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To:	North American Tungsten Corporation Ltd. c/o Alvarez & Marsal (A&M) Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)	**Date:**	August 16, 2022
c:		**Memo No.:**	001 r1
From:	Gary Koop – Principal Consultant Stephan Klump – Project Director	**File:**	ENW.WENW03039-06.008
Subject:	Site Monitoring Program Review – Recommended Modifications to the Monitoring Program Under the Current Water Licence		

1.0 INTRODUCTION

1.1 General

Tetra Tech Canada Inc. (Tetra Tech) was retained by North American Tungsten Corporation Ltd. (NATC) c/o Alvarez & Marsal (A&M) and Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) to review site-wide monitoring requirements at the Cantung Mine, NT.

The Cantung Mine is currently in care and maintenance with activities carried out by year-round staff. Current monitoring requirements, as presented in the Type A Water Licence (MV2015L2-0003), were developed while the mine was in operations and are no longer representative of current site activities and conditions. NATC is considering reducing Care & Maintenance (C&M) activities at the Cantung Mine site over the near and longer-term, and requested Tetra Tech review the current monitoring requirements in support of a potentially reduced C&M program.

This memo considers the current monitoring program and provides recommendations for changes under the current Water Licence (MV2015L2-0003). Recommendations for changes under a future Care and Maintenance water licence are provided under separate cover.

1.2 Data Review

Tetra Tech reviewed the existing network of surface and groundwater monitoring stations as well as tailings containment instrumentation and inspections to determine appropriate monitoring requirements for a reduced C&M program. This included stations associated with the Surveillance Network Program (SNP), Tailings Operations, Maintenance, and Surveillance Manual (OMS Manual), and Tailings Containment Area Monitoring Program (TCAMP).

Key factors considered in recommended modifications included:

- Site context (e.g., upstream, downstream of site infrastructure and contribution to overall monitoring network);
- Length of data record (with the idea that stations with a longer length of record would be beneficial to keep);
- Ease of access; and

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- Suitability to inform future remediation efforts.

The following documents were included as part of Tetra Tech's review:

- Water Licence MV2015L2-0003 (MVLWB 2016);
- Water Licence MV2002L2-0019 (MVLWB 2015);
- Care and Maintenance Plan (NATC 2017);
- Annual Water Licence Report (NATC 2020, 2021);
- Hydrology Management Plan, Cantung Mine, NT (NATC 2014)
- 2021 Annual Geotechnical Inspection (Tetra Tech 2021);
- Tailings OMS Manual (NATC 2018); and
- Tailings Containment Area Monitoring Plan (EBA 2011).

2.0 EXISTING MONITORING PROGRAM

Site monitoring requirements are detailed in Water Licence MV2015L2-0003 (the Licence), in effect from January 28, 2016 to January 27, 2024. The Licence specifies monitoring requirements under the Surveillance Network Program (SNP) and a number of plans including:

- Flat River Hydrology Plan (Part G, Item 18);
- Tailings Containment Area Monitoring Plan (Part G, Item 10);
- Geotechnical Inspections (Part G, Item 24 and 25); and
- OMS Manual.

These requirements are detailed in the following sections.

2.1 Surveillance Network Program

The SNP requirements are detailed in Annex A of the Licence and include active stations for surface and groundwater quality and hydrotechnical measurements. Reports are issued monthly. Monitoring locations for the SNP have been amended with time to reflect changing mine conditions. The Cantung Mine Site currently monitors and reports on up to 30 SNP stations.

Table 1 in the Tables section summarizes the SNP network as included in the Licence, and what is currently monitored. Stations that are no longer monitored are shown in grey. Monthly reporting includes weekly summaries of fresh and mine water movement, daily tailings containment area (TCA) inspections and instrumentation readings.

Collection of meteorological data is also required under the SNP and includes temperature, precipitation, evaporation, wind speed, and wind direction.

2.2 Tailings Containment Area Monitoring Plan

The TCAMP outlines the program that was developed to provide details about the geochemistry, hydrology, hydrogeology, and physical characteristics of the covered TCAs 1 and 2 (EBA 2011). The aim of the TCAMP was the collection of information required to design and maintain a long-term closure plan for the tailings containment facilities. The TCAMP Study Report was submitted to the Mackenzie Valley Land and Water Board (MVLWB) in 2014 (O'Kane 2014).

2.3 Geotechnical Inspection

The Licence stipulates daily inspections of the TCAs and associated infrastructure during milling operations. The current OMS manual (NATC 2018), also specifies daily inspections; however, this is largely related to operating water levels, pumping, and road conditions. Piezometers are read every two weeks and inclinometers are read every four months.

Annual geotechnical inspections of the TCAs are also completed by a Professional Engineer in accordance with Part G, Item 25 of the Water Licence and an independent Dam Safety Review is to be conducted every five years per Part G, Item 26.

2.4 Geotechnical Monitoring

Geotechnical instrumentation installed at the Cantung Mine Site consists of:

- Inclinometers/slope indicators (SI), which measure horizontal slope movement and deformation along a nominally vertical profile; and
- Vibrating wire piezometers (VWP), which measure groundwater pressure and temperature.

SIs are measured manually by lowering a probe into the SI casing and recording tilt readings at regular depth intervals as the probe is raised. VWPs are measured by connecting the wire leads of the VWP cables to a readout box.

2.4.1 Slope Indicators

There are 12 SIs installed at Cantung Mine Site which are presently measured monthly. An inventory of actively monitored SIs at Cantung Mine Site is presented in Table 2-1 below.

Table 2-1: Actively Monitored Slope Indicators

Instrument ID	Location	Northing	Easting	Ground Elevation (m a.s.l.)	Installation Depth (m b.g.s.)	Installation Date
SI-01	SI	6,870,598	540,842	1116.25	25.35	2007-12-11
SI-02	SI	6,870,571	540,882	1131.06	46.35	2007-12-09
SI-03	SI	6,870,555	540,911	1131.52	47.15	2007-11-23
SI-04	SI	6,870,530	540,950	1131.41	47.19	2007-11-20
SI-05	SI	6,870,508	540,979	1131.47	48.56	2007-11-17
SI-06	SI	6,870,484	541,010	1131.37	46.99	2007-11-14
GH11-01 (SI-09)	SI	6,870,277	541,177	1145.46	52.25	2011-07-02

Table 2-1: Actively Monitored Slope Indicators

Instrument ID	Location	Northing	Easting	Ground Elevation (m a.s.l.)	Installation Depth (m b.g.s.)	Installation Date
GH11-05 (SI-07)	SI	6,870,595	540,940	1111.72	31.14	2011-07-17
GH11-07 (SI-08)	SI	6,870,609	540,885	1113.29	39.42	2011-07-19
GH11-09 (SI-11)	SI	6,870,230	541,337	1108.89	29.40	2011-04-25
GH11-12 (SI-12)	SI	6,870,053	541,252	1145.70	52.19	2011-07-30
GH12-B (SI-13)	SI	6,870,557	540,779	1129.58	25.63	2012-02-23

2.4.2 Vibrating Wire Piezometers

There are 24 VWPs installed at Cantung Mine Site which are measured monthly. Several other VWPs were installed to support construction and/or monitoring of the tailings facilities which have since been removed, damaged, or provide anomalous readings and are considered inactive.

The 24 actively monitored VWPs at Cantung Mine Site are presented in Table 2-2 below.

Table 2-2: Actively Monitored Vibrating Wire Piezometers

Instrument ID	Location	Northing	Easting	Ground Elevation (m a.s.l.)	Installation Depth (m b.g.s.)	Installation Date
VW6308 (TP4-07-04)	TCA4	6,870,526	540,979	1112.43	13.11	2007-04-08
VW6309 (TP4-07-02)	TCA4	6,870,507	540,940	1123.55	24.08	2007-04-06
VW7593 (SI-02)	TCA4	6,870,571	540,882	1131.06	45.99	2007-12-09
VW7594 (SI-03)	TCA4	6,870,555	540,911	1131.52	46.69	2007-11-23
VW7595 (SI-04)	TCA4	6,870,530	540,950	1131.41	46.98	2007-11-20
VW7596 (SI-05)	TCA4	6,870,508	540,979	1131.47	48.53	2007-11-17
VW7597 (SI-06)	TCA4	6,870,484	541,010	1131.37	47.75	2007-11-14
VW18341	TCA4	6,870,465	540,756	unknown	unknown	2010-2011
VW18344	TCA4	6,870,496	540,823	unknown	unknown	2010-2011
VW20925	TCA5	6,869,913	541,100	1141.46	28.61	2012-03-26
VW20932	TCA3	6,870,112	541,092	1146.65	36.54	2012-03-09
VW20936	TCA3	6,870,171	540,954	1149.69	19.78	2012-04-06
VW60014	TCA2	6,871,069	540,393	1123.42	35.1	2019-09-02
VW60021	TCA2				25.96	2019-09-02
VW60015	TCA1	6,871,126	540,338	1126.79	36	2019-08-24
VW60023	TCA1				26	2019-08-24
VW60016	TCA3	6,870,247	541,199	1145.50	44.89	2019-09-07
VW60019	TCA3				59.15	2019-09-07
VW60017	TCA3	6,870,168	541,258	1146.14	50.3	2019-09-10
VW60018	TCA5	6,869,938	541,088	1150.68	48.93	2019-09-19

Table 2-2: Actively Monitored Vibrating Wire Piezometers

Instrument ID	Location	Northing	Easting	Ground Elevation (m a.s.l.)	Installation Depth (m b.g.s.)	Installation Date
VW60020	TCA4	6,870,457	540,984	1143.33	49.99	2019-09-04
VW60025	TCA4				37.19	2019-09-04
VW60022	TCA2	6,871,020	540,423	1123.20	26	2019-08-26
VW60024	TCA2				36	2019-08-26

3.0 DISCUSSION AND RECOMMENDATIONS

The following sections provide recommendations for a revised water monitoring program that supports the ongoing characterization of water quality and quantity at the Cantung Mine Site for short-term C&M purposes, as well as continued monitoring of the TCAs through care and maintenance, in accordance with Part E, Section 3 of the Licence.

3.1 Surface Water Monitoring (SNP Stations)

The surface water monitoring stations included in Table 3-1 are recommended for continued monitoring. The recommended monitoring frequency and parameters for surface water monitoring are included in Table 3-2.

Table 3-1: SNP Surface Water Monitoring Stations

SNP Station #	Description	Location		Ground Elevation (m asl)
		Easting	Northing	
4-5	Flat River at bridge downstream of airstrip	542520	6869094	1101.19
4-13	Discharge from main portal (“E” Zone)	541326	6869967	-
4-20	Drainage culvert from Stinky Pond	541342	6870330	1104.58
4-29	Flat River, three (3) kilometres upstream of pumphouse	538180	6873871	1144
4-32	Sardine Creek	540124	6871229	1123.42
4-33	Far Field Downstream Station 8.5 km – Flat River	547271	6864181	1024
4-33R	Flat River, west of Tailings Storage Facility 6	543488	6867875	1094.02
4-34	Seepage down-gradient of the fuel berm	-	-	-
4-36	Any point between Tailings Pond 3 and the Flat River, where Seepage is visible	541368	6870158	1097
4-37	Any point between Tailings Pond 4 and the Flat River, where Seepage is visible	-	-	-
4-38	Any point between Tailings Pond 1 and the Flat River, where Seepage is visible	-	-	-
4-39	Any point between Tailings Pond 2 and the Flat River, where Seepage is visible	-	-	-
4-40	Surface Water point on Flat River between Tailings Ponds 2 and 4	540858	6870816	1106.23

Table 3-1: SNP Surface Water Monitoring Stations

SNP Station #	Description	Location		Ground Elevation (m asl)
		Easting	Northing	
4-41	Surface Water point on Flat River downstream of Tailings Pond 3	541804	6869690	1104
4-42	Mine water pump in the mill, (*conveyor gallery*)	540169	6870899	1154
4-45	Middle Bridge, upstream of Stinky Pond Discharge to Flat River	-	-	1104.62
5-2	Discharge point from Polishing Pond	540523	6870986	-

Table 3-2: Monitoring Parameters and Frequency (SNP Surface Water)

Recommended Monitoring Frequency	Rationale	Parameters
Monthly (all SNP stations)	▪ About 10 years of continuous data (monthly or more frequently) are available for the SNP stations; and ▪ Continued monthly monitoring should suffice to maintain the surface water quality surveillance.	▪ Same as per current Water Licence MV2015L2-0003
Continuous: level logger Twice annually: stream gauging (SNP stations: 4-20 and 4-45)	▪ Stream flow measurements should be automated with level loggers installed at stations 4-20 and 4-45; ▪ Stream gauging and staff gauge readings should be completed twice per year during freshet and in the fall; ▪ Main reason for discharge measurements at 4-20 and 4-45 was to inform the wastewater treatment plant (WWTP) operations (4-45) and to monitor discharge from the WWTP (4-20). However, since the WWTP has been withdrawn from service, the recommended monitoring frequency should suffice under current conditions; and ▪ Flows are well understood given the long duration of the data record (greater than 10 years). Stream gauging twice per year plus the continuous logger record should provide satisfactory data to continue the existing hydrographs.	▪ Flow (m^3/day)

3.2 TCAMP

Since reporting in 2014, additional data have been collected from the TCAMP monitoring stations to date. Tetra Tech is of the opinion that sufficient data have been collated over the past 11 years and that the TCAMP program, as originally designed and implemented, can be discontinued.

Work completed by Tetra Tech with respect to the covers on TCA 1/2 from 2018 to present consists of the review of test pitting and drilling results, moisture contents, particle size analysis, mineralogical analyses, and seepage and infiltration modelling. As a result, the conceptual model for the TCA 1/2 cover and its application to future remedial design planning has evolved into an improved understanding of the mechanisms for how the cover has worked and mitigated metal leaching and acid-rock drainage (ML/ARD) concerns, and how the TCA 1/2 cover design could be applied to remedial planning of covers on the three uncovered TCA's on site.

3.3 Geotechnical Monitoring

3.3.1 Slope Indicators

None of the SIs installed show large, sustained movements or accelerating movements since baselines were established. Based on these measurements, we recommend reducing the current SI reading schedule to a semi-annual basis, however, we do not recommend ceasing readings or decommissioning any of the SIs at this time. Semi-annual readings should be completed approximately six months apart and completed during freshet and prior to complete freeze up.

Summaries of the general movement trends and recommended monitoring intervals for each SI are presented in Table 3-3 below.

Table 3-3: Slope Indicator Reading Summaries and Recommended Monitoring Intervals

Instrument ID	Instrument Reading Summary	Recommended Monitoring Interval
SI-01	Negligible to minor movement since January 2021. Incremental displacement <2 mm and cumulative displacement <4mm across all depths below 3 m.	Semi-annual
SI-02	Minor movement since January 2021. Incremental displacement <3 mm and cumulative displacement <6 mm across all depths below 2 m. Spikes in incremental displacement are not always sustained between reading sets and may be associated with measurement errors or damaged casing.	Semi-annual
SI-03	Minor movement since January 2021. Incremental displacement <4 mm and cumulative displacement <12 mm across all depths below 3 m. Spikes in incremental displacement are not always sustained between reading sets and may be associated with measurement errors or damaged casing.	Semi-annual
SI-04	Minor movement since January 2021. Incremental displacement typically <4 mm, except where associated with measurement errors. Cumulative displacement <10 mm across all depths below 3 m.	Semi-annual
SI-05	Negligible to minor movement since January 2021. Incremental displacement <2 mm and cumulative displacement <5 mm across all depths below 2 m.	Semi-annual
SI-06	Minor movement since January 2021. Spikes in incremental displacement are small (<5 mm) and not accelerating. Cumulative displacement <7 mm across all depths below 2 m. Slip surface at about 25.5 m depth does now show signs of accelerating movement.	Semi-annual
GH11-01 (SI-09)	Minor movement since March 2021. Spikes in incremental displacement are small (<3 mm) and not accelerating. Cumulative displacement <7 mm across all depths.	Semi-annual
GH11-05 (SI-07)	Negligible to minor movement since January 2021. Incremental displacement <1 mm and cumulative displacement <5 mm across all depths below 2 m.	Semi-annual
GH11-07 (SI-08)	Minor movement since January 2021. Spikes in incremental displacement are small (<4 mm) and not accelerating. Cumulative displacement <15 mm across all depths.	Semi-annual
GH11-09 (SI-11)	Negligible movement since January 2021. Incremental displacement <1 mm and cumulative displacement <7 mm across all depths below 2 m.	Semi-annual

Table 3-3: Slope Indicator Reading Summaries and Recommended Monitoring Intervals

Instrument ID	Instrument Reading Summary	Recommended Monitoring Interval
GH11-12 (SI-12)	Minor movement since January 2021. Incremental displacement <5 mm and not accelerating. Cumulative displacement 15 mm across all depths below 2 m.	Semi-annual
GH12-B (SI-13)	Negligible movement since January 2021. Incremental displacement <2 mm and cumulative displacement <4 mm across all depths below 2 m.	Semi-annual

3.3.2 Vibrating Wire Piezometers

Many of the VWPs on site were installed to support construction or to aid in developing a geological model for a specific design goal. Many of these instruments no longer provide useful data for ongoing site stability monitoring, particularly with mine operations now suspended. Other VWPs were also installed at a higher density than necessary for ongoing groundwater monitoring (e.g., along the northeast embankment of TP4).

Tetra Tech recommends that readings continue on VWPs installed as part of the 2019 geotechnical investigation and on VW6308 and VW20925, at a modified interval. Readings can be ceased on the remaining VWPs. We do not recommend that any VWPs be decommissioned/removed at this time, as these instruments could be read in the future in case anomalous readings are observed or data gaps are identified.

While the VWPs installed in 2019 have a short period of record (regular readings have been received since September 2021), these instruments are in better physical condition than VWPs which were installed over ten or more years ago. The newer instrumentation is expected to provide more accurate monitoring data for longer than the older instruments. Continued readings on VW6308 (installed in 2007) and VW20925 (installed in 2012) can be used to confirm that ongoing groundwater fluctuations are consistent with older records until a longer period of record has been established in the 2019 VWP installations.

Summaries of the general groundwater trends and recommended monitoring intervals for each VWP are presented in Table 3-4 below.

Table 3-4: Slope Indicator Reading Summaries and Recommended Monitoring Intervals

Instrument ID	Instrument Reading Summary	Recommended Monitoring Interval	Notes
VW6308 (TP4-07-04)	Readings show seasonal groundwater fluctuation between about 1107.4 m a.s.l. and 1108.4 m a.s.l. Groundwater levels are generally controlled by the elevation of the Flat River. Readings follow similar trends as VW6309, VW7593 (SI-02), VW7594 (SI-03), VW7595 (SI-04), VW7596 (SI-05), and VW7597 (SI-06).	Monthly	Optionally install a datalogger and collect/review data at least annually, shortly after freshet.
VW20925	Readings show seasonal groundwater fluctuation. Temperature readings are occasionally anomalous. Instrument is installed near VW60018 and emerging trends are similar.	Monthly	Optionally install a datalogger and collect/review data at least annually, shortly after freshet.
VW60014 through	Instruments have been measured regularly since September 2021, so seasonal trends in readings have not yet been established. Readings are	Monthly	Optionally install a datalogger and collect/review data at least annually, shortly after freshet.

Table 3-4: Slope Indicator Reading Summaries and Recommended Monitoring Intervals

Instrument ID	Instrument Reading Summary	Recommended Monitoring Interval	Notes
VW60025 (12 total)	generally consistent with older, nearby VWP installations.		
VW6309 (TP4-07-02)	Readings show seasonal groundwater fluctuation between about 1107.5 m a.s.l. and 1108.8 m a.s.l. Groundwater levels are generally controlled by the elevation of the Flat River. Readings follow similar trends as VW6308, VW7593 (SI-02), VW7594 (SI-03), VW7595 (SI-04), VW7596 (SI-05), and VW7597 (SI-06).	Cease	Cease readings due to hydraulic connection between VW309 and nearby instruments. Coverage is provided by VW60020 and VW60025.
VW7593 (SI-02)	Readings show seasonal groundwater fluctuation between about 1107.2 m a.s.l. and 1108.5 m a.s.l. Groundwater levels are generally controlled by the elevation of the Flat River. Readings follow similar trends as VW6308, VW6309, VW7594 (SI-03), VW7595 (SI-04), VW7596 (SI-05), and VW7597 (SI-06).	Cease	Cease readings due to hydraulic connection between VW7593 (SI-02) and nearby instruments. Coverage is provided by VW60020 and VW60025.
VW7594 (SI-03)	Readings show seasonal groundwater fluctuation between about 1107.2 m a.s.l. and 1108.5 m a.s.l. Groundwater levels are generally controlled by the elevation of the Flat River. Readings follow similar trends as VW6308, VW6309, VW7593 (SI-02), VW7595 (SI-04), VW7596 (SI-05), and VW7597 (SI-06).	Cease	Cease readings due to hydraulic connection between VW7594 (SI-03) and nearby instruments. Coverage is provided by VW60020 and VW60025.
VW7595 (SI-04)	Readings show seasonal groundwater fluctuation between about 1107.1 m a.s.l. and 1108.3 m a.s.l. Groundwater levels are generally controlled by the elevation of the Flat River. Readings follow similar trends as VW6308, VW6309, VW7593 (SI-02), VW7594 (SI-03), VW7596 (SI-05), and VW7597 (SI-06).	Cease	Cease readings due to hydraulic connection between VW7595 (SI-04) and nearby instruments. Coverage is provided by VW60020 and VW60025.
VW7596 (SI-05)	Readings show seasonal groundwater fluctuation between about 1107.1 m a.s.l. and 1108.1 m a.s.l. Groundwater levels are generally controlled by the elevation of the Flat River. Readings follow similar trends as VW6308, VW6309, VW7593 (SI-02), VW7594 (SI-03), VW7595 (SI-04), and VW7597 (SI-06).	Cease	Cease readings due to hydraulic connection between VW7596 (SI-05) and nearby instruments. Coverage is provided by VW60020 and VW60025.
VW7597 (SI-06)	Readings show seasonal groundwater fluctuation between about 1106.5 m a.s.l. and 1107.4 m a.s.l. Groundwater levels are generally controlled by the elevation of the Flat River. Readings follow similar trends as VW6308, VW6309, VW7593 (SI-02), VW7594 (SI-03), VW7595 (SI-04), VW7596 (SI-05).	Cease	Cease readings due to hydraulic connection between VW7597 (SI-06) and nearby instruments. Coverage is provided by VW60020 and VW60025.
VW18341	Readings show little fluctuation indicating that piezometers are installed above the groundwater table. Temperature readings are occasionally anomalous.	Cease	Cease readings due to lack of groundwater information provided by instrument.

Table 3-4: Slope Indicator Reading Summaries and Recommended Monitoring Intervals

Instrument ID	Instrument Reading Summary	Recommended Monitoring Interval	Notes
VW18344	Readings show little fluctuation indicating that piezometers are installed above the groundwater table. A large (approx. 3 m) drop in measured groundwater elevation was measured between consecutive readings in 2020 which was not reflected in other instruments; readings are not considered reliable. This drop may reflect recent permafrost thaw.	Cease	Cease readings due to lack of groundwater information provided by instrument.
VW20932	Readings show seasonal groundwater fluctuation between about 1111.5 m a.s.l. and 1117.2 m a.s.l. Instrument is installed between TP3 and TP5, away from embankments.	Cease	Cease readings due to instrument being located away from areas of possible slope instability.
VW20936	Readings show seasonal groundwater fluctuation between about 1130.5 m a.s.l. and 1140.7 m a.s.l. Instrument is installed in the northwest corner of TP5, away from embankments.	Cease	Cease readings due to instrument being located away from areas of possible slope instability.

Dataloggers are recommended as an optional approach for continued VWP monitoring to reduce onsite staff requirements. Suitable dataloggers for this monitoring program include RST datalogger models DT2011B (for single VWP installations) and DT2055B (for twinned VWP installations). Four DT2011B dataloggers and five DT2055B dataloggers would be required to eliminate the need for manual readings under the recommended monitoring program. Data would be downloaded annually (at a minimum) from these dataloggers shortly after freshet.

3.3.3 Geotechnical Inspections

Daily inspection of the tailings facilities is not required under care and maintenance, particularly during winter months. As a minimum, site inspections should be completed on a monthly basis and weekly during freshet as the snow pack melts and surface flows commence. Interim inspections may also be required after high precipitation or flow events.

An optional consideration for remote monitoring would be to install cameras at locations where surface erosion is possible or maintenance work has been historically performed.

4.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of North American Tungsten Corporation Ltd. Co Alvarez and Marsal Canada Inc. and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than North American Tungsten Corporation Ltd. Co Alvarez and Marsal Canada Inc., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

5.0 CLOSURE

We trust this technical memo meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
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Enclosure: Tables
Limitations on Use of this Document

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TABLES

Table 1: SNP Network

SNP station	Description Status	Status	Testing Frequency	Notes
4-1	Flat River at the Project and mill freshwater intake	Inactive	Continuously by in-line monitoring	
4-5	Flat River at bridge downstream of airstrip	Active	Monthly	
4-6	Inflow to Wastewater Treatment Facilities	Inactive	Monthly	Treatment Facilities not operational
4-9	Discharge of oil/Water separator at Metre 628 at Sardine Creek.	Inactive		
4-10	Any point between Tailings Pond 3 and Tailings Pond 4 where Seepage is visible	Inactive		
4-13	Discharge from “E” Zone	Active		Activated December 2018
4-20	Drainage culvert from Stinky Pond	Active	Every two weeks, and annually for toxicity testing	Sampling reduced to monthly when the WWTP is not discharging, and annually for toxicity testing 2016-08
4-21	Water Survey of Canada Stream gauge located on Flat River	Inactive		
4-27-2	Groundwater monitoring well MW-2	Inactive		
4-27-4	Groundwater monitoring well MW-5	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-7	Groundwater monitoring well BH-43	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-8	Groundwater monitoring well BH-44	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-9	Groundwater monitoring well BH-53, northwest of Polishing Pond	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-10	TP4-07-MW01. Replacement for SNP station 4-27-6; Groundwater monitoring well BH-42, and includes piezometers BH42-3, BH42-2, and BH42-1.	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-11	TP5-07-MW01	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12

Table 1: SNP Network

SNP station	Description Status	Status	Testing Frequency	Notes
4-27-12	TP3-07-MW01. Replacement for SNP station 4-27-3; TP3-07-MW01/A, and includes piezometers MW3-10, MW3-6, and MW3-1.	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-13	TP3-07-MW02. Replacement for SNP station 4-27-5: TP3-07-MW02/A, and includes piezometers MW6-13, MW6-8, and MW6-1.	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-14	Groundwater well southeast of Tailings Pond 5 (between small creek and Tailings Pond 5).	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-15	Groundwater well southeast of airstrip.	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-16	Groundwater well east of Tailings Ponds 1 and 2. Replacement for SNP station 4-27-1; Groundwater monitoring well MW-1, and includes piezometers MW1-10, MW1-6, and MW1-1.	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-17	Groundwater well upstream of the Project; background water quality.	Active	Three (3) times per year (approximately late June, August, and October)	Sampling reduced to annually 2018-12
4-27-18	Groundwater monitoring well (MW13-01) up-gradient of Tailings Storage Facility 7.	Active	Three (3) times per year (approximately late June, August, and October)	Removed 2016-08
4-27-19	Groundwater monitoring well down-gradient of Tailings Storage Facility 7.	Active	Three (3) times per year (approximately late June, August, and October)	Removed 2016-08
4-27-20	Groundwater monitoring well up-gradient of Tailings Storage Facility 6.	Active	Three (3) times per year (approximately late June, August, and October)	Removed 2016-08
4-27-21	Groundwater monitoring well (MW12-09) down-gradient of north end of Tailings Storage Facility 6.	Active	Three (3) times per year (approximately late June, August, and October)	Removed 2016-08
4-27-22	Groundwater monitoring well (MW12-3) down-gradient of middle of Tailings Storage Facility 6.	Active	Three (3) times per year (approximately late June, August, and October)	Removed 2016-08
4-27-23	Groundwater monitoring well (MW12-01 and MV12-02) down-gradient of south end of Tailings Storage Facility 6.	Active	Three (3) times per year (approximately late June, August, and October)	Removed 2016-08

Table 1: SNP Network

SNP station	Description Status	Status	Testing Frequency	Notes
4-28-1	Groundwater pumping well PW-1.	Active	Monthly, except total cyanide annually	
4-28-2	Groundwater pumping well PW-2.	Active	Three (3) times per year (approximately late June, August, and October)	
4-29	Flat River, three (3) kilometres upstream of pumphouse.	Active	Monthly	
4-30	Mill Tailings at Tails Box in Mill. Replacement for SNP station 4-11: Tailings Discharge pipe into active Tailings Pond.	Inactive	Monthly	
4-31	Sardine Creek Upstream of oil-water separator.	Inactive		
4-32	Sardine Creek.	Active	Monthly	
4-33	Far Field Downstream Station 8.5 km – Flat River. (Not accessible – helicopter access only).	Active	Monthly, if accessible	S4-33R established as alternate if inaccessible
4-33R	Flat River, west of Tailings Storage Facility 6. Alternate site for S4-33.	Active	Monthly	
4-34	Seepage down-gradient of the fuel berm.	Active	Monthly, when seepage is visible	
4-35	Decant from Sewage Disposal Facilities.	Inactive		
4-36	Any point between Tailings Pond 3 and the Flat River, where Seepage is visible.	Active	Monthly, when seepage is visible	
4-37	Any point between Tailings Pond 4 and the Flat River, where Seepage is visible.	Active	Monthly, when seepage is visible	
4-38	Any point between Tailings Pond 1 and the Flat River, where Seepage is visible.	Active	Monthly, when seepage is visible	
4-39	Any point between Tailings Pond 2 and the Flat River, where Seepage is visible.	Active	Monthly, when seepage is visible	
4-40	Surface Water point on Flat River between Tailings Ponds 2 and 4.	Active	Monthly	
4-41	Surface Water point on Flat River downstream of Tailings Pond 3.	Active	Monthly	
4-42	Minewater pump in the mill. This station is a replacement for 4-12: Discharge from conveyor gallery.	Active	Monthly	
4-43	Effluent from the Wastewater Treatment Facilities (sample port).	Active	Weekly	

Table 1: SNP Network

SNP station	Description Status	Status	Testing Frequency	Notes
4-44	Surface water point on Flat River approximately 180 metres downstream of drainage channel from Stinky Pond.	Active	When discharging at rates less than or equal to 4,500 m^3/day – sample monthly; or when discharging at rates above 4,500 m^3/day – sample weekly	Suspended December 2018
4-45	Middle Bridge, upstream of Stinky Pond Discharge to Flat River.	Active	Daily when required under Part G, item 37; otherwise, weekly	Flow measurement only
4-46	Thickener Overflow/Effluent.	Active	Monthly, when the Thickener is operating	
4-47	Collection point within Tailings Storage Facility 7 for Seepage/contact Water.	Active	Weekly, when water is present	
4-48	Collection point within Tailings Storage Facility 6 for Seepage/contact Water.	Active	Weekly, when water is present	
4-49	Flat River, west of the north end of Tailings Storage Facility 6.	Active	Monthly	Removed 2016-08
4-50	Flat River, immediately downstream of Tailings Storage Facility 6.	Active	Monthly	Removed 2016-08
5-2	Outflow from old Lagoon.	Active		Added December 2018

APPENDIX A

LIMITATIONS ON USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

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