


Notice of Alteration Form



Client File No. : 1906.20	Environment Act Licence No. : 973
Legal name of the Licencee: Tantalum Mining Corporation of Canada Limited	
Name of the development: CPF Containment Cell #1 Activation Request	
Category and Type of development per Classes of Development Regulation: Manufacturing Manufacturing and industrial plants	
Licencee Contact Person: Joey Champagne Mailing address of the Licencee: P.O. Box 2000 City: Lac du Bonnet Province: Manitoba Postal Code: R0E 1A0 Phone Number: (204) 884-2400 Fax: (204) 884-2211 Email: joey.champagne@sinominecorp.com	
Name of proponent contact person for purposes of the environmental assessment (e.g. consultant): Jerry White AlbaCon Environmental Inc.	
Phone: (519) 573-0024 Fax:	Mailing address: 1056 Pleasant Hill Lane Arden, Ontario K0H 1B0
Email address: j.white@albaconenv.com	
Short Description of Alteration (max 90 characters): Activate Containment Cell #1 for use in CPF Waste Management Strategy	
Alteration fee attached: Yes: <input checked="" type="checkbox"/> No: <input type="checkbox"/>	
If No, please explain:	
Date: 2019-09-11	Signature:  Printed name: JOEY CHAMPAGNE
<p>A complete Notice of Alteration (NoA) consists of the following components:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Cover letter <input checked="" type="checkbox"/> Notice of Alteration Form <input checked="" type="checkbox"/> 2 hard copies and 1 electronic copy of the NoA detailed report (see "Information Bulletin - Alteration to Developments with Environment Act Licences") <input checked="" type="checkbox"/> \$500 Application fee, if applicable (Cheque, payable to the Minister of Finance) 	
<p>Submit the complete NoA to:</p> <p>Director Environmental Approvals Branch Manitoba Sustainable Development 1007 Century Street Winnipeg, Manitoba R3H 0W4</p> <p>For more information:</p> <p>Phone: (204) 945-8321 Fax: (204) 945-5229 http://www.gov.mb.ca/sd/eal</p>	
<p>Note: Per Section 14(3) of the Environment Act, Major Notices of Alteration must be filed through submission of an Environment Act Proposal Form (see "Information Bulletin – Environment Act Proposal Report Guidelines")</p>	

PHONE 204-884-2400
FAX 204-884-2211



TRADE NAME
TANCO

Tantalum Mining Corporation of Canada Limited

BOX 2000, LAC DU BONNET
MANITOBA, CANADA R0E 1A0

September 24, 2019

Ms. Jennifer Winsor
Department of Sustainable Development
Environmental Approvals Branch
Manitoba Conservation
1007 Century Street
WINNIPEG, Manitoba, Canada
R3H 0W4

Re: TANCO Containment Cell #1 Effluent Transfer

Dear Ms. Winsor:

This letter is in regard to the general meeting held between Manitoba Sustainable Development and Sinomine Representatives and the letter sent from the Acting Facility General Manager, Joey Champagne, on September 9, 2019. During the meeting and in the letter, Mine staff communicated the need to modify the current management plan in order to effectively manage the water balance in the Containment Cells as current production strategies have resulted in a water imbalance as there is a higher volume of waste water being generated than can be used in the manufacturing process.

The changes to the management plan involve recommissioning Cell #1 and utilizing it in a similar manner in the production process as the Mine currently utilizes Cell #2. In order to place Cell #1 back into service, the Mine must first transfer approximately 7,500 m³ of effluent currently contained in Cell #1 into the West TMA. The effluent that will be transferred consists of lake water used for cell leak testing which was completed in June 2013 after both liners were replaced, further accumulations of precipitation from 2012 to present and some water from Cell #2 that was transferred into Cell #1 as part of the initial Chemical Plant Facility (CPF) Containment Cell Management Strategy.

The attached NoA report provides a description of the effect the proposed transfer of effluent from Containment Cell #1 to the West TMA would have on effluent quality at the Mine's compliance point, the West Discharge.

We appreciate your assistance with this matter and if you have any questions, please do not hesitate to contact myself at (204) 884-2400 extension 243 for more information.

Sincerely,

Joey Champagne
Acting Facility General Manager and Safety, Health and Environment Manager
Tantalum Mining Corporation of Canada Limited



September 24, 2019

Ms. Jennifer Winsor – Environmental Engineer
Environmental Approvals Branch
Department of Sustainable Development
1007 Century Street
Winnipeg, MB R3H 0W4
(204) 945-7012

Re: TANCO Containment Cell #1 Effluent Transfer.

Dear Ms. Winsor:

AlbaCon Environmental Inc. has been retained by the Tantalum Mining Corporation of Canada's Bernic Lake Mine near Lac du Bonnet, Manitoba, to prepare the NoA report regarding proposed transfer of effluent from Containment Cell #1 to the West TMA.

Modifications to the Containment Cell Management Strategy are required as the current production strategies have resulted in a water imbalance as there is a higher volume of waste water being generated than can be used in the manufacturing process. The first step in this process involves transferring effluent currently stored in Containment Cell #1 into the West TMA so the Mine can proceed with recommissioning the cell for use in the near future.

This document describes the anticipated effects associated with the transfer of effluent from the cell into the West TMA including an evaluation of effluent quality after the transfer has occurred.

We appreciate your assistance with this matter and if you have any questions, please do not hesitate to contact myself at (519) 573-0024 for more information.

Sincerely,
AlbaCon Environmental Inc.

A handwritten signature in black ink that reads "Jerry White".

Jerry White, B.Sc. (HON), M.Sc.
Director/ Environmental Scientist



Containment Cell # 1 Effluent Transfer:

Approximately 7,500 m³ of effluent contained with Containment Cell #1 must be transferred into the West TMA for treatment prior to its release. This water in the cell consists of lake water used for leak testing in 2012, further accumulations of precipitation from 2012 to present and some water from Cell #2 that was transferred into Cell #1 as part of the initial Containment Cell Strategy approved in 2012. Two samples were collected from the cell on September 13, 2019 and sent to SGS Laboratories (Lakefield ON) for chemical analysis.

Comparison of effluent quality between water collected from Containment Cell #1 and the Mine's compliance point, the West Discharge, indicates a number of parameters are elevated by more than 2 times in the Containment Cell including conductivity, TDS, hardness and total and dissolved concentrations of barium, cesium and rubidium (Table 10). Total and dissolved concentrations of sulphur are likely considerably greater in cell effluent compared to effluent collected at the West Discharge as concentrations in samples collected at the West Discharge were consistently less than 10 mg/L in 2018.

Estimates of parameter concentrations at the Final Discharge Point after the transfer of effluent from Containment Cell # 1 has occurred illustrates the small effect this will have on the overall effluent quality at the West Discharge due to the large difference in volumes between the Cell and the West TMA. It is estimated that there will be almost no detectable difference in the concentration of parameters regulated under Schedule 4 of the *MDMER* with all parameters remaining well below effluent limits. It should be noted that the estimates provided are highly conservative as it assumes the transfer of water would be instantaneous whereas the transfer would take place over a period time while the Mine continues to discharge water into the West TMA from other sources. Half the detection limit was used for calculations estimating mean concentrations of parameters in Containment Cell effluent and the anticipated effect on effluent quality at the West Discharge when measurements were below detection limits.



Table 1 Effluent quality for samples collected from Containment Cell #1 and the West Discharge and the estimated effect on effluent quality resulting from the transfer of effluent from Containment Cell #1 into the West TMA at the TANCO Mine in Bernic Lake; 2019. Shaded values exceed criteria in Schedule 4 of the *Metal and Diamond Mining Effluent Regulations (MDMER)*. Units are mg/L unless otherwise noted.

Sample ID Date Sampled	Sample 1 9/13/2019	Sample 2 9/13/2019	Mean 9/13/2019	West Discharge 7/30/2019	Anticipated Effect	MDMER
Volume (m ³)	--	--	7,500	1,087,885	1,095,385	
Physiochemical						
pH (pH units)	7.51	7.56	7.54	7.49	7.49	≥ 6.0 - < 9.0
Conductance (µS/cm)	882	879	881	203	207.6	
Total Dissolved Solids	917	906	912	150	155.2	
Hardness, total	276	277	277	53.2	54.73	
Alkalinity (Total as CaCO ₃)	34	34	34	57	56.8	
Bicarbonate (HCO ₃)	34	34	34	70	69.8	
Carbonate (CO ₃)	< 2	< 2	< 2	< 1.0	0.5	
Hydroxide (OH ⁻)	< 2	< 2	< 2	< 1.0	0.5	
Major Ions						
Potassium, dissolved	3.30	3.36	3.33	3.47	3.469	
Sodium, dissolved	22.9	23.2	23.1	12.3	12.37	
Calcium, dissolved	93.5	94.2	93.9	16.2	16.73	
Magnesium, dissolved	10.4	10.2	10.3	3.12	3.17	
Chloride, dissolved	5	5	5	8.2	8.18	
Sulphate, dissolved	430	410	420	21	23.7	
Nutrients						
Nitrite	< 0.03	< 0.03	< 0.03	< 0.010	0.005	
Nitrate	< 0.06	< 0.06	< 0.06	0.48	0.477	
Nitrate_Nitrite	< 0.06	< 0.06	< 0.06	0.48	0.477	
Dissolved Metals						
Aluminum (Al)	0.104	0.093	0.099	0.227	0.2261	
Antimony (Sb)	< 0.0009	< 0.0009	< 0.0009	0.0013	0.00129	
Arsenic (As)	0.0011	0.0012	0.0012	0.0081	0.00805	
Barium (Ba)	0.0382	0.0382	0.0382	0.01134	0.011524	
Beryllium (Be)	< 0.000007	< 0.000007	< 0.000007	0.000009	0.0000090	
Bismuth (Bi)	0.000011	0.000007	0.000009	0.000028	0.0000279	
Boron (B)	0.031	0.030	0.031	0.029	0.0290	
Cadmium (Cd)	0.000009	0.000004	0.000007	0.000003	0.0000030	
Cesium (Cs)	279	279	279	6.58	8.445	
Chromium (Cr)	< 0.00008	< 0.00008	< 0.00008	0.00018	0.000179	
Cobalt (Co)	0.000044	0.000051	0.000048	0.000328	0.000326	
Copper (Cu)	0.0007	0.0008	0.0008	0.001	0.0010	
Iron (Fe)	0.008	0.008	0.008	0.079	0.0785	
Lead (Pb)	< 0.00001	< 0.00001	< 0.00001	0.00008	0.000079	
Lithium (Li)	0.949	0.987	0.968	1.04	1.040	
Manganese (Mn)	0.01419	0.01383	0.01401	0.216	0.214617	
Molybdenum (Mo)	0.00096	0.00097	0.00097	0.00472	0.004694	
Nickel (Ni)	0.0008	0.0007	0.0008	0.0005	0.00050	
Rubidium (Rb)	5.44	5.51	5.48	0.284	0.3195	
Phosphorus (P)	0.010	0.010	0.010	0.017	0.0170	
Selenium (Se)	0.00008	0.00006	0.00007	0.00006	0.000060	
Silicon (Si)	1.22	1.33	1.28	2.43	2.422	
Silver (Ag)	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000025	
Strontium (Sr)	0.0867	0.0863	0.0865	0.0745	0.07458	
Sulphur (S)	142	143	143	--	--	
Tantalum (Ta)	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00005	
Tellurium (Te)	0.0003	0.0002	0.0003	--	--	
Thallium (Tl)	0.005813	0.005594	0.005704	0.000045	0.0000837	
Thorium (Th)	< 0.0001	< 0.0001	< 0.0001	--	--	
Tin (Sn)	< 0.00006	< 0.00006	< 0.00006	0.0001	0.000100	
Titanium (Ti)	0.00006	0.00008	0.00007	0.00012	0.000120	
Tungsten (W)	0.00003	0.00003	0.00003	--	--	
Uranium (U)	0.000077	0.000077	0.000077	0.0013	0.0012916	
Vanadium (V)	0.00007	0.00005	0.00006	0.00019	0.000189	
Zinc (Zn)	< 0.002	< 0.002	< 0.002	0.007	0.0070	
Zirconium (Zr)	< 0.002	< 0.002	< 0.002	< 0.002	0.0010	



Table 1(cont'd) Effluent quality for samples collected from Containment Cell #1 and the West Discharge and the estimated effect on effluent quality resulting from the transfer of effluent from Containment Cell #1 into the West TMA at the TANCO Mine in Bernic Lake; 2019. Shaded values exceed criteria in Schedule 4 of the *Metal and Diamond Mining Effluent Regulations (MDMER)*. Units are mg/L unless otherwise noted.

Sample ID Date Sampled	Sample 1 9/13/2019	Sample 2 9/13/2019	Mean 9/13/2019	West Discharge 7/30/2019	Anticipated Effect	MDMER
Total Metals						
Aluminum (Al)	0.103	0.101	0.102	0.57	0.567	
Antimony (Sb)	< 0.0009	< 0.0009	< 0.0009	0.0011	0.00110	
Arsenic (As)	0.0014	0.0012	0.0013	0.0119	0.01183	1.0
Barium (Ba)	0.0384	0.0399	0.0392	0.01884	0.018979	
Beryllium (Be)	0.000010	< 0.000007	0.0000068	0.000031	0.0000308	
Bismuth (Bi)	0.000050	0.000009	0.000030	0.000023	0.0000230	
Boron (B)	0.116	0.034	0.075	0.034	0.0343	
Cadmium (Cd)	< 0.000003	< 0.000003	< 0.000003	0.000006	0.0000060	
Calcium (Ca)	93.9	100	97	17.6	18.14	
Cesium (Cs)	291	310	301	7.41	9.417	
Chromium (Cr)	0.00045	0.00018	0.00032	0.00023	0.000231	
Cobalt (Co)	0.000090	0.000048	0.000069	0.00009	0.000090	
Copper (Cu)	0.0013	0.0008	0.0011	0.001	0.0010	0.6
Iron (Fe)	0.010	0.008	0.009	0.311	0.3089	
Lead (Pb)	< 0.00001	< 0.00001	< 0.00001	0.00021	0.000209	0.4
Lithium (Li)	1.02	1.07	1.05	1.19	1.189	
Magnesium (Mg)	10.3	11.0	10.7	3.4	3.45	
Manganese (Mn)	0.0154	0.0146	0.0150	0.551	0.547330	
Molybdenum (Mo)	0.00152	0.00098	0.00125	0.005	0.004974	
Nickel (Ni)	0.0013	0.0009	0.0011	0.0007	0.00070	1.0
Phosphorus (P)	< 0.003	0.008	0.00475	0.098	0.0974	
Potassium (K)	3.37	3.55	3.46	3.77	3.768	
Rubidium (Rb)	5.41	5.81	5.61	0.358	0.3940	
Selenium (Se)	0.00022	0.00006	0.00014	0.00009	0.000090	
Silicon (Si)	1.43	1.40	1.42	2.89	2.880	
Silver (Ag)	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000025	
Sodium (Na)	23.3	24.7	24.0	13.4	13.47	
Strontium (Sr)	0.0885	0.0924	0.0905	0.083	0.08305	
Sulphur (S)	143	156	150	--	--	
Tantalum (Ta)	0.0001	< 0.0001	0.00008	< 0.0001	0.00005	
Tellurium (Te)	0.0008	0.0003	0.0006	--	--	
Thallium (Tl)	0.00622	0.00612	0.00617	0.000066	0.0001078	
Thorium (Th)	0.0002	< 0.0001	0.00013	--	--	
Tin (Sn)	< 0.00006	< 0.00006	< 0.00006	0.00013	0.000129	
Titanium (Ti)	0.00047	0.00006	0.00027	0.00081	0.000806	
Tungsten (W)	0.00006	0.00002	0.00004	--	--	
Uranium (U)	0.000090	0.000085	0.000088	0.00163	0.001619	
Vanadium (V)	< 0.00001	0.00004	0.00002	0.00029	0.000288	
Zinc (Zn)	< 0.002	< 0.002	< 0.002	0.003	0.0030	1.0
Zirconium (Zr)	< 0.002	< 0.002	< 0.002	< 0.002	0.0010	



SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - K0L 2H0
Phone: 705-652-2000 FAX: 705-652-6365

Project : TANCO Mine "Containment
Cell Monitoring"

19-September-2019

AlbaCon Environmental Inc.
Attn : Jerry White

1056 Pleasant Hill Lane, Arden
, K0H 1B0
Phone: 519 573-0024, Fax:

Date Rec. : 14 September 2019
LR Report: CA12354-SEP19
Reference: 01-2019-07 TANCO Mine
"Containment Cell
Monitoring"

Copy: #2

CERTIFICATE OF ANALYSIS

Final Report - Revised

Analysis	1: Analysis Start Date	2: Analysis Start Time Completed	3: Analysis Date Completed	4: Analysis Time Completed	6: RL	7: Containment Cell #1 Sample 1	8: Containment Cell #1 Sample 2
Sample Date & Time						13-Sep-19 09:30	13-Sep-19 09:30
Temp Upon Receipt [°C]	---	---	---	---	---	6.0	6.0
Alkalinity [mg/L as CaCO3]	16-Sep-19	11:55	18-Sep-19	15:20	2	34	34
Conductivity [uS/cm]	16-Sep-19	11:55	18-Sep-19	15:20	1	882	879
HCO3 [mg/L as CaCO3]	16-Sep-19	11:55	18-Sep-19	15:20	2	34	34
CO3 [mg/L as CaCO3]	16-Sep-19	11:55	18-Sep-19	15:20	2	< 2	< 2
OH [mg/L as CaCO3]	16-Sep-19	11:55	18-Sep-19	15:20	2	< 2	< 2
pH [no unit]	16-Sep-19	11:55	18-Sep-19	15:20		7.51	7.56
TDS [mg/L]	16-Sep-19	15:58	18-Sep-19	09:17	30	917	906
Cl [mg/L]	16-Sep-19	12:00	18-Sep-19	08:09	1	5	5
SO4 [mg/L]	16-Sep-19	12:44	18-Sep-19	08:09	2	430	410
NO2 [as N mg/L]	17-Sep-19	10:46	18-Sep-19	12:59		< 0.03	< 0.03
NO3 [as N mg/L]	17-Sep-19	10:46	18-Sep-19	12:59		< 0.06	< 0.06
NO2+NO3 [as N mg/L]	17-Sep-19	10:46	18-Sep-19	12:59		< 0.06	< 0.06
Hardness (diss) [mg/L as CaCO3]	17-Sep-19	12:37	18-Sep-19	15:37		276	277
Al (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:19		0.103	0.101
Al (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.104	0.093
Sb (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:19		< 0.0009	< 0.0009
Sb (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		< 0.0009	< 0.0009
As (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:19		0.0014	0.0012
As (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.0011	0.0012
Ba (tot) [mg/L]	18-Sep-19	12:24	18-Sep-19	15:37		0.0384	0.0399
Ba (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.0382	0.0382
Be (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:19		0.000010	< 0.000007
Be (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		< 0.000007	< 0.000007
B (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:19		0.116	0.034
B (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.031	0.030
Bi (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.000050	0.000009
Bi (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.000011	0.000007
Cd (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		< 0.000003	< 0.000003
Cd (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.000009	0.000004
Ca (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		93.9	100



SGS Canada Inc.
 P.O. Box 4300 - 185 Concession St.
 Lakefield - Ontario - KOL 2H0
 Phone: 705-652-2000 FAX: 705-652-6365

Project : TANCO Mine "Containment
 Cell Monitoring"
 LR Report : CA12354-SEP19

Analysis	1: Analysis Start Date	2: Analysis Start Time Completed	3: Analysis Date Completed	4: Analysis Time	6: RL	7: Containment Cell #1 Sample 1	8: Containment Cell #1 Sample 2
Ca (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		93.5	94.2
Cr (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.00045	0.00018
Cr (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		< 0.00008	< 0.00008
Co (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.000090	0.000048
Co (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.000044	0.000051
Cu (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.0013	0.0008
Cu (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.0007	0.0008
Fe (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.010	0.008
Fe (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.008	0.008
Pb (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		< 0.00001	< 0.00001
Pb (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		< 0.00001	< 0.00001
Li (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		1.02	1.07
Li (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.949	0.987
Mg (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		10.3	11.0
Mg (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		10.4	10.2
Mn (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.0154	0.0146
Mn (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.01419	0.01383
Mo (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.00152	0.00098
Mo (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.00096	0.00097
Ni (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.0013	0.0009
Ni (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.0008	0.0007
P (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		< 0.003	0.008
P (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.010	0.010
K (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		3.37	3.55
K (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		3.30	3.36
Se (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.00022	0.00006
Se (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.00008	0.00006
Si (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		1.43	1.40
Si (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		1.22	1.33
Ag (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		< 0.00005	< 0.00005
Ag (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		< 0.00005	< 0.00005
Na (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		23.3	24.7
Na (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		22.9	23.2
Tl (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.00622	0.00612
Tl (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.005813	0.005594
Sn (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		< 0.00006	< 0.00006
Sn (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		< 0.00006	< 0.00006
Ti (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.00047	0.00006
Ti (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.00006	0.00008
V (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		< 0.00001	0.00004
V (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.00007	0.00005
U (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.000090	0.000085
U (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.000077	0.000077
Zn (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		< 0.002	< 0.002
Zn (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		< 0.002	< 0.002
Zr (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		< 0.002	< 0.002
Zr (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		< 0.002	< 0.002
Cs (tot) [mg/L]	17-Sep-19	12:37	18-Sep-19	13:10		291	310
Cs (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	13:10		279	279
Rb (tot) [mg/L]	17-Sep-19	12:37	18-Sep-19	13:10		5.41	5.81
Rb (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	13:10		5.44	5.51
Ta (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.0001	< 0.0001

OnLine LIMS

0001898570



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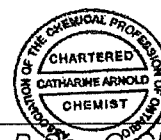
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Project : TANCO Mine "Containment

Cell Monitoring"
LR Report : CA12354-SEP19

Analysis	1: Analysis Start Date	2: Analysis Start Time Completed	3: Analysis Date Completed	4: Analysis Time Completed	6: RL	7: Containment Cell #1 Sample 1	8: Containment Cell #1 Sample 2
Ta (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		< 0.0001	< 0.0001
Te (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.0008	0.0003
Te (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.0003	0.0002
Th (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.0002	< 0.0001
Th (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		< 0.0001	< 0.0001
W (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.00006	0.00002
W (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.00003	0.00003
S (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		143	156
S (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		142	143
Sr (tot) [mg/L]	18-Sep-19	12:24	19-Sep-19	16:20		0.0885	0.0924
Sr (diss) [mg/L]	17-Sep-19	12:37	18-Sep-19	15:37		0.0867	0.0863

Catharine Arnold



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Project Specialist,
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Project : TANCO Mine "Containment Cell Monitoring"
 LR Report : CA12354-SEP19

Quality Control Report

Parameter	Reporting Limit	Unit	Method Blank	Inorganic Analysis				LCS / Spike Blank		Matrix Spike / Reference Material				
				Result 1	Result 2	Duplicate	RPD	Acceptance Criteria %	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
										Low	High		Low	High
Alkalinity - QCBatchID: EWL0215-SEP19														
Alkalinity	2	mg/L as Ca	< 2			2	10	100	80	120	NA	NA		
Alkalinity - QCBatchID: EWL0240-SEP19														
Alkalinity	2	mg/L as Ca	< 2			ND	10	102	80	120	NA	NA		
Anions by discrete analyzer - QCBatchID: D100220-SEP19														
Chloride	1	mg/L	< 1			3	20	99	80	120	106	75	125	
Sulphate	2	mg/L	< 2			ND	20	104	80	120	111	75	125	
Anions by IC - QCBatchID: D100229-SEP19														
Nitrate (as N)	0.06	mg/L	< 0.06			0	20	100	80	120	91	75	125	
Nitrate + Nitrite (as N)	0.06	mg/L	< 0.06			NA		NA			NA	NA		
Nitrite (as N)	0.03	mg/L	< 0.03			1	20	101	80	120	102	75	125	
Carbonate/Bicarbonate - QCBatchID: EWL0215-SEP19														
Bicarbonate	2	mg/L as Ca	< 2			2	10	NA	90	110	NA	NA		
Carbonate	2	mg/L as Ca	< 2			ND	10	NA	90	110	NA	NA		
OH	2	mg/L as Ca	< 2			ND	10	NA	90	110	NA	NA		
Carbonate/Bicarbonate - QCBatchID: EWL0240-SEP19														
Bicarbonate	2	mg/L as Ca	< 2			ND	10	NA	90	110	NA	NA		
Carbonate	2	mg/L as Ca	< 2			ND	10	NA	90	110	NA	NA		
OH	2	mg/L as Ca	< 2			ND	10	NA	90	110	NA	NA		
Metals in aqueous samples - ICP-MS - QCBatchID: EIMS0084-SEP19														
Aluminum (dissolved)	0.001	mg/L	< 0.001			1	20	93	80	110	NV	70	130	
Antimony (dissolved)	0.009	mg/L	< 0.009			ND	20	108	90	110	100	70	130	
Arsenic (dissolved)	0.002	mg/L	< 0.002			8	20	93	90	110	104	70	130	
Barium (dissolved)	0.00002	mg/L	< 0.00002			1	20	94	90	110	NV	70	130	
Beryllium (dissolved)	0.00007	mg/L	< 0.00007			0	20	96	90	110	83	70	130	
Bismuth (dissolved)	0.00007	mg/L	< 0.00007			ND	20	99	90	110	87	70	130	
Boron (dissolved)	0.002	mg/L	< 0.002			9	20	99	90	110	NV	70	130	
Cadmium (dissolved)	0.000003	mg/L	< 0.000003			0	20	94	90	110	89	70	130	
Calcium (dissolved)	0.01	mg/L	< 0.01			1	20	93	90	110	NV	70	130	
Cesium (total)	0.0001	mg/L	< 0.0001			ND	20	100	90	110	NV	70	130	
Chromium (dissolved)	0.00008	mg/L	< 0.00008			ND	20	95	90	110	114	70	130	
Cobalt (dissolved)	0.000004	mg/L	< 0.000004			13	20	93	90	110	97	70	130	
Copper (dissolved)	0.0002	mg/L	< 0.0002			6	20	95	90	110	100	70	130	
Iron (dissolved)	0.007	mg/L	< 0.007			18	20	101	90	110	NV	70	130	
Lead (dissolved)	0.00001	mg/L	< 0.00001			12	20	100	90	110	84	70	130	
Lithium (dissolved)	0.0001	mg/L	< 0.0001			11	20	97	90	110	79	70	130	



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Project : TANCO Mine "Containment Cell Monitoring"
 LR Report : CA12354-SEP19

0001898570

Parameter	Reporting Limit	Unit	Method Blank	Duplicate			Acceptance Criteria %	LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD		Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
									Low	High		Low	High
Magnesium (dissolved)	0.001	mg/L	<0.001		2	20	108	90	110	NV	70	130	
Manganese (dissolved)	0.00001	mg/L	<0.00001		18	20	95	90	110	101	70	130	
Molybdenum (dissolved)	0.00004	mg/L	<0.00004		6	20	96	90	110	109	70	130	
Nickel (dissolved)	0.0001	mg/L	<0.0001		7	20	92	90	110	85	70	130	
Phosphorus (dissolved)	0.003	mg/L	<0.003		ND	20	91	90	110	NV	70	130	
Potassium (dissolved)	0.009	mg/L	<0.009		2	20	104	90	110	105	70	130	
Rubidium (total)	0.0001	mg/L	<0.0001		ND	20	96	90	110	NV	70	130	
Selenium (dissolved)	0.00004	mg/L	<0.00004		19	20	103	90	110	120	70	130	
Silicon (dissolved)	0.02	mg/L	<0.02		8	20	109	90	110	NV	70	130	
Silver (dissolved)	0.00005	mg/L	<0.00005		ND	20	95	90	110	86	70	130	
Sodium (dissolved)	0.01	mg/L	<0.01		0	20	99	90	110	NV	70	130	
Strontium (dissolved)	0.00002	mg/L	<0.00002		3	20	92	90	110	75	70	130	
Sulfur (dissolved)	0.3	mg/L	<0.3		1	20	96	90	110	NV	70	130	
Tantalum (dissolved)	0.0001	mg/L	<0.0001		ND	20	97	90	110	NV	70	130	
Tellurium (dissolved)	0.0001	mg/L	<0.0001		ND	20	92	90	110	NV	70	130	
Thallium (dissolved)	0.000005	mg/L	<0.000005		ND	20	100	90	110	85	70	130	
Thorium (dissolved)	0.0001	mg/L	<0.0001		ND	20	95	90	110	NV	70	130	
Tin (dissolved)	0.00006	mg/L	<0.00006		3	20	100	90	110	NV	70	130	
Titanium (dissolved)	0.00005	mg/L	<0.00005		ND	20	99	90	110	NV	70	130	
Tungsten (dissolved)	0.00002	mg/L	<0.00002		ND	20	98	90	110	NV	70	130	
Uranium (dissolved)	0.000002	mg/L	<0.000002		9	20	94	90	110	87	70	130	
Vanadium (dissolved)	0.00001	mg/L	<0.00001		ND	20	93	90	110	116	70	130	
Zinc (dissolved)	0.002	mg/L	<0.002		ND	20	98	90	110	81	70	130	
Zirconium (dissolved)	0.002	mg/L	<0.002		ND	20	93	90	110	NV	70	130	
<i>Metals in aqueous samples - ICP-MS - QCBatchID: EMS0098-SEP19</i>													
Aluminum (dissolved)	0.001	mg/L	<0.001		ND	20	110	90	110	NV	70	130	
Aluminum (total)	0.001	mg/L	<0.001		ND	20	110	90	110	NV	70	130	
Antimony (dissolved)	0.0009	mg/L	<0.0009		ND	20	104	90	110	NV	70	130	
Arsenic (dissolved)	0.0002	mg/L	<0.0002		6	20	102	90	110	93	70	130	
Barium (dissolved)	0.00002	mg/L	<0.00002		14	20	100	90	110	NV	70	130	
Beryllium (dissolved)	0.000007	mg/L	<0.000007		10	20	104	90	110	102	70	130	
Beryllium (total)	0.000007	mg/L	<0.000007		10	20	104	90	110	102	70	130	
Bismuth (dissolved)	0.000007	mg/L	8e-006		ND	20	103	90	110	71	70	130	
Bismuth (total)	0.000007	mg/L	8e-006		ND	20	103	90	110	71	70	130	
Boron (dissolved)	0.002	mg/L	<0.002		ND	20	97	90	110	NV	70	130	
Boron (total)	0.002	mg/L	<0.002		ND	20	97	90	110	NV	70	130	
Cadmium (dissolved)	0.000003	mg/L	<0.000003		4	20	104	90	110	NV	70	130	
Cadmium (total)	0.000003	mg/L	<0.000003		4	20	104	90	110	NV	70	130	
Calcium (dissolved)	0.01	mg/L	<0.01		5	20	104	90	110	NV	70	130	



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Project : TANCO Mine "Containment Cell Monitoring"
 LR Report : CA12354-SEP19

0001898570

Parameter	Reporting Limit	Unit	Method Blank	Inorganic Analysis			Acceptance Criteria		LCS / Spike Blank Recovery Limits (%)		Matrix Spike / Reference Material Recovery Limits (%)		
				Result 1	Duplicate	RPD	%	Spike Recovery (%)	Spike Recovery (%)	Spike Recovery (%)	Low	High	
													Result 2
Calcium (total)	0.01	mg/L	<0.01			5	20	104	90	110	NV	70	130
Chromium (dissolved)	0.00008	mg/L	<0.00008			8	20	103	90	110	NV	70	130
Chromium (total)	0.00008	mg/L	<0.00008			8	20	103	90	110	NV	70	130
Cobalt (dissolved)	0.000004	mg/L	<0.000004			ND	20	93	90	110	95	70	130
Cobalt (total)	0.000004	mg/L	<0.000004			ND	20	93	90	110	95	70	130
Copper (dissolved)	0.0002	mg/L	<0.0002			20	20	109	90	110	NV	70	130
Copper (total)	0.0002	mg/L	<0.0002			20	20	109	90	110	NV	70	130
Iron (dissolved)	0.007	mg/L	<0.007			8	20	98	90	110	NV	70	130
Iron (total)	0.007	mg/L	<0.007			8	20	98	90	110	NV	70	130
Lead (dissolved)	0.00001	mg/L	<0.00001			12	20	106	90	110	87	70	130
Lead (total)	0.00001	mg/L	<0.00001			12	20	106	90	110	87	70	130
Lithium (dissolved)	0.0001	mg/L	<0.0001			8	20	105	90	110	NV	70	130
Lithium (total)	0.0001	mg/L	<0.0001			8	20	105	90	110	NV	70	130
Magnesium (dissolved)	0.001	mg/L	<0.001			5	20	105	90	110	NV	70	130
Magnesium (total)	0.001	mg/L	<0.001			5	20	105	90	110	NV	70	130
Manganese (dissolved)	0.00001	mg/L	<0.00001			3	20	106	90	110	99	70	130
Manganese (total)	0.00001	mg/L	<0.00001			3	20	106	90	110	99	70	130
Molybdenum (dissolved)	0.00004	mg/L	<0.00004			1	20	96	90	110	NV	70	130
Molybdenum (total)	0.00004	mg/L	<0.00004			1	20	96	90	110	NV	70	130
Nickel (dissolved)	0.0001	mg/L	<0.0001			ND	20	103	90	110	126	70	130
Nickel (total)	0.0001	mg/L	<0.0001			ND	20	103	90	110	126	70	130
Phosphorus (dissolved)	0.003	mg/L	<0.003			ND	20	99	90	110	NV	70	130
Phosphorus (total)	0.003	mg/L	<0.003			ND	20	99	90	110	NV	70	130
Potassium (dissolved)	0.009	mg/L	<0.009			9	20	98	90	110	NV	70	130
Potassium (total)	0.009	mg/L	<0.009			9	20	98	90	110	NV	70	130
Selenium (dissolved)	0.00004	mg/L	<0.00004			18	20	108	90	110	NV	70	130
Selenium (total)	0.00004	mg/L	<0.00004			18	20	108	90	110	NV	70	130
Silicon (dissolved)	0.02	mg/L	<0.02			2	20	91	90	110	NV	70	130
Silicon (total)	0.02	mg/L	<0.02			2	20	91	90	110	NV	70	130
Silver (dissolved)	0.00005	mg/L	<0.00005			6	20	103	90	110	NV	70	130
Silver (total)	0.00005	mg/L	<0.00005			6	20	103	90	110	NV	70	130
Sodium (dissolved)	0.01	mg/L	<0.01			2	20	106	90	110	NV	70	130
Sodium (total)	0.01	mg/L	<0.01			2	20	106	90	110	NV	70	130
Strontium (dissolved)	0.00002	mg/L	<0.00002			7	20	104	90	110	NV	70	130
Strontium (total)	0.00002	mg/L	<0.00002			7	20	104	90	110	NV	70	130
Sulfur (dissolved)	0.3	mg/L	<0.3			1	20	104	90	110	NV	70	130
Sulfur (total)	0.3	mg/L	<0.3			1	20	104	90	110	NV	70	130
Tantalum (dissolved)	0.0001	mg/L	<0.0001			ND	20	102	90	110	NV	70	130
Tantalum (total)	0.0001	mg/L	<0.0001			ND	20	102	90	110	NV	70	130

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Project : TANCO Mine "Containment Cell Monitoring"
 LR Report : CA12354-SEP19

0001898570

Parameter	Reporting Limit	Unit	Method Blank	Duplicate			Acceptance Criteria %	LCS / Spike Blank Recovery Limits (%)			Matrix Spike / Reference Material Recovery Limits (%)		
				Result 1	Result 2	RPD		Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
									Low	High		Low	High
Tellurium (dissolved)	0.0001	mg/L	0.000102			ND	20	107	90	110	NV	70	130
Tellurium (total)	0.0001	mg/L	0.000102			ND	20	107	90	110	NV	70	130
Thallium (dissolved)	0.000005	mg/L	<0.000005			ND	20	105	90	110	77	70	130
Thallium (total)	0.000005	mg/L	<0.000005			ND	20	105	90	110	77	70	130
Thorium (dissolved)	0.0001	mg/L	<0.0001			ND	20	93	90	110	NV	70	130
Thorium (total)	0.0001	mg/L	<0.0001			ND	20	93	90	110	NV	70	130
Tin (dissolved)	0.00006	mg/L	<0.00006			9	20	96	90	110	NV	70	130
Tin (total)	0.00006	mg/L	<0.00006			9	20	96	90	110	NV	70	130
Titanium (dissolved)	0.00005	mg/L	<0.00005			ND	20	100	90	110	NV	70	130
Titanium (total)	0.00005	mg/L	<0.00005			ND	20	100	90	110	NV	70	130
Tungsten (dissolved)	0.00002	mg/L	<0.00002			ND	20	96	90	110	NV	70	130
Tungsten (total)	0.00002	mg/L	<0.00002			ND	20	96	90	110	NV	70	130
Uranium (dissolved)	0.000002	mg/L	<0.000002			1	20	100	90	110	NV	70	130
Uranium (total)	0.000002	mg/L	<0.000002			1	20	100	90	110	NV	70	130
Vanadium (dissolved)	0.00001	mg/L	<0.00001			ND	20	105	90	110	115	70	130
Vanadium (total)	0.00001	mg/L	<0.00001			ND	20	105	90	110	115	70	130
Zinc (dissolved)	0.002	mg/L	<0.002			ND	20	106	90	110	NV	70	130
Zinc (total)	0.002	mg/L	<0.002			ND	20	106	90	110	NV	70	130
Zirconium (dissolved)	0.002	mg/L	<0.002			ND	20	90	90	110	NV	70	130
Zirconium (total)	0.002	mg/L	<0.002			ND	20	90	90	110	NV	70	130
pH - QCBatchID: EWL0215-SEP19													
pH	0.05	no unit	NA			1		100				NA	
pH - QCBatchID: EWL0240-SEP19													
pH	0.05	no unit	NA			3		100				NA	
Solids Analysis - QCBatchID: EWL0213-SEP19													
Total Dissolved Solids	30	mg/L	<30			1	20	99	90	110		NA	