538	NET	LEACH. BLANK	Silver (Ag)	2021/05/27	<0.30		ug/L
			Arsenic (As)	2021/05/27	<2.0		ug/L
			Barium (Ba)	2021/05/27	<5.0		ug/L
			Boron (B)	2021/05/27	<50		ug/L
			Cadmium (Cd)	2021/05/27	<1.0		ug/L
			Chromium (Cr)	2021/05/27	<7.0		ug/L
			Cobalt (Co)	2021/05/27	<10		ug/L
			Copper (Cu)	2021/05/27	4.9, RDL=3.0		ug/L
			Tin (Sn)	2021/05/27	<50		ug/L
			Iron (Fe)	2021/05/27	<100		ug/L
			Manganese (Mn)	2021/05/27	<3.0		ug/L
			Mercury (Hg)	2021/05/27	<0.50		ug/L
			Molybdenum (Mo)	2021/05/27	<10		ug/L
			Nickel (Ni)	2021/05/27	<6.0		ug/L
			Lead (Pb)	2021/05/27	<1.0		ug/L
			Selenium (Se)	2021/05/27	<1.0		ug/L
			Uranium (U)	2021/05/27	<0.60		ug/L
			Zinc (Zn)	2021/05/27	<5.0		ug/L
2188538	NET	Spiked Blank	Silver (Ag)	2021/05/27		87	%
			Arsenic (As)	2021/05/27		105	%
			Barium (Ba)	2021/05/27		100	%
			Boron (B)	2021/05/27		107	%
			Cadmium (Cd)	2021/05/27		92	%
			Chromium (Cr)	2021/05/27		97	%
			Cobalt (Co)	2021/05/27		94	%
			Copper (Cu)	2021/05/27		92	%
			Tin (Sn)	2021/05/27		99	%
			Iron (Fe)	2021/05/27		89	%
			Manganese (Mn)	2021/05/27		101	%
			Mercury (Hg)	2021/05/27		101	%
			Molybdenum (Mo)	2021/05/27		92	%
			Nickel (Ni)	2021/05/27		94	%
			Lead (Pb)	2021/05/27		91	%
			Selenium (Se)	2021/05/27		97	%
			Uranium (U)	2021/05/27		91	%
			Zinc (Zn)	2021/05/27		97	%
2188573	NET	LEACH. BLANK	Silver (Ag)	2021/05/25	<0.30		ug/L
			Arsenic (As)	2021/05/25	<2.0		ug/L
			Barium (Ba)	2021/05/25	<5.0		ug/L
			Boron (B)	2021/05/25	<50		ug/L
			Cadmium (Cd)	2021/05/25	<1.0		ug/L
			Chromium (Cr)	2021/05/25	<7.0		ug/L
			Cobalt (Co)	2021/05/25	<10		ug/L
			Copper (Cu)	2021/05/25	5.0, RDL=3.0		ug/L
			Tin (Sn)	2021/05/25	<50		ug/L
			Iron (Fe)	2021/05/25	<100		ug/L
			Manganese (Mn)	2021/05/25	<3.0		ug/L
			Mercury (Hg)	2021/05/25	<0.50		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Molybdenum (Mo)	2021/05/25	<10		ug/L
			Nickel (Ni)	2021/05/25	<6.0		ug/L
			Lead (Pb)	2021/05/25	<1.0		ug/L
			Selenium (Se)	2021/05/25	<1.0		ug/L
			Uranium (U)	2021/05/25	<0.60		ug/L
			Zinc (Zn)	2021/05/25	<5.0		ug/L
2188573	NET	Spiked Blank	Silver (Ag)	2021/05/25		98	%
			Arsenic (As)	2021/05/25		101	%
			Barium (Ba)	2021/05/25		103	%
			Boron (B)	2021/05/25		103	%
			Cadmium (Cd)	2021/05/25		97	%
			Chromium (Cr)	2021/05/25		95	%
			Cobalt (Co)	2021/05/25		95	%
			Copper (Cu)	2021/05/25		88	%
			Tin (Sn)	2021/05/25		105	%
			Iron (Fe)	2021/05/25		93	%
			Manganese (Mn)	2021/05/25		100	%
			Mercury (Hg)	2021/05/25		106	%
			Molybdenum (Mo)	2021/05/25		101	%
			Nickel (Ni)	2021/05/25		96	%
			Lead (Pb)	2021/05/25		99	%
			Selenium (Se)	2021/05/25		87	%
			Uranium (U)	2021/05/25		99	%
			Zinc (Zn)	2021/05/25		94	%
2188741	SBD	LEACH. BLANK	Fluoride (F)	2021/05/21	<1.0		mg/L
2188741	SBD	Spiked Blank	Fluoride (F)	2021/05/21		102	%
2188870	SBD	LEACH. BLANK	Fluoride (F)	2021/05/22	<1.0		mg/L
2188870	SBD	Spiked Blank	Fluoride (F)	2021/05/22		107	%
2188885	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/05/22	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/05/22	<0.20		mg/L
2188885	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/05/22		102	%
			Nitrate (N) and Nitrite(N)	2021/05/22		100	%
2188885	TGU	Method Blank	Nitrites (N-NO2-)	2021/05/22	<0.020		mg/L
			Nitrate (N) and Nitrite(N)	2021/05/22	<0.020		mg/L
2189028	ABT	LEACH. BLANK	Nitrites (N-NO2-)	2021/05/22	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/05/22	<0.20		mg/L
2189028	ABT	Spiked Blank	Nitrites (N-NO2-)	2021/05/22		97	%
			Nitrate (N) and Nitrite(N)	2021/05/22		97	%
2190331	VPA	LEACH. BLANK	Fluoride (F)	2021/05/28	<1.0		mg/L
2190331	VPA	Spiked Blank	Fluoride (F)	2021/05/28		104	%
2190336	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/05/28	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/05/28	<0.20		mg/L
2190336	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/05/28		99	%
			Nitrate (N) and Nitrite(N)	2021/05/28		97	%
2190353	ZEO	LEACH. BLANK	Silver (Ag)	2021/05/27	<0.30		ug/L
			Arsenic (As)	2021/05/27	<2.0		ug/L
			Barium (Ba)	2021/05/27	<5.0		ug/L
			Boron (B)	2021/05/27	<50		ug/L
			Cadmium (Cd)	2021/05/27	<1.0		ug/L
			Chromium (Cr)	2021/05/27	<7.0		ug/L
			Cobalt (Co)	2021/05/27	<10		ug/L
			Copper (Cu)	2021/05/27	<3.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Tin (Sn)	2021/05/27	<50		ug/L
			Iron (Fe)	2021/05/27	<100		ug/L
			Manganese (Mn)	2021/05/27	<3.0		ug/L
			Mercury (Hg)	2021/05/27	<0.50		ug/L
			Molybdenum (Mo)	2021/05/27	<10		ug/L
			Nickel (Ni)	2021/05/27	<6.0		ug/L
			Lead (Pb)	2021/05/27	<1.0		ug/L
			Selenium (Se)	2021/05/27	<1.0		ug/L
			Uranium (U)	2021/05/27	<0.60		ug/L
			Zinc (Zn)	2021/05/27	<5.0		ug/L
2190353	ZEO	Spiked Blank	Silver (Ag)	2021/05/27		80	%
			Arsenic (As)	2021/05/27		108	%
			Barium (Ba)	2021/05/27		103	%
			Boron (B)	2021/05/27		110	%
			Cadmium (Cd)	2021/05/27		97	%
			Chromium (Cr)	2021/05/27		100	%
			Cobalt (Co)	2021/05/27		97	%
			Copper (Cu)	2021/05/27		94	%
			Tin (Sn)	2021/05/27		105	%
			Iron (Fe)	2021/05/27		93	%
			Manganese (Mn)	2021/05/27		104	%
			Mercury (Hg)	2021/05/27		106	%
			Molybdenum (Mo)	2021/05/27		98	%
			Nickel (Ni)	2021/05/27		97	%
			Lead (Pb)	2021/05/27		95	%
			Selenium (Se)	2021/05/27		104	%
			Uranium (U)	2021/05/27		97	%
			Zinc (Zn)	2021/05/27		100	%

RDL = Reportable Detection Limit

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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.

(1) Recovery or relative percent difference (RPD) for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Frederic Arnau, B.Sc., Chemist, Montreal, Scientific Service Specialist

Miryam Assayag, B.Sc. Chemist, Montréal, Team Leader

Veronic Beausejour, B.Sc., Chemist, Supervisor

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Your P.O. #: 3000000997
Your Project #: GOODWOOD-ARD
Your C.O.C. #: 808542-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/08/10
Report #: R2680342
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C126013
Received: 2021/06/02, 16:40

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acid Base Accounting (Sobek modified) (1)	2	2021/08/10	N/A		
Grinding	2	N/A	2021/06/09	STL SOP-00019	N/A
Fluoride (free)	2	2021/06/08	2021/06/10	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	4	N/A	2021/06/10	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	2	N/A	2021/07/01	STL SOP-00038	SM 23 4500-F m
Mercury by ICP-MS	2	2021/06/03	2021/06/09	III-105 rév.10 03/09/25	MA.200–Mét. 1.2 R7
Water Leachate (CTEU - 9)	2	2021/06/22	2021/06/29	STL SOP-00024	MA100-Lixcom1.1 R1 m
Acid rain simulation leachate (EPA 1312)	2	2021/06/08	2021/06/09	STL SOP-00024	MA100-Lixcom1.1 R1 m
Total Extractable Metals (low level)	2	2021/06/08	2021/06/09	STL SOP-00069	MA.200–Mét. 1.2 R7
Metals - Leached	2	2021/06/29	2021/06/30	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	4	2021/06/09	2021/06/11	STL SOP-00062	MA.200–Mét. 1.2 R7
Nitrate and/or Nitrite- Leached	2	N/A	2021/06/10	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	2	N/A	2021/06/30	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	2	N/A	2021/06/09	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	2	2021/06/08	2021/06/09	STL SOP-00014	MA.300–Ions 1.3 R3 m
Toxicity Charact. Leach. Proc.(EPA 1311)	2	2021/06/08	2021/06/09	STL SOP-00024	MA100-Lixcom1.1 R1 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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Your P.O. #: 3000000997
Your Project #: GOODWOOD-ARD
Your C.O.C. #: 808542-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/08/10
Report #: R2680342
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C126013
Received: 2021/06/02, 16:40

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 Bureau Veritas, 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 Bureau Veritas - Burnaby

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Stephane Gagnon
Project Manager
11 Aug 2021 08:55:38

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
==========
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Lab BV Job #: C126013
Report Date: 2021/08/10

TATA STEEL MINERALS CANADA
Client Project #: GOODWOOD-ARD
Your P.O. #: 3000000997

TOTAL EXTRACTABLE METALS (SOIL)

Lab BV ID					JE8471	JE8472		
Sampling Date					2021/05/18	2021/05/15		
COC Number					808542-01-01	808542-01-01		
	Units	**A**	**B**	**C**	**TSMC-82180**	**TSMC-82126**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	4.4	0.5	N/A	N/A
METALS								
Silver (Ag)	mg/kg	**2**	20	40	<0.50	<0.50	0.50	2194823
Arsenic (As)	mg/kg	**6**	30	50	<2.0	<2.0	2.0	2194823
Barium (Ba)	mg/kg	**340**	500	2000	5.9	<4.0	4.0	2194823
Boron (B)	mg/kg	**-**	-	-	<2.0	<2.0	2.0	2194823
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	<0.10	0.10	2194823
Chromium (Cr)	mg/kg	**100**	250	800	<1.0	4.9	1.0	2194823
Copper (Cu)	mg/kg	**50**	100	500	2.1	<1.0	1.0	2194823
Cobalt (Co)	mg/kg	**25**	50	300	3.4	<1.0	1.0	2194823
Tin (Sn)	mg/kg	**5**	50	300	<1.0	<1.0	1.0	2194823
Iron (Fe) †	mg/kg	**-**	-	-	57000	43000	10	2194823
Manganese (Mn)	mg/kg	**1000**	1000	2200	470	67	2.0	2194823
Molybdenum (Mo)	mg/kg	**2**	10	40	<0.50	<0.50	0.50	2194823
Nickel (Ni)	mg/kg	**50**	100	500	0.72	0.71	0.50	2194823
Mercury (Hg)	mg/kg	**0.2**	2	10	0.044	0.075	0.010	2194823
Lead (Pb)	mg/kg	**50**	500	1000	1.9	2.9	1.0	2194823
Selenium (Se)	mg/kg	**1**	3	10	<0.50	<0.50	0.50	2194823
Uranium (U) †	mg/kg	**-**	-	-	<2.0	<2.0	2.0	2194823
Zinc (Zn)	mg/kg	**140**	500	1500	<5.0	<5.0	5.0	2194823

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C126013
Report Date: 2021/08/10

TATA STEEL MINERALS CANADA
Client Project #: GOODWOOD-ARD
Your P.O. #: 3000000997

METALS-LAB LEACHATE (SOIL)

Lab BV ID		JE8471	JE8472		JE8474	JE8475		
Sampling Date		2021/05/18	2021/05/15		2021/05/18	2021/05/15		
COC Number		808542-01-01	808542-01-01		808542-01-01	808542-01-01		
	Units	**TSMC-82180**	**TSMC-82126**	**QC Batch**	**TSMC-82180-CTEU-9**	**TSMC-82126-CTEU-9**	**RDL**	**QC Batch**
% MOISTURE	%	4.4	0.5	N/A	N/A	N/A	N/A	N/A
METALS								
Silver (Ag) †	ug/L	<0.30	<0.30	2195496	<0.30	<0.30	0.30	2202498
Arsenic (As)	ug/L	<2.0	<2.0	2195496	<2.0	<2.0	2.0	2202498
Barium (Ba)	ug/L	6.1	8.3	2195496	<5.0	<5.0	5.0	2202498
Boron (B)	ug/L	<50	<50	2195496	<50	<50	50	2202498
Cadmium (Cd)	ug/L	<1.0	<1.0	2195496	<1.0	<1.0	1.0	2202498
Chromium (Cr)	ug/L	<7.0	<7.0	2195496	<7.0	<7.0	7.0	2202498
Cobalt (Co)	ug/L	<10	<10	2195496	<10	<10	10	2202498
Copper (Cu)	ug/L	<3.0	<3.0	2195496	<3.0	<3.0	3.0	2202498
Tin (Sn) †	ug/L	<50	<50	2195496	<50	<50	50	2202498
Iron (Fe)	ug/L	1000	<100	2195496	<100	330	100	2202498
Manganese (Mn)	ug/L	200	34	2195496	<3.0	<3.0	3.0	2202498
Mercury (Hg)	ug/L	<0.50	<0.50	2195496	<0.50	<0.50	0.50	2202498
Molybdenum (Mo)	ug/L	<10	<10	2195496	<10	<10	10	2202498
Nickel (Ni)	ug/L	<6.0	<6.0	2195496	<6.0	<6.0	6.0	2202498
Lead (Pb)	ug/L	<1.0	<1.0	2195496	<1.0	<1.0	1.0	2202498
Selenium (Se)	ug/L	<1.0	<1.0	2195496	<1.0	<1.0	1.0	2202498
Uranium (U)	ug/L	<0.60	<0.60	2195496	<0.60	<0.60	0.60	2202498
Zinc (Zn)	ug/L	<5.0	<5.0	2195496	<5.0	<5.0	5.0	2202498

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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METALS-LAB LEACHATE (SOIL)

Lab BV ID		JE8477	JE8478		
Sampling Date		2021/05/18	2021/05/15		
COC Number		808542-01-01	808542-01-01		
	Units	TSMC-82180-(SPLP1312)	TSMC-82126-(SPLP1312)	RDL	QC Batch
METALS					
Silver (Ag) †	ug/L	<0.30	<0.30	0.30	2195498
Arsenic (As)	ug/L	<2.0	<2.0	2.0	2195498
Barium (Ba)	ug/L	<5.0	<5.0	5.0	2195498
Boron (B)	ug/L	<50	<50	50	2195498
Cadmium (Cd)	ug/L	<1.0	<1.0	1.0	2195498
Chromium (Cr)	ug/L	<7.0	<7.0	7.0	2195498
Cobalt (Co)	ug/L	<10	<10	10	2195498
Copper (Cu)	ug/L	<3.0	<3.0	3.0	2195498
Tin (Sn) †	ug/L	<50	<50	50	2195498
Iron (Fe)	ug/L	<100	<100	100	2195498
Manganese (Mn)	ug/L	9.2	<3.0	3.0	2195498
Mercury (Hg)	ug/L	<0.50	<0.50	0.50	2195498
Molybdenum (Mo)	ug/L	<10	<10	10	2195498
Nickel (Ni)	ug/L	<6.0	<6.0	6.0	2195498
Lead (Pb)	ug/L	<1.0	<1.0	1.0	2195498
Selenium (Se)	ug/L	<1.0	<1.0	1.0	2195498
Uranium (U)	ug/L	<0.60	<0.60	0.60	2195498
Zinc (Zn)	ug/L	<5.0	<5.0	5.0	2195498

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SOIL)

Lab BV ID					JE8471	JE8472		
Sampling Date					2021/05/18	2021/05/15		
COC Number					808542-01-01	808542-01-01		
	Units	**A**	**B**	**C**	**TSMC-82180**	**TSMC-82126**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	4.4	0.5	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/kg	**200**	400	2000	2.2	<1.0	1.0	2194926
Nitrates (N-NO3-) †	mg/kg	-	-	-	<1.0	<1.0	1.0	2194933
Nitrites (N-NO2-) †	mg/kg	-	-	-	<0.20	0.21	0.20	2194933
Nitrate (N) and Nitrite(N)	mg/kg	-	-	-	<1.0	<1.0	1.0	2194933

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C126013
Report Date: 2021/08/10

TATA STEEL MINERALS CANADA
Client Project #: GOODWOOD-ARD
Your P.O. #: 3000000997

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Lab BV ID		JE8471	JE8472		JE8474	JE8475		
Sampling Date		2021/05/18	2021/05/15		2021/05/18	2021/05/15		
COC Number		808542-01-01	808542-01-01		808542-01-01	808542-01-01		
	Units	**TSMC-82180**	**TSMC-82126**	**QC Batch**	**TSMC-82180-CTEU-9**	**TSMC-82126-CTEU-9**	**RDL**	**QC Batch**
% MOISTURE	%	4.4	0.5	N/A	N/A	N/A	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	<1.0	2195510	<1.0	<1.0	1.0	2202570
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	2195514	<0.20	<0.20	0.20	2202571
Nitrate (N) and Nitrite(N)	mg/L	<0.20	<0.20	2195514	<0.20	<0.20	0.20	2202571

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Lab BV ID		JE8477	JE8478		
Sampling Date		2021/05/18	2021/05/15		
COC Number		808542-01-01	808542-01-01		
	Units	**TSMC-82180-(SPLP1312)**	**TSMC-82126-(SPLP1312)**	**RDL**	**QC Batch**
CONVENTIONALS					
Fluoride (F)	mg/L	<1.0	<1.0	1.0	2195480
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	0.20	2195509
Nitrate (N) and Nitrite(N)	mg/L	<0.20	0.20	0.20	2195509

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TCLP-EPA 1311 (SOIL)

Lab BV ID		JE8471	JE8472	
Sampling Date		2021/05/18	2021/05/15	
COC Number		808542-01-01	808542-01-01	
	Units	**TSMC-82180**	**TSMC-82126**	**QC Batch**
% MOISTURE	%	4.4	0.5	N/A
Leachates				
Weight of sample (g)	n/a	20.1	20.0	2194590
pH of pre-test	n/a	<1.68	<1.68	2194590
pH end of leaching	n/a	4.89	4.89	2194590
Volume extracting fluid 1 (ml)	n/a	400	400	2194590

QC Batch = Quality Control Batch
N/A = Not Applicable

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SPLP-EPA 1312 (SOIL)

Lab BV ID		JE8477	JE8478	
Sampling Date		2021/05/18	2021/05/15	
COC Number		808542-01-01	808542-01-01	
	Units	**TSMC-82180-(SPLP1312)**	**TSMC-82126-(SPLP1312)**	**QC Batch**
Leachates				
Weight of sample (g)	n/a	25.1	25.2	2194591
Volume of extracting fluid (mL)	n/a	500	500	2194591
pH after 18 hours leaching	n/a	5.79	5.68	2194591
pH of extracting fluid	n/a	4.19	4.19	2194591
QC Batch = Quality Control Batch				

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WATER LEACHATE-CTEU-9 (SOIL)

Lab BV ID		JE8474	JE8475	
Sampling Date		2021/05/18	2021/05/15	
COC Number		808542-01-01	808542-01-01	
	Units	**TSMC-82180-CTEU-9**	**TSMC-82126-CTEU-9**	**QC Batch**
Leachates				
Weight of sample (g)	n/a	40.2	40.1	2200110
pH Deionized water	n/a	5.64	5.64	2200110
Date extraction fluid added	n/a	2021/06/22	2021/06/22	2200110
Date leaching terminated	n/a	2021/06/29	2021/06/29	2200110
Volume of extracting fluid (mL)	n/a	160	160	2200110
pH after 7 days of leaching	n/a	7.32	7.31	2200110
QC Batch = Quality Control Batch				

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GENERAL COMMENTS

A,B,C: Soil Criteria following appendix 2 of the " Guide d'intervention-Protection des sols et réhabilitation des terrains contaminés. MELCC, May 2021." 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 mentionned 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.

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

TCLP-EPA 1311 (SOIL)

pH du pré-test: Veuillez noter que le résultat de l'échantillon est en dehors de la courbe de calibration (pH 4 - 10), et aussi dehors des limites de la linéarité (pH 1.68 - 13.0).

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2194590	SMD	Method Blank	pH end of leaching	2021/06/09	4.89		n/a
			Volume extracting fluid 1 (ml)	2021/06/09	400		n/a
2194591	SMD	Method Blank	Volume of extracting fluid (mL)	2021/06/09	500		n/a
			pH after 18 hours leaching	2021/06/09	4.25		n/a
			pH of extracting fluid	2021/06/09	4.19		n/a
2194823	RB2	Spiked Blank	Silver (Ag)	2021/06/09		96	%
			Arsenic (As)	2021/06/09		94	%
			Barium (Ba)	2021/06/09		101	%
			Boron (B)	2021/06/09		113	%
			Cadmium (Cd)	2021/06/09		97	%
			Chromium (Cr)	2021/06/09		97	%
			Copper (Cu)	2021/06/09		97	%
			Cobalt (Co)	2021/06/09		97	%
			Tin (Sn)	2021/06/09		99	%
			Iron (Fe)	2021/06/09		98	%
			Manganese (Mn)	2021/06/09		97	%
			Molybdenum (Mo)	2021/06/09		98	%
			Nickel (Ni)	2021/06/09		99	%
			Mercury (Hg)	2021/06/09		92	%
			Lead (Pb)	2021/06/09		96	%
			Selenium (Se)	2021/06/09		92	%
			Uranium (U)	2021/06/09		106	%
			Zinc (Zn)	2021/06/09		97	%
2194823	RB2	Method Blank	Silver (Ag)	2021/06/09	<0.50		mg/kg
			Arsenic (As)	2021/06/09	<2.0		mg/kg
			Barium (Ba)	2021/06/09	<4.0		mg/kg
			Boron (B)	2021/06/09	<2.0		mg/kg
			Cadmium (Cd)	2021/06/09	<0.10		mg/kg
			Chromium (Cr)	2021/06/09	<1.0		mg/kg
			Copper (Cu)	2021/06/09	<1.0		mg/kg
			Cobalt (Co)	2021/06/09	<1.0		mg/kg
			Tin (Sn)	2021/06/09	<1.0		mg/kg
			Iron (Fe)	2021/06/09	<10		mg/kg
			Manganese (Mn)	2021/06/09	<2.0		mg/kg
			Molybdenum (Mo)	2021/06/09	<0.50		mg/kg
			Nickel (Ni)	2021/06/09	<0.50		mg/kg
			Mercury (Hg)	2021/06/09	<0.010		mg/kg
			Lead (Pb)	2021/06/09	<1.0		mg/kg
			Selenium (Se)	2021/06/09	<0.50		mg/kg
			Uranium (U)	2021/06/09	<2.0		mg/kg
			Zinc (Zn)	2021/06/09	<5.0		mg/kg
2194926	SBD	Spiked Blank	Fluoride (F)	2021/06/10		105	%
2194926	SBD	Method Blank	Fluoride (F)	2021/06/10	<1.0		mg/kg
2194933	ABT	Spiked Blank	Nitrates (N-NO3-)	2021/06/09		102	%
			Nitrites (N-NO2-)	2021/06/09		102	%
			Nitrate (N) and Nitrite(N)	2021/06/09		102	%
2194933	ABT	Method Blank	Nitrates (N-NO3-)	2021/06/09	<1.0		mg/kg
			Nitrites (N-NO2-)	2021/06/09	<0.20		mg/kg
			Nitrate (N) and Nitrite(N)	2021/06/09	<1.0		mg/kg
2195480	SBD	LEACH. BLANK	Fluoride (F)	2021/06/10	<1.0		mg/L
2195480	SBD	Spiked Blank	Fluoride (F)	2021/06/10		114	%
2195496	DZE	LEACH. BLANK	Silver (Ag)	2021/06/11	<0.30		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Arsenic (As)	2021/06/11	<2.0		ug/L
			Barium (Ba)	2021/06/11	<5.0		ug/L
			Boron (B)	2021/06/11	<50		ug/L
			Cadmium (Cd)	2021/06/11	<1.0		ug/L
			Chromium (Cr)	2021/06/11	<7.0		ug/L
			Cobalt (Co)	2021/06/11	<10		ug/L
			Copper (Cu)	2021/06/11	32, RDL=3.0		ug/L
			Tin (Sn)	2021/06/11	<50		ug/L
			Iron (Fe)	2021/06/11	<100		ug/L
			Manganese (Mn)	2021/06/11	<3.0		ug/L
			Mercury (Hg)	2021/06/11	<0.50		ug/L
			Molybdenum (Mo)	2021/06/11	<10		ug/L
			Nickel (Ni)	2021/06/11	<6.0		ug/L
			Lead (Pb)	2021/06/11	<1.0		ug/L
			Selenium (Se)	2021/06/11	<1.0		ug/L
			Uranium (U)	2021/06/11	<0.60		ug/L
			Zinc (Zn)	2021/06/11	<5.0		ug/L
2195496	DZE	Spiked Blank	Silver (Ag)	2021/06/11		100	%
			Arsenic (As)	2021/06/11		105	%
			Barium (Ba)	2021/06/11		104	%
			Boron (B)	2021/06/11		106	%
			Cadmium (Cd)	2021/06/11		104	%
			Chromium (Cr)	2021/06/11		98	%
			Cobalt (Co)	2021/06/11		94	%
			Copper (Cu)	2021/06/11		92	%
			Tin (Sn)	2021/06/11		113	%
			Iron (Fe)	2021/06/11		101	%
			Manganese (Mn)	2021/06/11		101	%
			Mercury (Hg)	2021/06/11		101	%
			Molybdenum (Mo)	2021/06/11		103	%
			Nickel (Ni)	2021/06/11		91	%
			Lead (Pb)	2021/06/11		97	%
			Selenium (Se)	2021/06/11		102	%
			Uranium (U)	2021/06/11		95	%
			Zinc (Zn)	2021/06/11		96	%
2195498	DZE	LEACH. BLANK	Silver (Ag)	2021/06/11	<0.30		ug/L
			Arsenic (As)	2021/06/11	<2.0		ug/L
			Barium (Ba)	2021/06/11	<5.0		ug/L
			Boron (B)	2021/06/11	<50		ug/L
			Cadmium (Cd)	2021/06/11	<1.0		ug/L
			Chromium (Cr)	2021/06/11	<7.0		ug/L
			Cobalt (Co)	2021/06/11	<10		ug/L
			Copper (Cu)	2021/06/11	3.6, RDL=3.0		ug/L
			Tin (Sn)	2021/06/11	<50		ug/L
			Iron (Fe)	2021/06/11	<100		ug/L
			Manganese (Mn)	2021/06/11	<3.0		ug/L
			Mercury (Hg)	2021/06/11	<0.50		ug/L
			Molybdenum (Mo)	2021/06/11	<10		ug/L
			Nickel (Ni)	2021/06/11	<6.0		ug/L
			Lead (Pb)	2021/06/11	<1.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Selenium (Se)	2021/06/11	<1.0		ug/L
			Uranium (U)	2021/06/11	<0.60		ug/L
			Zinc (Zn)	2021/06/11	<5.0		ug/L
2195498	DZE	Spiked Blank	Silver (Ag)	2021/06/11		99	%
			Arsenic (As)	2021/06/11		105	%
			Barium (Ba)	2021/06/11		102	%
			Boron (B)	2021/06/11		109	%
			Cadmium (Cd)	2021/06/11		102	%
			Chromium (Cr)	2021/06/11		84	%
			Cobalt (Co)	2021/06/11		94	%
			Copper (Cu)	2021/06/11		92	%
			Tin (Sn)	2021/06/11		110	%
			Iron (Fe)	2021/06/11		100	%
			Manganese (Mn)	2021/06/11		100	%
			Mercury (Hg)	2021/06/11		96	%
			Molybdenum (Mo)	2021/06/11		103	%
			Nickel (Ni)	2021/06/11		91	%
			Lead (Pb)	2021/06/11		91	%
			Selenium (Se)	2021/06/11		103	%
			Uranium (U)	2021/06/11		90	%
			Zinc (Zn)	2021/06/11		94	%
2195509	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/06/09	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/06/09	<0.20		mg/L
2195509	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/06/09		108	%
			Nitrate (N) and Nitrite(N)	2021/06/09		107	%
2195510	SBD	LEACH. BLANK	Fluoride (F)	2021/06/10	<1.0		mg/L
2195510	SBD	Spiked Blank	Fluoride (F)	2021/06/10		111	%
2195514	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/06/10	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/06/10	<0.20		mg/L
2195514	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/06/10		99	%
			Nitrate (N) and Nitrite(N)	2021/06/10		96	%
2195514	TGU	Method Blank	Nitrites (N-NO2-)	2021/06/10	<0.020		mg/L
			Nitrate (N) and Nitrite(N)	2021/06/10	<0.020		mg/L
2200110	SMD	Method Blank	pH Deionized water	2021/06/29	5.64		n/a
			Date extraction fluid added	2021/06/29	2021/06/22		n/a
			Date leaching terminated	2021/06/29	2021/06/29		n/a
			Volume of extracting fluid (mL)	2021/06/29	160		n/a
			pH after 7 days of leaching	2021/06/29	6.92		n/a
2202498	AT7	LEACH. BLANK	Silver (Ag)	2021/06/30	<0.30		ug/L
			Arsenic (As)	2021/06/30	<2.0		ug/L
			Barium (Ba)	2021/06/30	<5.0		ug/L
			Boron (B)	2021/06/30	<50		ug/L
			Cadmium (Cd)	2021/06/30	<1.0		ug/L
			Chromium (Cr)	2021/06/30	<7.0		ug/L
			Cobalt (Co)	2021/06/30	<10		ug/L
			Copper (Cu)	2021/06/30	<3.0		ug/L
			Tin (Sn)	2021/06/30	<50		ug/L
			Iron (Fe)	2021/06/30	<100		ug/L
			Manganese (Mn)	2021/06/30	<3.0		ug/L
			Mercury (Hg)	2021/06/30	<0.50		ug/L
			Molybdenum (Mo)	2021/06/30	<10		ug/L
			Nickel (Ni)	2021/06/30	<6.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Lead (Pb)	2021/06/30	<1.0		ug/L
			Selenium (Se)	2021/06/30	<1.0		ug/L
			Uranium (U)	2021/06/30	<0.60		ug/L
			Zinc (Zn)	2021/06/30	<5.0		ug/L
2202498	AT7	Spiked Blank	Silver (Ag)	2021/06/30		96	%
			Arsenic (As)	2021/06/30		99	%
			Barium (Ba)	2021/06/30		96	%
			Boron (B)	2021/06/30		105	%
			Cadmium (Cd)	2021/06/30		99	%
			Chromium (Cr)	2021/06/30		86	%
			Cobalt (Co)	2021/06/30		93	%
			Copper (Cu)	2021/06/30		92	%
			Tin (Sn)	2021/06/30		105	%
			Iron (Fe)	2021/06/30		100	%
			Manganese (Mn)	2021/06/30		98	%
			Mercury (Hg)	2021/06/30		99	%
			Molybdenum (Mo)	2021/06/30		96	%
			Nickel (Ni)	2021/06/30		86	%
			Lead (Pb)	2021/06/30		94	%
			Selenium (Se)	2021/06/30		95	%
			Uranium (U)	2021/06/30		98	%
			Zinc (Zn)	2021/06/30		96	%
2202570	VPA	LEACH. BLANK	Fluoride (F)	2021/07/01	<1.0		mg/L
2202570	VPA	Spiked Blank	Fluoride (F)	2021/07/01		94	%
2202571	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/06/30	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/06/30	<0.20		mg/L
2202571	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/06/30		102	%
			Nitrate (N) and Nitrite(N)	2021/06/30		104	%

RDL = Reportable Detection Limit

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Alex Thibert
Membre OCQ #2020-05

Alex Thibert, B.Sc., Chemist, Montréal, Analyst II, Chemist in Training

Faouzi Sarsi, B.Sc. Chemist, Montréal, SR Analyst

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Michelina Cinquino, Analyst II

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Your Project #: ARD
Site Location: GOODWOOD
Your C.O.C. #: N-A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/10/04
Report #: R2694764
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C135683
Received: 2021/07/15, 09:00

Sample Matrix: Soil
Samples Received: 15

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acid Base Accounting (Sobek modified) (1)	5	2021/10/04	N/A		
Grinding	5	N/A	2021/07/19	STL SOP-00019	N/A
Grinding	1	N/A	2021/07/22	STL SOP-00019	N/A
Fluoride (free)	5	2021/07/24	2021/07/28	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	1	N/A	2021/07/28	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	14	N/A	2021/07/29	STL SOP-00038	SM 23 4500-F m
Mercury by ICP-MS	1	2021/07/15	2021/07/22	III-105 rév.10 03/09/25	MA.200–Mét. 1.2 R7
Mercury by ICP-MS	4	2021/07/15	2021/07/23	III-105 rév.10 03/09/25	MA.200–Mét. 1.2 R7
Water Leachate (CTEU - 9)	5	2021/07/20	2021/07/27	STL SOP-00024	MA100-Lixcom1.1 R1 m
Acid rain simulation leachate (EPA 1312)	4	2021/07/21	2021/07/22	STL SOP-00024	MA100-Lixcom1.1 R1 m
Acid rain simulation leachate (EPA 1312)	1	2021/07/23	2021/07/23	STL SOP-00024	MA100-Lixcom1.1 R1 m
Total Extractable Metals (low level)	5	2021/07/23	2021/07/26	STL SOP-00069	MA.200–Mét. 1.2 R7
Metals - Leached	5	2021/07/23	2021/07/29	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	4	2021/07/23	2021/08/01	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	6	2021/07/27	2021/08/01	STL SOP-00062	MA.200–Mét. 1.2 R7
Nitrate and/or Nitrite- Leached	10	N/A	2021/07/24	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	5	N/A	2021/07/29	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	5	2021/07/24	2021/07/27	STL SOP-00014	MA.300–Ions 1.3 R3 m
Toxicity Charact. Leach. Proc.(EPA 1311)	5	2021/07/22	2021/07/23	STL SOP-00024	MA100-Lixcom1.1 R1 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

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Your Project #: ARD
Site Location: GOODWOOD
Your C.O.C. #: N-A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/10/04
Report #: R2694764
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C135683
Received: 2021/07/15, 09:00

implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas 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 Bureau Veritas, 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 Bureau Veritas Burnaby, 4606 Canada Way , Burnaby, BC, V5G 1K5

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Martine Lepage
Project Manager and Account Manager
06 Oct 2021 09:19:43

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
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Lab BV Job #: C135683
Report Date: 2021/10/04

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD

TOTAL EXTRACTABLE METALS (SOIL)

Lab BV ID					JJ9685	JJ9686	JJ9761	JJ9762	JJ9763		
Sampling Date					2021/07/04	2021/07/04	2021/07/04	2021/07/04	2021/07/04		
COC Number					N-A	N-A	N-A	N-A	N-A		
	Units	**A**	**B**	**C**	**TSMC-83077**	**TSMC-83075**	**TSMC-83076**	**TSMC-83285**	**TSMC-83284**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	0.7	1.8	0.4	0.2	5.9	N/A	N/A
METALS											
Silver (Ag)	mg/kg	**2**	20	40	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	2211834
Arsenic (As)	mg/kg	**6**	30	50	2.8	**7.6**	5.5	**7.1**	**8.5**	2.0	2211834
Barium (Ba)	mg/kg	**340**	500	2000	7.4	<4.0	4.4	6.2	<4.0	4.0	2211834
Boron (B)	mg/kg	**-**	-	-	3.1	<2.0	<2.0	<2.0	<2.0	2.0	2211834
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	2211834
Chromium (Cr)	mg/kg	**100**	250	800	6.3	<1.0	6.7	3.1	1.8	1.0	2211834
Copper (Cu)	mg/kg	**50**	100	500	7.9	6.5	5.7	4.1	8.3	1.0	2211834
Cobalt (Co)	mg/kg	**25**	50	300	3.8	3.7	1.8	2.4	6.0	1.0	2211834
Tin (Sn)	mg/kg	**5**	50	300	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2211834
Iron (Fe) †	mg/kg	**-**	-	-	160000	89000	180000	83000	140000	100	2211834
Manganese (Mn)	mg/kg	**1000**	1000	2200	760	1100	380	340	390	2.0	2211834
Molybdenum (Mo)	mg/kg	**2**	10	40	<0.50	<0.50	<0.50	0.83	<0.50	0.50	2211834
Nickel (Ni)	mg/kg	**50**	100	500	5.2	2.8	3.7	1.1	1.0	0.50	2211834
Mercury (Hg)	mg/kg	**0.2**	2	10	0.037	0.020	0.018	0.065	0.13	0.010	2211834
Lead (Pb)	mg/kg	**50**	500	1000	3.4	<1.0	1.0	2.3	1.3	1.0	2211834
Selenium (Se)	mg/kg	**1**	3	10	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	2211834
Uranium (U) †	mg/kg	**-**	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2211834
Zinc (Zn)	mg/kg	**140**	500	1500	20	<5.0	11	5.4	7.6	5.0	2211834

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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Lab BV Job #: C135683
Report Date: 2021/10/04

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD

METALS-LAB LEACHATE (SOIL)

Lab BV ID		JJ9685	JJ9685	JJ9686			JJ9687		
Sampling Date		2021/07/04	2021/07/04	2021/07/04			2021/07/04		
COC Number		N-A	N-A	N-A			N-A		
	Units	**TSMC-83077**	**TSMC-83077 Lab-Dup**	**TSMC-83075**	**RDL**	**QC Batch**	**TSMC-83077-CTEU-9**	**RDL**	**QC Batch**
% MOISTURE	%	0.7	0.7	1.8	N/A	N/A	N/A	N/A	N/A
METALS									
Silver (Ag) †	ug/L	<0.30	<0.30	<0.30	0.30	2211879	<0.30	0.30	2212914
Arsenic (As)	ug/L	<2.0	<2.0	<2.0	2.0	2211879	<2.0	2.0	2212914
Barium (Ba)	ug/L	75	88	<5.0	5.0	2211879	<5.0	5.0	2212914
Boron (B)	ug/L	<50	<50	<50	50	2211879	<50	50	2212914
Cadmium (Cd)	ug/L	<1.0	<1.0	<1.0	1.0	2211879	<1.0	1.0	2212914
Chromium (Cr)	ug/L	<7.0	<7.0	<7.0	7.0	2211879	<7.0	7.0	2212914
Cobalt (Co)	ug/L	<10	<10	<10	10	2211879	<10	10	2212914
Copper (Cu)	ug/L	<10 (1)	<10	<10	10	2211879	<3.0	3.0	2212914
Tin (Sn) †	ug/L	<50	<50	<50	50	2211879	<50	50	2212914
Iron (Fe)	ug/L	<100	<100	<100	100	2211879	<100	100	2212914
Manganese (Mn)	ug/L	180	180	92	3.0	2211879	150	3.0	2212914
Mercury (Hg)	ug/L	<0.50	<0.50	<0.50	0.50	2211879	<0.50	0.50	2212914
Molybdenum (Mo)	ug/L	<10	<10	<10	10	2211879	<10	10	2212914
Nickel (Ni)	ug/L	<6.0	14	<6.0	6.0	2211879	<6.0	6.0	2212914
Lead (Pb)	ug/L	<1.0	<1.0	<1.0	1.0	2211879	<1.0	1.0	2212914
Selenium (Se)	ug/L	<1.0	<1.0	<1.0	1.0	2211879	<1.0	1.0	2212914
Uranium (U)	ug/L	<0.60	<0.60	<0.60	0.60	2211879	<0.60	0.60	2212914
Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	5.0	2211879	<5.0	5.0	2212914

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable
(1) The detection limit was raised due to instrumentation.

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Lab BV Job #: C135683
Report Date: 2021/10/04

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD

METALS-LAB LEACHATE (SOIL)

Lab BV ID		JJ9688		JJ9689	JJ9690		
Sampling Date		2021/07/04		2021/07/04	2021/07/04		
COC Number		N-A		N-A	N-A		
	Units	TSMC-83075-CTEU-9	QC Batch	TSMC-83077-(SPLP1312)	TSMC-83075-(SPLP1312)	RDL	QC Batch
METALS							
Silver (Ag) †	ug/L	<0.30	2212914	<0.30	<0.30	0.30	2211901
Arsenic (As)	ug/L	<2.0	2212914	<2.0	<2.0	2.0	2211901
Barium (Ba)	ug/L	5.3	2212914	<5.0	<5.0	5.0	2211901
Boron (B)	ug/L	<50	2212914	<50	<50	50	2211901
Cadmium (Cd)	ug/L	<1.0	2212914	<1.0	<1.0	1.0	2211901
Chromium (Cr)	ug/L	<7.0	2212914	<7.0	<7.0	7.0	2211901
Cobalt (Co)	ug/L	<10	2212914	<10	<10	10	2211901
Copper (Cu)	ug/L	<3.0	2212914	160	<3.0	3.0	2211901
Tin (Sn) †	ug/L	<50	2212914	<50	<50	50	2211901
Iron (Fe)	ug/L	<100	2212914	<100	<100	100	2211901
Manganese (Mn)	ug/L	13	2212914	28	46	3.0	2211901
Mercury (Hg)	ug/L	<0.50	2212914	<0.50	<0.50	0.50	2211901
Molybdenum (Mo)	ug/L	<10	2212914	<10	<10	10	2211901
Nickel (Ni)	ug/L	<6.0	2212914	<6.0	<6.0	6.0	2211901
Lead (Pb)	ug/L	<1.0	2212914	<1.0	<1.0	1.0	2211901
Selenium (Se)	ug/L	<1.0	2212914	<1.0	<1.0	1.0	2211901
Uranium (U)	ug/L	<0.60	2212914	<0.60	<0.60	0.60	2211901
Zinc (Zn)	ug/L	<5.0	2212914	<5.0	<5.0	5.0	2211901

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

2021/10/04 11:17

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Lab BV Job #: C135683
Report Date: 2021/10/04

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD

METALS-LAB LEACHATE (SOIL)

Lab BV ID		JJ9761	JJ9762	JJ9763			JJ9765		
Sampling Date		2021/07/04	2021/07/04	2021/07/04			2021/07/04		
COC Number		N-A	N-A	N-A			N-A		
	Units	**TSMC-83076**	**TSMC-83285**	**TSMC-83284**	**RDL**	**QC Batch**	**TSMC-83076-CTEU-9**	**RDL**	**QC Batch**
% MOISTURE	%	0.4	0.2	5.9	N/A	N/A	N/A	N/A	N/A
METALS									
Silver (Ag) †	ug/L	<0.30	<0.30	<0.30	0.30	2211879	<0.30	0.30	2212914
Arsenic (As)	ug/L	<2.0	<2.0	<2.0	2.0	2211879	<2.0	2.0	2212914
Barium (Ba)	ug/L	54	17	6.5	5.0	2211879	<5.0	5.0	2212914
Boron (B)	ug/L	<50	<50	<50	50	2211879	<50	50	2212914
Cadmium (Cd)	ug/L	<1.0	<1.0	<1.0	1.0	2211879	<1.0	1.0	2212914
Chromium (Cr)	ug/L	<7.0	<7.0	<7.0	7.0	2211879	<7.0	7.0	2212914
Cobalt (Co)	ug/L	<10	12	<10	10	2211879	<10	10	2212914
Copper (Cu)	ug/L	<10	<10	<10	10	2211879	<3.0	3.0	2212914
Tin (Sn) †	ug/L	<50	<50	<50	50	2211879	<50	50	2212914
Iron (Fe)	ug/L	<100	65000	<100	100	2211879	<100	100	2212914
Manganese (Mn)	ug/L	270	1200	81	3.0	2211879	240	3.0	2212914
Mercury (Hg)	ug/L	<0.50	<0.50	<0.50	0.50	2211879	<0.50	0.50	2212914
Molybdenum (Mo)	ug/L	<10	<10	<10	10	2211879	<10	10	2212914
Nickel (Ni)	ug/L	<6.0	51	<6.0	6.0	2211879	<6.0	6.0	2212914
Lead (Pb)	ug/L	<1.0	<1.0	<1.0	1.0	2211879	<1.0	1.0	2212914
Selenium (Se)	ug/L	<1.0	<1.0	<1.0	1.0	2211879	<1.0	1.0	2212914
Uranium (U)	ug/L	<0.60	<0.60	<0.60	0.60	2211879	<0.60	0.60	2212914
Zinc (Zn)	ug/L	<5.0	<5.0	6.9	5.0	2211879	<5.0	5.0	2212914

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD

METALS-LAB LEACHATE (SOIL)

Lab BV ID		JJ9766	JJ9767		JJ9768		
Sampling Date		2021/07/04	2021/07/04		2021/07/04		
COC Number		N-A	N-A		N-A		
	Units	**TSMC-83285-CTEU-9**	**TSMC-83284-CTEU-9**	**QC Batch**	**TSMC-83076-(SPLP1312)**	**RDL**	**QC Batch**
METALS							
Silver (Ag) †	ug/L	<0.30	<0.30	2212914	<0.30	0.30	2211901
Arsenic (As)	ug/L	<2.0	<2.0	2212914	<2.0	2.0	2211901
Barium (Ba)	ug/L	8.4	<5.0	2212914	<5.0	5.0	2211901
Boron (B)	ug/L	200	<50	2212914	<50	50	2211901
Cadmium (Cd)	ug/L	<1.0	<1.0	2212914	<1.0	1.0	2211901
Chromium (Cr)	ug/L	<7.0	<7.0	2212914	<7.0	7.0	2211901
Cobalt (Co)	ug/L	<10	<10	2212914	<10	10	2211901
Copper (Cu)	ug/L	<3.0	<3.0	2212914	<3.0	3.0	2211901
Tin (Sn) †	ug/L	<50	<50	2212914	<50	50	2211901
Iron (Fe)	ug/L	180	<100	2212914	<100	100	2211901
Manganese (Mn)	ug/L	<3.0	72	2212914	31	3.0	2211901
Mercury (Hg)	ug/L	<0.50	<0.50	2212914	<0.50	0.50	2211901
Molybdenum (Mo)	ug/L	<10	<10	2212914	<10	10	2211901
Nickel (Ni)	ug/L	<6.0	<6.0	2212914	<6.0	6.0	2211901
Lead (Pb)	ug/L	<1.0	<1.0	2212914	<1.0	1.0	2211901
Selenium (Se)	ug/L	<1.0	<1.0	2212914	<1.0	1.0	2211901
Uranium (U)	ug/L	<0.60	<0.60	2212914	<0.60	0.60	2211901
Zinc (Zn)	ug/L	<5.0	<5.0	2212914	<5.0	5.0	2211901

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD

METALS-LAB LEACHATE (SOIL)

Lab BV ID		JJ9769		JJ9770		
Sampling Date		2021/07/04		2021/07/04		
COC Number		N-A		N-A		
	Units	TSMC-83285-(SPLP1312)	QC Batch	TSMC-83284-(SPLP1312)	RDL	QC Batch
METALS						
Silver (Ag) †	ug/L	<0.30	2212666	<0.30	0.30	2211901
Arsenic (As)	ug/L	<2.0	2212666	<2.0	2.0	2211901
Barium (Ba)	ug/L	<5.0	2212666	<5.0	5.0	2211901
Boron (B)	ug/L	<50	2212666	<50	50	2211901
Cadmium (Cd)	ug/L	<1.0	2212666	<1.0	1.0	2211901
Chromium (Cr)	ug/L	<7.0	2212666	<7.0	7.0	2211901
Cobalt (Co)	ug/L	<10	2212666	<10	10	2211901
Copper (Cu)	ug/L	<3.0	2212666	<3.0	3.0	2211901
Tin (Sn) †	ug/L	<50	2212666	<50	50	2211901
Iron (Fe)	ug/L	<100	2212666	<100	100	2211901
Manganese (Mn)	ug/L	240	2212666	27	3.0	2211901
Mercury (Hg)	ug/L	<0.50	2212666	<0.50	0.50	2211901
Molybdenum (Mo)	ug/L	<10	2212666	<10	10	2211901
Nickel (Ni)	ug/L	<6.0	2212666	<6.0	6.0	2211901
Lead (Pb)	ug/L	<1.0	2212666	<1.0	1.0	2211901
Selenium (Se)	ug/L	<1.0	2212666	<1.0	1.0	2211901
Uranium (U)	ug/L	<0.60	2212666	<0.60	0.60	2211901
Zinc (Zn)	ug/L	<5.0	2212666	<5.0	5.0	2211901

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD

CONVENTIONAL PARAMETERS (SOIL)

Lab BV ID					JJ9685	JJ9686	JJ9761	JJ9762	JJ9763		
Sampling Date					2021/07/04	2021/07/04	2021/07/04	2021/07/04	2021/07/04		
COC Number					N-A	N-A	N-A	N-A	N-A		
	Units	**A**	**B**	**C**	**TSMC-83077**	**TSMC-83075**	**TSMC-83076**	**TSMC-83285**	**TSMC-83284**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	0.7	1.8	0.4	0.2	5.9	N/A	N/A
CONVENTIONALS											
Fluoride (F)	mg/kg	**200**	400	2000	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2211933
Nitrates (N-NO3-) †	mg/kg	-	-	-	<1.0	1.1	<1.0	3.6	<1.0	1.0	2211934
Nitrites (N-NO2-) †	mg/kg	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	2211934
Nitrate (N) and Nitrite(N)	mg/kg	-	-	-	<1.0	1.1	<1.0	3.6	<1.0	1.0	2211934

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Lab BV ID		JJ9685	JJ9686		JJ9687	JJ9688		
Sampling Date		2021/07/04	2021/07/04		2021/07/04	2021/07/04		
COC Number		N-A	N-A		N-A	N-A		
	Units	TSMC-83077	TSMC-83075	QC Batch	TSMC-83077-CTEU-9	TSMC-83075-CTEU-9	RDL	QC Batch
% MOISTURE	%	0.7	1.8	N/A	N/A	N/A	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	<1.0	2211915	<1.0	<1.0	1.0	2212905
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	2211897	<0.20	<0.20	0.20	2212904
Nitrate (N) and Nitrite(N)	mg/L	<0.20	<0.20	2211897	0.22	0.47	0.20	2212904

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Lab BV ID		JJ9689	JJ9690		JJ9761	JJ9762		
Sampling Date		2021/07/04	2021/07/04		2021/07/04	2021/07/04		
COC Number		N-A	N-A		N-A	N-A		
	Units	TSMC-83077-(SPLP1312)	TSMC-83075-(SPLP1312)	QC Batch	TSMC-83076	TSMC-83285	RDL	QC Batch
% MOISTURE	%	N/A	N/A	N/A	0.4	0.2	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	<1.0	2211360	<1.0	<1.0	1.0	2211915
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	2211352	<0.20	<0.20	0.20	2211897
Nitrate (N) and Nitrite(N)	mg/L	<0.20	0.24	2211352	<0.20	<0.20	0.20	2211897

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Lab BV ID		JJ9763		JJ9765	JJ9766	JJ9767		
Sampling Date		2021/07/04		2021/07/04	2021/07/04	2021/07/04		
COC Number		N-A		N-A	N-A	N-A		
	Units	TSMC-83284	QC Batch	TSMC-83076-CTEU-9	TSMC-83285-CTEU-9	TSMC-83284-CTEU-9	RDL	QC Batch
% MOISTURE	%	5.9	N/A	N/A	N/A	N/A	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	2211915	<1.0	<1.0	<1.0	1.0	2212905
Nitrites (N-NO2-)	mg/L	<0.20	2211897	<0.20	<0.20	<0.20	0.20	2212904
Nitrate (N) and Nitrite(N)	mg/L	<0.20	2211897	<0.20	0.62	<0.20	0.20	2212904

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Lab BV ID		JJ9768		JJ9769		JJ9770		
Sampling Date		2021/07/04		2021/07/04		2021/07/04		
COC Number		N-A		N-A		N-A		
	Units	**TSMC-83076-(SPLP1312)**	**QC Batch**	**TSMC-83285-(SPLP1312)**	**QC Batch**	**TSMC-83284-(SPLP1312)**	**RDL**	**QC Batch**
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	2211360	<1.0	2211895	<1.0	1.0	2211360
Nitrites (N-NO2-)	mg/L	<0.20	2211352	<0.20	2211894	<0.20	0.20	2211352
Nitrate (N) and Nitrite(N)	mg/L	<0.20	2211352	0.30	2211894	<0.20	0.20	2211352

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TCLP-EPA 1311 (SOIL)

Lab BV ID		JJ9685	JJ9686	JJ9761	JJ9762	JJ9763	
Sampling Date		2021/07/04	2021/07/04	2021/07/04	2021/07/04	2021/07/04	
COC Number		N-A	N-A	N-A	N-A	N-A	
	Units	**TSMC-83077**	**TSMC-83075**	**TSMC-83076**	**TSMC-83285**	**TSMC-83284**	**QC Batch**
% MOISTURE	%	0.7	1.8	0.4	0.2	5.9	N/A
Leachates							
Weight of sample (g)	n/a	20.1	20.0	20.1	20.0	20.2	2211020
pH of pre-test	n/a	<1.68	<1.68	<1.68	<1.68	<1.68	2211020
pH end of leaching	n/a	4.85	4.57	4.56	4.36	4.49	2211020
Volume extracting fluid 1 (ml)	n/a	400	400	400	400	400	2211020

QC Batch = Quality Control Batch
N/A = Not Applicable

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Site Location: GOODWOOD

SPLP-EPA 1312 (SOIL)

Lab BV ID		JJ9689	JJ9690	JJ9768	
Sampling Date		2021/07/04	2021/07/04	2021/07/04	
COC Number		N-A	N-A	N-A	
	Units	**TSMC-83077-(SPLP1312)**	**TSMC-83075-(SPLP1312)**	**TSMC-83076-(SPLP1312)**	**QC Batch**
Leachates					
Weight of sample (g)	n/a	25.1	25.1	25.0	2210754
Volume of extracting fluid (mL)	n/a	500	500	500	2210754
pH after 18 hours leaching	n/a	5.58	5.24	5.55	2210754
pH of extracting fluid	n/a	4.22	4.22	4.22	2210754
QC Batch = Quality Control Batch					

Lab BV ID		JJ9769		JJ9770	
Sampling Date		2021/07/04		2021/07/04	
COC Number		N-A		N-A	
	Units	**TSMC-83285-(SPLP1312)**	**QC Batch**	**TSMC-83284-(SPLP1312)**	**QC Batch**
Leachates					
Weight of sample (g)	n/a	25.1	2211405	25.1	2210754
Volume of extracting fluid (mL)	n/a	500	2211405	500	2210754
pH after 18 hours leaching	n/a	6.55	2211405	5.74	2210754
pH of extracting fluid	n/a	4.16	2211405	4.22	2210754
QC Batch = Quality Control Batch					

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WATER LEACHATE-CTEU-9 (SOIL)

Lab BV ID		JJ9687	JJ9688	JJ9765	JJ9766	
Sampling Date		2021/07/04	2021/07/04	2021/07/04	2021/07/04	
COC Number		N-A	N-A	N-A	N-A	
	Units	**TSMC-83077-CTEU-9**	**TSMC-83075-CTEU-9**	**TSMC-83076-CTEU-9**	**TSMC-83285-CTEU-9**	**QC Batch**
Leachates						
Weight of sample (g)	n/a	40.2	40.1	40.0	40.2	2209907
pH Deionized water	n/a	5.98	5.98	5.98	5.98	2209907
Date extraction fluid added	n/a	2021/07/20	2021/07/20	2021/07/20	2021/07/20	2209907
Date leaching terminated	n/a	2021/07/27	2021/07/27	2021/07/27	2021/07/27	2209907
Volume of extracting fluid (mL)	n/a	160	160	160	160	2209907
pH after 7 days of leaching	n/a	6.50	7.08	6.48	8.14	2209907
QC Batch = Quality Control Batch						

Lab BV ID		JJ9767	
Sampling Date		2021/07/04	
COC Number		N-A	
	Units	**TSMC-83284-CTEU-9**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	40.1	2209907
pH Deionized water	n/a	5.98	2209907
Date extraction fluid added	n/a	2021/07/20	2209907
Date leaching terminated	n/a	2021/07/27	2209907
Volume of extracting fluid (mL)	n/a	160	2209907
pH after 7 days of leaching	n/a	6.91	2209907
QC Batch = Quality Control Batch			

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GENERAL COMMENTS

A,B,C: Soil Criteria following appendix 2 of the " Guide d'intervention-Protection des sols et réhabilitation des terrains contaminés. MELCC, May 2021." 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 mentionned 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 (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

TCLP-EPA 1311 (SOIL)

pH du pre-test : Veuillez noter que le résultat de l'échantillon (JJ9685, JJ9686, JJ9761, JJ9762, JJ9763) sont en dehors de la courbe de calibration, et certains d'entre eux aussi dehors des limites de la linéarité.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2209907	SMD	Method Blank	pH Deionized water	2021/07/27	5.98		n/a
			Date extraction fluid added	2021/07/27	2021/07/20		n/a
			Date leaching terminated	2021/07/27	2021/07/27		n/a
			Volume of extracting fluid (mL)	2021/07/27	160		n/a
			pH after 7 days of leaching	2021/07/27	6.77		n/a
2210754	SMD	Method Blank	Volume of extracting fluid (mL)	2021/07/22	500		n/a
			pH after 18 hours leaching	2021/07/22	4.22		n/a
			pH of extracting fluid	2021/07/22	4.22		n/a
2211020	SMD	Method Blank	pH end of leaching	2021/07/23	4.90/2.85		n/a
			Volume extracting fluid 1 (ml)	2021/07/23	400		n/a
2211352	ABT	LEACH. BLANK	Nitrites (N-NO2-)	2021/07/24	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/07/24	<0.20		mg/L
2211352	ABT	Spiked Blank	Nitrites (N-NO2-)	2021/07/24		98	%
			Nitrate (N) and Nitrite(N)	2021/07/24		98	%
2211360	YAZ	LEACH. BLANK	Fluoride (F)	2021/07/29	<1.0		mg/L
2211360	YAZ	Spiked Blank	Fluoride (F)	2021/07/29		101	%
2211405	SMD	Method Blank	Volume of extracting fluid (mL)	2021/07/23	500		n/a
			pH after 18 hours leaching	2021/07/23	4.15		n/a
			pH of extracting fluid	2021/07/23	4.16		n/a
2211834	CRI	Spiked Blank	Silver (Ag)	2021/07/26		104	%
			Arsenic (As)	2021/07/26		106	%
			Barium (Ba)	2021/07/26		110	%
			Boron (B)	2021/07/26		113	%
			Cadmium (Cd)	2021/07/26		106	%
			Chromium (Cr)	2021/07/26		112	%
			Copper (Cu)	2021/07/26		106	%
			Cobalt (Co)	2021/07/26		107	%
			Tin (Sn)	2021/07/26		113	%
			Iron (Fe)	2021/07/26		101	%
			Manganese (Mn)	2021/07/26		108	%
			Molybdenum (Mo)	2021/07/26		104	%
			Nickel (Ni)	2021/07/26		110	%
			Mercury (Hg)	2021/07/26		113	%
			Lead (Pb)	2021/07/26		108	%
			Selenium (Se)	2021/07/26		115	%
			Uranium (U)	2021/07/26		112	%
			Zinc (Zn)	2021/07/26		107	%
2211834	CRI	Method Blank	Silver (Ag)	2021/07/26	<0.50		mg/kg
			Arsenic (As)	2021/07/26	<2.0		mg/kg
			Barium (Ba)	2021/07/26	<4.0		mg/kg
			Boron (B)	2021/07/26	<2.0		mg/kg
			Cadmium (Cd)	2021/07/26	<0.10		mg/kg
			Chromium (Cr)	2021/07/26	<1.0		mg/kg
			Copper (Cu)	2021/07/26	<1.0		mg/kg
			Cobalt (Co)	2021/07/26	<1.0		mg/kg
			Tin (Sn)	2021/07/26	<1.0		mg/kg
			Iron (Fe)	2021/07/26	11, RDL=10		mg/kg
			Manganese (Mn)	2021/07/26	<2.0		mg/kg
			Molybdenum (Mo)	2021/07/26	<0.50		mg/kg
			Nickel (Ni)	2021/07/26	<0.50		mg/kg
			Mercury (Hg)	2021/07/26	<0.010		mg/kg

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Lead (Pb)	2021/07/26	<1.0		mg/kg
			Selenium (Se)	2021/07/26	<0.50		mg/kg
			Uranium (U)	2021/07/26	<2.0		mg/kg
			Zinc (Zn)	2021/07/26	<5.0		mg/kg
2211879	ST5	LEACH. BLANK	Silver (Ag)	2021/07/29	<0.30		ug/L
			Arsenic (As)	2021/07/29	<2.0		ug/L
			Barium (Ba)	2021/07/29	<5.0		ug/L
			Boron (B)	2021/07/29	<50		ug/L
			Cadmium (Cd)	2021/07/29	<1.0		ug/L
			Chromium (Cr)	2021/07/29	<7.0		ug/L
			Cobalt (Co)	2021/07/29	<10		ug/L
			Copper (Cu)	2021/07/29	<10		ug/L
			Tin (Sn)	2021/07/29	<50		ug/L
			Iron (Fe)	2021/07/29	<100		ug/L
			Manganese (Mn)	2021/07/29	<3.0		ug/L
			Mercury (Hg)	2021/07/29	<0.50		ug/L
			Molybdenum (Mo)	2021/07/29	<10		ug/L
			Nickel (Ni)	2021/07/29	<6.0		ug/L
			Lead (Pb)	2021/07/29	<1.0		ug/L
			Selenium (Se)	2021/07/29	<1.0		ug/L
			Uranium (U)	2021/07/29	<0.60		ug/L
			Zinc (Zn)	2021/07/29	<5.0		ug/L
2211879	ST5	Spiked Blank	Silver (Ag)	2021/07/29		99	%
			Arsenic (As)	2021/07/29		110	%
			Barium (Ba)	2021/07/29		107	%
			Boron (B)	2021/07/29		108	%
			Cadmium (Cd)	2021/07/29		105	%
			Chromium (Cr)	2021/07/29		101	%
			Cobalt (Co)	2021/07/29		106	%
			Copper (Cu)	2021/07/29		104	%
			Tin (Sn)	2021/07/29		118	%
			Iron (Fe)	2021/07/29		108	%
			Manganese (Mn)	2021/07/29		107	%
			Mercury (Hg)	2021/07/29		113	%
			Molybdenum (Mo)	2021/07/29		108	%
			Nickel (Ni)	2021/07/29		107	%
			Lead (Pb)	2021/07/29		103	%
			Selenium (Se)	2021/07/29		108	%
			Uranium (U)	2021/07/29		97	%
			Zinc (Zn)	2021/07/29		118	%
2211894	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/07/24	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/07/24	<0.20		mg/L
2211894	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/07/24		96	%
			Nitrate (N) and Nitrite(N)	2021/07/24		97	%
2211895	ANB	LEACH. BLANK	Fluoride (F)	2021/07/28	<1.0		mg/L
2211895	ANB	Spiked Blank	Fluoride (F)	2021/07/28		114	%
2211897	ABT	LEACH. BLANK	Nitrites (N-NO2-)	2021/07/24	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/07/24	<0.20		mg/L
2211897	ABT	Spiked Blank	Nitrites (N-NO2-)	2021/07/24		96	%
			Nitrate (N) and Nitrite(N)	2021/07/24		100	%
2211901	AT7	LEACH. BLANK	Silver (Ag)	2021/08/01	<0.30		ug/L
			Arsenic (As)	2021/08/01	<2.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Barium (Ba)	2021/08/01	<5.0		ug/L
			Boron (B)	2021/08/01	<50		ug/L
			Cadmium (Cd)	2021/08/01	<1.0		ug/L
			Chromium (Cr)	2021/08/01	<7.0		ug/L
			Cobalt (Co)	2021/08/01	<10		ug/L
			Copper (Cu)	2021/08/01	5.0, RDL=3.0		ug/L
			Tin (Sn)	2021/08/01	<50		ug/L
			Iron (Fe)	2021/08/01	<100		ug/L
			Manganese (Mn)	2021/08/01	<3.0		ug/L
			Mercury (Hg)	2021/08/01	<0.50		ug/L
			Molybdenum (Mo)	2021/08/01	<10		ug/L
			Nickel (Ni)	2021/08/01	<6.0		ug/L
			Lead (Pb)	2021/08/01	<1.0		ug/L
			Selenium (Se)	2021/08/01	<1.0		ug/L
			Uranium (U)	2021/08/01	<0.60		ug/L
			Zinc (Zn)	2021/08/01	<5.0		ug/L
2211901	AT7	Spiked Blank	Silver (Ag)	2021/08/01		95	%
			Arsenic (As)	2021/08/01		96	%
			Barium (Ba)	2021/08/01		84	%
			Boron (B)	2021/08/01		106	%
			Cadmium (Cd)	2021/08/01		105	%
			Chromium (Cr)	2021/08/01		97	%
			Cobalt (Co)	2021/08/01		100	%
			Copper (Cu)	2021/08/01		99	%
			Tin (Sn)	2021/08/01		114	%
			Iron (Fe)	2021/08/01		116	%
			Manganese (Mn)	2021/08/01		108	%
			Mercury (Hg)	2021/08/01		122 (1)	%
			Molybdenum (Mo)	2021/08/01		100	%
			Nickel (Ni)	2021/08/01		107	%
			Lead (Pb)	2021/08/01		118	%
			Selenium (Se)	2021/08/01		97	%
			Uranium (U)	2021/08/01		134 (1)	%
			Zinc (Zn)	2021/08/01		104	%
2211915	YAZ	LEACH. BLANK	Fluoride (F)	2021/07/29	<1.0		mg/L
2211915	YAZ	Spiked Blank	Fluoride (F)	2021/07/29		101	%
2211933	ANB	Spiked Blank	Fluoride (F)	2021/07/28		103	%
2211933	ANB	Method Blank	Fluoride (F)	2021/07/28	<1.0		mg/kg
2211934	TGU	Spiked Blank	Nitrates (N-NO3-)	2021/07/27		98	%
			Nitrites (N-NO2-)	2021/07/27		97	%
			Nitrate (N) and Nitrite(N)	2021/07/27		97	%
2211934	TGU	Method Blank	Nitrates (N-NO3-)	2021/07/27	<1.0		mg/kg
			Nitrites (N-NO2-)	2021/07/27	<0.20		mg/kg
			Nitrate (N) and Nitrite(N)	2021/07/27	<1.0		mg/kg
2212666	AT7	LEACH. BLANK	Silver (Ag)	2021/08/01	<0.30		ug/L
			Arsenic (As)	2021/08/01	<2.0		ug/L
			Barium (Ba)	2021/08/01	<5.0		ug/L
			Boron (B)	2021/08/01	<50		ug/L
			Cadmium (Cd)	2021/08/01	<1.0		ug/L
			Chromium (Cr)	2021/08/01	<7.0		ug/L
			Cobalt (Co)	2021/08/01	<10		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Copper (Cu)	2021/08/01	5.0, RDL=3.0		ug/L
			Tin (Sn)	2021/08/01	<50		ug/L
			Iron (Fe)	2021/08/01	<100		ug/L
			Manganese (Mn)	2021/08/01	<3.0		ug/L
			Mercury (Hg)	2021/08/01	<0.50		ug/L
			Molybdenum (Mo)	2021/08/01	<10		ug/L
			Nickel (Ni)	2021/08/01	<6.0		ug/L
			Lead (Pb)	2021/08/01	<1.0		ug/L
			Selenium (Se)	2021/08/01	<1.0		ug/L
			Uranium (U)	2021/08/01	<0.60		ug/L
			Zinc (Zn)	2021/08/01	<5.0		ug/L
2212666	AT7	Spiked Blank	Silver (Ag)	2021/08/01		103	%
			Arsenic (As)	2021/08/01		105	%
			Barium (Ba)	2021/08/01		89	%
			Boron (B)	2021/08/01		111	%
			Cadmium (Cd)	2021/08/01		108	%
			Chromium (Cr)	2021/08/01		108	%
			Cobalt (Co)	2021/08/01		108	%
			Copper (Cu)	2021/08/01		107	%
			Tin (Sn)	2021/08/01		124 (1)	%
			Iron (Fe)	2021/08/01		124 (1)	%
			Manganese (Mn)	2021/08/01		119	%
			Mercury (Hg)	2021/08/01		126 (1)	%
			Molybdenum (Mo)	2021/08/01		104	%
			Nickel (Ni)	2021/08/01		107	%
			Lead (Pb)	2021/08/01		124 (1)	%
			Selenium (Se)	2021/08/01		106	%
			Uranium (U)	2021/08/01		140 (1)	%
			Zinc (Zn)	2021/08/01		110	%
2212904	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/07/29	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/07/29	<0.20		mg/L
2212904	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/07/29		97	%
			Nitrate (N) and Nitrite(N)	2021/07/29		97	%
2212905	YAZ	LEACH. BLANK	Fluoride (F)	2021/07/29	<1.0		mg/L
2212905	YAZ	Spiked Blank	Fluoride (F)	2021/07/29		106	%
2212914	AT7	LEACH. BLANK	Silver (Ag)	2021/08/01	<0.30		ug/L
			Arsenic (As)	2021/08/01	<2.0		ug/L
			Barium (Ba)	2021/08/01	<5.0		ug/L
			Boron (B)	2021/08/01	<50		ug/L
			Cadmium (Cd)	2021/08/01	<1.0		ug/L
			Chromium (Cr)	2021/08/01	<7.0		ug/L
			Cobalt (Co)	2021/08/01	<10		ug/L
			Copper (Cu)	2021/08/01	<3.0		ug/L
			Tin (Sn)	2021/08/01	<50		ug/L
			Iron (Fe)	2021/08/01	<100		ug/L
			Manganese (Mn)	2021/08/01	<3.0		ug/L
			Mercury (Hg)	2021/08/01	<0.50		ug/L
			Molybdenum (Mo)	2021/08/01	<10		ug/L
			Nickel (Ni)	2021/08/01	<6.0		ug/L
			Lead (Pb)	2021/08/01	<1.0		ug/L
			Selenium (Se)	2021/08/01	<1.0		ug/L

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Lab BV Job #: C135683
Report Date: 2021/10/04

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: GOODWOOD

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Uranium (U)	2021/08/01	<0.60		ug/L
			Zinc (Zn)	2021/08/01	<5.0		ug/L
2212914	AT7	Spiked Blank	Silver (Ag)	2021/08/04		101	%
			Arsenic (As)	2021/08/04		103	%
			Barium (Ba)	2021/08/04		101	%
			Boron (B)	2021/08/04		101	%
			Cadmium (Cd)	2021/08/04		99	%
			Chromium (Cr)	2021/08/04		97	%
			Cobalt (Co)	2021/08/04		98	%
			Copper (Cu)	2021/08/04		97	%
			Tin (Sn)	2021/08/04		109	%
			Iron (Fe)	2021/08/04		102	%
			Manganese (Mn)	2021/08/04		103	%
			Mercury (Hg)	2021/08/04		99	%
			Molybdenum (Mo)	2021/08/04		99	%
			Nickel (Ni)	2021/08/04		99	%
			Lead (Pb)	2021/08/04		97	%
			Selenium (Se)	2021/08/04		98	%
			Uranium (U)	2021/08/04		98	%
			Zinc (Zn)	2021/08/04		97	%

RDL = Reportable Detection Limit

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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.

(1) Recovery or relative percent difference (RPD) for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Frederic Arnau, B.Sc., Chemist, Montreal, Scientific Service Specialist

Faouzi Sarsi, B.Sc. Chemist, Montréal, SR Analyst

Jonathan Fauvel, B.Sc., Chemist, Montreal, Manager of Inorganics

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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Your P.O. #: 3000000997
Your Project #: ARD
Site Location: DS04
Your C.O.C. #: N/A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/12/29
Report #: R2724690
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C150724
Received: 2021/09/22, 16:45

Sample Matrix: Rock
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Grinding	1	N/A	2021/10/13	STL SOP-00019	N/A
Fluoride (free)	1	2021/10/02	2021/10/04	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	1	N/A	2021/09/30	STL SOP-00038	SM 23 4500-F m
Mercury by ICP-MS	1	2021/09/23	2021/09/28	III-105 rév.10 03/09/25	MA.200–Mét. 1.2 R7
Total Extractable Metals (low level)	1	2021/09/28	2021/09/30	STL SOP-00069	MA.200–Mét. 1.2 R7
Metals - Leached	1	2021/09/28	2021/09/29	STL SOP-00062	MA.200–Mét. 1.2 R7
Nitrate and/or Nitrite- Leached	1	N/A	2021/09/30	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	1	2021/10/02	2021/10/03	STL SOP-00014	MA.300–Ions 1.3 R3 m
Toxicity Charact. Leach. Proc.(EPA 1311)	1	2021/09/27	2021/09/28	STL SOP-00024	MA100-Lixcom1.1 R1 m

Sample Matrix: Soil
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acid Base Accounting (Sobek modified) (1)	4	2021/12/20	N/A		
Grinding	4	N/A	2021/09/27	STL SOP-00019	N/A
Fluoride (free)	3	2021/10/02	2021/10/04	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	4	N/A	2021/10/07	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	7	N/A	2021/09/30	STL SOP-00038	SM 23 4500-F m
Mercury by ICP-MS	3	2021/09/23	2021/09/28	III-105 rév.10 03/09/25	MA.200–Mét. 1.2 R7
Water Leachate (CTEU - 9)	4	2021/09/29	2021/10/06	STL SOP-00024	MA100-Lixcom1.1 R1 m
Acid rain simulation leachate (EPA 1312)	4	2021/09/27	2021/09/28	STL SOP-00024	MA100-Lixcom1.1 R1 m
Total Extractable Metals (low level)	3	2021/09/28	2021/09/30	STL SOP-00069	MA.200–Mét. 1.2 R7
Metals - Leached	3	2021/10/07	2021/10/07	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	1	2021/10/07	2021/10/08	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	7	2021/09/28	2021/09/29	STL SOP-00062	MA.200–Mét. 1.2 R7
Nitrate and/or Nitrite- Leached	4	N/A	2021/10/01	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	4	N/A	2021/10/08	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	3	N/A	2021/09/30	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	3	2021/10/02	2021/10/03	STL SOP-00014	MA.300–Ions 1.3 R3 m
Toxicity Charact. Leach. Proc.(EPA 1311)	3	2021/09/27	2021/09/28	STL SOP-00024	MA100-Lixcom1.1 R1 m

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Your P.O. #: 3000000997
Your Project #: ARD
Site Location: DS04
Your C.O.C. #: N/A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/12/29
Report #: R2724690
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C150724
Received: 2021/09/22, 16:45

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas 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 Bureau Veritas, 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 Bureau Veritas - ARD Receiving, 200-11620 Horseshoe Way , Richmond, BC, V7A 4V5

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Martine Lepage
Project Manager and Account Manager
25 Jan 2022 16:46:29

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
==========
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Lab BV Job #: C150724
Report Date: 2021/12/29

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: DS04
Your P.O. #: 3000000997

TOTAL EXTRACTABLE METALS (ROCK)

Lab BV ID					JS3043		
Sampling Date					2021/09/10		
	Units	A	B	C	TSMC-78147	RDL	QC Batch
METALS							
Silver (Ag)	mg/kg	**2**	20	40	<0.50	0.50	2234493
Arsenic (As)	mg/kg	**6**	30	50	3.2	2.0	2234493
Barium (Ba)	mg/kg	**340**	500	2000	<4.0	4.0	2234493
Boron (B)	mg/kg	**-**	-	-	2.8	2.0	2234493
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	0.10	2234493
Chromium (Cr)	mg/kg	**100**	250	800	1.1	1.0	2234493
Copper (Cu)	mg/kg	**50**	100	500	<1.0	1.0	2234493
Cobalt (Co)	mg/kg	**25**	50	300	<1.0	1.0	2234493
Tin (Sn)	mg/kg	**5**	50	300	<1.0	1.0	2234493
Iron (Fe) †	mg/kg	**-**	-	-	47000	10	2234493
Manganese (Mn)	mg/kg	**1000**	1000	2200	160	2.0	2234493
Molybdenum (Mo)	mg/kg	**2**	10	40	<0.50	0.50	2234493
Nickel (Ni)	mg/kg	**50**	100	500	0.88	0.50	2234493
Mercury (Hg)	mg/kg	**0.2**	2	10	0.015	0.010	2234493
Lead (Pb)	mg/kg	**50**	500	1000	1.4	1.0	2234493
Selenium (Se)	mg/kg	**1**	3	10	<0.50	0.50	2234493
Uranium (U) †	mg/kg	**-**	-	-	<2.0	2.0	2234493
Zinc (Zn)	mg/kg	**140**	500	1500	<5.0	5.0	2234493

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

2021/12/29 13:56

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Lab BV Job #: C150724
Report Date: 2021/12/29

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: DS04
Your P.O. #: 3000000997

METALS-LAB LEACHATE (ROCK)

Lab BV ID		JS3043		
Sampling Date		2021/09/10		
	Units	**TSMC-78147**	**RDL**	**QC Batch**
METALS				
Silver (Ag) †	ug/L	<0.30	0.30	2234616
Arsenic (As)	ug/L	<2.0	2.0	2234616
Barium (Ba)	ug/L	7.7	5.0	2234616
Boron (B)	ug/L	<50	50	2234616
Cadmium (Cd)	ug/L	<1.0	1.0	2234616
Chromium (Cr)	ug/L	<7.0	7.0	2234616
Cobalt (Co)	ug/L	<10	10	2234616
Copper (Cu)	ug/L	<3.0	3.0	2234616
Tin (Sn) †	ug/L	<50	50	2234616
Iron (Fe)	ug/L	430	100	2234616
Manganese (Mn)	ug/L	56	3.0	2234616
Mercury (Hg)	ug/L	<0.50	0.50	2234616
Molybdenum (Mo)	ug/L	<10	10	2234616
Nickel (Ni)	ug/L	<6.0	6.0	2234616
Lead (Pb)	ug/L	2.7	1.0	2234616
Selenium (Se)	ug/L	<1.0	1.0	2234616
Uranium (U)	ug/L	<0.60	0.60	2234616
Zinc (Zn)	ug/L	29	5.0	2234616

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: DS04
Your P.O. #: 3000000997

CONVENTIONAL PARAMETERS (ROCK)

Lab BV ID					JS3043		
Sampling Date					2021/09/10		
	Units	A	B	C	TSMC-78147	RDL	QC Batch
CONVENTIONALS							
Fluoride (F)	mg/kg	**200**	400	2000	1.7	1.0	2236380
Nitrates (N-NO3-) †	mg/kg	-	-	-	2.2	1.0	2236382
Nitrites (N-NO2-) †	mg/kg	-	-	-	<0.20	0.20	2236382
Nitrate (N) and Nitrite(N)	mg/kg	-	-	-	2.2	1.0	2236382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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Site Location: DS04
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CONVENTIONAL PARAMETERS-LAB LEACHATE (ROCK)

Lab BV ID		JS3043		
Sampling Date		2021/09/10		
	Units	**TSMC-78147**	**RDL**	**QC Batch**
CONVENTIONALS				
Fluoride (F)	mg/L	<1.0	1.0	2235603
Nitrites (N-NO2-)	mg/L	<0.20	0.20	2235402
Nitrate (N) and Nitrite(N)	mg/L	<0.20	0.20	2235402

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TCLP-EPA 1311 (ROCK)

Lab BV ID		JS3043	
Sampling Date		2021/09/10	
	Units	**TSMC-78147**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	20.1	2234067
pH of pre-test	n/a	<1.68	2234067
pH end of leaching	n/a	4.90	2234067
Volume extracting fluid 1 (ml)	n/a	400	2234067
QC Batch = Quality Control Batch			

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TATA STEEL MINERALS CANADA
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TOTAL EXTRACTABLE METALS (SOIL)

Lab BV ID					JS3044	JS3050	JS3051		
Sampling Date					2021/09/10	2021/09/10	2021/09/10		
	Units	**A**	**B**	**C**	**TSMC-84452**	**TSMC-83284**	**TSMC-84553**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	3.1	2.1	8.8	N/A	N/A
METALS									
Silver (Ag)	mg/kg	**2**	20	40	<0.50	<0.50	<0.50	0.50	2234493
Arsenic (As)	mg/kg	**6**	30	50	**7.1**	**14**	3.0	2.0	2234493
Barium (Ba)	mg/kg	**340**	500	2000	<4.0	<4.0	63	4.0	2234493
Boron (B)	mg/kg	**-**	-	-	<2.0	<2.0	<2.0	2.0	2234493
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	<0.10	<0.10	0.10	2234493
Chromium (Cr)	mg/kg	**100**	250	800	1.3	<1.0	4.3	1.0	2234493
Copper (Cu)	mg/kg	**50**	100	500	2.6	3.4	3.3	1.0	2234493
Cobalt (Co)	mg/kg	**25**	50	300	4.1	14	2.8	1.0	2234493
Tin (Sn)	mg/kg	**5**	50	300	<1.0	<1.0	<1.0	1.0	2234493
Iron (Fe) †	mg/kg	**-**	-	-	130000	97000	200000	100	2234493
Manganese (Mn)	mg/kg	**1000**	1000	2200	490	510	930	2.0	2234493
Molybdenum (Mo)	mg/kg	**2**	10	40	<0.50	<0.50	<0.50	0.50	2234493
Nickel (Ni)	mg/kg	**50**	100	500	1.6	1.0	1.6	0.50	2234493
Mercury (Hg)	mg/kg	**0.2**	2	10	<0.010	0.033	0.054	0.010	2234493
Lead (Pb)	mg/kg	**50**	500	1000	<1.0	1.8	1.1	1.0	2234493
Selenium (Se)	mg/kg	**1**	3	10	<0.50	<0.50	<0.50	0.50	2234493
Uranium (U) †	mg/kg	**-**	-	-	<2.0	<2.0	<2.0	2.0	2234493
Zinc (Zn)	mg/kg	**140**	500	1500	5.7	5.2	7.4	5.0	2234493

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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METALS-LAB LEACHATE (SOIL)

Lab BV ID		JS3044		JS3046	JS3047		
Sampling Date		2021/09/10		2021/09/10	2021/09/10		
	Units	**TSMC-84452**	**QC Batch**	**TSMC-78147-CTEU-9**	**TSMC-84452-CTEU-9**	**RDL**	**QC Batch**
% MOISTURE	%	3.1	N/A	N/A	N/A	N/A	N/A
METALS							
Silver (Ag) †	ug/L	<0.30	2234616	<0.30	<0.30	0.30	2237970
Arsenic (As)	ug/L	<2.0	2234616	<2.0	<2.0	2.0	2237970
Barium (Ba)	ug/L	9.1	2234616	13	5.9	5.0	2237970
Boron (B)	ug/L	<50	2234616	62	<50	50	2237970
Cadmium (Cd)	ug/L	<1.0	2234616	<1.0	<1.0	1.0	2237970
Chromium (Cr)	ug/L	<7.0	2234616	<7.0	<7.0	7.0	2237970
Cobalt (Co)	ug/L	<10	2234616	<10	<10	10	2237970
Copper (Cu)	ug/L	<3.0	2234616	<3.0	<3.0	3.0	2237970
Tin (Sn) †	ug/L	<50	2234616	<50	<50	50	2237970
Iron (Fe)	ug/L	<100	2234616	15000	410	100	2237970
Manganese (Mn)	ug/L	82	2234616	140	11	3.0	2237970
Mercury (Hg)	ug/L	<0.50	2234616	<0.50	<0.50	0.50	2237970
Molybdenum (Mo)	ug/L	<10	2234616	<10	<10	10	2237970
Nickel (Ni)	ug/L	<6.0	2234616	<6.0	<6.0	6.0	2237970
Lead (Pb)	ug/L	<1.0	2234616	2.6	<1.0	1.0	2237970
Selenium (Se)	ug/L	<1.0	2234616	<1.0	<1.0	1.0	2237970
Uranium (U)	ug/L	<0.60	2234616	<0.60	<0.60	0.60	2237970
Zinc (Zn)	ug/L	<5.0	2234616	5.3	<5.0	5.0	2237970

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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METALS-LAB LEACHATE (SOIL)

Lab BV ID		JS3048	JS3049		JS3050	JS3051		
Sampling Date		2021/09/10	2021/09/10		2021/09/10	2021/09/10		
	Units	**TSMC-78147-(SPLP1312)**	**TSMC-84452-(SPLP1312)**	**QC Batch**	**TSMC-83284**	**TSMC-84553**	**RDL**	**QC Batch**
% MOISTURE	%	N/A	N/A	N/A	2.1	8.8	N/A	N/A
METALS								
Silver (Ag) †	ug/L	<0.30	<0.30	2234625	<0.30	<0.30	0.30	2234616
Arsenic (As)	ug/L	<2.0	<2.0	2234625	<2.0	<2.0	2.0	2234616
Barium (Ba)	ug/L	N/A	N/A	N/A	28	81	5.0	2234616
Boron (B)	ug/L	<50	<50	2234625	<50	<50	50	2234616
Cadmium (Cd)	ug/L	<1.0	<1.0	2234625	<1.0	<1.0	1.0	2234616
Chromium (Cr)	ug/L	<7.0	<7.0	2234625	<7.0	<7.0	7.0	2234616
Cobalt (Co)	ug/L	<10	<10	2234625	<10	<10	10	2234616
Copper (Cu)	ug/L	<3.0	<3.0	2234625	<3.0	<3.0	3.0	2234616
Tin (Sn) †	ug/L	<50	<50	2234625	<50	<50	50	2234616
Iron (Fe)	ug/L	<100	<100	2234625	<100	<100	100	2234616
Manganese (Mn)	ug/L	<3.0	35	2234625	100	1500	3.0	2234616
Mercury (Hg)	ug/L	<0.50	<0.50	2234625	<0.50	<0.50	0.50	2234616
Molybdenum (Mo)	ug/L	<10	<10	2234625	<10	<10	10	2234616
Nickel (Ni)	ug/L	<6.0	<6.0	2234625	<6.0	<6.0	6.0	2234616
Lead (Pb)	ug/L	<1.0	<1.0	2234625	<1.0	<1.0	1.0	2234616
Selenium (Se)	ug/L	<1.0	<1.0	2234625	<1.0	<1.0	1.0	2234616
Uranium (U)	ug/L	<0.60	<0.60	2234625	<0.60	<0.60	0.60	2234616
Zinc (Zn)	ug/L	<5.0	<5.0	2234625	<5.0	<5.0	5.0	2234616

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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METALS-LAB LEACHATE (SOIL)

Lab BV ID		JS3053	JS3054		JS3056		
Sampling Date		2021/09/10	2021/09/10		2021/09/10		
	Units	**TSMC-83284-CTEU-9**	**TSMC-84553-CTEU-9**	**QC Batch**	**TSMC-83284-(SPLP1312)**	**RDL**	**QC Batch**
METALS							
Silver (Ag) †	ug/L	<0.30	<0.30	2237970	<0.30	0.30	2234625
Arsenic (As)	ug/L	<2.0	<2.0	2237970	<2.0	2.0	2234625
Barium (Ba)	ug/L	<5.0	79	2237970	N/A	5.0	N/A
Boron (B)	ug/L	140	<50	2237970	<50	50	2234625
Cadmium (Cd)	ug/L	<1.0	<1.0	2237970	<1.0	1.0	2234625
Chromium (Cr)	ug/L	<7.0	<7.0	2237970	<7.0	7.0	2234625
Cobalt (Co)	ug/L	<10	<10	2237970	<10	10	2234625
Copper (Cu)	ug/L	<3.0	<3.0	2237970	<3.0	3.0	2234625
Tin (Sn) †	ug/L	<50	<50	2237970	<50	50	2234625
Iron (Fe)	ug/L	<100	<100	2237970	<100	100	2234625
Manganese (Mn)	ug/L	380	280	2237970	14	3.0	2234625
Mercury (Hg)	ug/L	<0.50	<0.50	2237970	<0.50	0.50	2234625
Molybdenum (Mo)	ug/L	<10	<10	2237970	<10	10	2234625
Nickel (Ni)	ug/L	<6.0	<6.0	2237970	<6.0	6.0	2234625
Lead (Pb)	ug/L	<1.0	<1.0	2237970	<1.0	1.0	2234625
Selenium (Se)	ug/L	<1.0	<1.0	2237970	<1.0	1.0	2234625
Uranium (U)	ug/L	<0.60	<0.60	2237970	<0.60	0.60	2234625
Zinc (Zn)	ug/L	<5.0	<5.0	2237970	<5.0	5.0	2234625

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

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METALS-LAB LEACHATE (SOIL)

Lab BV ID		JS3057		
Sampling Date		2021/09/10		
	Units	TSMC-84553-(SPLP1312)	RDL	QC Batch
METALS				
Silver (Ag) †	ug/L	<0.30	0.30	2234625
Arsenic (As)	ug/L	<2.0	2.0	2234625
Boron (B)	ug/L	<50	50	2234625
Cadmium (Cd)	ug/L	<1.0	1.0	2234625
Chromium (Cr)	ug/L	<7.0	7.0	2234625
Cobalt (Co)	ug/L	<10	10	2234625
Copper (Cu)	ug/L	<3.0	3.0	2234625
Tin (Sn) †	ug/L	<50	50	2234625
Iron (Fe)	ug/L	<100	100	2234625
Manganese (Mn)	ug/L	24	3.0	2234625
Mercury (Hg)	ug/L	<0.50	0.50	2234625
Molybdenum (Mo)	ug/L	<10	10	2234625
Nickel (Ni)	ug/L	<6.0	6.0	2234625
Lead (Pb)	ug/L	<1.0	1.0	2234625
Selenium (Se)	ug/L	<1.0	1.0	2234625
Uranium (U)	ug/L	<0.60	0.60	2234625
Zinc (Zn)	ug/L	<5.0	5.0	2234625

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SOIL)

Lab BV ID					JS3044	JS3050	JS3051		
Sampling Date					2021/09/10	2021/09/10	2021/09/10		
	Units	**A**	**B**	**C**	**TSMC-84452**	**TSMC-83284**	**TSMC-84553**	**RDL**	**QC Batch**
% MOISTURE	%	-	-	-	3.1	2.1	8.8	N/A	N/A
CONVENTIONALS									
Fluoride (F)	mg/kg	**200**	400	2000	<1.0	<1.0	<1.0	1.0	2236380
Nitrates (N-NO3-) †	mg/kg	**-**	-	-	<1.0	<1.0	2.6	1.0	2236382
Nitrites (N-NO2-) †	mg/kg	**-**	-	-	<0.20	<0.20	<0.20	0.20	2236382
Nitrate (N) and Nitrite(N)	mg/kg	**-**	-	-	<1.0	<1.0	2.6	1.0	2236382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Lab BV ID		JS3044		JS3046	JS3047		
Sampling Date		2021/09/10		2021/09/10	2021/09/10		
	Units	TSMC-84452	QC Batch	TSMC-78147-CTEU-9	TSMC-84452-CTEU-9	RDL	QC Batch
% MOISTURE	%	3.1	N/A	N/A	N/A	N/A	N/A
CONVENTIONALS							
Fluoride (F)	mg/L	<1.0	2235603	<1.0	<1.0	1.0	2238123
Nitrites (N-NO2-)	mg/L	<0.20	2235402	<0.20	<0.20	0.20	2238114
Nitrate (N) and Nitrite(N)	mg/L	<0.20	2235402	0.33	<0.20	0.20	2238114

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Lab BV ID		JS3048	JS3049		JS3050	JS3051		
Sampling Date		2021/09/10	2021/09/10		2021/09/10	2021/09/10		
	Units	TSMC-78147-(SPLP1312)	TSMC-84452-(SPLP1312)	QC Batch	TSMC-83284	TSMC-84553	RDL	QC Batch
% MOISTURE	%	N/A	N/A	N/A	2.1	8.8	N/A	N/A
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	<1.0	2235601	<1.0	<1.0	1.0	2235603
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	2235404	<0.20	<0.20	0.20	2235402
Nitrate (N) and Nitrite(N)	mg/L	N/A	N/A	N/A	<0.20	<0.20	0.20	2235402

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Lab BV ID		JS3053	JS3054		JS3056		
Sampling Date		2021/09/10	2021/09/10		2021/09/10		
	Units	TSMC-83284-CTEU-9	TSMC-84553-CTEU-9	QC Batch	TSMC-83284-(SPLP1312)	RDL	QC Batch
CONVENTIONALS							
Fluoride (F)	mg/L	<1.0	<1.0	2238123	<1.0	1.0	2235601
Nitrites (N-NO2-)	mg/L	<0.20	<0.20	2238114	<0.20	0.20	2235404
Nitrate (N) and Nitrite(N)	mg/L	<0.20	0.24	2238114	N/A	0.20	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Lab BV ID		JS3057		
Sampling Date		2021/09/10		
	Units	TSMC-84553-(SPLP1312)	RDL	QC Batch
CONVENTIONALS				
Fluoride (F)	mg/L	<1.0	1.0	2235601
Nitrites (N-NO2-)	mg/L	<0.20	0.20	2235404

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TCLP-EPA 1311 (SOIL)

Lab BV ID		JS3044	JS3050	JS3051	
Sampling Date		2021/09/10	2021/09/10	2021/09/10	
	Units	**TSMC-84452**	**TSMC-83284**	**TSMC-84553**	**QC Batch**
% MOISTURE	%	3.1	2.1	8.8	N/A
Leachates					
Weight of sample (g)	n/a	20.0	20.1	20.1	2234067
pH of pre-test	n/a	<1.68	<1.68	<1.68	2234067
pH end of leaching	n/a	4.88	4.89	4.75	2234067
Volume extracting fluid 1 (ml)	n/a	400	400	400	2234067

QC Batch = Quality Control Batch
N/A = Not Applicable

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SPLP-EPA 1312 (SOIL)

Lab BV ID		JS3048	JS3049	JS3056	
Sampling Date		2021/09/10	2021/09/10	2021/09/10	
	Units	**TSMC-78147-(SPLP1312)**	**TSMC-84452-(SPLP1312)**	**TSMC-83284-(SPLP1312)**	**QC Batch**
Leachates					
Weight of sample (g)	n/a	25.0	25.2	25.1	2234107
Volume of extracting fluid (mL)	n/a	500	500	500	2234107
pH after 18 hours leaching	n/a	9.66	5.49	5.61	2234107
pH of extracting fluid	n/a	4.17	4.17	4.17	2234107
QC Batch = Quality Control Batch					

Lab BV ID		JS3057	
Sampling Date		2021/09/10	
	Units	**TSMC-84553-(SPLP1312)**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	25.0	2234107
Volume of extracting fluid (mL)	n/a	500	2234107
pH after 18 hours leaching	n/a	5.78	2234107
pH of extracting fluid	n/a	4.17	2234107
QC Batch = Quality Control Batch			

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Client Project #: ARD
Site Location: DS04
Your P.O. #: 3000000997

WATER LEACHATE-CTEU-9 (SOIL)

Lab BV ID		JS3046	JS3047	JS3053	JS3054	
Sampling Date		2021/09/10	2021/09/10	2021/09/10	2021/09/10	
	Units	**TSMC-78147-CTEU-9**	**TSMC-84452-CTEU-9**	**TSMC-83284-CTEU-9**	**TSMC-84553-CTEU-9**	**QC Batch**
Leachates						
Weight of sample (g)	n/a	40.1	40.0	40.2	40.1	2235199
pH Deionized water	n/a	5.66	5.66	5.66	5.66	2235199
Date extraction fluid added	n/a	2021/09/29	2021/09/29	2021/09/29	2021/09/29	2235199
Date leaching terminated	n/a	2021/10/06	2021/10/06	2021/10/06	2021/10/06	2235199
Volume of extracting fluid (mL)	n/a	160	160	160	160	2235199
pH after 7 days of leaching	n/a	7.42	7.96	6.52	7.04	2235199
QC Batch = Quality Control Batch						

Lab BV ID		JS3054	
Sampling Date		2021/09/10	
	Units	**TSMC-84553-CTEU-9 Lab-Dup**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	40.0	2235199
pH Deionized water	n/a	5.66	2235199
Date extraction fluid added	n/a	2021/09/29	2235199
Date leaching terminated	n/a	2021/10/06	2235199
Volume of extracting fluid (mL)	n/a	160	2235199
pH after 7 days of leaching	n/a	6.96	2235199
QC Batch = Quality Control Batch			

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GENERAL COMMENTS

A,B,C: Soil Criteria following appendix 2 of the " Guide d'intervention-Protection des sols et réhabilitation des terrains contaminés. MELCC, May 2021." 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 mentionned 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.

CONVENTIONAL PARAMETERS-LAB LEACHATE (ROCK)

Reported detection limits are multiplied by dilution factors used for sample analysis.

TOTAL EXTRACTABLE METALS (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

TCLP-EPA 1311 (SOIL)

pH du pre-test : Veuillez noter que le résultat de l'échantillon (JS3043, JS3044, JS3050 et JS3051) sont en dehors de la courbe de calibration, et aussi dehors des limites de la linearite.

Results relate only to the items tested.

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Report Date: 2021/12/29

TATA STEEL MINERALS CANADA
Client Project #: ARD
Site Location: DS04
Your P.O. #: 3000000997

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2234067	SMD	Method Blank	pH end of leaching	2021/09/28	4.91/2.85		n/a
			Volume extracting fluid 1 (ml)	2021/09/28	400		n/a
2234107	SMD	Method Blank	Volume of extracting fluid (mL)	2021/09/28	500		n/a
			pH after 18 hours leaching	2021/09/28	4.17		n/a
			pH of extracting fluid	2021/09/28	4.17		n/a
2234493	AT7	Spiked Blank	Silver (Ag)	2021/09/30		99	%
			Arsenic (As)	2021/09/30		104	%
			Barium (Ba)	2021/09/30		101	%
			Boron (B)	2021/09/30		109	%
			Cadmium (Cd)	2021/09/30		101	%
			Chromium (Cr)	2021/09/30		102	%
			Copper (Cu)	2021/09/30		96	%
			Cobalt (Co)	2021/09/30		98	%
			Tin (Sn)	2021/09/30		92	%
			Iron (Fe)	2021/09/30		100	%
			Manganese (Mn)	2021/09/30		103	%
			Molybdenum (Mo)	2021/09/30		96	%
			Nickel (Ni)	2021/09/30		104	%
			Mercury (Hg)	2021/09/30		99	%
			Lead (Pb)	2021/09/30		94	%
			Selenium (Se)	2021/09/30		84	%
			Uranium (U)	2021/09/30		100	%
			Zinc (Zn)	2021/09/30		103	%
2234493	AT7	Method Blank	Silver (Ag)	2021/09/30	<0.50		mg/kg
			Arsenic (As)	2021/09/30	<2.0		mg/kg
			Barium (Ba)	2021/09/30	<4.0		mg/kg
			Boron (B)	2021/09/30	<2.0		mg/kg
			Cadmium (Cd)	2021/09/30	<0.10		mg/kg
			Chromium (Cr)	2021/09/30	<1.0		mg/kg
			Copper (Cu)	2021/09/30	<1.0		mg/kg
			Cobalt (Co)	2021/09/30	<1.0		mg/kg
			Tin (Sn)	2021/09/30	<1.0		mg/kg
			Iron (Fe)	2021/09/30	<10		mg/kg
			Manganese (Mn)	2021/09/30	<2.0		mg/kg
			Molybdenum (Mo)	2021/09/30	<0.50		mg/kg
			Nickel (Ni)	2021/09/30	<0.50		mg/kg
			Mercury (Hg)	2021/09/30	<0.010		mg/kg
			Lead (Pb)	2021/09/30	<1.0		mg/kg
			Selenium (Se)	2021/09/30	<0.50		mg/kg
			Uranium (U)	2021/09/30	<2.0		mg/kg
			Zinc (Zn)	2021/09/30	<5.0		mg/kg
2234616	MEM	LEACH. BLANK	Silver (Ag)	2021/09/29	<0.30		ug/L
			Arsenic (As)	2021/09/29	<2.0		ug/L
			Barium (Ba)	2021/09/29	<5.0		ug/L
			Boron (B)	2021/09/29	<50		ug/L
			Cadmium (Cd)	2021/09/29	<1.0		ug/L
			Chromium (Cr)	2021/09/29	<7.0		ug/L
			Cobalt (Co)	2021/09/29	<10		ug/L
			Copper (Cu)	2021/09/29	13, RDL=3.0		ug/L
			Tin (Sn)	2021/09/29	<50		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Iron (Fe)	2021/09/29	<100		ug/L
			Manganese (Mn)	2021/09/29	<3.0		ug/L
			Mercury (Hg)	2021/09/29	<0.50		ug/L
			Molybdenum (Mo)	2021/09/29	<10		ug/L
			Nickel (Ni)	2021/09/29	<6.0		ug/L
			Lead (Pb)	2021/09/29	<1.0		ug/L
			Selenium (Se)	2021/09/29	<1.0		ug/L
			Uranium (U)	2021/09/29	<0.60		ug/L
			Zinc (Zn)	2021/09/29	<5.0		ug/L
2234616	MEM	Spiked Blank	Silver (Ag)	2021/09/29		101	%
			Arsenic (As)	2021/09/29		97	%
			Barium (Ba)	2021/09/29		106	%
			Boron (B)	2021/09/29		101	%
			Cadmium (Cd)	2021/09/29		99	%
			Chromium (Cr)	2021/09/29		90	%
			Cobalt (Co)	2021/09/29		90	%
			Copper (Cu)	2021/09/29		84	%
			Tin (Sn)	2021/09/29		107	%
			Iron (Fe)	2021/09/29		93	%
			Manganese (Mn)	2021/09/29		94	%
			Mercury (Hg)	2021/09/29		82	%
			Molybdenum (Mo)	2021/09/29		101	%
			Nickel (Ni)	2021/09/29		88	%
			Lead (Pb)	2021/09/29		98	%
			Selenium (Se)	2021/09/29		102	%
			Uranium (U)	2021/09/29		101	%
			Zinc (Zn)	2021/09/29		88	%
2234625	MEM	LEACH. BLANK	Silver (Ag)	2021/09/29	<0.30		ug/L
			Arsenic (As)	2021/09/29	<2.0		ug/L
			Boron (B)	2021/09/29	60, RDL=50		ug/L
			Cadmium (Cd)	2021/09/29	<1.0		ug/L
			Chromium (Cr)	2021/09/29	<7.0		ug/L
			Cobalt (Co)	2021/09/29	<10		ug/L
			Copper (Cu)	2021/09/29	7.1, RDL=3.0		ug/L
			Tin (Sn)	2021/09/29	<50		ug/L
			Iron (Fe)	2021/09/29	<100		ug/L
			Manganese (Mn)	2021/09/29	<3.0		ug/L
			Mercury (Hg)	2021/09/29	<0.50		ug/L
			Molybdenum (Mo)	2021/09/29	<10		ug/L
			Nickel (Ni)	2021/09/29	<6.0		ug/L
			Lead (Pb)	2021/09/29	<1.0		ug/L
			Selenium (Se)	2021/09/29	<1.0		ug/L
			Uranium (U)	2021/09/29	<0.60		ug/L
			Zinc (Zn)	2021/09/29	<5.0		ug/L
2234625	MEM	Spiked Blank	Silver (Ag)	2021/09/29		101	%
			Arsenic (As)	2021/09/29		103	%
			Boron (B)	2021/09/29		114	%
			Cadmium (Cd)	2021/09/29		99	%
			Chromium (Cr)	2021/09/29		98	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Cobalt (Co)	2021/09/29		99	%
			Copper (Cu)	2021/09/29		95	%
			Tin (Sn)	2021/09/29		108	%
			Iron (Fe)	2021/09/29		102	%
			Manganese (Mn)	2021/09/29		101	%
			Mercury (Hg)	2021/09/29		87	%
			Molybdenum (Mo)	2021/09/29		103	%
			Nickel (Ni)	2021/09/29		96	%
			Lead (Pb)	2021/09/29		100	%
			Selenium (Se)	2021/09/29		105	%
			Uranium (U)	2021/09/29		104	%
			Zinc (Zn)	2021/09/29		95	%
2235199	SMD	Method Blank	pH Deionized water	2021/10/06	5.66		n/a
			Date extraction fluid added	2021/10/06	2021/09/29		n/a
			Date leaching terminated	2021/10/06	2021/10/06		n/a
			Volume of extracting fluid (mL)	2021/10/06	160		n/a
			pH after 7 days of leaching	2021/10/06	7.04		n/a
2235402	VPA	LEACH. BLANK	Nitrites (N-NO2-)	2021/09/30	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/09/30	<0.20		mg/L
2235402	VPA	Spiked Blank	Nitrites (N-NO2-)	2021/09/30		100	%
			Nitrate (N) and Nitrite(N)	2021/09/30		100	%
2235404	VPA	LEACH. BLANK	Nitrites (N-NO2-)	2021/09/30	<0.20		mg/L
2235404	VPA	Spiked Blank	Nitrites (N-NO2-)	2021/09/30		101	%
2235601	YAZ	LEACH. BLANK	Fluoride (F)	2021/09/30	<1.0		mg/L
2235601	YAZ	Spiked Blank	Fluoride (F)	2021/09/30		96	%
2235603	YAZ	LEACH. BLANK	Fluoride (F)	2021/09/30	<1.0		mg/L
2235603	YAZ	Spiked Blank	Fluoride (F)	2021/09/30		96	%
2236380	LI	Spiked Blank	Fluoride (F)	2021/10/04		108	%
2236380	LI	Method Blank	Fluoride (F)	2021/10/04	<1.0		mg/kg
2236382	SNA	Spiked Blank	Nitrates (N-NO3-)	2021/10/03		100	%
			Nitrites (N-NO2-)	2021/10/03		102	%
			Nitrate (N) and Nitrite(N)	2021/10/03		101	%
2236382	SNA	Method Blank	Nitrates (N-NO3-)	2021/10/03	<1.0		mg/kg
			Nitrites (N-NO2-)	2021/10/03	<0.20		mg/kg
			Nitrate (N) and Nitrite(N)	2021/10/03	<1.0		mg/kg
2237970	ZEO	LEACH. BLANK	Silver (Ag)	2021/10/07	<0.30		ug/L
			Arsenic (As)	2021/10/07	<2.0		ug/L
			Barium (Ba)	2021/10/07	<5.0		ug/L
			Boron (B)	2021/10/07	<50		ug/L
			Cadmium (Cd)	2021/10/07	<1.0		ug/L
			Chromium (Cr)	2021/10/07	<7.0		ug/L
			Cobalt (Co)	2021/10/07	<10		ug/L
			Copper (Cu)	2021/10/07	<3.0		ug/L
			Tin (Sn)	2021/10/07	<50		ug/L
			Iron (Fe)	2021/10/07	<100		ug/L
			Manganese (Mn)	2021/10/07	<3.0		ug/L
			Mercury (Hg)	2021/10/07	<0.50		ug/L
			Molybdenum (Mo)	2021/10/07	<10		ug/L
			Nickel (Ni)	2021/10/07	<6.0		ug/L
			Lead (Pb)	2021/10/07	<1.0		ug/L
			Selenium (Se)	2021/10/07	<1.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Uranium (U)	2021/10/07	<0.60		ug/L
			Zinc (Zn)	2021/10/07	<5.0		ug/L
2237970	ZEO	Spiked Blank	Silver (Ag)	2021/10/07		245 (1)	%
			Arsenic (As)	2021/10/07		107	%
			Barium (Ba)	2021/10/07		100	%
			Boron (B)	2021/10/07		97	%
			Cadmium (Cd)	2021/10/07		104	%
			Chromium (Cr)	2021/10/07		102	%
			Cobalt (Co)	2021/10/07		101	%
			Copper (Cu)	2021/10/07		95	%
			Tin (Sn)	2021/10/07		109	%
			Iron (Fe)	2021/10/07		98	%
			Manganese (Mn)	2021/10/07		105	%
			Mercury (Hg)	2021/10/07		90	%
			Molybdenum (Mo)	2021/10/07		106	%
			Nickel (Ni)	2021/10/07		97	%
			Lead (Pb)	2021/10/07		96	%
			Selenium (Se)	2021/10/07		101	%
			Uranium (U)	2021/10/07		99	%
			Zinc (Zn)	2021/10/07		100	%
2238114	NDA	LEACH. BLANK	Nitrites (N-NO2-)	2021/10/08	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/10/08	<0.20		mg/L
2238114	NDA	Spiked Blank	Nitrites (N-NO2-)	2021/10/08		99	%
			Nitrate (N) and Nitrite(N)	2021/10/08		97	%
2238123	YAZ	LEACH. BLANK	Fluoride (F)	2021/10/07	<1.0		mg/L
2238123	YAZ	Spiked Blank	Fluoride (F)	2021/10/07		107	%

RDL = Reportable Detection Limit

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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.

(1) Recovery or relative percent difference (RPD) for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria

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Your P.O. #: 3000000997

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Alex Thibert
Membre OCQ #2020-05

Alex Thibert, B.Sc., Chemist, Montréal, Analyst II, Chemist in Training

Catherine Anne Mardakis, Project Manager

Faouzi Sarsi, B.Sc. Chemist, Montréal, SR Analyst

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Your P.O. #: 3000000997
Your Project #: ARD
Your C.O.C. #: N-A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/02/16
Report #: R2734816
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C158457
Received: 2021/10/27, 15:30

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acid Base Accounting (Sobek modified) (1)	1	2022/02/15	N/A		
Fluoride (free)	1	2021/11/11	2021/11/11	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	1	N/A	2021/11/23	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	1	N/A	2021/11/05	STL SOP-00038	SM 23 4500-F m
Fluoride- Leached	1	N/A	2021/11/06	STL SOP-00038	SM 23 4500-F m
Water Leachate (CTEU - 9)	1	2021/11/11	2021/11/18	STL SOP-00024	MA100-Lixcom1.1 R1 m
Acid rain simulation leachate (EPA 1312)	1	2021/11/03	2021/11/04	STL SOP-00024	MA100-Lixcom1.1 R1 m
Total Extractable Metals (low level)	1	2021/11/03	2021/11/05	STL SOP-00069	MA.200–Mét. 1.2 R7
Metals - Leached	1	2021/11/20	2021/11/21	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	1	2021/11/04	2021/11/06	STL SOP-00062	MA.200–Mét. 1.2 R7
Metals - Leached	1	2021/11/04	2021/11/07	STL SOP-00062	MA.200–Mét. 1.2 R7
Nitrate and/or Nitrite- Leached	1	N/A	2021/11/20	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite- Leached	2	N/A	2021/11/06	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	1	2021/11/12	2021/11/12	STL SOP-00014	MA.300–Ions 1.3 R3 m
Toxicity Charact. Leach. Proc.(EPA 1311)	1	2021/11/03	2021/11/04	STL SOP-00024	MA100-Lixcom1.1 R1 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas 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 Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

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Your P.O. #: 3000000997
Your Project #: ARD
Your C.O.C. #: N-A

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2022/02/16
Report #: R2734816
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C158457
Received: 2021/10/27, 15:30

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 Bureau Veritas, 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 Bureau Veritas Burnaby, 4606 Canada Way , Burnaby, BC, V5G 1K5

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Martine Lepage
Project Manager and Account Manager
16 Feb 2022 09:44:07

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
==========
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Bureau Veritas Job #: C158457
Report Date: 2022/02/16

TATA STEEL MINERALS CANADA
Client Project #: ARD
Your P.O. #: 3000000997

TOTAL EXTRACTABLE METALS (SOIL)

Bureau Veritas ID					JW4979		
Sampling Date					2021/10/26		
COC Number					N-A		
	Units	**A**	**B**	**C**	**TSMC-90125**	**RDL**	**QC Batch**
METALS							
Silver (Ag)	mg/kg	**2**	20	40	<0.50	0.50	2247874
Arsenic (As)	mg/kg	**6**	30	50	**7.7**	2.0	2247874
Barium (Ba)	mg/kg	**340**	500	2000	55	4.0	2247874
Boron (B)	mg/kg	**-**	-	-	<2.0	2.0	2247874
Cadmium (Cd)	mg/kg	**1.5**	5	20	<0.10	0.10	2247874
Chromium (Cr)	mg/kg	**100**	250	800	<1.0	1.0	2247874
Copper (Cu)	mg/kg	**50**	100	500	3.8	1.0	2247874
Cobalt (Co)	mg/kg	**25**	50	300	7.4	1.0	2247874
Tin (Sn)	mg/kg	**5**	50	300	<1.0	1.0	2247874
Iron (Fe) †	mg/kg	**-**	-	-	86000	10	2247874
Manganese (Mn)	mg/kg	**1000**	1000	2200	2900	2.0	2247874
Molybdenum (Mo)	mg/kg	**2**	10	40	<0.50	0.50	2247874
Nickel (Ni)	mg/kg	**50**	100	500	0.83	0.50	2247874
Mercury (Hg)	mg/kg	**0.2**	2	10	0.047	0.010	2247874
Lead (Pb)	mg/kg	**50**	500	1000	<1.0	1.0	2247874
Selenium (Se)	mg/kg	**1**	3	10	<0.50	0.50	2247874
Uranium (U) †	mg/kg	**-**	-	-	<2.0	2.0	2247874
Zinc (Zn)	mg/kg	**140**	500	1500	<5.0	5.0	2247874

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

2022/02/16 09:06

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Bureau Veritas Job #: C158457
Report Date: 2022/02/16

TATA STEEL MINERALS CANADA
Client Project #: ARD
Your P.O. #: 3000000997

METALS-LAB LEACHATE (SOIL)

Bureau Veritas ID		JW4979			JW4982		JW4985		
Sampling Date		2021/10/26			2021/10/26		2021/10/26		
COC Number		N-A			N-A		N-A		
	Units	TSMC-90125	RDL	QC Batch	TSMC-90125-CTEU-9	QC Batch	TSMC-90125-(SPLP1312)	RDL	QC Batch
METALS									
Silver (Ag) †	ug/L	<0.30	0.30	2248630	<0.30	2254808	<0.30	0.30	2248627
Arsenic (As)	ug/L	<2.0	2.0	2248630	<2.0	2254808	<2.0	2.0	2248627
Barium (Ba)	ug/L	10	5.0	2248630	<5.0	2254808	<5.0	5.0	2248627
Boron (B)	ug/L	<50	50	2248630	<50	2254808	<50	50	2248627
Cadmium (Cd)	ug/L	<1.0	1.0	2248630	<1.0	2254808	<1.0	1.0	2248627
Chromium (Cr)	ug/L	<7.0	7.0	2248630	<7.0	2254808	<7.0	7.0	2248627
Cobalt (Co)	ug/L	<10	10	2248630	<10	2254808	<10	10	2248627
Copper (Cu)	ug/L	<10	10	2248630	<3.0	2254808	<3.0	3.0	2248627
Tin (Sn) †	ug/L	<50	50	2248630	<50	2254808	<50	50	2248627
Iron (Fe)	ug/L	180	100	2248630	<100	2254808	<100	100	2248627
Manganese (Mn)	ug/L	510	3.0	2248630	<3.0	2254808	7.7	3.0	2248627
Mercury (Hg)	ug/L	<0.50	0.50	2248630	<0.50	2254808	<0.50	0.50	2248627
Molybdenum (Mo)	ug/L	<10	10	2248630	<10	2254808	<10	10	2248627
Nickel (Ni)	ug/L	<6.0	6.0	2248630	<6.0	2254808	<6.0	6.0	2248627
Lead (Pb)	ug/L	<1.0	1.0	2248630	<1.0	2254808	<1.0	1.0	2248627
Selenium (Se)	ug/L	<1.0	1.0	2248630	<1.0	2254808	<1.0	1.0	2248627
Uranium (U)	ug/L	<0.60	0.60	2248630	<0.60	2254808	<0.60	0.60	2248627
Zinc (Zn)	ug/L	6.7	5.0	2248630	<5.0	2254808	<5.0	5.0	2248627

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SOIL)

Bureau Veritas ID					JW4979		
Sampling Date					2021/10/26		
COC Number					N-A		
	Units	A	B	C	TSMC-90125	RDL	QC Batch
CONVENTIONALS							
Fluoride (F)	mg/kg	**200**	400	2000	1.3	1.0	2251162
Nitrates (N-NO3-) †	mg/kg	-	-	-	<1.0	1.0	2251645
Nitrites (N-NO2-) †	mg/kg	-	-	-	<0.20	0.20	2251645
Nitrate (N) and Nitrite(N)	mg/kg	-	-	-	<1.0	1.0	2251645

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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Bureau Veritas Job #: C158457
Report Date: 2022/02/16

TATA STEEL MINERALS CANADA
Client Project #: ARD
Your P.O. #: 3000000997

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Bureau Veritas ID		JW4979		JW4982		JW4985		
Sampling Date		2021/10/26		2021/10/26		2021/10/26		
COC Number		N-A		N-A		N-A		
	Units	**TSMC-90125**	**QC Batch**	**TSMC-90125-CTEU-9**	**QC Batch**	**TSMC-90125-(SPLP1312)**	**RDL**	**QC Batch**
CONVENTIONALS								
Fluoride (F)	mg/L	<1.0	2249126	<1.0	2254754	<1.0	1.0	2248655
Nitrites (N-NO2-)	mg/L	<0.20	2249129	<0.20	2254755	<0.20	0.20	2248661
Nitrate (N) and Nitrite(N)	mg/L	<0.20	2249129	<0.20	2254755	<0.20	0.20	2248661

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TCLP-EPA 1311 (SOIL)

Bureau Veritas ID		JW4979	
Sampling Date		2021/10/26	
COC Number		N-A	
	Units	**TSMC-90125**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	20.0	2247686
pH of pre-test	n/a	<1.68	2247686
pH end of leaching	n/a	4.90	2247686
Volume extracting fluid 1 (ml)	n/a	400	2247686
QC Batch = Quality Control Batch			

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SPLP-EPA 1312 (SOIL)

Bureau Veritas ID		JW4985	
Sampling Date		2021/10/26	
COC Number		N-A	
	Units	**TSMC-90125-(SPLP1312)**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	25.1	2247689
Volume of extracting fluid (mL)	n/a	500	2247689
pH after 18 hours leaching	n/a	6.37	2247689
pH of extracting fluid	n/a	4.17	2247689
QC Batch = Quality Control Batch			

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WATER LEACHATE-CTEU-9 (SOIL)

Bureau Veritas ID		JW4982	
Sampling Date		2021/10/26	
COC Number		N-A	
	Units	**TSMC-90125-CTEU-9**	**QC Batch**
Leachates			
Weight of sample (g)	n/a	40.0	2251138
pH Deionized water	n/a	5.46	2251138
Date extraction fluid added	n/a	2021/11/11	2251138
Date leaching terminated	n/a	2021/11/18	2251138
Volume of extracting fluid (mL)	n/a	160	2251138
pH after 7 days of leaching	n/a	6.96	2251138
QC Batch = Quality Control Batch			

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GENERAL COMMENTS

A,B,C: Soil Criteria following appendix 2 of the " Guide d'intervention-Protection des sols et réhabilitation des terrains contaminés. MELCC, May 2021." 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 mentionned 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.

CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)

Reported detection limits are multiplied by dilution factors used for sample analysis.

TCLP-EPA 1311 (SOIL)

pH du pre-test : Veuillez noter que le résultat de l'échantillon (JW4979) est en dehors de la courbe de calibration, et certains d'entre eux aussi dehors des limites de la linearite.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2247686	SMD	Method Blank	pH end of leaching	2021/11/04	4.90/2.92		n/a
			Volume extracting fluid 1 (ml)	2021/11/04	400		n/a
2247689	SMD	Method Blank	Volume of extracting fluid (mL)	2021/11/04	500		n/a
			pH after 18 hours leaching	2021/11/04	4.19		n/a
			pH of extracting fluid	2021/11/04	4.17		n/a
2247874	JF1	Spiked Blank	Silver (Ag)	2021/11/05		95	%
			Arsenic (As)	2021/11/05		102	%
			Barium (Ba)	2021/11/05		105	%
			Boron (B)	2021/11/05		98	%
			Cadmium (Cd)	2021/11/05		103	%
			Chromium (Cr)	2021/11/05		96	%
			Copper (Cu)	2021/11/05		94	%
			Cobalt (Co)	2021/11/05		100	%
			Tin (Sn)	2021/11/05		105	%
			Iron (Fe)	2021/11/05		91	%
			Manganese (Mn)	2021/11/05		93	%
			Molybdenum (Mo)	2021/11/05		103	%
			Nickel (Ni)	2021/11/05		97	%
			Mercury (Hg)	2021/11/05		100	%
			Lead (Pb)	2021/11/05		103	%
			Selenium (Se)	2021/11/05		101	%
			Uranium (U)	2021/11/05		100	%
			Zinc (Zn)	2021/11/05		96	%
2247874	JF1	Method Blank	Silver (Ag)	2021/11/05	<0.50		mg/kg
			Arsenic (As)	2021/11/05	<2.0		mg/kg
			Barium (Ba)	2021/11/05	<4.0		mg/kg
			Boron (B)	2021/11/05	<2.0		mg/kg
			Cadmium (Cd)	2021/11/05	<0.10		mg/kg
			Chromium (Cr)	2021/11/05	<1.0		mg/kg
			Copper (Cu)	2021/11/05	<1.0		mg/kg
			Cobalt (Co)	2021/11/05	<1.0		mg/kg
			Tin (Sn)	2021/11/05	<1.0		mg/kg
			Iron (Fe)	2021/11/05	<10		mg/kg
			Manganese (Mn)	2021/11/05	<2.0		mg/kg
			Molybdenum (Mo)	2021/11/05	<0.50		mg/kg
			Nickel (Ni)	2021/11/05	<0.50		mg/kg
			Mercury (Hg)	2021/11/05	<0.010		mg/kg
			Lead (Pb)	2021/11/05	<1.0		mg/kg
			Selenium (Se)	2021/11/05	<0.50		mg/kg
			Uranium (U)	2021/11/05	<2.0		mg/kg
			Zinc (Zn)	2021/11/05	<5.0		mg/kg
2248627	NET	LEACH. BLANK	Silver (Ag)	2021/11/07	<0.30		ug/L
			Arsenic (As)	2021/11/07	<2.0		ug/L
			Barium (Ba)	2021/11/07	<5.0		ug/L
			Boron (B)	2021/11/07	<50		ug/L
			Cadmium (Cd)	2021/11/07	<1.0		ug/L
			Chromium (Cr)	2021/11/07	<7.0		ug/L
			Cobalt (Co)	2021/11/07	<10		ug/L
			Copper (Cu)	2021/11/07	<3.0		ug/L
			Tin (Sn)	2021/11/07	<50		ug/L
			Iron (Fe)	2021/11/07	<100		ug/L
			Manganese (Mn)	2021/11/07	<3.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Mercury (Hg)	2021/11/07	<0.50		ug/L
			Molybdenum (Mo)	2021/11/07	<10		ug/L
			Nickel (Ni)	2021/11/07	<6.0		ug/L
			Lead (Pb)	2021/11/07	<1.0		ug/L
			Selenium (Se)	2021/11/07	<1.0		ug/L
			Uranium (U)	2021/11/07	<0.60		ug/L
			Zinc (Zn)	2021/11/07	<5.0		ug/L
2248627	NET	Spiked Blank	Silver (Ag)	2021/11/07		103	%
			Arsenic (As)	2021/11/07		110	%
			Barium (Ba)	2021/11/07		112	%
			Boron (B)	2021/11/07		94	%
			Cadmium (Cd)	2021/11/07		106	%
			Chromium (Cr)	2021/11/07		97	%
			Cobalt (Co)	2021/11/07		97	%
			Copper (Cu)	2021/11/07		93	%
			Tin (Sn)	2021/11/07		112	%
			Iron (Fe)	2021/11/07		102	%
			Manganese (Mn)	2021/11/07		106	%
			Mercury (Hg)	2021/11/07		93	%
			Molybdenum (Mo)	2021/11/07		108	%
			Nickel (Ni)	2021/11/07		94	%
			Lead (Pb)	2021/11/07		105	%
			Selenium (Se)	2021/11/07		107	%
			Uranium (U)	2021/11/07		104	%
			Zinc (Zn)	2021/11/07		97	%
2248630	NET	LEACH. BLANK	Silver (Ag)	2021/11/06	<0.30		ug/L
			Arsenic (As)	2021/11/06	<2.0		ug/L
			Barium (Ba)	2021/11/06	<5.0		ug/L
			Boron (B)	2021/11/06	<50		ug/L
			Cadmium (Cd)	2021/11/06	<1.0		ug/L
			Chromium (Cr)	2021/11/06	<7.0		ug/L
			Cobalt (Co)	2021/11/06	<10		ug/L
			Copper (Cu)	2021/11/06	<10		ug/L
			Tin (Sn)	2021/11/06	<50		ug/L
			Iron (Fe)	2021/11/06	<100		ug/L
			Manganese (Mn)	2021/11/06	<3.0		ug/L
			Mercury (Hg)	2021/11/06	<0.50		ug/L
			Molybdenum (Mo)	2021/11/06	<10		ug/L
			Nickel (Ni)	2021/11/06	<6.0		ug/L
			Lead (Pb)	2021/11/06	<1.0		ug/L
			Selenium (Se)	2021/11/06	<1.0		ug/L
			Uranium (U)	2021/11/06	<0.60		ug/L
			Zinc (Zn)	2021/11/06	<5.0		ug/L
2248630	NET	Spiked Blank	Silver (Ag)	2021/11/06		107	%
			Arsenic (As)	2021/11/06		114	%
			Barium (Ba)	2021/11/06		114	%
			Boron (B)	2021/11/06		121 (1)	%
			Cadmium (Cd)	2021/11/06		107	%
			Chromium (Cr)	2021/11/06		105	%
			Cobalt (Co)	2021/11/06		104	%
			Copper (Cu)	2021/11/06		109	%
			Tin (Sn)	2021/11/06		115	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Iron (Fe)	2021/11/06		109	%
			Manganese (Mn)	2021/11/06		109	%
			Mercury (Hg)	2021/11/06		93	%
			Molybdenum (Mo)	2021/11/06		112	%
			Nickel (Ni)	2021/11/06		103	%
			Lead (Pb)	2021/11/06		111	%
			Selenium (Se)	2021/11/06		111	%
			Uranium (U)	2021/11/06		105	%
			Zinc (Zn)	2021/11/06		101	%
2248655	YAZ	LEACH. BLANK	Fluoride (F)	2021/11/05	<1.0		mg/L
2248655	YAZ	Spiked Blank	Fluoride (F)	2021/11/05		103	%
2248661	RHT	LEACH. BLANK	Nitrites (N-NO2-)	2021/11/06	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/11/06	1.6, RDL=0.20		mg/L
2248661	RHT	Spiked Blank	Nitrites (N-NO2-)	2021/11/06		90	%
			Nitrate (N) and Nitrite(N)	2021/11/06		96	%
2249126	YAZ	LEACH. BLANK	Fluoride (F)	2021/11/06	<1.0		mg/L
2249126	YAZ	Spiked Blank	Fluoride (F)	2021/11/06		105	%
2249129	SNA	LEACH. BLANK	Nitrites (N-NO2-)	2021/11/06	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/11/06	<0.20		mg/L
2249129	SNA	Spiked Blank	Nitrites (N-NO2-)	2021/11/06		92	%
			Nitrate (N) and Nitrite(N)	2021/11/06		98	%
2251138	SMD	Method Blank	pH Deionized water	2021/11/18	5.46		n/a
			Date extraction fluid added	2021/11/18	2021/11/11		n/a
			Date leaching terminated	2021/11/18	2021/11/18		n/a
			Volume of extracting fluid (mL)	2021/11/18	160		n/a
			pH after 7 days of leaching	2021/11/18	7.12		n/a
2251162	LI	Spiked Blank	Fluoride (F)	2021/11/11		97	%
2251162	LI	Method Blank	Fluoride (F)	2021/11/11	<1.0		mg/kg
2251645	RHT	Spiked Blank	Nitrates (N-NO3-)	2021/11/12		93	%
			Nitrites (N-NO2-)	2021/11/12		98	%
			Nitrate (N) and Nitrite(N)	2021/11/12		95	%
2251645	RHT	Method Blank	Nitrates (N-NO3-)	2021/11/12	<1.0		mg/kg
			Nitrites (N-NO2-)	2021/11/12	<0.20		mg/kg
			Nitrate (N) and Nitrite(N)	2021/11/12	<1.0		mg/kg
2254754	YAZ	LEACH. BLANK	Fluoride (F)	2021/11/23	<1.0		mg/L
2254754	YAZ	Spiked Blank	Fluoride (F)	2021/11/23		101	%
2254755	RHT	LEACH. BLANK	Nitrites (N-NO2-)	2021/11/20	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/11/20	<0.20		mg/L
2254755	RHT	Spiked Blank	Nitrites (N-NO2-)	2021/11/20		98	%
			Nitrate (N) and Nitrite(N)	2021/11/20		96	%
2254808	VFT	LEACH. BLANK	Silver (Ag)	2021/11/21	<0.30		ug/L
			Arsenic (As)	2021/11/21	<2.0		ug/L
			Barium (Ba)	2021/11/21	<5.0		ug/L
			Boron (B)	2021/11/21	<50		ug/L
			Cadmium (Cd)	2021/11/21	<1.0		ug/L
			Chromium (Cr)	2021/11/21	<7.0		ug/L
			Cobalt (Co)	2021/11/21	<10		ug/L
			Copper (Cu)	2021/11/21	<3.0		ug/L
			Tin (Sn)	2021/11/21	<50		ug/L
			Iron (Fe)	2021/11/21	<100		ug/L
			Manganese (Mn)	2021/11/21	<3.0		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Mercury (Hg)	2021/11/21	<0.50		ug/L
			Molybdenum (Mo)	2021/11/21	<10		ug/L
			Nickel (Ni)	2021/11/21	<6.0		ug/L
			Lead (Pb)	2021/11/21	<1.0		ug/L
			Selenium (Se)	2021/11/21	<1.0		ug/L
			Uranium (U)	2021/11/21	<0.60		ug/L
			Zinc (Zn)	2021/11/21	<5.0		ug/L
2254808	VFT	Spiked Blank	Silver (Ag)	2021/11/21		105	%
			Arsenic (As)	2021/11/21		105	%
			Barium (Ba)	2021/11/21		104	%
			Boron (B)	2021/11/21		99	%
			Cadmium (Cd)	2021/11/21		101	%
			Chromium (Cr)	2021/11/21		99	%
			Cobalt (Co)	2021/11/21		99	%
			Copper (Cu)	2021/11/21		97	%
			Tin (Sn)	2021/11/21		107	%
			Iron (Fe)	2021/11/21		101	%
			Manganese (Mn)	2021/11/21		101	%
			Mercury (Hg)	2021/11/21		100	%
			Molybdenum (Mo)	2021/11/21		100	%
			Nickel (Ni)	2021/11/21		101	%
			Lead (Pb)	2021/11/21		97	%
			Selenium (Se)	2021/11/21		105	%
			Uranium (U)	2021/11/21		98	%
			Zinc (Zn)	2021/11/21		97	%
2254808	VFT	Method Blank	Silver (Ag)	2021/11/21	<0.30		ug/L
			Arsenic (As)	2021/11/21	<2.0		ug/L
			Barium (Ba)	2021/11/21	<5.0		ug/L
			Boron (B)	2021/11/21	<50		ug/L
			Cadmium (Cd)	2021/11/21	<1.0		ug/L
			Chromium (Cr)	2021/11/21	<7.0		ug/L
			Cobalt (Co)	2021/11/21	<10		ug/L
			Copper (Cu)	2021/11/21	<3.0		ug/L
			Tin (Sn)	2021/11/21	<50		ug/L
			Iron (Fe)	2021/11/21	<100		ug/L
			Manganese (Mn)	2021/11/21	<3.0		ug/L
			Mercury (Hg)	2021/11/21	<0.50		ug/L
			Molybdenum (Mo)	2021/11/21	<10		ug/L
			Nickel (Ni)	2021/11/21	<6.0		ug/L
			Lead (Pb)	2021/11/21	<1.0		ug/L
			Selenium (Se)	2021/11/21	<1.0		ug/L
			Uranium (U)	2021/11/21	<0.60		ug/L
			Zinc (Zn)	2021/11/21	<5.0		ug/L

RDL = Reportable Detection Limit

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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.

(1) Recovery or relative percent difference (RPD) for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Appendix XIII. Stability analysis report-WSP

NOTE TECHNIQUE

CLIENT :	Tata Steel Minerals Canada Ltd.		
PROJET :	Halde à stériles de Goodwood, Québec	**Réf. WSP :**	181-04013-93_NT-01-FR
OBJET :	Mise à jour de l'évaluation de la stabilité	**DATE :**	28 juillet 2021
DESTINATAIRE :	Mme Mariana Trindade, Ph. D.		

Note : Ce document est une traduction de l'original intitulé Goodwood Waste Rock Dump, Quebec, Stability Assessment Update daté du 28 juillet 2021.

1 INTRODUCTION

Cette note technique résume l'évaluation et l'analyse de la stabilité réalisées pour la halde à stériles de Goodwood en tenant compte de la géométrie relevée en mars 2021 et fournie par Tata Steel Minerals Canada (TSMC).

En novembre 2020, WSP a réalisé une analyse de stabilité pour l'état final (durée de vie de la mine) de la halde à stériles de Goodwood, puis a transmis le rapport technique (WSP, 2020) à Tata Steel Minerals Canada Ltd. (TSMC). Les paramètres d'entrée de cette étude proviennent de l'évaluation de novembre 2020.

La géométrie finale de la halde à stériles a été fournie par TSMC en 2020. Une étude par LiDAR (détection et télémétrie par ondes lumineuses) de la surface existante a été fournie par TSMC en mars 2021; il s'agit de l'ensemble de données d'étude le plus à jour.

2 CRITÈRES D'ACCEPTATION

Le tableau 1 présente les exigences minimales recommandées des critères d'acceptation pour les facteurs de sécurité (FS) et la probabilité de rupture (PDR) dans le cadre des évaluations de stabilité statique et pseudo-statique en se basant sur les lignes directrices suggérées pour les conceptions de halde à stériles miniers (Guidelines for Mine Waste Dump and Stockpile Design) par Hawley et Cunning (2017).

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Tableau 1 Valeurs des critères d'acceptation des facteurs de sécurité pour les haldes à stériles (d'après Hawley et Cunning, 2017)

Conséquence	Niveau de confiance des données	Analyse statique		Analyse pseudo-statique	Déformation maximale admissible
		FS minimal	PDR maximale	FS minimal	
Faible	Faible	1,3 à 1,4	10 à 15 %	1,05 à 1,1	≤ 1 %
	Modérée	1,2 à 1,3	15 à 25 %	1 à 1,05	≤ 1,5 %
	Élevée	1,1 à 1,2	25 à 40 %	1	≤ 2 %
Modérée	Faible	1,4 à 1,5	2,5 à 5 %	1,1 à 1,15	≤ 0,75 %
	Modérée	1,3 à 1,4	5 à 10 %	1,05 à 1,1	≤ 1 %
	Élevée	1,2 à 1,3	10 à 15 %	1 à 1,05	≤ 1,5 %
Élevée	Faible	≥ 1,5	≤ 1 %	1,15	≤ 0,5 %
	Modérée	1,4 à 1,5	1 à 2,5 %	1,1 à 1,15	≤ 0,75 %
	Élevée	1,3 à 1,4	2,5 à 5 %	1,05 à 1,1	≤ 1 %

La description de chacune des catégories de conséquence et de niveau de confiance est donnée ci-dessous, telle que détaillée par Hawley et Cunning.

1. Conséquence

Faible : des haldes à stériles avec des pentes de remblais générales de moins de 25° et d'une hauteur inférieure à 100 m, avec des pentes de talus naturel de moins de 50 m de hauteur. Aucune infrastructure essentielle ni aucun accès libre dans la zone d'éboulement potentiel. Impact environnemental potentiel limité. Exposition à long terme (plus de 5 ans) pour les sites soumis à une précipitation annuelle très faible à faible (moins de 350 mm); exposition à moyen terme (1 à 5 ans) pour les sites soumis à une précipitation annuelle modérée (350 à 1 000 mm); exposition à court terme (moins d'un an) pour les sites soumis à une précipitation annuelle élevée (1 000 à 2 000 mm); construction/exploitation en saison sèche uniquement pour les sites soumis à une précipitation annuelle très élevée (plus de 2 000 mm) ou à une ou plusieurs saisons de pluies abondantes.

Modérée : des haldes à stériles avec des pentes de remblais générales de moins de 30° et d'une hauteur inférieure à 250 m, avec des pentes de talus naturel de moins de 100 m de hauteur. Aucune infrastructure essentielle ni aucun accès libre, ou des mesures de retenue/d'atténuation solides pour protéger une infrastructure essentielle ou un accès, au sein de la zone d'éboulement potentiel. Impact environnemental potentiel modéré, mais gérable. Exposition à long terme (plus de 5 ans) pour les sites soumis à une précipitation annuelle modérée (350 à 1 000 mm); exposition à moyen terme (1 à 5 ans) pour les sites soumis à une précipitation annuelle élevée (1 000 à 2 000 mm); exposition à court terme (moins d'un an) pour les sites soumis à une précipitation annuelle très élevée (plus de 2 000 mm) ou à une ou plusieurs saisons de pluies abondantes.

Élevée : des haldes à stériles avec des pentes de remblais générales de plus de 30° et d'une hauteur supérieure à 250 m, avec des pentes de talus naturel de plus de 200 m de hauteur. Infrastructure essentielle ou accès libre au sein de la zone d'éboulement potentiel avec des mesures d'atténuation ou de retenue d'éboulement limitées. Impact environnemental potentiel élevé difficile à gérer. Exposition à long terme (plus de 5 ans) pour les sites soumis à une précipitation annuelle élevée (1 000 à 2 000 mm); exposition à moyen terme (1 à 5 ans) pour les sites soumis à une précipitation annuelle très élevée (plus de 2 000 mm) ou à une ou plusieurs saisons de pluies abondantes.

2. Confiance

Faible : confiance limitée en ce qui concerne les conditions de fondation, les propriétés des stériles, les pressions piézométriques, la technique d'analyse ou les mécanismes d'instabilité potentiels. Paramètres d'entrée mal définis ou optimistes; grande variabilité des données. Pour les structures projetées, recherches au niveau conceptuel avec des données complémentaires limitées. Pour les structures existantes, historique de construction et d'exploitation mal documenté ou inconnu; absence de fiches de suivi; historique de performances inconnu ou faible.

Modérée : confiance modérée en ce qui concerne les conditions de fondation, les propriétés des stériles, la pression piézométrique, la technique d'analyse ou les mécanismes de rupture potentiels. Paramètres d'entrée définis de manière adéquate; variabilité modérée des données. Pour les structures projetées, recherches au niveau de l'étude de préfaisabilité avec des données complémentaires adéquates. Pour les structures existantes, des fiches de suivi et une documentation de construction raisonnablement complètes; un historique de performances correct.

Élevée : confiance élevée en ce qui concerne les conditions de fondation, les propriétés des stériles, les pressions piézométriques, la technique d'analyse et le ou les mécanismes d'instabilité. Paramètres d'entrée bien définis, prudents; faible variabilité des données. Pour les structures projetées, recherches au niveau de l'étude de faisabilité avec des données complémentaires complètes. Pour les structures existantes, dossiers de construction et de suivi bien documentés ainsi que bon historique de performances.

Compte tenu des conditions existantes de la halde à stériles (c'est-à-dire pentes générales de moins de 25° et hauteur inférieure à 100 m) et de son emplacement (la halde à stériles n'est pas située près d'une infrastructure essentielle), les conséquences d'une rupture peuvent être considérées comme « faibles ». En outre, en raison des données limitées concernant les conditions de fondation, les propriétés des stériles et les conditions piézométriques, un niveau de confiance faible est attribué aux données. Par conséquent, le facteur de sécurité minimal requis en condition statique est fixé à 1,3 (voir le tableau 1).

3 STABILITÉ DE LA HALDE À STÉRILES

Des analyses de stabilité en condition d'équilibre limité ont été réalisées pour la halde à stériles à l'aide du programme Rocscience Slide2®, version 9.008 en appliquant la méthode Sarma. La méthode Sarma a été choisie parce qu'elle fournit le facteur de sécurité le plus conservateur par rapport aux autres méthodes de modélisation (c'est-à-dire Morgenstern Price, Bishops et Spencer). Des sections représentatives ont été sélectionnées pour l'évaluation basée sur une modélisation numérique 2D : la section B-B' et la section C-C'. Elles ont été choisies parce qu'il s'agit de sections critiques : la section avec la pente de fondation la plus raide (section B-B') et la section la plus proche du bassin de récupération d'eau (section C-C'). La section A-A' n'a pas été évaluée, car aucune déposition de stériles n'a encore eu lieu dans cette zone. Les sections sont présentées à l'annexe A.

Les valeurs d'entrée des propriétés des stériles et des sols en fondation sont détaillées au tableau 6 de l'annexe B avec les résultats de l'évaluation de la stabilité. Les figures des modèles de stabilité et les résultats sont fournies à l'annexe C.

Pour toutes les évaluations, la surface piézométrique est située au niveau de la surface avant l'exploitation minière (terrain naturel) afin d'envisager le pire scénario (c'est-à-dire une surface piézométrique qui coïncide avec la surface avant l'exploitation minière). Afin de comparer le profil de halde à stériles existant avec le profil à l'état final (fin de vie de la mine), les modèles de profils à l'état final ont été modifiés pour correspondre à l'élévation actuelle des deux sections.

Cette évaluation a été uniquement réalisée pour des conditions statiques. Un résumé des résultats des facteurs de sécurité est présenté ci-dessous au tableau 2.

Selon le site Internet de Ressources naturelles Canada (RNCan) (https://earthquakescanada.nrcan.gc.ca/hazard-alea/zoning-zonage/NBCC2015maps-fr.php), le site se trouve dans une zone présentant un niveau relativement faible de risque sismique par rapport aux autres régions du Canada. WSP pense qu'une évaluation de la stabilité dans des conditions pseudo-statiques (sismiques) n'est pas nécessaire pour les conditions d'exploitation. Cependant, il est recommandé de réaliser une analyse pseudo-statique pour les pentes à la fermeture.

Tableau 2 Résultats de la modélisation numérique en équilibre limite (Slide2©)

Cas [a]	Section	Condition de la halde à stériles	FS
13	Section B-B'	LiDAR actuel 2021	1,43
14	Section B-B'	Cycle de vie de la mine modifié pour correspondre à l'élévation actuelle	1,41
15	Section C-C'	LiDAR actuel 2021	1,46
16	Section C-C'	Cycle de vie de la mine modifié pour correspondre à l'élévation actuelle	1,32

Note : a) Les numéros de cas correspondent aux numéros de cas de l'étude précédente (WSP, 2020).

Pour les entrées sélectionnées, le facteur de sécurité est supérieur au critère établi dans le cadre des critères d'acceptation. Concernant la section B-B' et la section C-C', le facteur de sécurité est supérieur pour la condition 2021 actuelle en comparaison à celle de la fin de vie de la mine modifié pour correspondre à la hauteur actuelle de la halde. Concernant la section B-B', cela est dû au changement de volume, qui est plus élevé dans le cycle de vie de la mine modifié pour correspondre à la hauteur actuelle. Concernant la section C-C', cela est probablement dû à un angle de pente plus raide dans le cycle de vie de la mine modifié pour correspondre au modèle de hauteur actuel.

4 CONCLUSION ET RECOMMANDATIONS

TSMC a demandé à WSP de mener une évaluation de la stabilité sur les profils actuels de la halde à stériles en 2021. WSP a réalisé l'évaluation et l'a comparée au profil de cycle de vie de la mine de 2020 modifié pour correspondre à l'élévation actuelle.

La modélisation en équilibre limite menée à bien sur les deux sections a estimé que le facteur de sécurité était supérieur aux critères acceptables recommandés pour les deux sections.

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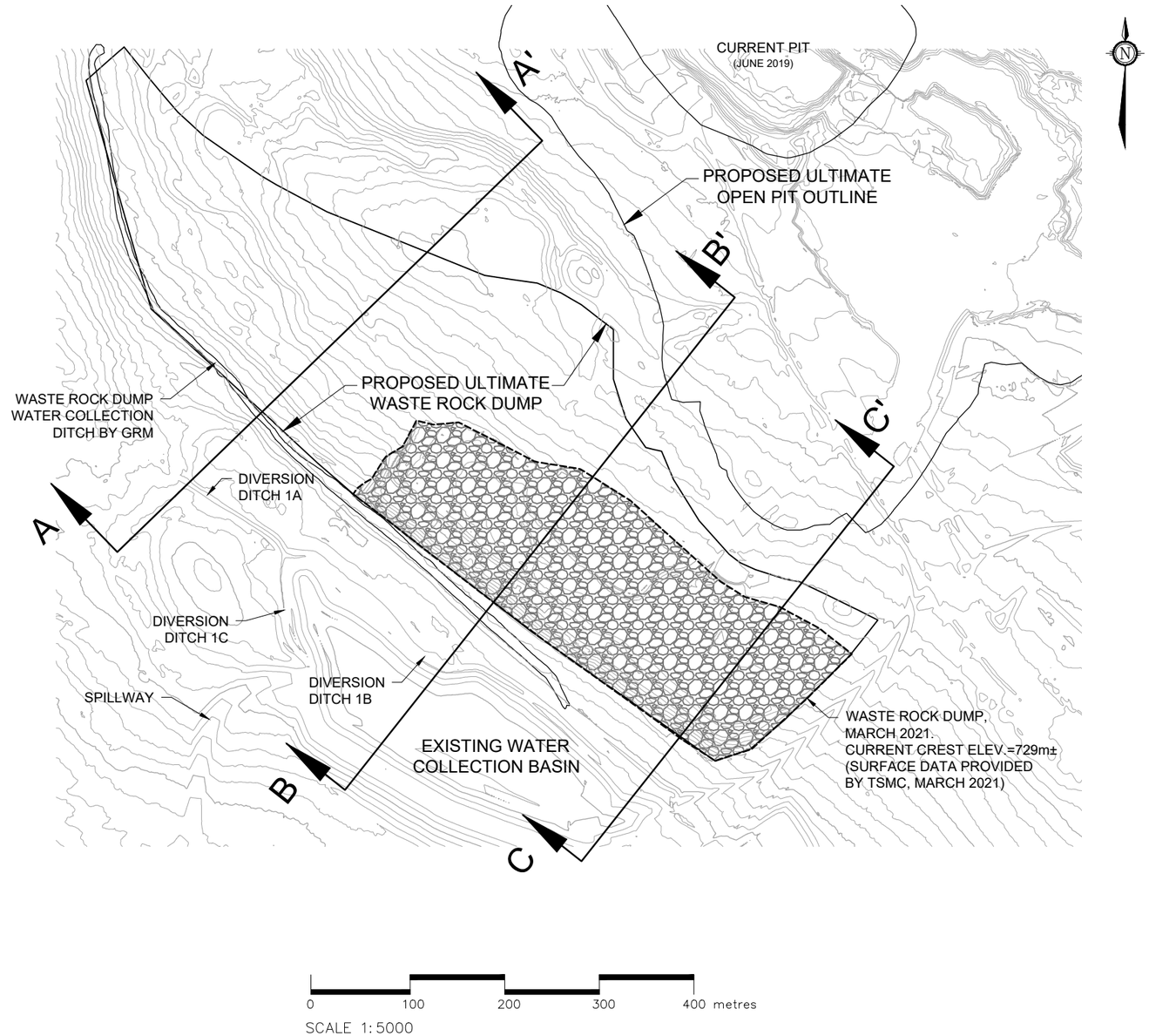
RÉFÉRENCES

- HAWLEY, M. et CUNNING, J. (2017). *Guidelines for Mine Waste Dump and Stockpile Design*. CSIRO Publishing.
- WSP. (novembre 2020) *Goodwood Waste Dump Stability Assessment – DRAFT (for comment), memorandum* préparé pour Tata Steel Mineral Canada, nº de réf. 181-04013-91-MEM-01-R0, 5 p. + annexes.

ANNEXE A

Figures (anglais seulement)



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NOTES:
1. WASTE ROCK DUMP PLAN PROVIDED BY TSMC, 2020.
2. LiDAR DATA OF CURRENT SITE SURFACE PROVIDED BY TSMC, MARCH 2021.

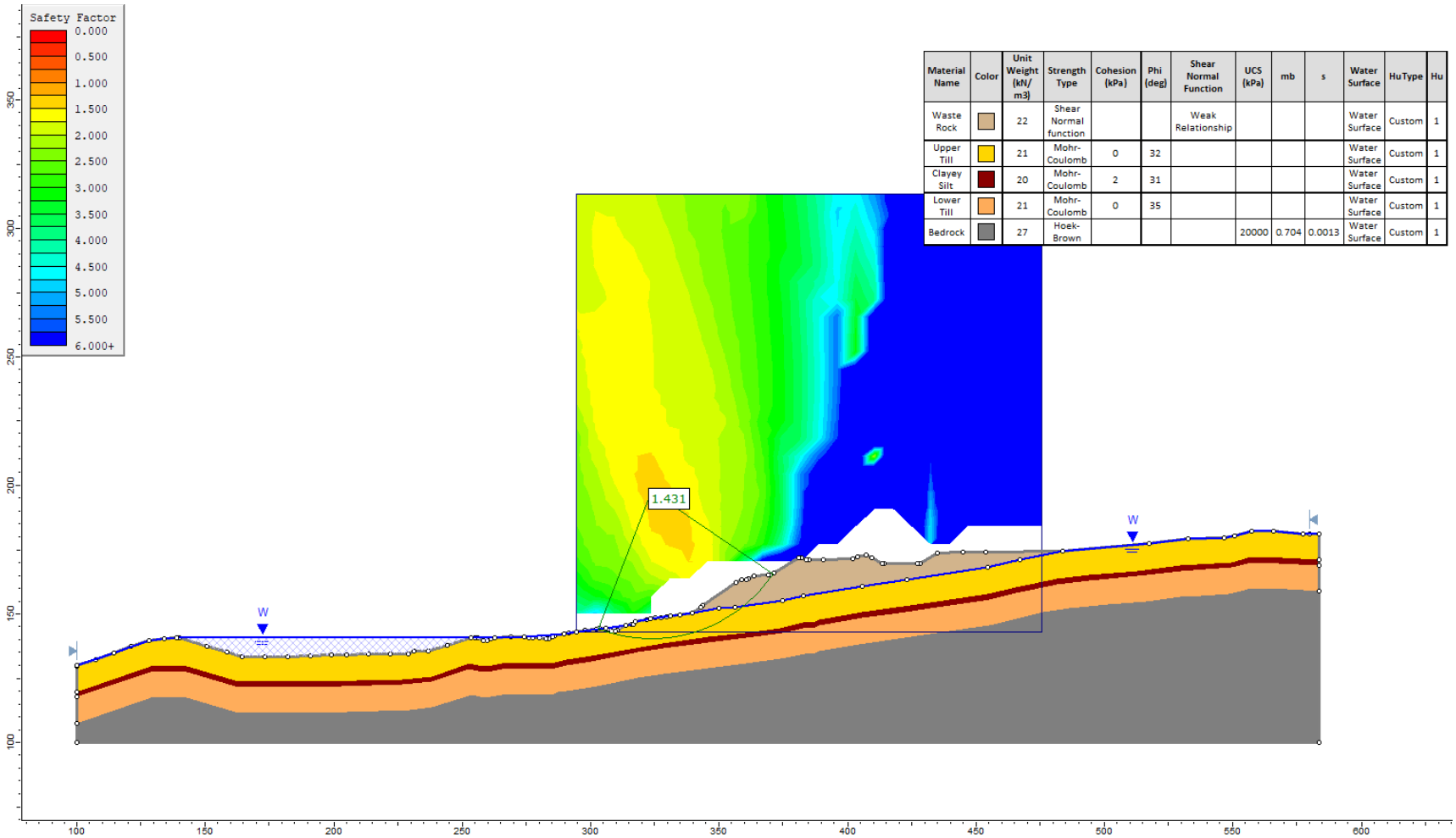
TATA STEEL

PROJECT:	GOODWOOD - TATA STEEL MINERALS CANADA WASTE ROCK DUMP
TITLE:	LOCATION OF STABILITY SECTIONS FOR THE WASTE ROCK DUMP
PROJECT NO:	181-04013-92
SCALE:	AS SHOWN (11X17)
DRAWN BY:	G.HOOGWERF
CHECKED BY:	D.NELSON
APPROVED BY:	J.S.HOULE
REVISION:	DRAFT ISSUE 2
ISSUE DATE:	APRIL 7, 2021
FIGURE NO:	FIGURE A1

S:\2018\181-04013-03 TSMC-GOODWOOD\00-CAD\WRD STABILITY\FIGURE B1-SLOPE STABILITY SECTIONS-21APR7-REV.2.DWG BY: GARRET.HOOGWERF
LAST EDITED: 4/7/2021 8:50 AM

ANNEXE B

Analyses en équilibre limite – Slide2® (anglais seulement)



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Shear Normal Function	UCS (kPa)	mb	s	Water Surface	HuType	Hu
Waste Rock		22	Shear Normal function			Weak Relationship				Water Surface	Custom	1
Upper Till		21	Mohr-Coulomb	0	32					Water Surface	Custom	1
Clayey Silt		20	Mohr-Coulomb	2	31					Water Surface	Custom	1
Lower Till		21	Mohr-Coulomb	0	35					Water Surface	Custom	1
Bedrock		27	Hoek-Brown				20000	0.704	0.0013	Water Surface	Custom	1

CASE 13
Foundation Materials: Overall average thickness based on 2019 boreholes (WSP)
Section B-B': Existing Condition
Loading Conditions: Static condition
Hydrogeological Regime Piezometric Surface at top of the overburden through the entire model
Search Method: Grid Search
FOS: 1.43
LEM Method: Sarma
Slide2, V. 9,008 - Rocscience Inc.

Prepared by:	HH	Checked by:	JS	Approved by:	DN

TATA STEEL

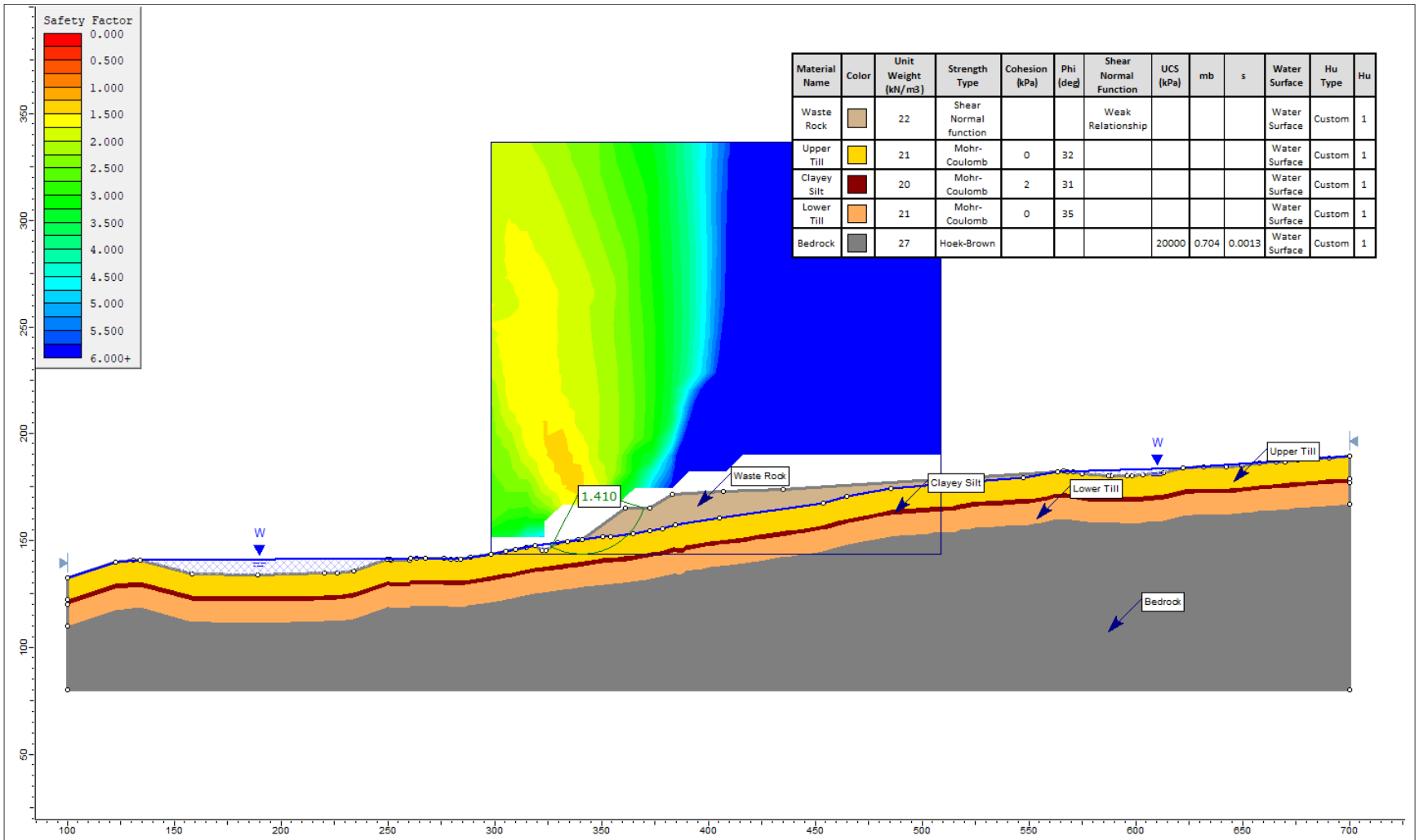
wsp

Goodwood Site, Quebec

Waste Rock Dump Stability Assessment

Date: April 14 , 2021

FIGURE 13	Project No.: 181-04013-92	Ref. No.: 0



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Shear Normal Function	UCS (kPa)	mb	s	Water Surface	Hu Type	Hu
Waste Rock		22	Shear Normal function			Weak Relationship				Water Surface	Custom	1
Upper Till		21	Mohr-Coulomb	0	32					Water Surface	Custom	1
Clayey Silt		20	Mohr-Coulomb	2	31					Water Surface	Custom	1
Lower Till		21	Mohr-Coulomb	0	35					Water Surface	Custom	1
Bedrock		27	Hoek-Brown				20000	0.704	0.0013	Water Surface	Custom	1

CASE 14
Foundation Materials: Overall average thickness based on 2019 boreholes (WSP)
Section B-B': LOM to Existing Elevation
Loading Conditions: Static condition
Hydrogeological Regime Piezometric Surface at top of the overburden through the entire model
Search Method: Grid Search
FOS: 1.41
LEM Method: Sarma
Slide2, V. 9,008 - Rocscience Inc.

Prepared by:	HH	Checked by:	JS	Approved by:	DN

TATA STEEL

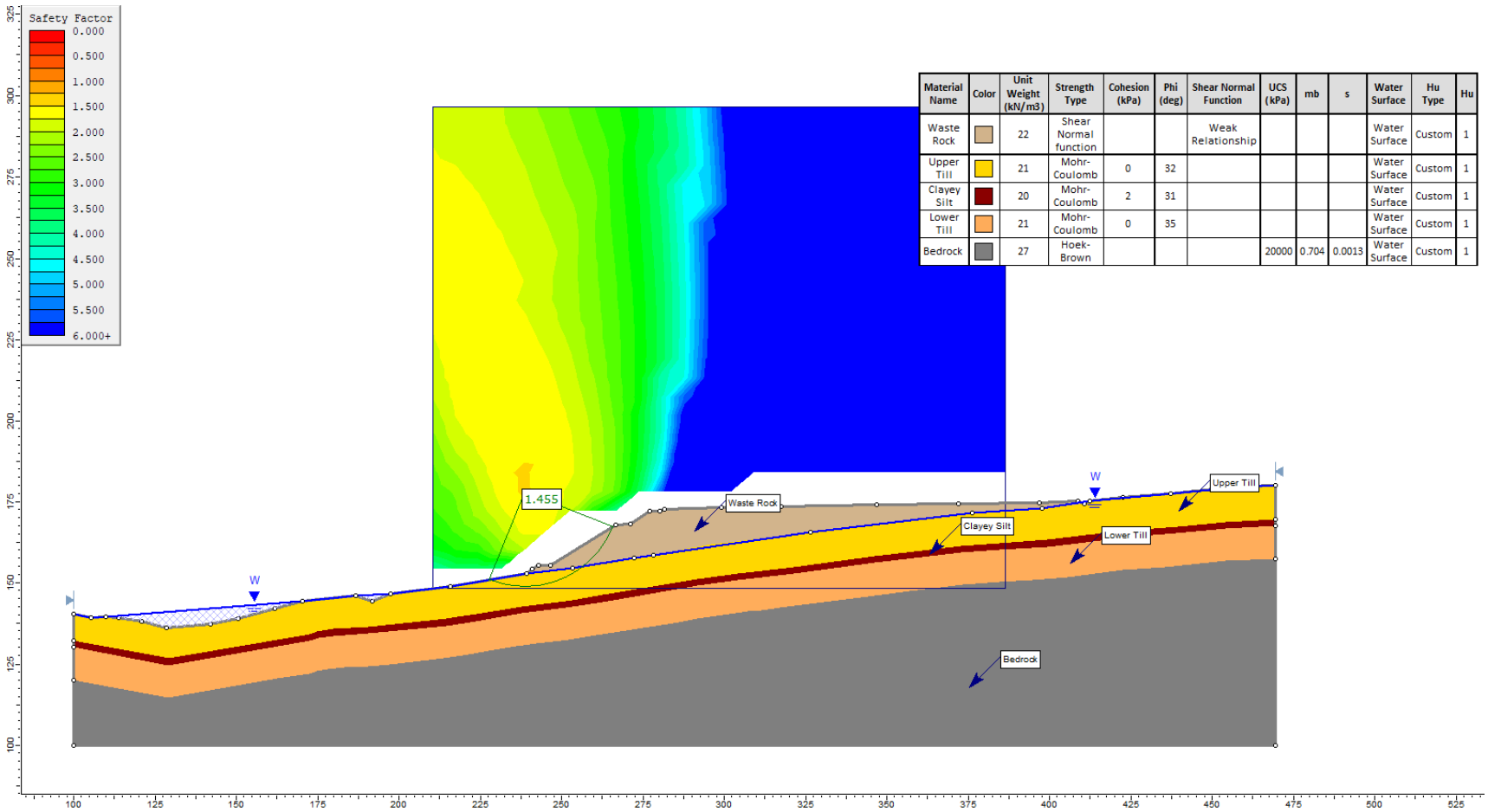
wsp

Goodwood Site, Quebec

Waste Rock Dump Stability Assessment

Date: April 14 , 2021

FIGURE 14	Project No.: 181-04013-92	Ref. No.: 0



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Shear Normal Function	UCS (kPa)	mb	s	Water Surface	Hu Type	Hu
Waste Rock		22	Shear Normal function			Weak Relationship				Water Surface	Custom	1
Upper Till		21	Mohr-Coulomb	0	32					Water Surface	Custom	1
Clayey Silt		20	Mohr-Coulomb	2	31					Water Surface	Custom	1
Lower Till		21	Mohr-Coulomb	0	35					Water Surface	Custom	1
Bedrock		27	Hoek-Brown				20000	0.704	0.0013	Water Surface	Custom	1

CASE 15
Foundation Materials: Overall average thickness based on 2019 boreholes (WSP)
Section C-C': Existing Condition
Loading Conditions: Static condition
Hydrogeological Regime Piezometric Surface at top of the overburden through the entire model
Search Method: Grid Search
FOS: 1.46
LEM Method: Sarma
Slide2, V. 9,008 - Rocscience Inc.

Prepared by:	HH	Checked by:	JS	Approved by:	DN

TATA STEEL

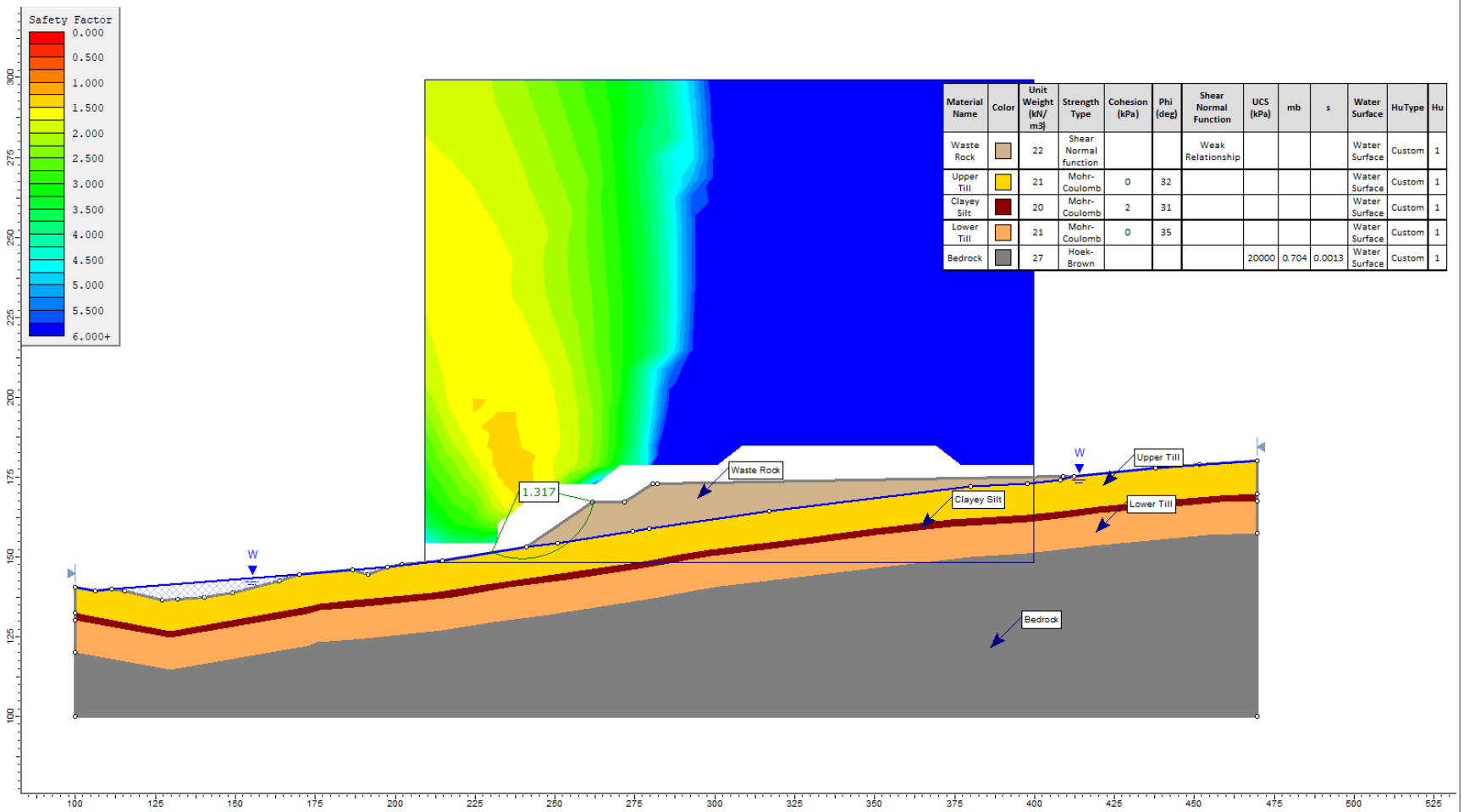
wsp

Goodwood Site, Quebec

Waste Rock Dump Stability Assessment

Date: April 14 , 2021

FIGURE 15	Project No.: 181-04013-92	Ref. No.: 0



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Shear Normal Function	UCS (kPa)	mb	s	Water Surface	HuType	Hu
Waste Rock		22	Shear Normal function			Weak Relationship				Water Surface	Custom	1
Upper Till		21	Mohr-Coulomb	0	32					Water Surface	Custom	1
Clayey Silt		20	Mohr-Coulomb	2	31					Water Surface	Custom	1
Lower Till		21	Mohr-Coulomb	0	35					Water Surface	Custom	1
Bedrock		27	Hoek-Brown				20000	0.704	0.0013	Water Surface	Custom	1

CASE 16
Foundation Materials: Overall average thickness based on 2019 boreholes (WSP)
Section C-C': LOM to Existing Elevation
Loading Conditions: Static condition
Hydrogeological Regime Piezometric Surface at top of the overburden through the entire model
Search Method: Grid Search
FOS: 1.32
LEM Method: Sarma
Slide2, V. 9,008 - Rocscience Inc.

Prepared by:	HH	Checked by:	JS	Approved by:	DN

TATA STEEL

wsp

Goodwood Site, Quebec

Waste Rock Dump Stability Assessment

Date: April 14 , 2021

FIGURE 16	Project No.: 181-04013-92	Ref. No.: 0

ANNEXE C

Tableaux de conception géotechnique (anglais seulement)

Client:	Tata Steel Minerals Canada
Project:	Goodwood, Quebec
Project No:	181-04013-92
Title:	Waste Rock Dump Stability Assessment
Level of Study:	Feasibility Study
Date:	14-Apr-21
Rev:	0

Waste Dump and Stockpile Stability Worksheets

Client:	Tata Steel Minerals Canada
Project:	Goodwood, Quebec
Project No:	181-04013-92
Title:	Waste Rock Dump Stability Assessment
Level of Study:	Feasibility Study
Date:	2021-04-14
Rev:	0

Table 1 - Data Sources

Sources:

Geotechnical Information on Foundation (soil and rock): WSP 2020. *Geotechnical Investigation, Goodwood Basin and Waste Rock Dump*. Report Prepared for Tata Steel Minerals Canada Ltd. WSP ref: 181-04013-13-RPT-01-R0, 10 p. + Appendices
Engineering Brief: WSP, June 2020. Goodwood - Retention Pond - Dyke Crack Assessment ref: 181-04013-14, 14p. + Appendices
Strength Parameters for Waste Rock Dump Material: Leps, T. M. (1970). "Review of Shearing Strength of Rockfill". Journal of Soil Mechanics & Foundations Div.
Seismic Hazard: Government of Canada, Seismic Risk Hazard Site, https://earthquakescanada.nrcan.gc.ca/hazard-alea/zoning-
Goodwood Pit - Geotechnical Design Parameters for Year 1 Open Pit and Waste Dump, WSP 2016 ref: Report No. 131-21244-00 +Appendices
Goodwood Site Visit/Validation of Pit Geotechnical Design Input Parameters Memo Report, WSP February 2018. ref:131-21244-00_MEM-01_R1

Client:	Tata Steel Minerals Canada
Project:	Goodwood, Quebec
Project No:	181-04013-92
Title:	Waste Rock Dump Stability Assessment
Date:	April 14, 2021
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Table 2 - Factor of Safety Acceptance Criteria Values for Waste Rock Dumps and Stockpiles (after Hawley and Cunning, 2017)

Consequence[1,3]	Confidence[2,3]	Static Analysis		Pseudo-Static Analysis	Maximum Allowable Strain[4]
		Minimum FoS	Maximum PoF[4]	Minimum FoS	
Low	Low	1.3 to 1.4	10-15%	1.05 to 1.1	≤1%
	Moderate	1.2 to 1.3	15-25%	1.0 to 1.05	≤1.5%
	High	1.1 to 1.2	25-40%	1.0	≤2%
Moderate	Low	1.4 to 1.5	2.5-5%	1.1 to 1.15	≤0.75%
	Moderate	1.3 to 1.4	5-10%	1.05 to 1.1	≤1%
	High	1.2 to 1.3	10-15%	1.0 to 1.05	≤1.5%
High	Low	≥1.5	≤1%	1.15	≤0.5%
	Moderate	1.4 to 1.5	1-2.5%	1.1 to 1.15	≤0.75%
	High	1.3 to 1.4	2.5-5%	1.05 to 1.1	≤1%

Notes:

1. Consequence

Low - waste dumps and stockpiles will overall fill slopes less than 25° and less than 100 m high and repose angles slopes less than 50 m high. No critical infrastructure or unrestricted access within potential runout shadow. Limited potential for environmental impact. Long-term (more than 5 years) exposure for sites subject to very low to low (less than 350 mm) annual precipitation; medium-term (1-5 years) exposure for sites subject to moderate (350-1000 mm) annual precipitation; short-term (less than 1 year) exposure for sites subject to high (1000-2000 mm) annual precipitation; dry season construction/operation only for sites subject to very high (more than 2000 mm annual precipitation or intensive rainy season(s).

Moderate - waste dumps with overall fill slopes less than 30° and less than 250 m high or repose angle slopes less than 100 m high. No critical infrastructure or unrestricted access, or robust containment/mitigative measures to protect critical infrastructure and access within potential runout shadow. Potential for moderate environmental impact, but manageable. Long-term (more than 5 years) exposure for sites subject to moderate (350-1000 mm) annual precipitation; medium-term (1-5 years) exposure for sites subject to high (1000-2000 mm) annual precipitation; short-term (less than 1 year) exposure for sites subject to very high (more than 2000 mm) annual precipitation or intensive rainy season(s)

High - waste dumps with overall fill slopes more than 30° and more than 250 m high, or with repose angle slopes more than 200 m high. Critical infrastructure or unrestricted access within potential runout shadow with limited runout mitigation/containment measures. Potential for high environmental impact that would be difficult to manage. Long-term exposure (more than 5 years) for sites subject to high (1000-2000 mm) annual precipitation; medium-term (1-5 years) exposure for sites subject to very high (more than 2000 m) annual precipitation or intensive rainy season(s).

2. Confidence

Low - limited confidence in foundation conditions, waste material properties, piezometric pressures, analysis technique or potential instability mechanisms(s). Poorly defined or optimistic input parameters; high data variability. For proposed structures, investigations at the conceptual level with limited supporting data. For existing structures, poorly documented or unknown construction and operational history; lack of monitoring records; unknown or poor historical performance.

Moderate - moderate confidence in foundation conditions, waste material properties, piezometric pressure, analysis technique or potential failure mechanism(s). Input parameters adequately defined; moderate data variability. For proposed structures, investigations at the pre-feasibility study level with adequate supporting data. For existing structures, reasonably complete construction documentation and monitoring records; fair historical performance.

High - high confidence in foundation conditions, waste material properties, piezometric pressures, analysis technique and instability mechanism(s). Well-defined, conservative input parameters; low data variability. For proposed structures, investigations at the feasibility study level with comprehensive supporting data. For existing structures, well-documented construction and monitoring records and good historical performance.

3. In cases where the guidance for consequence or confidence conflicts or is unclear, selection of the appropriate level should be based on judgements and the rationale for the selection should be documented.

4. A simplified and conservative estimate of the potential displacement or deformation that may occur during a seismic event may be obtained using a variety of methods (e.g. Newmark 1965, Swaisgood 2003). For the purposes of these acceptance criteria, displacement or deformation estimates derived using these methods can be converted to an 'equivalent' strain by dividing the estimated cumulative displacement or deformation by the length of the critical failure path and expressive the results as a percentage. If the length of the critical failure path is unknown or not easily obtainable, the overall slope length or height of the embankment can be used as a conservative estimate for the length of the critical failure path. If numerical techniques are used, then convergence of the numerical model is necessary before the cumulative displacement can be calculated. A non-convergence numerical model would not meet the acceptance criteria.

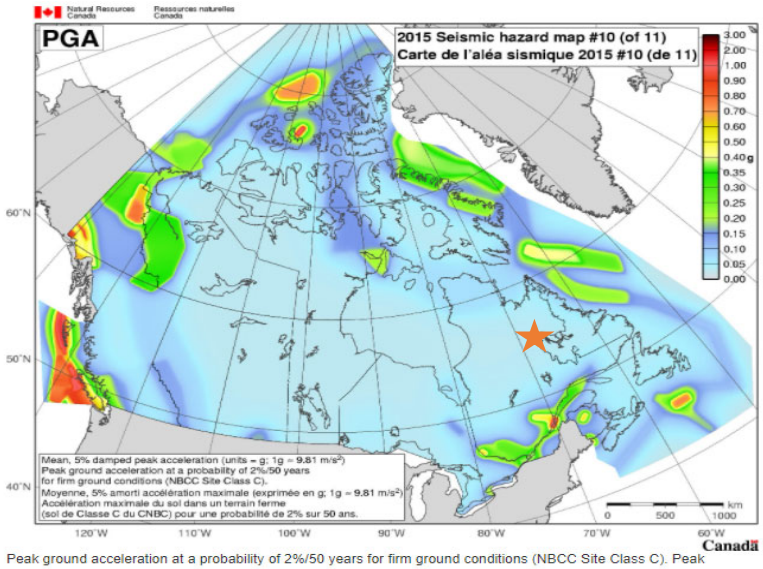
Client:	Tata Steel Minerals Canada
Project:	Goodwood, Quebec
Project No:	181-04013-92
Title:	Waste Rock Dump Stability Assessment
Level of Study:	Feasibility Study
Date:	2021-04-14
Rev:	0

Table 3 - Summary of Probabilistic Seismic Hazard Analysis

Exposure Time (years)	Probability of Exceedance (%)	Peak Ground Acceleration PGA (g)	Return Period
50 Years	40	0.003	208
50 Years	10	0.012	475
50 Years	5	0.019	975
50 Years	2	0.034	2475

Notes:

Source: Government of Canada, Seismic Risk Hazard Site, https://earthquakescanada.nrcan.gc.ca/hazard-alea/zoning-zonage/NBCC2015maps-en.php



Peak ground acceleration at a probability of 2%/50 years for firm ground conditions (NBCC Site Class C). Peak acceleration is contoured in g.

Client:	Tata Steel Minerals Canada
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Title:	Waste Rock Dump Stability Assessment
Level of Study:	Feasibility Study
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Table 4a - Waste Dump Profile Parameters

Lift	Bench Height (m)	Overall Waste Dump Height (h) (m)	Face Angle - Design (°)	Face Angle from Slide2 Model (°)	Berm Width (m)	Comments
1	14.5	14.5	28	36	11.4	
2	15	29.5	34	33	10.1	
3	15	44.5	33	33	10.1	
4	10	54.5	33	33	n.a.	

Source:
2019 LIDAR survey and 2020 ditch survey provided by TSMC in June 2020 for existing profile.
Waste Dump design as provided by Tata Steel and modified by WSP to incorporate a runoff collection ditch along the downstream toe that drains to the pond.

Notes:

Table 4b - Ground Water Depth and Elevation in Boreholes from Geotechnical Investigation Report (WSP, 2020)

Borehole No.	Piezometer Toe Depth (mbgs)	Ground Surface Elevation (m)	Ground Water Depth (mbgs)	Ground Water Elevation (m)	Date of Reading
19-BH-02 (#1)	14.9	695.81	Dry	Dry	September 22, 2019
19-BH-02 (#2)	11.0	695.81	Dry	Dry	September 22, 2019
19-BH-04 (#1)	14.0	683.21	Dry	Dry	September 22, 2019
19-BH-04 (#2)	9.1	683.21	Dry	Dry	September 22, 2019
19-BH-05 (#1)	14.0	681.36	6.34	675.02	September 22, 2019
19-BH-05 (#2)	8.5	681.36	6.19	675.17	September 22, 2019
19-BH-06	0.8	685.44	4.88	680.56	September 22, 2019

Notes:

The minimum ground water level from Table 4b for borehole 19-BH-06 is used as hydrogeological condition for various scenarios.
Note that these readings does not represent seasonal data so other hydrogeological scenarios are considered to test for sensitivity.

Client:	Tata Steel Minerals Canada
Project:	Goodwood, Quebec
Project No:	181-04013-92
Title:	Waste Rock Dump Stability Assessment
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Table 5 - Input Parameters for Waste Dump Stability

Material	g_b [a,b] (Bulk Unit Weight) (kN/m³)	f' [a,b] (Friction Angle) (degrees)	c' [a,b] (Cohesion) (kPa)	Thickness (m) [c]	
				Average	Maximum
Rockfill	19	Shear Normal Function Leps - Weak		see profile	see profile
Upper Till	21	32	0	10.3	14.6
Clayey Silt	20	31	2	2.1	2.4
Lower Till	21	35	0	10.0	17.7

Notes:

a) Input parameters for Upper Till, Clayey Sand and Lower Till are based on retention pond stability analysis (WSP, June 2020)

b) Unit weight of rockfill and bedrock input parameters were extracted from geotechnical design parameters for Year 1 Open Pit and Waste Dump Report (WSP, 2016). The following unit weight and Hoek-Brown input parameters for the bedrock is assumed: Unit Weight (g_b) = 27 kN/m³, Unconfined Compressive Strength (UCS) = 20000 kPa, m_b = 0.704 and s = 0.0013.

c) Overburden average and maximum thicknesses are based on the borehole logs from the geotechnical investigation report (WSP, 2020)

d) Rockfill quality is assumed to be weak rocks with low durability and fines (% passing No. 200 sieve) content above 25% and verified in waste dump sampling completed by TSMC and tested by WSP, 2020

Client:	Tata Steel Minerals Canada
Project:	Goodwood, Quebec
Project No:	181-04013-92
Title:	Waste Rock Dump Stability Assessment
Level of Study	Feasibility Study
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Table 6 - Limit Equilibrium Results

Scenario	Model - Surface Type - Search Method - Load	Overburden Thickness (m)	Geotechnical Inputs					Hydrogeological Conditions (e)	F.O.S.	Description of failure
			Parameter	Upper Till (a,b)	Clayey Silt (a,b)	Lower Till (a,b)	Waste Rock Parameters (c,d)			
13	Existing (March, 2021) Section B-B' Sarma Method Surface type: Circular Search: Grid Search Seismic load: none	22.4	γb (kN/m³) Strength Type φ' (°) c' (kPa) Average Thickness (m)	21 Mohr-Coulomb 32 0 10.3	20 Mohr-Coulomb 31 2 2.1	21 Mohr-Coulomb 35 0 10	22 Shear/Normal Function Leps - Weak Leps - Weak See profile	Piezometric line at ground surface	1.43	Failure predicted at 7.3 m from the edge of the crest of the first lift through the Upper Till layer and exits 36.7 m from the Toe.
14	LOM to Existing Elevation (March, 2021) Section B-B' Sarma Method Surface type: Circular Search: Grid Search Seismic load: none	22.4	γb (kN/m³) Strength Type φ' (°) c' (kPa) Average Thickness (m)	21 Mohr-Coulomb 32 0 10.3	20 Mohr-Coulomb 31 2 2.1	21 Mohr-Coulomb 35 0 10	22 Shear/Normal Function Leps - Weak Leps - Weak See profile	Piezometric line at ground surface	1.41	Failure predicted at 8.7 m from the edge of the crest of the first lift through the Upper Till layer and exits in the wall of ditch.
15	Existing (March, 2021) Section C-C' Sarma Method Surface type: Circular Search: Grid Search Seismic load: none	22.4	γb (kN/m³) Strength Type φ' (°) c' (kPa) Average Thickness (m)	21 Mohr-Coulomb 32 0 10.3	20 Mohr-Coulomb 31 2 2.1	21 Mohr-Coulomb 35 0 10	22 Shear/Normal Function Leps - Weak Leps - Weak See profile	Piezometric line at ground surface	1.46	Failure predicted at the slope of the first lift through the Upper Till layer and exits 11.5 m from the Toe.
16	LOM to Existing Elevation (March, 2021) Section C-C' Sarma Method Surface type: Circular Search: Grid Search Seismic load: none	22.4	γb (kN/m³) Strength Type φ' (°) c' (kPa) Average Thickness (m)	21 Mohr-Coulomb 32 0 10.3	20 Mohr-Coulomb 31 2 2.1	21 Mohr-Coulomb 35 0 10	22 Shear/Normal Function Leps - Weak Leps - Weak See profile	Piezometric line at ground surface	1.32	Failure predicted at 0.5 m from the edge of the crest of the first lift through the Upper Till layer and exits 10.8 m from the Toe.

NOTES:
a) Overburden average and maximum thickness are based on the borehole logs from the geotechnical investigation report (WSP, 2020)
b) Geotechnical input parameters are from Table 5.
c) Unit weight of rockfill and bedrock input parameters were extracted from geotechnical design parameters for Year 1 Open Pit and Waste Dump Report (WSP, 2016) for scenarios 1 to 6. The following unit weight and Hoek-Brown input parameters for the bedrock is assumed: Unit Weight (g_b) = 27 kN/m³, Unconfined Compressive Strength (UCS) = 20000 kPa, m_b = 0.704 and s = 0.0013.
d) Unit weight of rockfill and bedrock input values were extracted from Goodwood Site Visit/Validation of Pit Geotechnical Design Input Parameters Memo (WSP, 2018) for scenarios 7 to 12. Bedrock Unit Weight (g_b) = 31 kN/m³ is assumed for scenarios 7 to 12.
e) The water level for scenarios 1,2 and 4 is based on the water level readings on September 22, 2019 from geotechnical investigation report (WSP, 2020). The minimum water level is considered for this study.
f) F.O.S are from Slide2, Sarma Interslice Strength Option: Computed Average Value, Limit Equilibrium Analysis Program (Rocscience)
g) Water table is as per Hydrogeological scenarios.

Appendix XIV. WSP geotechnical monitoring report

	RAPPORT D'INSPECTION		Révision 00
Client :	Tata Steel Mineral Canada Ltd. (TSMC)	**Réf. Client :**	s.o.
Site :	Goodwood, Québec, Canada	**Réf. WSP :**	181-04013-94
Projet :	Inspection géotechnique 2021	**Météo :**	cf. section «Activité(s)»
Inspecteur.trice :	Louise Chaput, ing. (OIQ, n°. 109191)	**Date de l'inspection :**	2021-06-24, 26 et 27
Chargé.e de projet :	Carl Gauthier, ing. (OIQ n°. 111186)	**Date du rapport :**	2022-03-31

Ressource	Compagnie	Commentaires
Jean-François Dion (JFD)	TSMC	Guide; référence; conducteur
Louise Chaput, ing. (LC)	WSP	Inspectrice
Mariana Trindade, PhD (MT)	TSMC	Gestionnaire des questions environnementales

Date; heure	Activité(s)
24-juin	Arrivée au site; conditions météorologiques : pluvieux et venteux; 9 °C.
12 h 30 à 14 h	Marche sur la digue sud du bassin de sédimentation, jusqu'au déversoir, avec quelques inspections sur le versant intérieur et extérieur de la digue sud. Retour au véhicule, balade au pied de la digue sud.
25-juin	Arrivée au site; conditions météorologiques : nuageux et venteux; 10 °C.
12 h 30 à 14 h	Marche sur la digue médiane du bassin, puis sur la digue nord en direction ouest et retour par la digue sud. Aussi avec quelques inspections sur la pente intérieure et les fossés extérieurs.
26-juin	Arrivée au site; conditions météorologiques : ciel variable et venteux; ≈20 °C.
12 h 30 à 14 h	Réunion de coordination avec le géomètre, pour avoir un relevé complet du bassin, y compris base et crête des digues, dépressions sur le dessus des digues, plaques de tassement, etc. Dégagement manuel de l'enrochement à l'intersection de la digue sud et de la fin de la rampe, pour découvrir une déchirure dans la géomembrane. Inspection du fond du bassin de sédimentation.
28-juin	Arrivée au site; conditions météorologiques : variable à ensoleillé; ≈20 °C.
9 h à 12 h	Inspection du pied de la halde à stériles, des haldes à mort terrain et de la fosse à ciel ouvert.

Limitations : **Ce mandat n'est pas un examen des pratiques géotechniques des opérations de ce site ni une vérification entre les recommandations et/ou les critères de conception antérieurs. Le mandat n'est pas une diligence raisonnable ou un audit. Le mandat est de tout noter et consigner dans un rapport d'inspection.**

Secteur	Observations principales / préoccupations / commentaires	Photo n°
Bassin de sédimentation	**Intérieur du bassin :** - Le niveau d'eau dans le bassin est bas : l'eau est pompée de l'amont vers l'aval de la digue médiane puis pompée vers la fosse à ciel ouvert **Préoccupation : faible.**	1
	Digue sud : la superficie de la membrane découverte sur la pente amont (interne) a triplé depuis l'été 2018. **Préoccupation : modérée**	2 et 3
	Digue sud : une nouvelle dépression est observée sur la partie interne de la crête, près du déversoir d'urgence. **Préoccupation : modérée**.	4
	Digue sud : - Empierrement dégagé dans le talus interne, en aval de la digue médiane, pour découvrir des déchirures dans la géomembrane sur une longueur d'environ 2 m. - Dépression en crête de talus, juste devant les déchirures de fond ou de talus. Préoccupation : modérée.	5 et 6
	Digue médiane : Dépression dans le centre de la digue, probablement causé par un tassement du matériel constitutif du cœur de la digue. **Préoccupation : faible.**	7
	Général : La qualité de l'empierrement à l'intérieur du bassin est variable; après quatre saisons de gel/dégel, plusieurs roches présentent un état avancé de dégradation, laissant parfois la géomembrane à nue. **Préoccupation : modérée**	8
Halde à stériles	**Pied de la halde, secteur est :** - Résurgence causant un début d'érosion. - Érosion de surface entre ces résurgences et le fossé menant au bassin de sédimentation **Préoccupation : faible.**	9 et 10

	RAPPORT D'INSPECTION		Révision 00
Client :	Tata Steel Mineral Canada Ltd. (TSMC)	**Réf. Client :**	s.o.
Site :	Goodwood, Québec, Canada	**Réf. WSP :**	181-04013-94
Projet :	Inspection géotechnique 2021	**Météo :**	cf. section «Activité(s)»
Inspecteur.trice :	Louise Chaput, ing. (OIQ, n°. 109191)	**Date de l'inspection :**	2021-06-24, 26 et 27
Chargé.e de projet :	Carl Gauthier, ing. (OIQ n°. 111186)	**Date du rapport :**	2022-03-31

Secteur	Observations principales / préoccupations / commentaires (suite)	Photo n°
Halde à stériles (suite)	Talus Sud, portion est : - Plusieurs décrochements de surface visibles; - Les décrochements de surface génèrent des sédiments en amont du fossé et dans le fossé. Notons que les pentes sont fortes et que l'exploitant nous a mentionné qu'elles doivent être adoucies. Préoccupation : faible.	11 et 12
	Talus ouest : En crête de talus, des fissures sont présentes sur les bermes de sécurité et des cavités d'infiltration d'eau sont présente, avec signes de tassements. **Préoccupation : faible.**	13
	Sommet (plateau) de la halde : - Aucune stratégie de drainage des eaux de surface. - Fissure de tassement à la suite l'assèchement visible. - Des renfoncements avec trous d'infiltration des eaux de surface sont visibles. **Préoccupation : modérée.**	14 et 15
	Crête : des fissures de tensions provoquées par les décrochements de surface (voir observations ci-dessus) sont visibles à divers endroits. **Préoccupation : faible.**	16
Fossés et ponceaux	**Fossé à l'est de la halde vers le bassin :** Trois zones où le géotextile de séparation est visible. **Préoccupation : modérée.**	17
	Fossé entre la halde et le bassin de sédimentation : - Géotextile de séparation visible à plusieurs endroits, dû au manque d'empierrement. - Trou d'infiltration d'eau de surface (renard), juste devant le fossé. Il est possible que l'eau s'infiltre sous le fossé. Préoccupation : modérée	18 et 19
	Ponceau à l'entrée de la halde : - Fossé est bouché à l'est - Le côté ouest est brisé **Préoccupation : modérée.**	20 et 21
Fosse à ciel ouvert	Aucun mur final depuis l'an passé. Exploitation au même niveau que l'an passé (pas plus profond)	s.o.
	Présence de signe d'érosion autour de la fosse particulièrement le long du mur nord **Préoccupation : faible.**	22 et 23
Halde à mort terrain	Les talus sont généralement en bonnes conditions avec des signes d'érosions localisés à quelques endroits comme observés l'an dernier probablement dus à une mauvaise stratégie de drainage sur les zones planes. **Préoccupation : Modérée.**	s.o.
	Présence de flaque d'eau aux abords de la Halde Nord. **Préoccupation : faible.**	24

Secteur	Actions recommandées	Photo n°
Bassin de sédimentation	**Digue sud :** procéder aux travaux de réparation selon kles plans et devis développés par WSP.	2 à 6
	Digue médiane (temporaire) : pas de travaux de réparation à prévoir puisque cette digue sera démantelée dans le contexte des travaux de réparation.	7
	Général : dans les secteurs où les travaux de réparation ne sont pas déjà prévus et là où la l'empierrement s'est dégradé significativement et des tassements sont apparus, valider la cause des problèmes et ajouter de l'empierrement de bonne qualité.	8

	RAPPORT D'INSPECTION		Révision 00
Client :	Tata Steel Mineral Canada Ltd. (TSMC)	**Réf. Client :**	s.o.
Site :	Goodwood, Québec, Canada	**Réf. WSP :**	181-04013-94
Projet :	Inspection géotechnique 2021	**Météo :**	cf. section «Activité(s)»
Inspecteur.trice :	Louise Chaput, ing. (OIQ, n°. 109191)	**Date de l'inspection :**	2021-06-24, 26 et 27
Chargé.e de projet :	Carl Gauthier, ing. (OIQ n°. 111186)	**Date du rapport :**	2022-03-31

Secteur	Actions recommandées (suite)	Photo n°
Halde à stériles	**Résurgence et érosion en pied du talus sud :** Suivre l'évolution et aménager des entrées vers les fossés existants au besoin	9 et 10
	Talus sud et ouest : - Documenter (photos et rapport) l'évolution des décrochements de surface et s'assurer que les bermes de sécurité sont adéquates. - Le profilage des talus est à prévoir selon les spécifications de l'étude géotechnique de WSP de 2017 lorsque le talus sus-jacent a atteint sa géométrie finale.	11, 12, 13 et 16
Halde à stériles (suite)	**Sommet (plateau) :** Mettre en place une stratégie de drainage en éloignant l'eau des crêtes de talus et en minimisant les zones de flaque qui peuvent accentuer voire générer les enfoncements	14 et 15
	Général : - Réaliser des inspections mensuelles documentées (rapport et photos) afin de noter l'évolution des éléments mentionnés dans ce rapport ainsi que toutes nouvelles situations - Réaliser un arpentage mensuel des zones actives et vérifier que la géométrie respecte de la conception	s.o.
Fossés et ponceaux	**Fossés en général :** réaliser un entretien au besoin en enlevant les sédiments accumulés et ajoutant de l'empierrement où le géotextile est visible.	17, 18 et 19
	Fossés entre la halde à stériles et le bassin de sédimentation : boucher le trou observé en amont du fossé entre la halde et le bassin de sédimentation et reprofiler le terrain lors de la période estivale de 2022	19
	Ponceaux : réparer ou remplacer les ponceaux endommagés et dégager les fossés en amont et aval au besoin	20 et 21
Fosse à ciel ouvert	Détourner l'afflux d'eau dans la fosse à ciel ouvert en mettant en œuvre/en améliorant le fossé périphérique au-delà de la crête de la pente.	22 et 23
Halde à mort terrain	Dans les zones inactives : - Améliorer le nivellement du sommet (plateau) pour empêcher l'eau de s'écouler sur les pentes. - Considérer la construction/implantation d'un canal d'eau bordé d'un matériau de protection contre l'érosion (ex. : empierrement) là où nécessaire.	24
	Dans les zones actives : - Remodeler/niveler le sommet (plateau) loin des talus (ex. : vers l'arrière/l'entrée).	24

SIGNATURES

Préparé par :

Louise Chaput ing.

Louise Chaput, ing. (OIQ, n°. 109191)
Bassin de sédimentation, halde à stériles et fossés

Jean-Sébastien Houle, ing. (OIQ no. 129263)
Fosse à ciel ouvert et halde à mort terrain

Autorisé et revue par les pairs :

Carl Gauthier, ing. (OIQ n°. 111186)
Chargé de projet

LC/JSH/CG/

P.j. : Annexe A - Rapport photographique

ANNEXE

A RAPPORT PHOTOGRAPHIQUE

	RAPPORT PHOTOGRAPHIQUE		Révision 00
Client :	Tata Steel Mineral Canada Ltd. (TSMC)	**Réf. Client :**	s.o.
Site :	Goodwood, Québec, Canada	**Réf. WSP :**	181-04013-94
Projet :	Inspection géotechnique 2021		
Inspecteur.trice :	Louise Chaput, ing. (OIQ, n°. 109191)	**Date de l'inspection :**	2021-06-24, 26 et 27
Chargé.e de projet :	Carl Gauthier, ing. (OIQ n°. 111186)	**Date du rapport :**	1 de 12

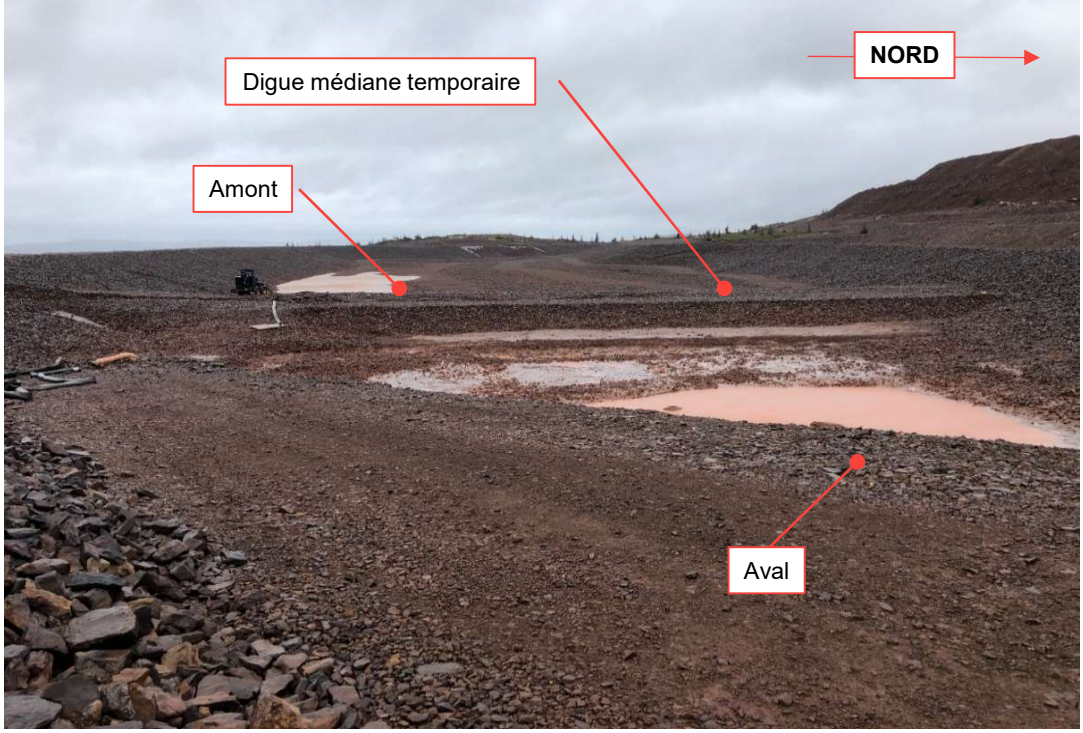
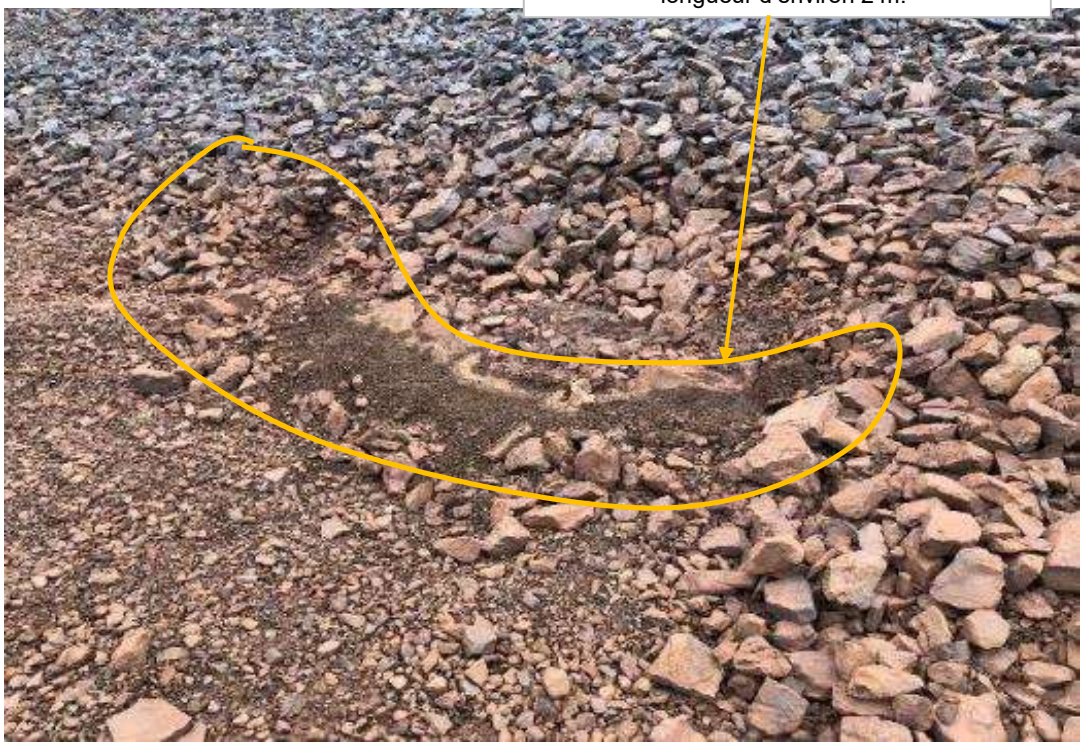


Photo 1 : Bassin de sédimentation, vue générale (vue vers l'ouest)

Photo 2 : Digue Sud, exemple d'une portion découverte de la membrane dans le talus interne

Préparé par :	Louise Chaput, ing. (OIQ, n°. 109191)	**Date**	2022-03-31
Préparé par :	Jean-Sébastien Houle, ing. (OIQ no. 129263)	**Date**	2022-03-31
Approuvé par :	Carl Gauthier, ing. (OIQ n°. 111186)	**Date**	2022-03-31



Photos 5 et 6 : Déchirure dans la membrane du talus interne de la digue sud et dépression en haut du talus dans le même secteur

Photo 3 : Digue Sud, exemple d'une portion découverte de la membrane dans le talus interne

Photo 4 : Digue Sud, une nouvelle dépression est observée sur la partie interne de la crête

Photo 7 : Dépression dans le centre de la digue médiane

Photo 8 : Bassin de sédimentation, la qualité de l'empierrement à l'intérieur du bassin est variable; après quatre saisons, plusieurs roches présentent un état avancé de dégradation

Photo 9 : Écoulement au pied de la halde à stérile, coin est, vers le fossé en aval

Photo 10 : Écoulement au pied de la halde à stérile, coin est.

Photo 11 : Halde à stérile, Talus Sud, dans la portion est, plusieurs décrochements de surface sont visibles

Photo 12 : Halde à stériles, Talus Sud, les décrochements (c.f. photos 11) génèrent des sédiments en amont du fossé et dans le fossé

Photo 13 : Halde à stérile, Talus Ouest, des fissures sont présentes sur les merlons de sécurité et des cavités d'infiltration d'eau sont présente, avec signes de tassements

Photo 14 : Halde à stériles, sommet (plateau), renfoncements avec trous d'infiltration des eaux de surface

Photo 15 : Halde à stériles, sommet (plateau), fissures et trous d'infiltration des eaux de surface (secteur est)

Photo 16 : Halde à stériles, exemple de fissures en crête de talus

Photo 17 : Fossé en amont du bassin de sédimentation, exemple d'une des trois zones où le géotextile est découvert

Photo 18 : Fossé entre la halde à stériles et le bassin de sédimentation, géotextile découvert à plusieurs endroits et sédiments dans le fossé.

Photo 19 : Fossé entre la halde à stériles et le bassin de sédimentation, un trou d'infiltration d'eau de surface (renard), est visite devant le fossé.

Photo 20 : Le fossé est bouché, à l'est du ponceau à l'entrée de la halde

Photo 21 : Le ponceau à l'entrée de la halde, côté ouest, est brisé

Photo 22 : Fosse à ciel ouvert, vue générale vers le sud-ouest

Photo 23 : Fosse à ciel ouvert, écoulement d'eau de surface à plusieurs endroits le long de la paroi nord

Photo 24 : Halde à mort terrain, présence de flaque d'eau aux abords de la halde

Appendix XV. COVID-19 announcement

Centre intégré
de santé
et de services sociaux
de la Côte-Nord
Québec

Avis à la population

AVIS DE LA SANTÉ PUBLIQUE CONCERNANT L'AUGMENTATION DES CAS DE COVID-19 À KAWAWACHIKAMACH, SCHEFFERVILLE ET MATIMEKUSH-LAC JOHN

Le 22 décembre 2021 – Quatre nouveaux cas de COVID-19 sont enregistrés dans la communauté de Kawawachikamach. La situation est préoccupante et la Direction de santé publique de la Côte-Nord invite les résidents de Schefferville, Kawawachikamach et Matimekush-Lac John à faire preuve de vigilance et à suivre les recommandations ci-dessous :

- Si vous présentez des symptômes (fièvre, toux, essoufflement, mal de gorge, perte de goût ou de l'odorat) et que vous avez un test de dépistage rapide à la maison, utilisez-le. Si le test est positif, restez en isolement et appelez la clinique pour une confirmation. Si vous avez des symptômes et que le test est négatif, reprenez le test après 24 heures (lendemain)
- Restez chez vous sauf pour des déplacements essentiels (travail, épicerie, soins de santé)
- Évitez les déplacements dans une autre municipalité ou communauté
- Respectez les consignes d'isolement des cas de COVID-19 ou des contacts domiciliaires
- Suivez les recommandations du protocole de gestion des entrées. Les visiteurs et les étudiants qui reviennent doivent se faire dépister et respecter un confinement de 7 jours
- Évitez les rassemblements
- Faites-vous vacciner contre la COVID-19
- Pour les personnes âgées de 18 ans et plus, prenez rendez-vous pour recevoir une 3e dose de vaccin contre la COVID-19

Il est important de porter adéquatement un masque, de rester à 2 mètres des autres et de se laver fréquemment les mains.

Aidez-nous à protéger notre communauté contre la transmission du virus.

Merci de votre collaboration.

La Direction de santé publique de la Côte-Nord

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