

## **Annexe X. Résultats et calculs pour la qualité de l'air – retombées de poussières et métaux**





BUREAU  
VERITAS

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.

Total Cover Pages : 1  
Page 1 de 11



BUREAU  
VERITAS

Dossier BV Labs: C1B1520

Date du rapport: 2021/05/12

Bureau Veritas Laboratories

Votre # du projet: C117642

Initiales du préleur: 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	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	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	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
LDR = limite de détection rapportée				
Lot CQ = Lot Contrôle Qualité				



BUREAU  
VERITAS

Dossier BV Labs: C1B1520

Date du rapport: 2021/05/12

Bureau Veritas Laboratories

Votre # du projet: C117642

Initiales du préleur: 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

LDR = limite de détection rapportée

Lot CQ = Lot Contrôle Qualité



BUREAU  
VERITAS

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

Bureau Veritas Laboratories  
Votre # du projet: C117642  
Initiales du préleur: 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

#### 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
Baryum (Ba) totaux	ug/L	<2.0	2.0	7343107	<2.0	<2.0	2.0
Béryllium (Be) totaux	ug/L	<0.40	0.40	7343107	<0.40	<0.40	0.40
Cadmium (Cd) totaux	ug/L	<0.090	0.090	7343107	<0.090	<0.090	0.090
Chrome (Cr) totaux	ug/L	<5.0	5.0	7343107	<5.0	<5.0	5.0
Cuivre (Cu) totaux	ug/L	<0.90	0.90	7343107	<0.90	<0.90	0.90
Fer (Fe) totaux	ug/L	<100	100	7343107	<100	<100	100
Plomb (Pb) totaux	ug/L	<0.50	0.50	7343107	<0.50	<0.50	0.50
Nickel (Ni) totaux	ug/L	<1.0	1.0	7343107	<1.0	<1.0	1.0
Argent (Ag) totaux	ug/L	<0.090	0.090	7343107	<0.090	<0.090	0.090
Thallium (Tl) totaux	ug/L	<0.050	0.050	7343107	<0.050	<0.050	0.050
Vanadium (V) totaux	ug/L	<0.50	0.50	7343107	<0.50	<0.50	0.50
Zinc (Zn) totaux	ug/L	<5.0	5.0	7343107	<5.0	<5.0	5.0

LDR = limite de détection rapportée

Lot CQ = Lot Contrôle Qualité

Duplicata de laboratoire



BUREAU  
VERITAS

Dossier BV Labs: C1B1520

Date du rapport: 2021/05/12

Bureau Veritas Laboratories

Votre # du projet: C117642

Initiales du préleur: 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



BUREAU  
VERITAS

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		PKO885		
Date d'échantillonnage		2021/04/07 16:23		
# Bordereau		C117642-NONT-01-01		
	Unités	JA6438-AQS9-SN	LDR	Lot CQ
<b>MÉTAUX</b>				
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				
Lot CQ = Lot Contrôle Qualité				



BUREAU  
VERITAS

Dossier BV Labs: C1B1520

Date du rapport: 2021/05/12

Bureau Veritas Laboratories

Votre # du projet: C117642

Initiales du préleur: JFD

## REMARQUES GÉNÉRALES

Bench Level Deviation Attached,50% of Volume post separation 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.**



BUREAU  
VERITAS

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	



BUREAU  
VERITAS

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
7347229	AFZ	Échantillon fortifié		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
				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
7347229	AFZ	Blanc fortifié		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

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

Réc = Récupération



BUREAU  
VERITAS

Dossier BV Labs: C1B1520

Date du rapport: 2021/05/12

Bureau Veritas Laboratories

Votre # du projet: C117642

Initiales du préleur: JFD

## 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.



BUREAU  
VERITAS

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:**

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.

(1) This test was performed by Bureau Veritas - Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8



BUREAU  
VERITAS

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

=====

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.



BUREAU  
VERITAS

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.



BUREAU  
VERITAS

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:

---

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.



BUREAU  
VERITAS

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:**

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.



BUREAU  
VERITAS

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

=====

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.



BUREAU  
VERITAS

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 (IMPELLER 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
<b>METALS</b>									
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



BUREAU  
VERITAS

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



BUREAU  
VERITAS

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

## GENERAL COMMENTS

Results relate only to the items tested.

BUREAU  
VERITAS

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.



BUREAU  
VERITAS

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:



shu Yang

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.



BUREAU  
VERITAS

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:**

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.



BUREAU  
VERITAS

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.

BUREAU  
VERITAS

Lab BV Job #: C200221

Report Date: 2022/01/26

TATA STEEL MINERALS CANADA

Client Project #: DUSTFALL

Your P.O. #: 3000000997

Sampler Initials: JMC

**METALS (IMPIINGER 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



BUREAU  
VERITAS

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 (IMPELLER 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



BUREAU  
VERITAS

Lab BV Job #: C200221

Report Date: 2022/01/26

TATA STEEL MINERALS CANADA

Client Project #: DUSTFALL

Your P.O. #: 3000000997

Sampler Initials: JMC

#### 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.**



BUREAU  
VERITAS

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



BUREAU  
VERITAS

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:



shu Yang

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.

ID échantillon	Date (mm-jj) - heure de début	Date (mm-jj) - heure de fin	# de jour échantillonné	Aire échantillonnée (m <sup>2</sup> )	Poussière insoluble (mg)	Poussière soluble (mg)	Poussière totale (mg)	Dépôt de poussière insoluble (g/m <sup>2</sup> /30d)	Dépôt de poussière soluble (g/m <sup>2</sup> /30d)	Taux de dépôt des poussières total (g/m <sup>2</sup> /30d)	Commentaires
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	N/A	N/A	0,017672	N/A	N/A	N/A	N/A	N/A	N/A	Endommagé par un ours
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	N/A	N/A	0,017672	N/A	N/A	N/A	N/A	N/A	N/A	IN/Accessible
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	10-1012:00 PM	25	0,017672			36,0	0,00000	0,00000	2,43117	

Notes: AQ : Qualité de l'air, # : nombre, N/A : Non applicable

## **Annexe XI. Certificats d'analyses – PM2.5 et matière particulière totale**





BUREAU  
VERITAS

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.



BUREAU  
VERITAS

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

=====

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.



BUREAU  
VERITAS

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



BUREAU  
VERITAS

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

## 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.**



BUREAU  
VERITAS

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:



shuYang

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.



BUREAU  
VERITAS

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.



BUREAU  
VERITAS

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

=====

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.



BUREAU  
VERITAS

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



BUREAU  
VERITAS

Lab BV Job #: C145330

Report Date: 2021/09/01

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

## GENERAL COMMENTS

### CONVENTIONAL PARAMETERS (FILTER)

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

**Results relate only to the items tested.**



BUREAU  
VERITAS

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:



shu Yang

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.

## **Annexe XII. Certificats d'analyses – drainage minier acide**





BUREAU  
VERITAS

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.



BUREAU  
VERITAS

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**

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.

BUREAU  
VERITAS

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
<b>METALS</b>													
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

BUREAU  
VERITAS

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)**

<b>Lab BV ID</b>					IU3222		
<b>Sampling Date</b>					2021/01/26		
<b>COC Number</b>					789989-01-01		
	<b>Units</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>TCMC-81075</b>	<b>RDL</b>	<b>QC Batch</b>
% MOISTURE	%	-	-	-	4.8	N/A	N/A
<b>METALS</b>							
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							

BUREAU  
VERITAS

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		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
<b>METALS</b>								
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

BUREAU  
VERITAS

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)**

<b>Lab BV ID</b>		IU3223	IU3363	IU3364	IU3365		
<b>Sampling Date</b>		2021/01/03	2021/01/03	2021/01/03	2021/01/03		
<b>COC Number</b>		789989-01-01	789989-01-01	789989-01-01	789989-01-01		
<b>Units</b>	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



BUREAU  
VERITAS

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)

<b>Lab BV ID</b>		IU3366		IU3378	IU3388		
<b>Sampling Date</b>		2021/01/03		2021/01/03	2021/01/03		
<b>COC Number</b>		789989-01-01		789989-01-01	789989-01-01		
<b>Units</b>	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



BUREAU  
VERITAS

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		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



BUREAU  
VERITAS

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

### 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
<b>CONVENTIONALS</b>											
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

BUREAU  
VERITAS

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

**CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)**

<b>Lab BV ID</b>		IU3150	IU3219	IU3220	IU3221	IU3222		
<b>Sampling Date</b>		2021/01/03	2021/01/03	2021/01/26	2021/01/26	2021/01/26		
<b>COC Number</b>		789989-01-01	789989-01-01	789989-01-01	789989-01-01	789989-01-01		
	<b>Units</b>	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
<b>CONVENTIONALS</b>								
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

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

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

<b>Lab BV ID</b>		IU3366		IU3378	IU3388			
<b>Sampling Date</b>		2021/01/03		2021/01/03	2021/01/03			
<b>COC Number</b>		789989-01-01		789989-01-01	789989-01-01			
	<b>Units</b>	TCMC-81075-CTEU-9	QC Batch	TCMC-37467- (SPLP1312)	TCMC-37468- (SPLP1312)	RDL	QC Batch	
<b>CONVENTIONALS</b>								
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



BUREAU  
VERITAS

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

### 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



BUREAU  
VERITAS

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

### 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							



BUREAU  
VERITAS

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

### SPLP-EPA 1312 (SOIL)

<b>Lab BV ID</b>		IU3378	IU3388	IU3389	
<b>Sampling Date</b>		2021/01/03	2021/01/03	2021/01/03	
<b>COC Number</b>		789989-01-01	789989-01-01	789989-01-01	
<b>Units</b>	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					

<b>Lab BV ID</b>		IU3390	IU3391	
<b>Sampling Date</b>		2021/01/03	2021/01/03	
<b>COC Number</b>		789989-01-01	789989-01-01	
<b>Units</b>	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				



BUREAU  
VERITAS

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

### 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
pH Deionized water	n/a
Date extraction fluid added	n/a
Date leaching terminated	n/a
Volume of extracting fluid (mL)	n/a
pH after 7 days of leaching	n/a

QC Batch = Quality Control Batch



BUREAU  
VERITAS

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

## 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.**

BUREAU  
VERITAS

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

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	

BUREAU  
VERITAS

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
2162696	ZEO	Spiked Blank	Cobalt (Co)	2021/02/05	<10		ug/L
			Copper (Cu)	2021/02/05	8.3,		ug/L
					RDL=3.0		
			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
			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



BUREAU  
VERITAS

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
2162995	ZEO	Spiked Blank	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
			Silver (Ag)	2021/02/08	99	%	
			Arsenic (As)	2021/02/08	104	%	
			Barium (Ba)	2021/02/08	101	%	
			Boron (B)	2021/02/08	96	%	
2164537	JGZ	LEACH. BLANK	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	%	
			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

**BUREAU  
VERITAS**

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



BUREAU  
VERITAS

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 Bouquedoura, B.Sc., Chemist, Montréal, Analyst II

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.

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



BUREAU  
VERITAS

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. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

=====

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.

BUREAU  
VERITAS

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)**

<b>Lab BV ID</b>					IV8523		
<b>Sampling Date</b>					2021/02/01		
	<b>Units</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>TSMC-75262</b>	<b>RDL</b>	<b>QC Batch</b>
% MOISTURE	%	-	-	-	4.0	N/A	N/A
<b>METALS</b>							
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							

BUREAU  
VERITAS

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
<b>METALS</b>										
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



BUREAU  
VERITAS

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



BUREAU  
VERITAS

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
<b>CONVENTIONALS</b>								
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								



BUREAU  
VERITAS

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)**

<b>Lab BV ID</b>		IV8523	
<b>Sampling Date</b>		2021/02/01	
	<b>Units</b>	<b>TSMC-75262</b>	<b>QC Batch</b>
% MOISTURE	%	4.0	N/A
<b>Leachates</b>			
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			



BUREAU  
VERITAS

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)**

<b>Lab BV ID</b>		IV8525	
<b>Sampling Date</b>		2021/02/01	
	<b>Units</b>	<b>TSMC-75262 (SPLP1312)</b>	<b>QC Batch</b>

**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



BUREAU  
VERITAS

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)

<b>Lab BV ID</b>		IV8524	
<b>Sampling Date</b>		2021/02/01	
	<b>Units</b>	<b>TSMC-75262 (CTEU-9)</b>	<b>QC Batch</b>

#### 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



BUREAU  
VERITAS

Lab BV Job #: C107257

Report Date: 2021/04/12

TATA STEEL MINERALS CANADA

Site Location: GOODWOOD ARD

Your P.O. #: 3000000730

Sampler Initials: EF

## 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.**

**BUREAU  
VERITAS**

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	n/a
			Volume extracting fluid 1 (ml)	2021/02/24	400		
2166625	SMD	Method Blank	Volume of extracting fluid (mL)	2021/02/24	500	n/a	n/a
			pH after 18 hours leaching	2021/02/24	4.23		
2166711	KK	Spiked Blank	pH of extracting fluid	2021/02/24	4.18	n/a	n/a
			Silver (Ag)	2021/02/24			%
			Arsenic (As)	2021/02/24			%
			Barium (Ba)	2021/02/24			%
			Boron (B)	2021/02/24			%
			Cadmium (Cd)	2021/02/24			%
			Chromium (Cr)	2021/02/24			%
			Copper (Cu)	2021/02/24			%
			Cobalt (Co)	2021/02/24			%
			Tin (Sn)	2021/02/24			%
			Iron (Fe)	2021/02/24			%
			Manganese (Mn)	2021/02/24			%
			Molybdenum (Mo)	2021/02/24			%
			Nickel (Ni)	2021/02/24			%
			Mercury (Hg)	2021/02/24			%
			Lead (Pb)	2021/02/24			%
			Selenium (Se)	2021/02/24			%
			Uranium (U)	2021/02/24			%
			Zinc (Zn)	2021/02/24			%
2166711	KK	Method Blank	Silver (Ag)	2021/02/24	<0.50	mg/kg	mg/kg
			Arsenic (As)	2021/02/24	<2.0		
			Barium (Ba)	2021/02/24	<4.0		
			Boron (B)	2021/02/24	<2.0		
			Cadmium (Cd)	2021/02/24	<0.10		
			Chromium (Cr)	2021/02/24	<1.0		
			Copper (Cu)	2021/02/24	<1.0		
			Cobalt (Co)	2021/02/24	<1.0		
			Tin (Sn)	2021/02/24	<1.0		
			Iron (Fe)	2021/02/24	<10		
			Manganese (Mn)	2021/02/24	<2.0		
			Molybdenum (Mo)	2021/02/24	<0.50		
			Nickel (Ni)	2021/02/24	<0.50		
			Mercury (Hg)	2021/02/24	<0.010		
			Lead (Pb)	2021/02/24	<1.0		
			Selenium (Se)	2021/02/24	<0.50		
			Uranium (U)	2021/02/24	<2.0		
			Zinc (Zn)	2021/02/24	<5.0		
2166884	NET	LEACH. BLANK	Silver (Ag)	2021/02/25	<0.30	ug/L	ug/L
			Arsenic (As)	2021/02/25	<2.0		
			Barium (Ba)	2021/02/25	<5.0		
			Boron (B)	2021/02/25	<50		
			Cadmium (Cd)	2021/02/25	<1.0		
			Chromium (Cr)	2021/02/25	<7.0		
			Cobalt (Co)	2021/02/25	<10		
			Copper (Cu)	2021/02/25	<20		
			Tin (Sn)	2021/02/25	<50		
			Iron (Fe)	2021/02/25	<100		

BUREAU  
VERITAS

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
2166884	NET	Spiked Blank	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
			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	%

BUREAU  
VERITAS

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
2167033	TGU	Spiked Blank	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	%	
			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	
2167033	TGU	Method Blank	Nitrites (N-NO2-)	2021/02/25	<0.20	mg/kg	
2167033	TGU	Method Blank	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	
2167273	TGU	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/02/26	<0.20	mg/L	
2167273	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/02/26	106	%	
2167285	TGU	LEACH. BLANK	Nitrate (N) and Nitrite(N)	2021/02/26	105	%	
2167285	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/02/26	<0.20	mg/L	
2167285	TGU	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/02/26	<0.20	mg/L	
2167383	SMD	Method Blank	pH Deionized water	2021/03/05	5.37	n/a	
2167383	SMD	Method Blank	Date extraction fluid added	2021/03/05	2021/02/26	n/a	
2167383	SMD	Method Blank	Date leaching terminated	2021/03/05	2021/03/05	n/a	
2167383	SMD	Method Blank	Volume of extracting fluid (mL)	2021/03/05	160	n/a	
2167383	SMD	Method Blank	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	
2168988	JGZ	LEACH. BLANK	Arsenic (As)	2021/03/08	<2.0	ug/L	
2168988	JGZ	LEACH. BLANK	Barium (Ba)	2021/03/08	<5.0	ug/L	
2168988	JGZ	LEACH. BLANK	Boron (B)	2021/03/08	<50	ug/L	
2168988	JGZ	LEACH. BLANK	Cadmium (Cd)	2021/03/08	<1.0	ug/L	
2168988	JGZ	LEACH. BLANK	Chromium (Cr)	2021/03/08	<7.0	ug/L	
2168988	JGZ	LEACH. BLANK	Cobalt (Co)	2021/03/08	<10	ug/L	
2168988	JGZ	LEACH. BLANK	Copper (Cu)	2021/03/08	<10	ug/L	
2168988	JGZ	LEACH. BLANK	Tin (Sn)	2021/03/08	<50	ug/L	
2168988	JGZ	LEACH. BLANK	Iron (Fe)	2021/03/08	<100	ug/L	
2168988	JGZ	LEACH. BLANK	Manganese (Mn)	2021/03/08	<3.0	ug/L	
2168988	JGZ	LEACH. BLANK	Mercury (Hg)	2021/03/08	<0.50	ug/L	
2168988	JGZ	LEACH. BLANK	Molybdenum (Mo)	2021/03/08	<10	ug/L	
2168988	JGZ	LEACH. BLANK	Nickel (Ni)	2021/03/08	<6.0	ug/L	



BUREAU  
VERITAS

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
2168988	JGZ	Spiked Blank	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
			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	%
2168998	VPA	LEACH. BLANK	Lead (Pb)	2021/03/08		92	%
			Selenium (Se)	2021/03/08		91	%
			Uranium (U)	2021/03/08		94	%
			Zinc (Zn)	2021/03/08		90	%
			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.



BUREAU  
VERITAS

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

---

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.

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.



BUREAU  
VERITAS

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

=====

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.

BUREAU  
VERITAS

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
<b>METALS</b>											
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

BUREAU  
VERITAS

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
<b>METALS</b>								
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

BUREAU  
VERITAS

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		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

BUREAU  
VERITAS

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		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



BUREAU  
VERITAS

Lab BV Job #: C113725

Report Date: 2021/06/01

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

### 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
<b>CONVENTIONALS</b>									
Fluoride (F)	mg/kg	200	400	2000	<1.0	<1.0	<1.0	1.0	2182030
Nitrates (N-NO3-) <sup>†</sup>	mg/kg	-	-	-	1.5	<1.0	<1.0	1.0	2182029
Nitrites (N-NO2-) <sup>†</sup>	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

BUREAU  
VERITAS

Lab BV Job #: C113725

Report Date: 2021/06/01

TATA STEEL MINERALS CANADA

Client Project #: GOODWOOD ARD

Site Location: GOODWOOD

Your P.O. #: 3000000730

**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
<b>CONVENTIONALS</b>								
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
<b>CONVENTIONALS</b>							
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
<b>CONVENTIONALS</b>					
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



BUREAU  
VERITAS

Lab BV Job #: C113725

Report Date: 2021/06/01

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

**TCLP-EPA 1311 (SOIL)**

Lab BV ID		IY8892	IY8893	IY8894	IY8894	
<b>Sampling Date</b>		2021/03/17 17:05	2021/03/26 17:45	2021/03/28 16:55	2021/03/28 16:55	
<b>COC Number</b>		789989-01-01	789989-01-01	789989-01-01	789989-01-01	
	<b>Units</b>	TSMC-81334	TSMC-81462	TSMC-81470	<b>TSMC-81470 Lab-Dup</b>	<b>QC Batch</b>
% MOISTURE	%	12	18	13	13	N/A
<b>Leachates</b>						
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



BUREAU  
VERITAS

Lab BV Job #: C113725

Report Date: 2021/06/01

TATA STEEL MINERALS CANADA

Client Project #: GOODWOOD ARD

Site Location: GOODWOOD

Your P.O. #: 3000000730

### 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



BUREAU  
VERITAS

Lab BV Job #: C113725

Report Date: 2021/06/01

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

### 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
<b>Leachates</b>					
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					



BUREAU  
VERITAS

Lab BV Job #: C113725

Report Date: 2021/06/01

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

## 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.**



BUREAU  
VERITAS

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

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



BUREAU  
VERITAS

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
2175952	NET	Spiked Blank	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
			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
			Nitrites (N-NO2-)	2021/04/08		97	%
2176041	TGU	Spiked Blank	Nitrates (N-NO3-)	2021/04/08		94	%
			Nitrate (N) and Nitrite(N)	2021/04/08		95	%
			Nitrites (N-NO2-)	2021/04/08	<0.20		mg/L
2176044	TGU	LEACH. BLANK	Nitrates (N-NO3-)	2021/04/08		95	%
2176044	TGU	Spiked Blank	pH Deionized water	2021/05/05	5.45		n/a
2180972	SMD	Method Blank	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
			Silver (Ag)	2021/04/30		83	%
			Arsenic (As)	2021/04/30		92	%
			Barium (Ba)	2021/04/30		95	%
			Boron (B)	2021/04/30		108	%
2181808	NET	Spiked Blank	Cadmium (Cd)	2021/04/30		91	%
			Chromium (Cr)	2021/04/30		90	%
			Copper (Cu)	2021/04/30		91	%
			Cobalt (Co)	2021/04/30		85	%

BUREAU  
VERITAS

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
2181808	NET	Method Blank	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	%	
			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



BUREAU  
VERITAS

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
2182991	RB2	Spiked Blank	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
			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.



BUREAU  
VERITAS

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

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

### 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

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

---

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.



BUREAU  
VERITAS

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



BUREAU  
VERITAS

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

=====

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.

BUREAU  
VERITAS

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
<b>METALS</b>									
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



BUREAU  
VERITAS

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
<b>METALS</b>								
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



BUREAU  
VERITAS

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)

<b>Lab BV ID</b>		JA6344	JA6346		JA6387		
<b>Sampling Date</b>		2021/04/04	2021/04/12		2021/02/20		
<b>COC Number</b>		808542-01-01	808542-01-01		808542-01-01		
<b>Units</b>	<b>TSMC-81539-CTEU-9</b>	<b>TSMC-81655-CTEU-9</b>	<b>QC Batch</b>	<b>TSMC-81181-(SPLP1312)</b>	<b>RDL</b>	<b>QC Batch</b>	

#### 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

BUREAU  
VERITAS

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)**

<b>Lab BV ID</b>		JA6388	JA6389		
<b>Sampling Date</b>		2021/04/04	2021/04/12		
<b>COC Number</b>		808542-01-01	808542-01-01		
<b>Units</b>	<b>TSMC-81539-(SPLP1312)</b>	<b>TSMC-81655-(SPLP1312)</b>	<b>RDL</b>	<b>QC Batch</b>	

**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



BUREAU  
VERITAS

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

### 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
<b>CONVENTIONALS</b>									
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

BUREAU  
VERITAS

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

**CONVENTIONAL PARAMETERS-LAB LEACHATE (SOIL)**

<b>Lab BV ID</b>		JA6221	JA6222	JA6223		JA6334		
<b>Sampling Date</b>		2021/02/20	2021/04/04	2021/04/12		2021/02/20		
<b>COC Number</b>		808542-01-01	808542-01-01	808542-01-01		808542-01-01		
<b>Units</b>	<b>TSMC-81181</b>	<b>TSMC-81539</b>	<b>TSMC-81655</b>	<b>QC Batch</b>	<b>TSMC-81181-CTEU-9</b>	<b>RDL</b>	<b>QC Batch</b>	
% MOISTURE	%	0.2	3.6	7.4	N/A	N/A	N/A	N/A
<b>CONVENTIONALS</b>								
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								

<b>Lab BV ID</b>		JA6344	JA6346		JA6387		
<b>Sampling Date</b>		2021/04/04	2021/04/12		2021/02/20		
<b>COC Number</b>		808542-01-01	808542-01-01		808542-01-01		
<b>Units</b>	<b>TSMC-81539-CTEU-9</b>	<b>TSMC-81655-CTEU-9</b>	<b>QC Batch</b>	<b>TSMC-81181-(SPLP1312)</b>	<b>RDL</b>	<b>QC Batch</b>	
<b>CONVENTIONALS</b>							
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							

<b>Lab BV ID</b>		JA6388	JA6389		
<b>Sampling Date</b>		2021/04/04	2021/04/12		
<b>COC Number</b>		808542-01-01	808542-01-01		
<b>Units</b>	<b>TSMC-81539-(SPLP1312)</b>	<b>TSMC-81655-(SPLP1312)</b>	<b>RDL</b>	<b>QC Batch</b>	
<b>CONVENTIONALS</b>					
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					



BUREAU  
VERITAS

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

### 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
<b>Leachates</b>					
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					



BUREAU  
VERITAS

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

### 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



BUREAU  
VERITAS

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

### 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
<b>Leachates</b>					
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					



BUREAU  
VERITAS

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

## 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.**

BUREAU  
VERITAS

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

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		
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		
			Barium (Ba)	2021/04/30	<4.0		
			Boron (B)	2021/04/30	<2.0		
			Cadmium (Cd)	2021/04/30	<0.10		
			Chromium (Cr)	2021/04/30	<1.0		
			Copper (Cu)	2021/04/30	<1.0		
			Cobalt (Co)	2021/04/30	<1.0		
			Tin (Sn)	2021/04/30	<1.0		
			Iron (Fe)	2021/04/30	<10		
			Manganese (Mn)	2021/04/30	<2.0		
			Molybdenum (Mo)	2021/04/30	<0.50		
			Nickel (Ni)	2021/04/30	<0.50		
			Mercury (Hg)	2021/04/30	<0.010		
			Lead (Pb)	2021/04/30	<1.0		
			Selenium (Se)	2021/04/30	<0.50		
			Uranium (U)	2021/04/30	<2.0		
			Zinc (Zn)	2021/04/30	<5.0		
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		
			Nitrate (N) and Nitrite(N)	2021/05/01	<1.0		
2181778	NET	LEACH. BLANK	Silver (Ag)	2021/04/30	<0.30	ug/L	
			Arsenic (As)	2021/04/30	<2.0		
			Barium (Ba)	2021/04/30	<5.0		

BUREAU  
VERITAS

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
2181778	NET	Spiked Blank	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
			Silver (Ag)	2021/04/30	92	%	
			Arsenic (As)	2021/04/30	100	%	
			Barium (Ba)	2021/04/30	96	%	
			Boron (B)	2021/04/30	107	%	
2181795	VPA	LEACH. BLANK	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	%	
			Fluoride (F)	2021/04/30	<1.0		mg/L
			Fluoride (F)	2021/04/30		107	%
2181795	VPA	Spiked 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
2181852	NET	LEACH. BLANK					

BUREAU  
VERITAS

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
2181852	NET	Spiked Blank	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
			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	%
2182026	JGZ	LEACH. BLANK	Lead (Pb)	2021/04/30		95	%
			Selenium (Se)	2021/04/30		108	%
			Uranium (U)	2021/04/30		94	%
			Zinc (Zn)	2021/04/30		96	%
			Nitrites (N-NO2-)	2021/05/02	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/05/02	<0.20		mg/L
			Nitrites (N-NO2-)	2021/05/02		101	%
			Nitrate (N) and Nitrite(N)	2021/05/02		103	%
			Fluoride (F)	2021/05/01	<1.0		mg/L
			Fluoride (F)	2021/05/01		101	%
2182027	VPA	LEACH. BLANK	pH end of leaching	2021/05/04	4.96	n/a	
			Volume extracting fluid 1 (ml)	2021/05/04	400	n/a	
2182160	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	
			Nitrites (N-NO2-)	2021/05/05	<0.20		mg/L
			Nitrate (N) and Nitrite(N)	2021/05/05	<0.20		mg/L
			Nitrites (N-NO2-)	2021/05/05		99	%
			Nitrate (N) and Nitrite(N)	2021/05/05		101	%
			Silver (Ag)	2021/05/13	<0.30		ug/L
2182591	VPA	LEACH. BLANK	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
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

BUREAU  
VERITAS

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
2184801	NET	Spiked Blank	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
			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
2184909	TGU	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/05/12	<0.20		mg/L
			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.



BUREAU  
VERITAS

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

---

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.



BUREAU  
VERITAS

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



BUREAU  
VERITAS

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

=====

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.

BUREAU  
VERITAS

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)**

<b>Lab BV ID</b>					JC6686		
<b>Sampling Date</b>					2021/05/09		
<b>COC Number</b>					817816-01-01		
	<b>Units</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>TSMC-81181</b>	<b>RDL</b>	<b>QC Batch</b>
<b>% MOISTURE</b>	%	-	-	-	13	N/A	N/A
<b>METALS</b>							
Silver (Ag)	mg/kg	<b>2</b>	20	40	<0.50	0.50	2187617
Arsenic (As)	mg/kg	<b>6</b>	30	50	5.2	2.0	2187617
Barium (Ba)	mg/kg	<b>340</b>	500	2000	<4.0	4.0	2187617
Boron (B)	mg/kg	-	-	-	6.1	2.0	2187617
Cadmium (Cd)	mg/kg	<b>1.5</b>	5	20	<0.10	0.10	2187617
Chromium (Cr)	mg/kg	<b>100</b>	250	800	18	1.0	2187617
Copper (Cu)	mg/kg	<b>50</b>	100	500	1.6	1.0	2187617
Cobalt (Co)	mg/kg	<b>25</b>	50	300	1.9	1.0	2187617
Tin (Sn)	mg/kg	<b>5</b>	50	300	<1.0	1.0	2187617
Iron (Fe) †	mg/kg	-	-	-	78000	10	2187617
Manganese (Mn)	mg/kg	<b>1000</b>	1000	2200	99	2.0	2187617
Molybdenum (Mo)	mg/kg	<b>2</b>	10	40	<0.50	0.50	2187617
Nickel (Ni)	mg/kg	<b>50</b>	100	500	1.4	0.50	2187617
Mercury (Hg)	mg/kg	<b>0.2</b>	2	10	0.042	0.010	2187617
Lead (Pb)	mg/kg	<b>50</b>	500	1000	7.6	1.0	2187617
Selenium (Se)	mg/kg	<b>1</b>	3	10	<0.50	0.50	2187617
Uranium (U) †	mg/kg	-	-	-	<2.0	2.0	2187617
Zinc (Zn)	mg/kg	<b>140</b>	500	1500	<5.0	5.0	2187617
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							
N/A = Not Applicable							
† Parameter is not accreditable							



BUREAU  
VERITAS

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
<b>METALS</b>								
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



BUREAU  
VERITAS

Lab BV Job #: C121681

Report Date: 2021/06/18

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

### CONVENTIONAL PARAMETERS (SOIL)

<b>Lab BV ID</b>					JC6686		
<b>Sampling Date</b>					2021/05/09		
<b>COC Number</b>					817816-01-01		
	<b>Units</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>TSMC-81181</b>	<b>RDL</b>	<b>QC Batch</b>
% MOISTURE	%	-	-	-	13	N/A	N/A
<b>CONVENTIONALS</b>							
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							



BUREAU  
VERITAS

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
<b>CONVENTIONALS</b>								
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								



BUREAU  
VERITAS

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

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

**TCLP-EPA 1311 (SOIL)**

<b>Lab BV ID</b>		JC6686	
<b>Sampling Date</b>		2021/05/09	
<b>COC Number</b>		817816-01-01	
	<b>Units</b>	<b>TSMC-81181</b>	<b>QC Batch</b>
% MOISTURE	%	13	N/A
<b>Leachates</b>			
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			



BUREAU  
VERITAS

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

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

### SPLP-EPA 1312 (SOIL)

Lab BV ID		JC6692	
Sampling Date		2021/05/09	
COC Number		817816-01-01	
	Units	TSMC-81181-(SPLP1312)	QC Batch
<b>Leachates</b>			
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			



BUREAU  
VERITAS

Lab BV Job #: C121681

Report Date: 2021/06/18

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

### WATER LEACHATE-CTEU-9 (SOIL)

<b>Lab BV ID</b>		JC6689	
<b>Sampling Date</b>		2021/05/09	
<b>COC Number</b>		817816-01-01	
	<b>Units</b>	<b>TSMC-81181-CTEU-9</b>	<b>QC Batch</b>
<b>Leachates</b>			
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			



BUREAU  
VERITAS

Lab BV Job #: C121681

Report Date: 2021/06/18

TATA STEEL MINERALS CANADA

Client Project #: GOODWOOD-ARD

Your P.O. #: 3000000997

## 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.**

BUREAU  
VERITAS

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

**BUREAU  
VERITAS**

Lab BV Job #: C121681

Report Date: 2021/06/18

TATA STEEL MINERALS CANADA

Client Project #: GOODWOOD-ARD

Your P.O. #: 3000000997

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2188538	NET	LEACH. BLANK	Nitrites (N-NO2-)	2021/05/22	<0.20		mg/kg
			Nitrate (N) and Nitrite(N)	2021/05/22	<1.0		mg/kg
			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



BUREAU  
VERITAS

Lab BV Job #: C121681

Report Date: 2021/06/18

TATA STEEL MINERALS CANADA

Client Project #: GOODWOOD-ARD

Your P.O. #: 3000000997

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2188573	NET	Spiked Blank	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
			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
2188885	TGU	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/05/22	<0.20		mg/L
2188885	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/05/22		102	%
2188885	TGU	Method Blank	Nitrate (N) and Nitrite(N)	2021/05/22		100	%
2189028	ABT	LEACH. BLANK	Nitrites (N-NO2-)	2021/05/22	<0.020		mg/L
2189028	ABT	LEACH. BLANK	Nitrate (N) and Nitrite(N)	2021/05/22	<0.020		mg/L
2189028	ABT	Spiked Blank	Nitrites (N-NO2-)	2021/05/22	<0.20		mg/L
2189028	ABT	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/05/22	<0.20		mg/L
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
2190336	TGU	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/05/28	<0.20		mg/L
2190336	TGU	Spiked Blank	Nitrites (N-NO2-)	2021/05/28		99	%
2190336	TGU	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/05/28		97	%
2190353	ZEO	LEACH. BLANK	Silver (Ag)	2021/05/27	<0.30		ug/L
2190353	ZEO	Spiked Blank	Arsenic (As)	2021/05/27	<2.0		ug/L
2190353	ZEO	Spiked Blank	Barium (Ba)	2021/05/27	<5.0		ug/L
2190353	ZEO	Spiked Blank	Boron (B)	2021/05/27	<50		ug/L
2190353	ZEO	Spiked Blank	Cadmium (Cd)	2021/05/27	<1.0		ug/L
2190353	ZEO	Spiked Blank	Chromium (Cr)	2021/05/27	<7.0		ug/L
2190353	ZEO	Spiked Blank	Cobalt (Co)	2021/05/27	<10		ug/L
2190353	ZEO	Spiked Blank	Copper (Cu)	2021/05/27	<3.0		ug/L

BUREAU  
VERITAS

Lab BV Job #: C121681

Report Date: 2021/06/18

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

## QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2190353	ZEO	Spiked Blank	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
			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



BUREAU  
VERITAS

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

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

### VALIDATION SIGNATURE PAGE

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



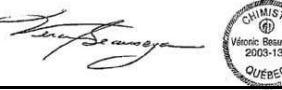
---

Frederic Arnaud, 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

---

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.

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.



BUREAU  
VERITAS

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

=====

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.

BUREAU  
VERITAS

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)**

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



BUREAU  
VERITAS

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
<b>METALS</b>								
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

BUREAU  
VERITAS

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)**

<b>Lab BV ID</b>		JE8477	JE8478		
<b>Sampling Date</b>		2021/05/18	2021/05/15		
<b>COC Number</b>		808542-01-01	808542-01-01		
<b>Units</b>	<b>TSMC-82180-(SPLP1312)</b>	<b>TSMC-82126-(SPLP1312)</b>	<b>RDL</b>	<b>QC Batch</b>	
<b>METALS</b>					
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					



BUREAU  
VERITAS

Lab BV Job #: C126013

Report Date: 2021/08/10

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

### 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
<b>CONVENTIONALS</b>								
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								



BUREAU  
VERITAS

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)

<b>Lab BV ID</b>		JE8471	JE8472		JE8474	JE8475		
<b>Sampling Date</b>		2021/05/18	2021/05/15		2021/05/18	2021/05/15		
<b>COC Number</b>		808542-01-01	808542-01-01		808542-01-01	808542-01-01		
	<b>Units</b>	<b>TSMC-82180</b>	<b>TSMC-82126</b>	<b>QC Batch</b>	<b>TSMC-82180-CTEU-9</b>	<b>TSMC-82126-CTEU-9</b>	<b>RDL</b>	<b>QC Batch</b>
% MOISTURE	%	4.4	0.5	N/A	N/A	N/A	N/A	N/A
<b>CONVENTIONALS</b>								
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								

<b>Lab BV ID</b>		JE8477	JE8478			
<b>Sampling Date</b>		2021/05/18	2021/05/15			
<b>COC Number</b>		808542-01-01	808542-01-01			
	<b>Units</b>	<b>TSMC-82180-(SPLP1312)</b>	<b>TSMC-82126-(SPLP1312)</b>	<b>RDL</b>	<b>QC Batch</b>	
<b>CONVENTIONALS</b>						
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						



BUREAU  
VERITAS

Lab BV Job #: C126013

Report Date: 2021/08/10

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

**TCLP-EPA 1311 (SOIL)**

<b>Lab BV ID</b>		JE8471	JE8472	
<b>Sampling Date</b>		2021/05/18	2021/05/15	
<b>COC Number</b>		808542-01-01	808542-01-01	
	<b>Units</b>	<b>TSMC-82180</b>	<b>TSMC-82126</b>	<b>QC Batch</b>
% MOISTURE	%	4.4	0.5	N/A
<b>Leachates</b>				
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				



BUREAU  
VERITAS

Lab BV Job #: C126013

Report Date: 2021/08/10

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

**SPLP-EPA 1312 (SOIL)**

<b>Lab BV ID</b>		JE8477	JE8478	
<b>Sampling Date</b>		2021/05/18	2021/05/15	
<b>COC Number</b>		808542-01-01	808542-01-01	
	<b>Units</b>	<b>TSMC-82180-(SPLP1312)</b>	<b>TSMC-82126-(SPLP1312)</b>	<b>QC Batch</b>
<b>Leachates</b>				
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				



BUREAU  
VERITAS

Lab BV Job #: C126013

Report Date: 2021/08/10

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

### 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
<b>Leachates</b>				
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				



BUREAU  
VERITAS

Lab BV Job #: C126013

Report Date: 2021/08/10

TATA STEEL MINERALS CANADA

Client Project #: GOODWOOD-ARD

Your P.O. #: 3000000997

## 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.**

BUREAU  
VERITAS

Lab BV Job #: C126013

Report Date: 2021/08/10

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

BUREAU  
VERITAS

Lab BV Job #: C126013

Report Date: 2021/08/10

TATA STEEL MINERALS CANADA

Client Project #: GOODWOOD-ARD

Your P.O. #: 3000000997

## QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2195496	DZE	Spiked Blank	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,		ug/L
					RDL=3.0		
			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
			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,		ug/L
					RDL=3.0		
			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



BUREAU  
VERITAS

Lab BV Job #: C126013

Report Date: 2021/08/10

TATA STEEL MINERALS CANADA

Client Project #: GOODWOOD-ARD

Your P.O. #: 3000000997

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2195498	DZE	Spiked Blank	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
			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
2195509	TGU	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/06/09	<0.20		mg/L
2195510	SBD	LEACH. BLANK	Nitrites (N-NO2-)	2021/06/09		108	%
2195510	SBD	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/06/09		107	%
2195510	SBD	LEACH. BLANK	Fluoride (F)	2021/06/10	<1.0		mg/L
2195514	TGU	Spiked Blank	Fluoride (F)	2021/06/10		111	%
2195514	TGU	LEACH. BLANK	Nitrites (N-NO2-)	2021/06/10	<0.20		mg/L
2195514	TGU	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/06/10	<0.20		mg/L
2195514	TGU	Method Blank	Nitrites (N-NO2-)	2021/06/10		99	%
2195514	TGU	Method Blank	Nitrate (N) and Nitrite(N)	2021/06/10		96	%
2200110	SMD	Method Blank	pH Deionized water	2021/06/29	5.64		n/a
2202498	AT7	LEACH. BLANK	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
			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

BUREAU  
VERITAS

Lab BV Job #: C126013

Report Date: 2021/08/10

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

## QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2202498	AT7	Spiked Blank	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
			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	%
2202570	VPA	LEACH. BLANK	Lead (Pb)	2021/06/30		94	%
			Selenium (Se)	2021/06/30		95	%
			Uranium (U)	2021/06/30		98	%
			Zinc (Zn)	2021/06/30		96	%
			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-NO <sub>2</sub> -)	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-NO <sub>2</sub> -)	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.



BUREAU  
VERITAS

Lab BV Job #: C126013

Report Date: 2021/08/10

TATA STEEL MINERALS CANADA  
Client Project #: GOODWOOD-ARD  
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



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



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



Michelina Cinquino, Analyst II



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.



BUREAU  
VERITAS

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.

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



BUREAU  
VERITAS

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

=====

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.

BUREAU  
VERITAS

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
<b>METALS</b>											
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

BUREAU  
VERITAS

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 Lab-Dup	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
<b>METALS</b>									
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.



BUREAU  
VERITAS

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

BUREAU  
VERITAS

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
<b>METALS</b>									
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

BUREAU  
VERITAS

Lab BV Job #: C135683

Report Date: 2021/10/04

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: GOODWOOD

**METALS-LAB LEACHATE (SOIL)**

<b>Lab BV ID</b>		JJ9766	JJ9767		JJ9768	
<b>Sampling Date</b>		2021/07/04	2021/07/04		2021/07/04	
<b>COC Number</b>		N-A	N-A		N-A	
<b>Units</b>	<b>TSMC-83285-CTEU-9</b>	<b>TSMC-83284-CTEU-9</b>	<b>QC Batch</b>	<b>TSMC-83076-(SPLP1312)</b>	<b>RDL</b>	<b>QC Batch</b>

**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

BUREAU  
VERITAS

Lab BV Job #: C135683

Report Date: 2021/10/04

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: GOODWOOD

**METALS-LAB LEACHATE (SOIL)**

<b>Lab BV ID</b>		JJ9769		JJ9770		
<b>Sampling Date</b>		2021/07/04		2021/07/04		
<b>COC Number</b>		N-A		N-A		
	<b>Units</b>	<b>TSMC-83285-(SPLP1312)</b>	<b>QC Batch</b>	<b>TSMC-83284-(SPLP1312)</b>	<b>RDL</b>	<b>QC Batch</b>

**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



BUREAU  
VERITAS

Lab BV Job #: C135683

Report Date: 2021/10/04

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
<b>CONVENTIONALS</b>											
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

BUREAU  
VERITAS

Lab BV Job #: C135683

Report Date: 2021/10/04

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: GOODWOOD

## 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
<b>CONVENTIONALS</b>								
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
<b>CONVENTIONALS</b>								
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
<b>CONVENTIONALS</b>								
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								



BUREAU  
VERITAS

Lab BV Job #: C135683

Report Date: 2021/10/04

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: GOODWOOD

### 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



BUREAU  
VERITAS

Lab BV Job #: C135683

Report Date: 2021/10/04

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: GOODWOOD

### 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
<b>Leachates</b>							
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							



BUREAU  
VERITAS

Lab BV Job #: C135683

Report Date: 2021/10/04

TATA STEEL MINERALS CANADA

Client Project #: ARD

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



BUREAU  
VERITAS

Lab BV Job #: C135683

Report Date: 2021/10/04

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: GOODWOOD

### WATER LEACHATE-CTEU-9 (SOIL)

<b>Lab BV ID</b>		JJ9687	JJ9688	JJ9765	JJ9766	
<b>Sampling Date</b>		2021/07/04	2021/07/04	2021/07/04	2021/07/04	
<b>COC Number</b>		N-A	N-A	N-A	N-A	
	<b>Units</b>	<b>TSMC-83077-CTEU-9</b>	<b>TSMC-83075-CTEU-9</b>	<b>TSMC-83076-CTEU-9</b>	<b>TSMC-83285-CTEU-9</b>	<b>QC Batch</b>

#### 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

<b>Lab BV ID</b>		JJ9767	
<b>Sampling Date</b>		2021/07/04	
<b>COC Number</b>		N-A	
	<b>Units</b>	<b>TSMC-83284-CTEU-9</b>	<b>QC Batch</b>

#### 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



BUREAU  
VERITAS

Lab BV Job #: C135683

Report Date: 2021/10/04

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: GOODWOOD

## 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.**

BUREAU  
VERITAS

Lab BV Job #: C135683

Report Date: 2021/10/04

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: GOODWOOD

## 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
			Silver (Ag)	2021/07/26		104	%
			Arsenic (As)	2021/07/26		106	%
2211834	CRI	Spiked Blank	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

BUREAU  
VERITAS

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
2211879	ST5	LEACH. BLANK	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
			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
2211879	ST5	Spiked Blank	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
			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

BUREAU  
VERITAS

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
2211901	AT7	Spiked Blank	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,		ug/L
					RDL=3.0		
			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
			Silver (Ag)	2021/08/01	95	%	
			Arsenic (As)	2021/08/01	96	%	
			Barium (Ba)	2021/08/01	84	%	
			Boron (B)	2021/08/01	106	%	
2211915	YAZ	LEACH. BLANK	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	Spiked 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

BUREAU  
VERITAS

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
2212666	AT7	Spiked Blank	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
			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



BUREAU  
VERITAS

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
2212914	AT7	Spiked Blank	Uranium (U)	2021/08/01	<0.60		ug/L
			Zinc (Zn)	2021/08/01	<5.0		ug/L
			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



BUREAU  
VERITAS

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

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

### VALIDATION SIGNATURE PAGE

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



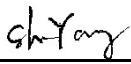
Frederic Arnaud, B.Sc., Chemist, Montreal, Scientific Service Specialist



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

---

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.



BUREAU  
VERITAS

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



BUREAU  
VERITAS

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. 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 - 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

=====

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.

BUREAU  
VERITAS

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
<b>METALS</b>							
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



BUREAU  
VERITAS

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
<b>METALS</b>				
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



BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

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
<b>CONVENTIONALS</b>							
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



BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

Your P.O. #: 3000000997

### CONVENTIONAL PARAMETERS-LAB LEACHATE (ROCK)

Lab BV ID		JS3043		
Sampling Date		2021/09/10		
	Units	TSMC-78147	RDL	QC Batch
<b>CONVENTIONALS</b>				
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				



BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

Your P.O. #: 3000000997

**TCLP-EPA 1311 (ROCK)**

<b>Lab BV ID</b>		JS3043	
<b>Sampling Date</b>		2021/09/10	
	<b>Units</b>	<b>TSMC-78147</b>	<b>QC Batch</b>
<b>Leachates</b>			
Weight of sample (g)			
pH of pre-test	n/a	20.1	2234067
pH end of leaching	n/a	<1.68	2234067
Volume extracting fluid 1 (ml)	n/a	4.90	2234067
Volume extracting fluid 2 (ml)			
QC Batch = Quality Control Batch			

BUREAU  
VERITAS

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 (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
<b>METALS</b>									
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

BUREAU  
VERITAS

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 (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
<b>METALS</b>							
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



BUREAU  
VERITAS

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 (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
<b>METALS</b>								
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

BUREAU  
VERITAS

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 (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



BUREAU  
VERITAS

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 (SOIL)

<b>Lab BV ID</b>		JS3057		
<b>Sampling Date</b>		2021/09/10		
	<b>Units</b>	<b>TSMC-84553-(SPLP1312)</b>	<b>RDL</b>	<b>QC Batch</b>
<b>METALS</b>				
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				



BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

Your P.O. #: 3000000997

### 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



BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

Your P.O. #: 3000000997

### 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
<b>CONVENTIONALS</b>							
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
<b>CONVENTIONALS</b>								
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
<b>CONVENTIONALS</b>							
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
<b>CONVENTIONALS</b>				
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				



BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

Your P.O. #: 3000000997

**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
<b>Leachates</b>					
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					



BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

Your P.O. #: 3000000997

### SPLP-EPA 1312 (SOIL)

<b>Lab BV ID</b>		JS3048	JS3049	JS3056	
<b>Sampling Date</b>		2021/09/10	2021/09/10	2021/09/10	
<b>Units</b>		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

<b>Lab BV ID</b>		JS3057	
<b>Sampling Date</b>		2021/09/10	
<b>Units</b>		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



BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

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



BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

Your P.O. #: 3000000997

## 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 linearité.

**Results relate only to the items tested.**

**BUREAU  
VERITAS**

Lab BV Job #: C150724

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	n/a
			Volume extracting fluid 1 (ml)	2021/09/28	400		
2234107	SMD	Method Blank	Volume of extracting fluid (mL)	2021/09/28	500	n/a	n/a
			pH after 18 hours leaching	2021/09/28	4.17		
2234493	AT7	Spiked Blank	pH of extracting fluid	2021/09/28	4.17	n/a	n/a
			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	mg/kg
			Arsenic (As)	2021/09/30	<2.0		
			Barium (Ba)	2021/09/30	<4.0		
			Boron (B)	2021/09/30	<2.0		
			Cadmium (Cd)	2021/09/30	<0.10		
			Chromium (Cr)	2021/09/30	<1.0		
			Copper (Cu)	2021/09/30	<1.0		
			Cobalt (Co)	2021/09/30	<1.0		
			Tin (Sn)	2021/09/30	<1.0		
			Iron (Fe)	2021/09/30	<10		
			Manganese (Mn)	2021/09/30	<2.0		
			Molybdenum (Mo)	2021/09/30	<0.50		
			Nickel (Ni)	2021/09/30	<0.50		
			Mercury (Hg)	2021/09/30	<0.010		
			Lead (Pb)	2021/09/30	<1.0		
			Selenium (Se)	2021/09/30	<0.50		
			Uranium (U)	2021/09/30	<2.0		
			Zinc (Zn)	2021/09/30	<5.0		
2234616	MEM	LEACH. BLANK	Silver (Ag)	2021/09/29	<0.30	ug/L	ug/L
			Arsenic (As)	2021/09/29	<2.0		
			Barium (Ba)	2021/09/29	<5.0		
			Boron (B)	2021/09/29	<50		
			Cadmium (Cd)	2021/09/29	<1.0		
			Chromium (Cr)	2021/09/29	<7.0		
			Cobalt (Co)	2021/09/29	<10		
			Copper (Cu)	2021/09/29	13, RDL=3.0		
			Tin (Sn)	2021/09/29	<50		

BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

Your P.O. #: 3000000997

## QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2234616	MEM	Spiked Blank	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
			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,		ug/L
					RDL=50		
			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,		ug/L
					RDL=3.0		
			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	%

BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

Your P.O. #: 3000000997

## 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	

BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

Your P.O. #: 3000000997

## QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2237970	ZEO	Spiked Blank	Uranium (U)	2021/10/07	<0.60		ug/L
			Zinc (Zn)	2021/10/07	<5.0		ug/L
			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	%
2238114	NDA	LEACH. BLANK	Selenium (Se)	2021/10/07		101	%
			Uranium (U)	2021/10/07		99	%
			Zinc (Zn)	2021/10/07		100	%
			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



BUREAU  
VERITAS

Lab BV Job #: C150724

Report Date: 2021/12/29

TATA STEEL MINERALS CANADA

Client Project #: ARD

Site Location: DS04

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.



BUREAU  
VERITAS

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.

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.



BUREAU  
VERITAS

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

=====

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.



BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

### TOTAL EXTRACTABLE METALS (SOIL)

<b>Bureau Veritas ID</b>					JW4979		
<b>Sampling Date</b>					2021/10/26		
<b>COC Number</b>					N-A		
	<b>Units</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>TSMC-90125</b>	<b>RDL</b>	<b>QC Batch</b>
<b>METALS</b>							
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							



BUREAU  
VERITAS

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



BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

### 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
<b>CONVENTIONALS</b>							
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							



BUREAU  
VERITAS

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



BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

### TCLP-EPA 1311 (SOIL)

Bureau Veritas ID		JW4979	
Sampling Date		2021/10/26	
COC Number		N-A	
	Units	TSMC-90125	QC Batch
<b>Leachates</b>			
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			



BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

### SPLP-EPA 1312 (SOIL)

<b>Bureau Veritas ID</b>	JW4985		
<b>Sampling Date</b>	2021/10/26		
<b>COC Number</b>	N-A		
	<b>Units</b>	<b>TSMC-90125-(SPLP1312)</b>	<b>QC Batch</b>
<b>Leachates</b>			
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			



BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

### 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
<b>Leachates</b>			
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			



BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

## 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 linearité.

**Results relate only to the items tested.**



BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

## 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	n/a
			Volume extracting fluid 1 (ml)	2021/11/04	400		
2247689	SMD	Method Blank	Volume of extracting fluid (mL)	2021/11/04	500	n/a	n/a
			pH after 18 hours leaching	2021/11/04	4.19		
2247874	JF1	Spiked Blank	pH of extracting fluid	2021/11/04	4.17	n/a	n/a
			Silver (Ag)	2021/11/05	95		%
2247874	JF1	Spiked Blank	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	mg/kg
			Arsenic (As)	2021/11/05	<2.0		
			Barium (Ba)	2021/11/05	<4.0		
			Boron (B)	2021/11/05	<2.0		
			Cadmium (Cd)	2021/11/05	<0.10		
			Chromium (Cr)	2021/11/05	<1.0		
			Copper (Cu)	2021/11/05	<1.0		
			Cobalt (Co)	2021/11/05	<1.0		
			Tin (Sn)	2021/11/05	<1.0		
			Iron (Fe)	2021/11/05	<10		
			Manganese (Mn)	2021/11/05	<2.0		
			Molybdenum (Mo)	2021/11/05	<0.50		
			Nickel (Ni)	2021/11/05	<0.50		
			Mercury (Hg)	2021/11/05	<0.010		
			Lead (Pb)	2021/11/05	<1.0		
			Selenium (Se)	2021/11/05	<0.50		
			Uranium (U)	2021/11/05	<2.0		
			Zinc (Zn)	2021/11/05	<5.0		
2248627	NET	LEACH. BLANK	Silver (Ag)	2021/11/07	<0.30	ug/L	ug/L
			Arsenic (As)	2021/11/07	<2.0		
			Barium (Ba)	2021/11/07	<5.0		
			Boron (B)	2021/11/07	<50		
			Cadmium (Cd)	2021/11/07	<1.0		
			Chromium (Cr)	2021/11/07	<7.0		
			Cobalt (Co)	2021/11/07	<10		
			Copper (Cu)	2021/11/07	<3.0		
			Tin (Sn)	2021/11/07	<50		
			Iron (Fe)	2021/11/07	<100		
			Manganese (Mn)	2021/11/07	<3.0		

BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

## QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2248627	NET	Spiked Blank	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
			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
			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	%
2248630	NET	Spiked Blank	Silver (Ag)	2021/11/06			
			Arsenic (As)	2021/11/06			
			Barium (Ba)	2021/11/06			
			Boron (B)	2021/11/06			
			Cadmium (Cd)	2021/11/06			
			Chromium (Cr)	2021/11/06			
			Cobalt (Co)	2021/11/06			
			Copper (Cu)	2021/11/06			



BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

### 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
2248661			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	%	
2248661			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
2249129	SNA	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/11/06	<0.20		mg/L
2251138	SMD	Method Blank	Nitrites (N-NO2-)	2021/11/06	92	%	
2251138			Nitrate (N) and Nitrite(N)	2021/11/06	98	%	
2251138			pH Deionized water	2021/11/18	5.46		n/a
2251138			Date extraction fluid added	2021/11/18	2021/11/11		n/a
2251138			Date leaching terminated	2021/11/18	2021/11/18		n/a
2251138			Volume of extracting fluid (mL)	2021/11/18	160		n/a
2251138			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	%	
2251645			Nitrites (N-NO2-)	2021/11/12	98	%	
2251645	RHT	Method Blank	Nitrate (N) and Nitrite(N)	2021/11/12	95	%	
2251645			Nitrates (N-NO3-)	2021/11/12	<1.0		mg/kg
2251645			Nitrites (N-NO2-)	2021/11/12	<0.20		mg/kg
2251645			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
2254755	RHT	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/11/20	<0.20		mg/L
2254755			Nitrites (N-NO2-)	2021/11/20	98	%	
2254755			Nitrate (N) and Nitrite(N)	2021/11/20	96	%	
2254808	VFT	LEACH. BLANK	Silver (Ag)	2021/11/21	<0.30		ug/L
2254808			Arsenic (As)	2021/11/21	<2.0		ug/L
2254808			Barium (Ba)	2021/11/21	<5.0		ug/L
2254808			Boron (B)	2021/11/21	<50		ug/L
2254808			Cadmium (Cd)	2021/11/21	<1.0		ug/L
2254808			Chromium (Cr)	2021/11/21	<7.0		ug/L
2254808			Cobalt (Co)	2021/11/21	<10		ug/L
2254808			Copper (Cu)	2021/11/21	<3.0		ug/L
2254808			Tin (Sn)	2021/11/21	<50		ug/L
2254808			Iron (Fe)	2021/11/21	<100		ug/L
2254808			Manganese (Mn)	2021/11/21	<3.0		ug/L

BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

## QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2254808	VFT	Spiked Blank	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
			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



BUREAU  
VERITAS

Bureau Veritas Job #: C158457

Report Date: 2022/02/16

TATA STEEL MINERALS CANADA

Client Project #: ARD

Your P.O. #: 3000000997

### VALIDATION SIGNATURE PAGE

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

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

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

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

---

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.

## **Annexe XIII. Rapport d'analyse de la stabilité - WSP**





## NOTE TECHNIQUE

---

<b>CLIENT :</b>	Tata Steel Minerals Canada Ltd.	
<b>PROJET :</b>	Halde à stériles de Goodwood, Québec	<b>Réf. WSP :</b> 181-04013-93_NT-01-FR
<b>OBJET :</b>	Mise à jour de l'évaluation de la stabilité	<b>DATE :</b> 28 juillet 2021
<b>DESTINATAIRE :</b> 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).

**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		
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 <sup>(a)</sup>	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.

#### PRÉPARÉ PAR

*Version originale anglaise signée par :*

Hamed Hosseini, M. Ing.  
Spécialiste en mécanique des roches

*Version originale anglaise signée par :*

Darlene Nelson, B. Sc. P.Eng. (ON)  
Ingénierie principale en mécanique des roches

#### VÉRIFIÉ PAR

---

Jean-Sébastien Houle, ing. (No 129263)  
Chef d'équipe, mécanique des roches

CB/JSH/cg

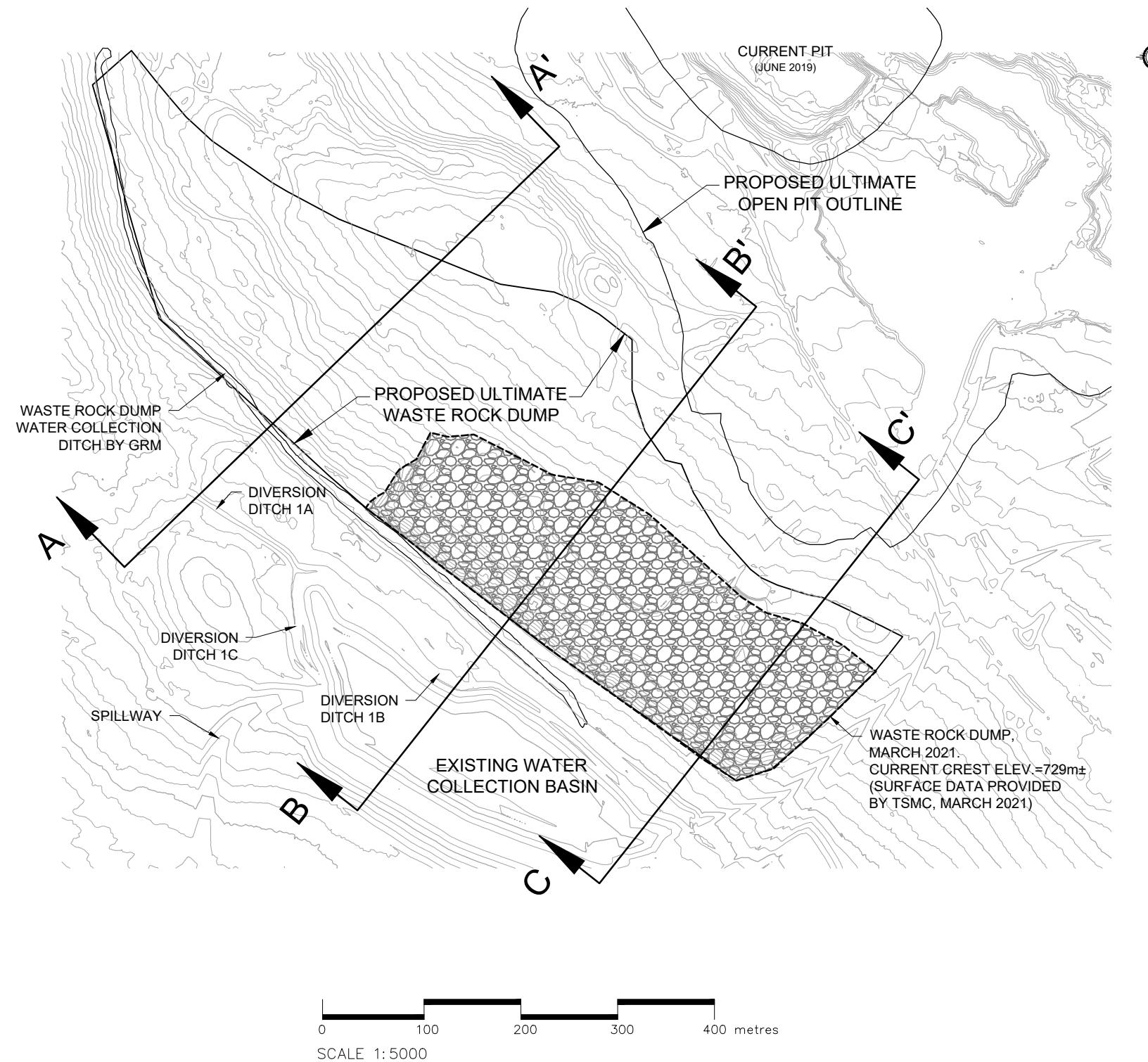
## RÉFÉRENCES

- 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, n° de réf. 181-04013-91-MEM-01-R0, 5 p. + annexes.



## **ANNEXE A**

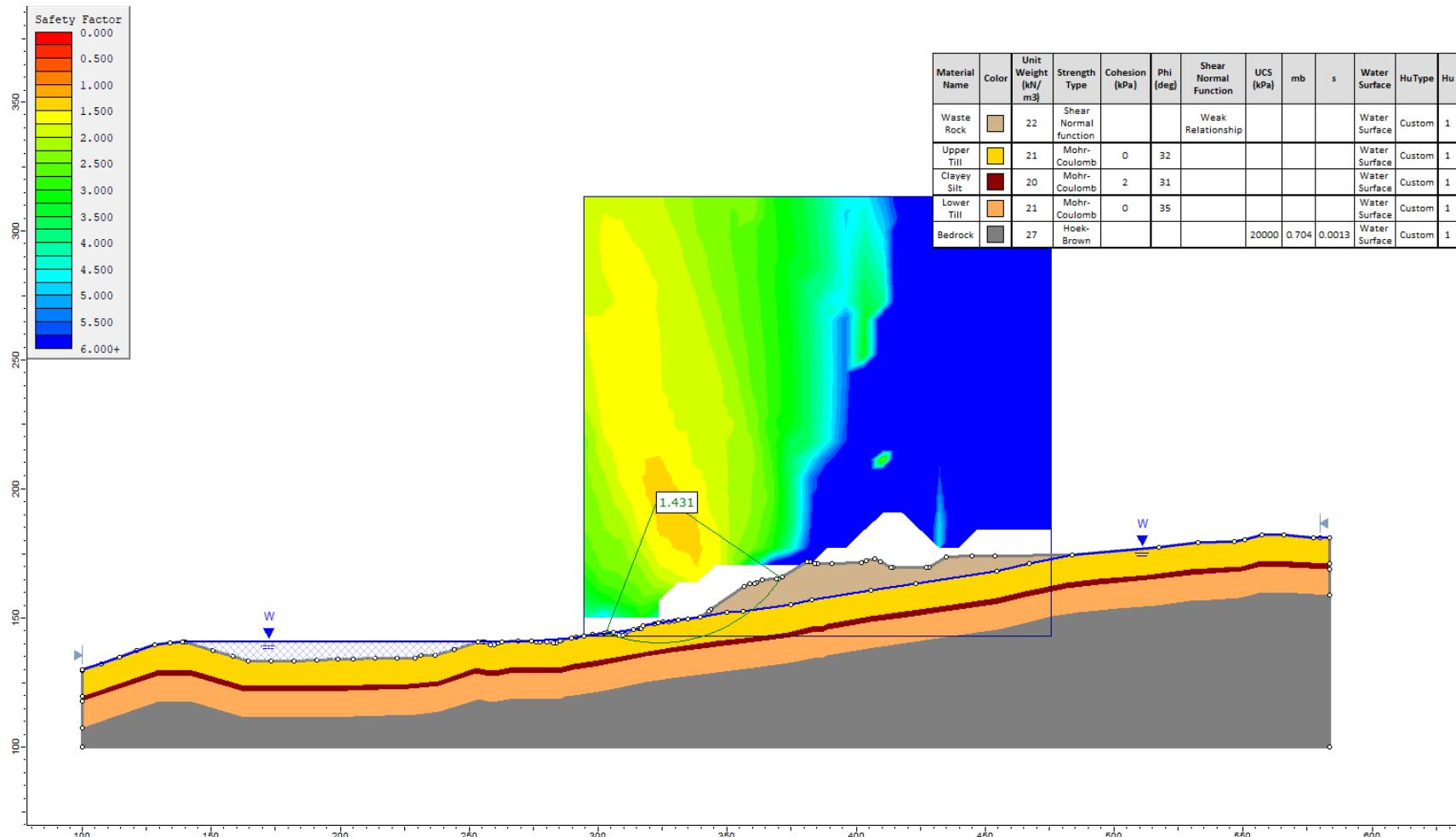
**Figures (anglais seulement)**





## **ANNEXE B**

**Analyses en équilibre limite – Slide2® (anglais seulement)**



### 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



Goodwood Site, Quebec

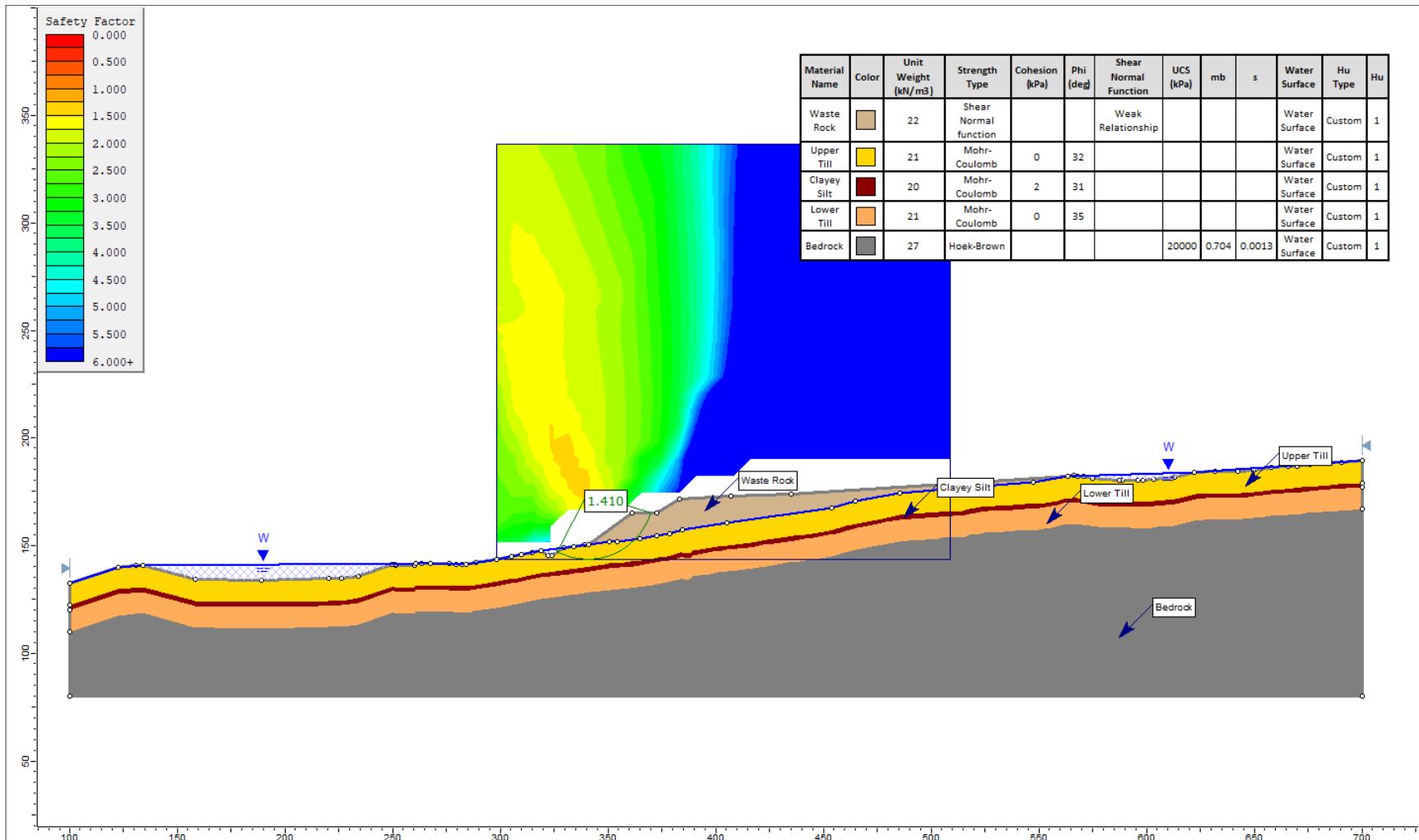
Waste Rock Dump Stability Assessment

Date: April 14, 2021

FIGURE 13

Project No.: 181-04013-92

Ref. No.: 0



#### 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.



Goodwood Site, Quebec

Waste Rock Dump Stability Assessment

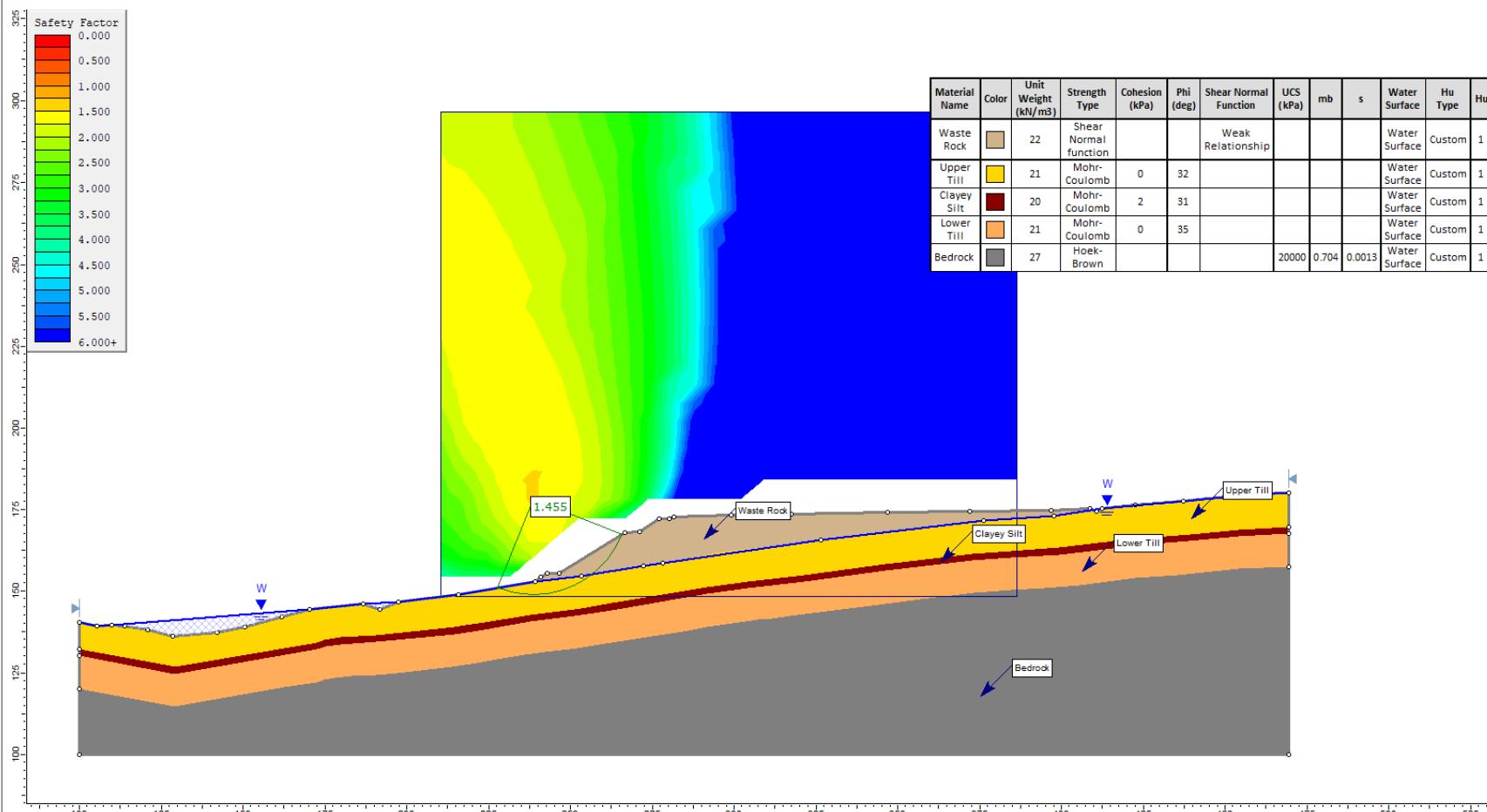
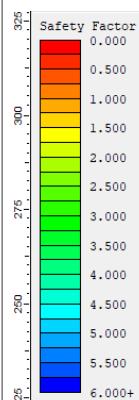
Date: April 14, 2021

FIGURE 14

Project No.:  
181-04013-92

Ref. No.:  
0

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



### 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



Goodwood Site, Quebec

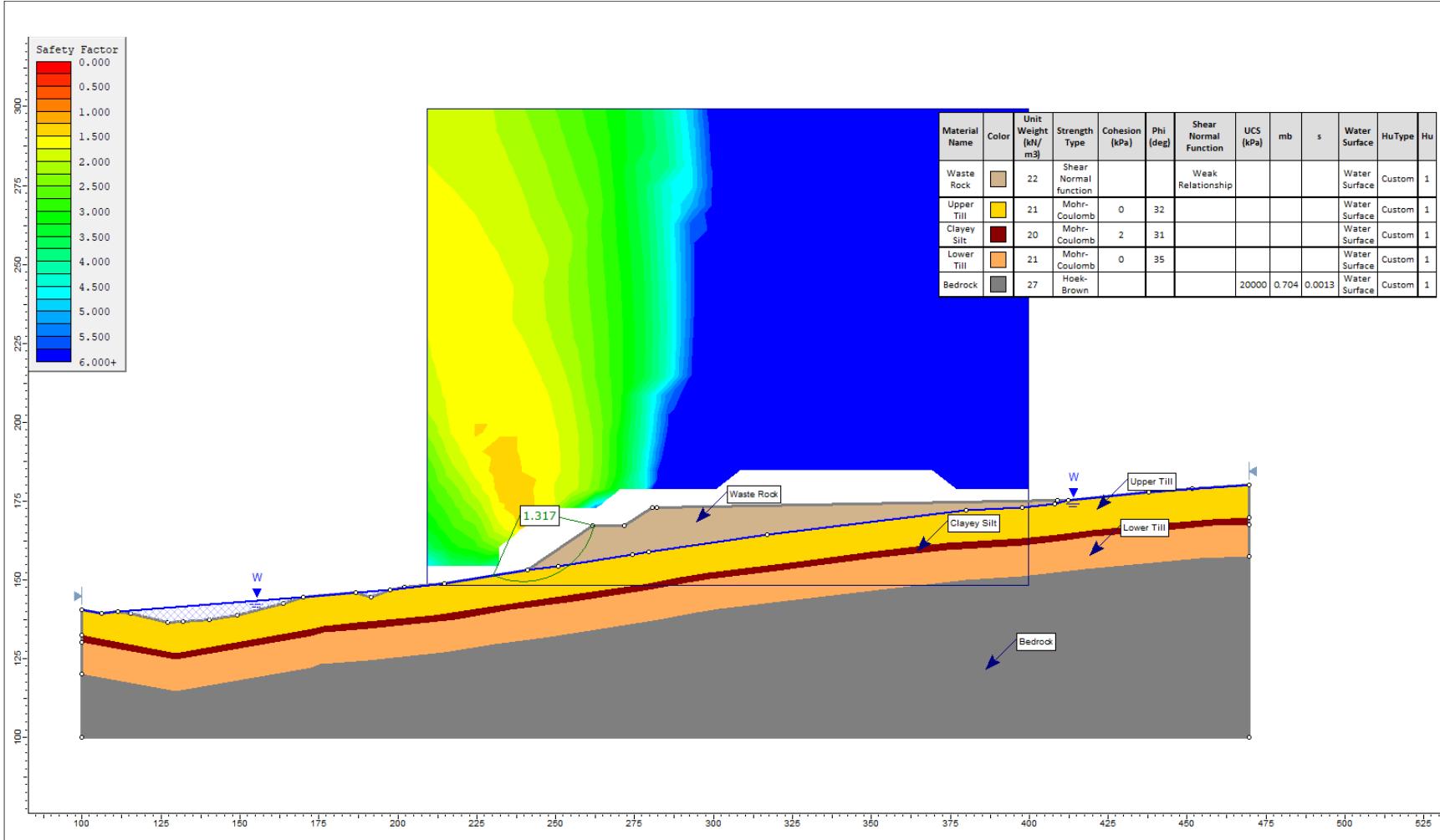
Waste Rock Dump Stability Assessment

Date: April 14, 2021

FIGURE 15

Project No.: 181-04013-92

Ref. No.: 0



#### 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



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

**Table 1:** Input Parameters

**Table 2:** Acceptance Criteria

**Table 3:** Seismic Parameters

**Table 4:** Surface Profile

**Table 5:** Input Parameters

**Table 6:** Limited Equilibrium Numerical Modelling Results

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
Rev:	0

**Table 2 - Factor of Safety Acceptance Criteria Values for Waste Rock Dumps and Stockpiles (after Hawley and Cunning, 2017)**

Consequence <sup>1,3</sup>	Confidence <sup>2,3</sup>	Static Analysis		Pseudo-Static Analysis	Maximum Allowable Strain <sup>4</sup>
		Minimum FoS	Maximum PoF <sup>4</sup>		
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 mechanism(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 express 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.

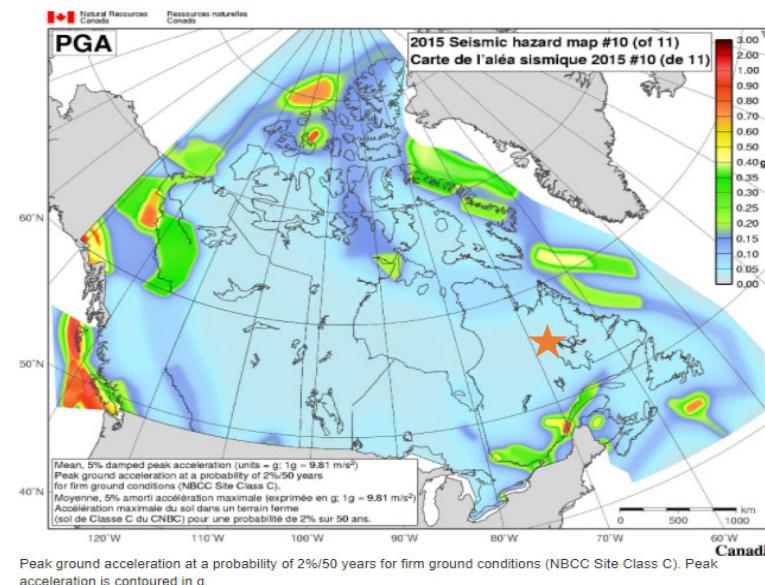
Client:	Tata Steel Minerals Canada
Project:	Goodwood, Quebec
Project No:	181-04013-92
Title:	Waste Rock Dump Stability Assessment
Level of Study:	Feasibility Study
Date:	2021-04-14
Rev:	0

**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>



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 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
Level of Study:	Feasibility Study
Date:	14-Apr-21
Rev:	0

**Table 5 - Input Parameters for Waste Dump Stability**

Material	$g_b$ <sup>(a,b)</sup> (Bulk Unit Weight) (kN/m <sup>3</sup> )	$f$ <sup>(a,b)</sup> (Friction Angle) (degrees)	$c'$ <sup>(a,b)</sup> (Cohesion) (kPa)	Thickness (m) <sup>(c)</sup>	
				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/m<sup>3</sup>, 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
Date:	14-Apr-21
Rev:	0

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	y <sub>b</sub> (kN/m <sup>3</sup> )	21	20	21	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.
			Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb				
			φ' (°)	32	31	35				
			c' (kPa)	0	2	0				
14	LOM to Existing Elevation (March, 2021) Section B-B' Sarma Method Surface type: Circular Search: Grid Search Seismic load: none	22.4	Average Thickness (m)	10.3	2.1	10	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.	
			y <sub>b</sub> (kN/m <sup>3</sup> )	21	20	21				
			Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb				
			φ' (°)	32	31	35				
15	Existing (March, 2021) Section C-C' Sarma Method Surface type: Circular Search: Grid Search Seismic load: none	22.4	c' (kPa)	0	2	0	1.46		Failure predicted at the slope of the first lift through the Upper Till layer and exits 11.5 m from the Toe.	
			Average Thickness (m)	10.3	2.1	10				
			y <sub>b</sub> (kN/m <sup>3</sup> )	21	20	21				
			Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb				
16	LOM to Existing Elevation (March, 2021) Section C-C' Sarma Method Surface type: Circular Search: Grid Search Seismic load: none	22.4	φ' (°)	32	31	35	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.	
			c' (kPa)	0	2	0				
			Average Thickness (m)	10.3	2.1	10				

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/m <sup>3</sup> , 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/m <sup>3</sup> 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.

## **Annexe XIV. Rapport de surveillance géotechnique - WSP**



<b>WSP</b>		<b>RAPPORT D'INSPECTION</b>		<b>Révision 00</b>		
<b>Client :</b>	Tata Steel Mineral Canada Ltd. (TSMC)	<b>Réf. Client :</b>	s.o.			
<b>Site :</b>	Goodwood, Québec, Canada	<b>Réf. WSP :</b>	181-04013-94			
<b>Projet :</b>	Inspection géotechnique 2021	<b>Météo :</b>	cf. section «Activité(s)»			
<b>Inspecteur.trice :</b>	Louise Chaput, ing. (OIQ, n°. 109191)	<b>Date de l'inspection :</b>	2021-06-24, 26 et 27			
<b>Chargé.e de projet :</b>	Carl Gauthier, ing. (OIQ n°. 111186)	<b>Date du rapport :</b>	2022-03-31			
<b>Ressource</b>	<b>Compagnie</b>	<b>Commentaires</b>				
Jean-François Dion (JFD)	TSMC	Guide; référence; conducteur				
Louise Chaput, ing. (LC)	WSP	Inspectrice				
Mariana Trindade, PhD (MT)	TSMC	Gestionnaire des questions environnementales				
<b>Date; heure</b>	<b>Activité(s)</b>					
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.					
<b>Limitations :</b>	<b>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.</b>					
<b>Secteur</b>	<b>Observations principales / préoccupations / commentaires</b>			<b>Photo n°</b>		
Bassin de sédimentation	<b>Intérieur du bassin :</b> - 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 <b>Préoccupation : faible.</b>					
	<b>Digue sud :</b> la superficie de la membrane découverte sur la pente amont (interne) a triplé depuis l'été 2018. <b>Préoccupation : modérée</b>					
	<b>Digue sud :</b> une nouvelle dépression est observée sur la partie interne de la crête, près du déversoir d'urgence. <b>Préoccupation : modérée.</b>					
	<b>Digue sud :</b> 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. <b>Préoccupation : modérée.</b>					
	<b>Digue médiane :</b> Dépression dans le centre de la digue, probablement causé par un tassement du matériel constitutif du cœur de la digue. <b>Préoccupation : faible.</b>					
	<b>Général :</b> 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. <b>Préoccupation : modérée</b>					
	<b>Pied de la halde, secteur est :</b> - Résurgence causant un début d'érosion. - Érosion de surface entre ces résurgences et le fossé menant au bassin de sédimentation <b>Préoccupation : faible.</b>					
Halde à stériles						

WSP		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)	<p>Talus Sud, portion est :</p> <ul style="list-style-type: none"> <li>- Plusieurs décrochements de surface visibles;</li> <li>- 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.</li> </ul> <p>Préoccupation : faible.</p>			11 et 12
	<p><b>Talus ouest</b> : 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.</p> <p><b>Préoccupation : faible.</b></p>			13
	<p><b>Sommet (plateau) de la halde</b> :</p> <ul style="list-style-type: none"> <li>- Aucune stratégie de drainage des eaux de surface.</li> <li>- Fissure de tassement à la suite l'assèchement visible.</li> <li>- Des renflements avec trous d'infiltration des eaux de surface sont visibles.</li> </ul> <p><b>Préoccupation : modérée.</b></p>			14 et 15
	<p><b>Crête</b> : des fissures de tensions provoquées par les décrochements de surface (voir observations ci-dessus) sont visibles à divers endroits.</p> <p><b>Préoccupation : faible.</b></p>			16
Fossés et ponceaux	<p><b>Fossé à l'est de la halde vers le bassin</b> : Trois zones où le géotextile de séparation est visible.</p> <p><b>Préoccupation : modérée.</b></p>			17
	<p>Fossé entre la halde et le bassin de sédimentation :</p> <ul style="list-style-type: none"> <li>- Géotextile de séparation visible à plusieurs endroits, dû au manque d'empierrement.</li> <li>- Trou d'infiltration d'eau de surface (renard), juste devant le fossé. Il est possible que l'eau s'infiltra sous le fossé.</li> </ul> <p>Préoccupation : modérée</p>			18 et 19
	<p><b>Ponceau à l'entrée de la halde</b> :</p> <ul style="list-style-type: none"> <li>- Fossé est bouché à l'est</li> <li>- Le côté ouest est brisé</li> </ul> <p><b>Préoccupation : modérée.</b></p>			20 et 21
Fosse à ciel ouvert	<p>Aucun mur final depuis l'an passé.</p> <p>Exploitation au même niveau que l'an passé (pas plus profond)</p>			s.o.
	<p>Présence de signe d'érosion autour de la fosse particulièrement le long du mur nord</p> <p><b>Préoccupation : faible.</b></p>			22 et 23
Halde à mort terrain	<p>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.</p> <p><b>Préoccupation : Modérée.</b></p>			s.o.
	<p>Présence de flaques d'eau aux abords de la Halde Nord.</p> <p><b>Préoccupation : faible.</b></p>			24
Secteur	Actions recommandées			Photo n°
Bassin de sédimentation	<p><b>Digue sud</b> : procéder aux travaux de réparation selon les plans et devis développés par WSP.</p>			2 à 6
	<p><b>Digue médiane (temporaire)</b> : pas de travaux de réparation à prévoir puisque cette digue sera démantelée dans le contexte des travaux de réparation.</p>			7
	<p><b>Général</b> : 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.</p>			8

WSP		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)			
Halde à stériles	<b>Résurgence et érosion en pied du talus sud :</b> Suivre l'évolution et aménager des entrées vers les fossés existants au besoin			
	<b>Talus sud et ouest :</b> - 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.			
Halde à stériles (suite)	<b>Sommet (plateau) :</b> Mettre en place une stratégie de drainage en éloignant l'eau des crêtes de talus et en minimisant les zones de flaue qui peuvent accentuer voire générer les enfoncements			
	<b>Général :</b> - 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 arpantage mensuel des zones actives et vérifier que la géométrie respecte de la conception			
Fossés et ponceaux	<b>Fossés en général :</b> réaliser un entretien au besoin en enlevant les sédiments accumulés et ajoutant de l'empierrement où le géotextile est visible.			
	<b>Fossés entre la halde à stériles et le bassin de sédimentation :</b> boucher le trou observé en amont du fossé entre la halde et le bassin de sédimentation et reprofilier le terrain lors de la période estivale de 2022			
	<b>Ponceaux :</b> réparer ou remplacer les ponceaux endommagés et dégager les fossés en amont et aval au besoin			
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.			
Halde à mort terrain	<b>Dans les zones inactives :</b> - Améliorer le niveling 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.			
	<b>Dans les zones actives :</b> - Remodeler/niveler le sommet (plateau) loin des talus (ex. : vers l'arrière/l'entrée).			

## 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

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

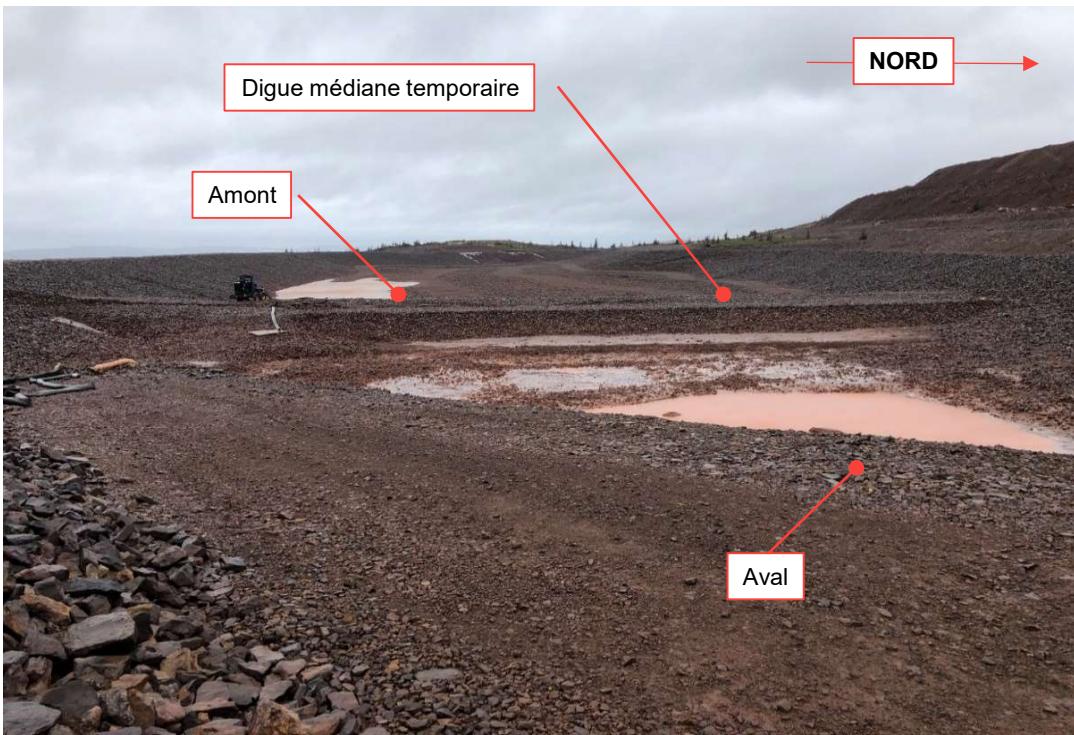


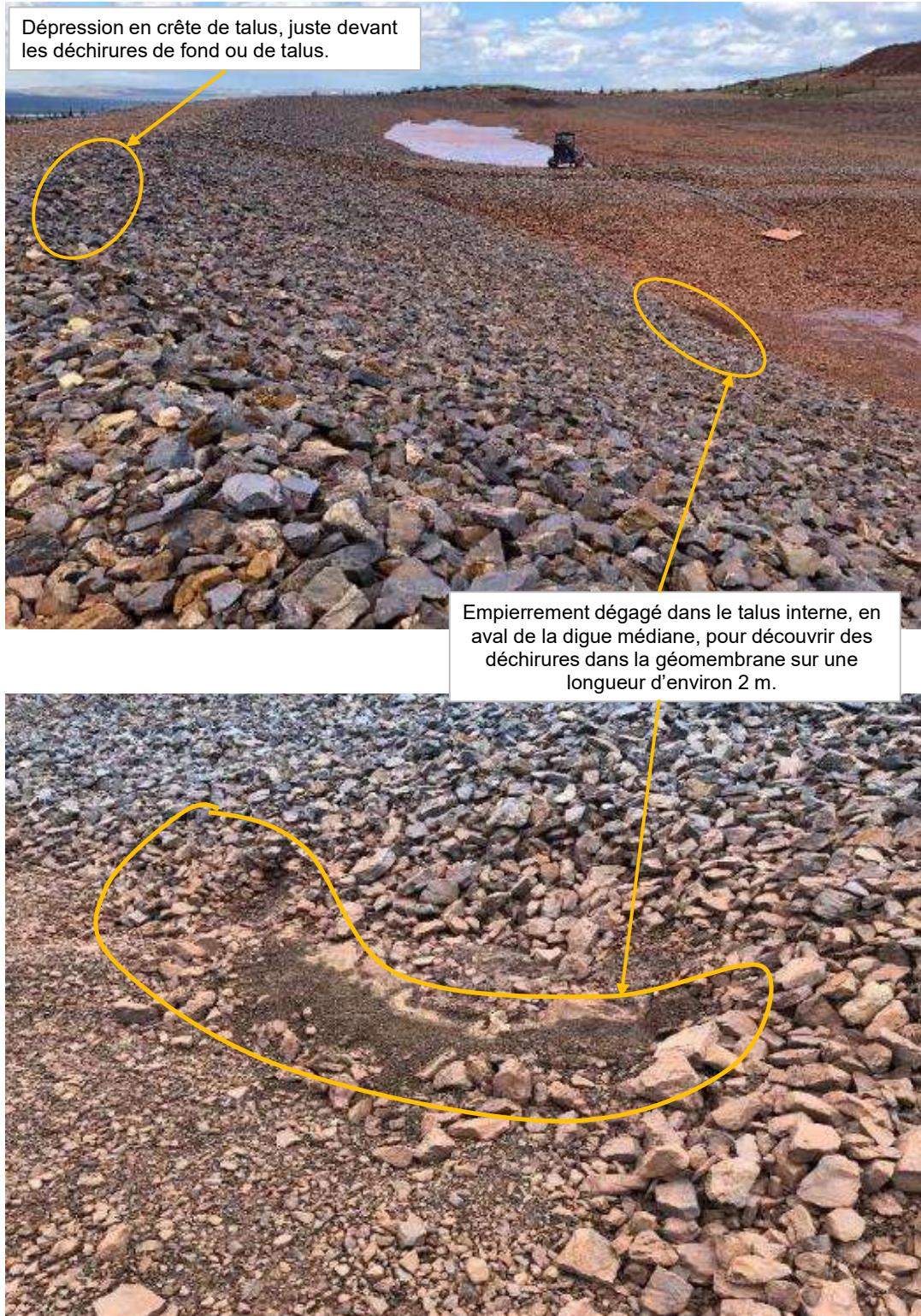
Photo 1 : Bassin de sédimentation, vue générale (vue vers l'ouest)



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

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 :	2 de 12



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

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

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 :	3 de 12



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

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

WSP	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 :	4 de 12



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

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

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 :	5 de 12



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.

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

<b>WSP</b>	<b>RAPPORT PHOTOGRAPHIQUE</b>		<b>Révision 00</b>
<b>Client :</b>	Tata Steel Mineral Canada Ltd. (TSMC)	<b>Réf. Client :</b>	s.o.
<b>Site :</b>	Goodwood, Québec, Canada	<b>Réf. WSP :</b>	181-04013-94
<b>Projet :</b>	Inspection géotechnique 2021		
<b>Inspecteur.trice :</b>	Louise Chaput, ing. (OIQ, n°. 109191)	<b>Date de l'inspection :</b>	2021-06-24, 26 et 27
<b>Chargé.e de projet :</b>	Carl Gauthier, ing. (OIQ n°. 111186)	<b>Date du rapport :</b>	6 de 12



**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**

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

<b>WSP</b>	<b>RAPPORT PHOTOGRAPHIQUE</b>		<b>Révision 00</b>
<b>Client :</b>	Tata Steel Mineral Canada Ltd. (TSMC)	<b>Réf. Client :</b>	s.o.
<b>Site :</b>	Goodwood, Québec, Canada	<b>Réf. WSP :</b>	181-04013-94
<b>Projet :</b>	Inspection géotechnique 2021		
<b>Inspecteur.trice :</b>	Louise Chaput, ing. (OIQ, n°. 109191)	<b>Date de l'inspection :</b>	2021-06-24, 26 et 27
<b>Chargé.e de projet :</b>	Carl Gauthier, ing. (OIQ n°. 111186)	<b>Date du rapport :</b>	7 de 12



**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), renforcements avec trous d'infiltration des eaux de surface**

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

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 :	8 de 12



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

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

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 :	9 de 12



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.

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

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 :	10 de 12



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



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

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

<b>WSP</b>	<b>RAPPORT PHOTOGRAPHIQUE</b>		<b>Révision 00</b>
<b>Client :</b>	Tata Steel Mineral Canada Ltd. (TSMC)	<b>Réf. Client :</b>	s.o.
<b>Site :</b>	Goodwood, Québec, Canada	<b>Réf. WSP :</b>	181-04013-94
<b>Projet :</b>	Inspection géotechnique 2021		
<b>Inspecteur.trice :</b>	Louise Chaput, ing. (OIQ, n°. 109191)	<b>Date de l'inspection :</b>	2021-06-24, 26 et 27
<b>Chargé.e de projet :</b>	Carl Gauthier, ing. (OIQ n°. 111186)	<b>Date du rapport :</b>	11 de 12



**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**

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

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



**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**

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

## **Annexe XV. Avis à la population – COVID-19**

# 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 etappelez 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 3<sup>e</sup> 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