

NWB Annual Report

Year being reported:

2016

License No: 2BE-HOP1222

Issued Date: June 30, 2012

Expiry Date: June 30, 2022

Project Name: Hope Bay Regional Exploration Project

Licensee: TMAC Resources

Mailing Address: 95 Wellington St. W.  
Suite 1010, PO Box 44  
TD Centre  
Toronto, Ontario M5J 2N7

Name of Company filing Annual Report (if different from Name of Licensee please clarify relationship between the two entities, if applicable):

Licence 2BE-HOP1222 was issued June 30, 2012 to Hope Bay Mining Ltd. Effective June 18, 2013, the NWB authorized the assignment of Licence 2BE - HOP1222 from Hope Bay Mining Ltd. To TMAC Resources Inc.

General Background Information on the Project (\*optional):

Licence 2BE-HOP1222 allows TMAC to carry out activities in support of exploration drilling at the Hope Bay Regional Exploration Project and the Windy Camp, which supports exploration activities.

Licence Requirements: the licensee must provide the following information in accordance with

Part B

Item 2

A summary report of water use and waste disposal activities, including, but not limited to: methods of obtaining water; sewage and greywater management; drill waste management; solid and hazardous waste management.

Water Source(s): Domestic from Windy Lake; drill water from local water sources

Water Quantity:	22995 cu.m	Quantity Allowable Domestic (cu.m)
	8437 cu. m.	Actual Quantity Used Domestic (cu.m)
	29200 cu.m	Quantity Allowable Drilling (cu.m)
	453 cu. m.	Total Quantity Used Drilling (cu.m)
	30600 cu.m	Quantity Allowable Dust Suppression (cu.m)
	336	Total Quantity Used Dust Suppression (cu.m)

Waste Management and/or Disposal

- ☒ Solid Waste Disposal  
☐ Sewage  
☒ Drill Waste  
☐ Greywater  
☐ Hazardous  
☒ Other:

Contaminated Soil

Additional Details:

Occupancy of the Old Windy Camp ended October 23, 2008 and dismantling and reclamation of the area is on-going.

Water was used from Windy Lake to supply domestic water to Doris Camp in accordance with 2BE-HOP1222 Part C, Item 1. Water used for drilling is taken from the closest lake to each drill in accordance with Part C Item 1, or for drill locations accessible by road or winter ice road, water is hauled by truck from Windy Lake. Water is supplied to a water tank at the drill, and recirculation to cool equipment occurs through this tank. Non-saline drill cuttings produced under this licence are deposited in a depression at Quarry D along the Doris-Windy AWR. Saline cuttings are removed to the Tailings Impoundment Area at the Doris Project.

The Waste Water Treatment Facility for management of domestic sewage at Old Windy Camp was relocated to the Boston Camp in 2010.

The Landfarm at Windy Camp and Bulk Fuel Storage Facilities at Windy Camp and Patch Lake have been dismantled and are in the process of reclamation. No effluent is produced at these locations.

Water accumulated in Quarries A, B and D is managed in accordance with the approved *Quarry A, B, D Management and Monitoring Plan* and the relevant sections of Part D of the licence. No discharges of water occurred from these sites in 2016.

**A list of unauthorized discharges and a summary of follow-up actions taken.**

Spill No.:  (as reported to the Spill Hot-line)

Date of Spill:

Date of Notification to an Inspector:

Additional Details: (impacts to water, mitigation measures, short/long term monitoring, etc)

No unauthorized discharges occurred in 2016 under licence 2BE-HOP1222.

### Revisions to the Spill Contingency Plan

Other: (see additional details)



#### Additional Details:

See Item 5 of attached Annual Report Supplement for details.

### Revisions to the Abandonment and Restoration Plan

Other: (see additional details)



#### Additional Details:

A revised Closure Plan for the licence was submitted to the NWB on May 26, 2014 and confirmation was received from the NWB August 27, 2014 that the plan was approved. No revisions are provided this year.

### Progressive Reclamation Work Undertaken

Additional Details (i.e., work completed and future works proposed)

See Item 6 of attached Annual Report Supplement for details.

### Results of the Monitoring Program including:

**The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where sources of water are utilized;**

Details described below



#### Additional Details:

The coordinates for the freshwater intake (HOP-1) are in the attached coordinates file.  
Drilling water source coordinates are maintained on file by the TMAC Exploration Department for all water sources utilized proximal to the drill targets.

**The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where wastes associated with the licence are deposited;**

Details described below



#### Additional Details:

Monitoring Stations HOP-2 and HOP-3 had no discharge, as Windy Camp has been closed since 2008 and these facilities were not operational in 2016. Discharges did not occur at the monitoring station HOP-4, as the landfarm at the location was dismantled in 2008.

Monitoring Stations HOP-5 and HOP-6 had no discharges in 2016, as these fuel storage facilities were decommissioned in 2012.

No discharges occurred at Quarries A, B or D (HOP-7a, b and d), as no water accumulated at these locations.

**Results of any additional sampling and/or analysis that was requested by an Inspector**

No additional sampling requested by an Inspector or the Board ▼

Additional Details: (date of request, analysis of results, data attached, etc)

N/A

**Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.**

No additional sampling requested by an Inspector or the Board ▼

Additional Details: (Attached or provided below)

N/A

**Any responses or follow-up actions on inspection/compliance reports**

Inspection and Compliance Report received by the Licensee (Date): ▼

Additional Details: (Dates of Report, Follow-up by the Licensee)

Details are set out at Item 4 of the attached supplement.

**Any additional comments or information for the Board to consider**

Please see attached supplement for additional information requirements set out in Licence No. 2BE-HOP1222.

**Date Submitted:**

March 31, 2017

**Submitted/Prepared by:**

John Roberts

**Contact Information:**

**Tel:** 416-628-0216 Ext 109

**Fax:**

**email:** [john.roberts@tmac.com](mailto:john.roberts@tmac.com)

### GPS Coordinates for water sources utilized

Source Description	Latitude			Longitude		
	Deg °	Min ,	Sec '	Deg °	Min ,	Sec '
HOP-1 - Raw water supply intake at Windy Lake	68	3	38	106	37	6
Raw water supply intake at Doris Lake	68	8	4	106	35	51
Patch Lake to support regional exploration efforts	68	3	1	106	33	25
Unnamed Lake to support regional exploration efforts	67	59	0	106	37	23
Unnamed Lake to support regional exploration efforts	68	5	11	106	36	9

### GPS Locations of areas of waste disposal

Location Description (type)	Latitude			Longitude		
	Deg °	Min ,	Sec '	Deg °	Min ,	Sec '



**2016 2BE-HOP1222 Type B Water Licence  
Annual Report  
Supplemental Document**

**Hope Bay Regional Exploration Program**

**Nunavut Water Board**

Prepared by  
TMAC Resources Inc.  
Toronto, ON

Prepared for  
Nunavut Water Board  
Gjoa Haven, NU

March 2017

## **Executive Summary**

### **2BE-HOP1222 Annual Report**

TMAC Resources Inc. (“TMAC”) has filed its Annual Report on its activities during 2016 under Water Licence No. 2BE-HOP1222 issued by the Nunavut Water Board. As set out in Part B Item 2 of the Licence, the report includes information with respect to the following topics:

- a summary report of water use and waste disposal activities
- a summary of all information requested and results of the Monitoring Program
- a list of unauthorized discharges and a summary of follow-up actions taken
- a brief description of follow-up actions taken to address concerns detailed in inspection and compliance reports prepared by the Inspector
- an update to the Spill Contingency Plan, if required, including contact information in the form of an addendum
- a description of all progressive and/or final reclamation work undertaken, including photographic records of site conditions before, during and after completion of operations
- a summary of modification and/or major maintenance work carried out on the water supply and waste disposal facilities, including all associated structures, and an outline of any work anticipated for the next year
- a summary of any specific studies or reports requested by the board, and a brief description of future studies planned or proposed
- any other details on water use or waste disposal requested by the board

**Atanguyan Naetomik Okaohen  
2BE-HOP1222 Ukeotoagaagan Unipkaak**

TMAC Resources Inc.-kon (“TMAC-kon”) tonihimaliktaan Ukeotoagaagan Unipkagiyaktik havaamigun 2016-mi ilagani Imaknik Atoknigagun Laeseoyum Napaani 2BE-HOP1222-mi toniyaohimayok Nunavumi Imalikiyin Katimayinin. Okaotaoyomi Ilagani B Titigaknigani 2 Laeseoyum, unipkaak ilakaktok hivonikhiyotikhanik ukuniga:

- naetomik okaohik imaknik atoknigagun atakugutiniklo havaoheoyonik
- naetomik okaohik tamaenik hivonikhiyotikhanik tukhigaoyonik kanogilinigilo Amigiyotinun Havaami
- titigaknigin agiktaohimagitun kuvipkaeyotin naetomiklo okaohik kigoagun havaanik
- naetomi okateagun kigoani havaanik ihoakhiyaagani ihomalutaoyun okateakhimayun ihivgeokhiyotik atoteaknigagulo unipkaagini Ihivgeokhiyin
- kaogiliniganik Kuviyokakan Havaakhanun Opaogaeyaon, piyageakakan, okakatikhaniklo hivonikhiyotik makpigaami oegugilogo
- okateagutin tamaeta atoenaktun kigulelo nunan utiktiniganun havaagiyaoyun, ilakaklotik piksaleoganik iglukpakakveom kanoginiganik hivoani, havaktilogin inikmatalo
- naetomik okaohik ihoakhaotik agiyoniklunen hanayotik imiktakvikni atagukviknilo, ukoalo tamaeta iglukpaen atoktun, kanogitoniklo havaanik nahogiyamiknik atoktukhani ukeomi
- naetomik okaohik kituniklikaa naonaeyaotik unipkaanilunen tukhiktaenik katimayin, naetomiklo okaohik hivonikhami ilitokhaotik opalogaeyaotinun atoktaoyomayoniklunen
- hunaniklikaa ahenik okateagutinik imaknik atoknigagun atagukveoyoniklo tukhiktaenik katimayin



**ጋኒሴካ ፌዴራል ኮሚሽን**  
**2BE-HOP1222 የኢትዮጵያ ጋኒሴካ**

ፅድቅ TMAC Resources Inc.-ድር በበኖኤሚሮ ላይገኛቸው የሚገኙትን ለፅድቅ 2016-ፖ  
ፈጥሮአዊነት ፅድቅ No. 2BE-HOP1222 ጋራውሮቶም ወደፊት ፈጥሮአዊነት ከበረከቶር. ፅድቅ  
ፈጥሮ B ለኖር 2 ርዕሰነትበም, ጋራነት ለፅድቅ ጋራነት ለኖርቶም ለፅድቅ:

- [illegible]

## **Résumé opérationnel 2BE-HOP1222 Rapport annuel**

TMAC Resources Inc. (« TMAC ») a déposé son rapport annuel sur ses activités au cours de l'année 2016 en conformité avec le Permis no 2BE-HOP1222 émis par l'Office des eaux du Nunavut (Nunavut Water Board), tel qu'énoncé dans la partie B, point 2, du permis. Le rapport comprend des renseignements sur les sujets suivants :

- un aperçu de l'utilisation et du traitement de l'eau et de l'évacuation des rejets
- un résumé des résultats du programme de surveillance des requêtes au sujet du programme
- une liste des déversements non autorisés et un résumé des mesures de suivi prises à la suite de ces incidents
- une brève description des mesures de suivi prises pour régler les problèmes décrits dans les rapports d'inspection et de conformité établies par l'inspecteur
- si nécessaire, une mise à jour du plan d'urgence en cas de déversement « Spill Contingency Plan », comprenant une liste de contacts et leurs coordonnées pour le signalement des déversements fournie sous forme d'addenda
- une description de tous les travaux de remise progressive et terminés qui ont été entrepris, y compris les documents photographiques des conditions du site avant, pendant et après l'achèvement des travaux de remise
- un résumé des travaux d'entretien mineurs ou des travaux majeurs effectués sur les réserves d'eau potable et les installations d'élimination des résidus miniers et de toutes leurs composantes s'y rattachant, ainsi qu'un aperçu des travaux prévus l'année suivante
- un résumé des rapports ou études scientifiques exigés par l'Office et une brève description des éventuelles recherches ou celles prévues par l'Office
- tout autre détail en lien avec l'utilisation et du traitement de l'eau et de l'évacuation des rejets, tel que demandé par l'Office

## Table of Contents

1. A summary report of water use and waste disposal activities [see Part B Item 2 (a)].....	1
2. A summary of all information requested and results of the Monitoring Program [see Part B Item 2 (b) and Part J Item 21] .....	1
3. A list of unauthorized discharges and a summary of follow-up actions taken [see Part B Item 2 (c)].....	1
4. A brief description of follow-up action taken to address concerns detailed in inspection and compliance reports prepared by the Inspector [see Part B Item 2 (d)] .....	1
5. An update to the Spill Contingency Plan, if required, including contact information in the form of an addendum [see Part B Item 2 (e)] .....	1
6. A description of all progressive and or final reclamation work undertaken, including photographic records of site conditions before, during and after completion or operations [see Part B Item 2 (f)] .....	1
7. A summary of modification and/or major maintenance work carried out on the Water Supply and the Waste Disposal Facilities, including all associated structures, and an outline of any work anticipated for the next year [see Part B Item 2 (g)].....	1
8. A summary of any specific studies or reports requested by the Board, and a brief description of any future studies planned or proposed [see Part B Item 2 (h)] .....	2
9. Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported [see Part B Item 2 (i)].....	2
10. Report of any artesian flow occurrences [see Part F Item 3] .....	2
11. Where drilling activity has penetrated below the permafrost layer, the NWB requests that the proponent record the depth of permafrost and location of the drill hole to be included within the Annual Report [see Part F Item 4] .....	3

## List of Tables

Table 1 Summary of 2016 Annual Inspection Activities.....	1
Table 2 - Volume of Water Utilized for Camp, Drilling and Other Purposes, 2016, in cubic meters (m <sup>3</sup> )* .....	6

## List of Figures

Figure 1. August 2015 aerial view of Patch Cuttings Sump with cap (right side of pad above) showing vegetation recovery. Photo looking East.....	<b>Error! Bookmark not defined.</b>
Figure 1. July 2016 aerial view of Patch Cuttings Sump with cap (bottom right side of pad above) showing vegetation recovery downstream of the sump. Photo looking North-East.....	2

## List of Appendices

Appendix A: Annual Monitoring Report – 2BE-HOP1222	
--	--



**1. A summary report of water use and waste disposal activities [see Part B Item 2 (a)]**

General details on water use and waste disposal activities under licence 2BE-HOP1222 can be found in the annual report form. Further details on water use in 2016 are presented in part B of Appendix A.

Windy Camp was not operational in 2016 so no domestic waste was produced and an incinerator was not put into service. Waste produced in support of the Regional Exploration surface drilling program was transported to Doris Camp and disposed of appropriately and as outlined in the Hope Bay Project Hazardous Waste Management Plan (April 2016) and Non-Hazardous Waste Management Plans (November 2016).

**2. A summary of all information requested and results of the Monitoring Program [see Part B Item 2 (b) and Part J Item 21]**

This information is set out in Appendix A to this document.

**3. A list of unauthorized discharges and a summary of follow-up actions taken [see Part B Item 2 (c)]**

No unauthorized discharges occurred pertaining to this licence in 2016.

**4. A brief description of follow-up action taken to address concerns detailed in inspection and compliance reports prepared by the Inspector [see Part B Item 2 (d)]**

In 2016 TMAC hosted regulatory inspections from INAC, NIRB and KIA on the Hope Bay Project. Details of when those visits occurred and a summary of the reports and follow up from those visits are detailed in Table below.



**Table 1 Summary of 2016 Annual Inspection Activities**

Date	Agency	Summary	Follow up	Response
April 5-7, 2016	Indigenous and Northern Affairs Canada	<p>Inspection to verify compliance with the Type A water license, 2AM-DOH1323. The inspection focused on uses of water, waste management, and new construction/changes at site.</p> <p>Section 2 – Non-Compliance with Act or License; D.23: The license shall not use Waste Rock from underground for any purpose, including the construction of any infrastructure, unless otherwise approved by the Board under Part G, Item 9 and in accordance with the plan provided under Part G, Item 14, revised and approved accordingly. TMAC has converted the existing waste rock pile to an ore storage pad. TMAC must ensure that that changes to plans are reviewed and approved by the Board prior to implementation in the future.</p>	<ol style="list-style-type: none"> <li>1. Continue recording and reporting water used for all purposes, including ice road development.</li> <li>2. Resume seasonal backhauls of hazardous waste as per Hazardous Waste Management Plan.</li> <li>3. Monitor drainage function of, and sediment resulting from, newly constructed works.</li> <li>4. Monitor dustfall as per licence requirements.</li> <li>5. Ensure extensive sediment control measures during spring freshet.</li> <li>6. Ensure that changes to licensed facilities are approved prior to implementation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Acknowledged. TMAC has continued to record and report all water used, and has also recorded and reported water applied to ice roads.</li> <li>2. TMAC made one test backhaul of packaged waste by air in December (the material was a non-hazardous animal attractant) and will commence routine air backhaul of Hazardous Wastes in 2017, making use of flight and/or sealift backhaul opportunities. TMAC is also working with shippers to arrange backhaul of waste stored in sea containers.</li> <li>3. Prior to freshet, sediment control (rolled coconut matting) was placed downslope of the newly constructed Tailings Impoundment Area (TIA) roadway to ensure sediment was not flushed to a natural water body. During freshet, monitoring along the roadway indicated no runoff of sediment-laden water or drainage concerns.</li> </ol> <p>As is the case with all roads constructed on site, only rock is used for construction. This minimizes or eliminates potential for sediment runoff in most areas, except where overburden has been previously removed. In areas of overburden removal fine sediments may be exposed and/or liberated and sediment control measures may be appropriate. Generally, removal of overburden is not conducted in road building or pad expansion. Overburden disruption is also minimized by constructing roads while the ground is frozen. 2016 construction activities have not required overburden removal.</p> <ol style="list-style-type: none"> <li>4. TMAC continues to monitor dustfall routinely at the Doris Project, and results are reported to the Board. The Doris Air Quality Management Plan was revised in 2016, with improvements made in winter dustfall collection methodologies and overall sampling design.</li> <li>5. To limit sediment runoff during freshet of 2016, sediment controls (coconut matting) were installed across surface drainages downslope of areas with notable visible dust. Visual</li> </ol>

				<p>inspections were also conducted during freshet to ensure runoff did not contain excessive quantities of dust; no turbid runoff was noted.</p> <p>6. Acknowledged, TMAC will seek approval where required.</p>
June 21-22, 2016	Kitikmeot Inuit Association	<p>On June 21-22 the KIA inspected the Doris Commercial Lease area and infrastructure including Roberts Bay, the Jetty, Doris Site and Area, the North Dam at Tail Lake, and the Doris Windy, All- Weather Road. Windy Camp and Boston were also toured. An inspection report was not issued for this visit.</p>	No follow up actions required at this time.	
August 26, 2016	Nunavut Impact Review Board	<p>The NIRB Monitoring Officer, and Technical Advisor, conducted the 2016 NIRB site visit and flew on August 26, 2016 from Cambridge Bay, Nunavut to the Doris Project site.</p> <p>Sites Visit included inspection of Roberts Bay, All-weather road and airstrip, Camp site and mine facilities, Tailings Impoundment Area.</p> <p>Overall, TMAC has generally complied with the original Project Certificate No. 003 Terms and Conditions, the site remains in good condition as TMAC progresses construction in preparation for operations.</p>	On November 4, 2016 NIRB issued 6 recommendations along with the 2015-2016 Annual Monitoring Report for the Doris Project.	TMAC submitted a response to these recommendations on February 3, 2017. A copy of the NIRB Site visit report, and Board recommendations and TMAC's response can be found on the NIRB Public registry.



August 9-12, 2016	Environment and Climate Change Canada	Inspection of the contact water management at the Doris site, explosives storage area and waste management facilities at Roberts Bay.	1. Inspector requested testing record for fuel procured for site. 2. ECCC requested that TMAC provide documentation on what entity imports fuel for site.	TMAC provided analysis results for ultra low sulphur diesel fuel procured and confirmed that TMAC was not an importer of fuel.
November 4-5, 2016	Indigenous and Northern Affairs Canada	Inspection to verify compliance with the Water licence(s) Windy Licence, 2BE-HOP12222 and 2AM-DOH1323. Inspector noted that the site conditions and practice are found to be generally excellent, even with increased levels of activity and personal.	1. Inspector requested that TMAC notify them when waste backhaul begins. 2. Inspector requested that secondary containment is maintained by removing snow regularly through the winter.	1. As noted above, TMAC made one test backhaul of packaged waste (kitchen grease) in 2016 and plans additional backhauls of hazardous waste via air in 2017. TMAC acknowledges this request and will report backhaul in monthly reports. 2. Snow removal occurs routinely throughout the winter on an as needed basis to maintain adequate containment capacity.



**5. An update to the Spill Contingency Plan, if required, including contact information in the form of an addendum [see Part B Item 2 (e)]**

TMAC has an approved Hope Bay Project Spill Contingency Plan (April 2016) which will be utilized to safeguard against accidental spills of harmful substances that may negatively affect the environment. This plan was developed in accordance with the Spill Contingency Planning and Reporting Regulations developed under Section 34 the Government of Nunavut's *Environmental Protection Act* (RSNWT Nu1988), and was developed specifically to address the requirements of Water Licences 2AM-DOH1323, 2BE-HOP1222 and 2BB-BOS1217, and Project Certificate Number 003. This plan provides a consistent spill response framework that is available to all site personnel so they can effectively and efficiently respond to a spill of petroleum products and/or hazardous materials regardless of where on the Hope Bay site they are encountered. An update to this plan was issued to the NWB in February 2017 as per the requirement of the amended Type A Water Licence 2AM-DOH1323 (December 2016).

**6. A description of all progressive and or final reclamation work undertaken, including photographic records of site conditions before, during and after completion or operations [see Part B Item 2 (f)]**

No progressive or final reclamation work was completed in this licence area in 2016.

**7. A summary of modification and/or major maintenance work carried out on the Water Supply and the Waste Disposal Facilities, including all associated structures, and an outline of any work anticipated for the next year [see Part B Item 2 (g)]**

Windy Camp was closed on October 23, 2008. In 2010, the Waste Water Treatment Facility for management of domestic sewage at Old Windy Camp was removed to the Boston Camp. No modification and/or maintenance work was carried out on the Waste Disposal Facilities in 2016.

Water is obtained from Windy Lake (ST-7a) for use at Doris Camp under 2AM-DOH1323 and as allowed under 2BE-HOP1222. Water is taken up through a screened intake and sunken heat-traced line by a permanent pump house, which is used as needed to fill a water truck that transports the water to Doris Camp for use. In 2016, a second screened and heat-traced intake line was installed at the Windy Lake pump house. This new intake line is approximately 10 m longer than the original line and was installed to access deeper water that is less influenced by turbidity created during natural spring runoff. Notification of this modification was provided on April 15, 2016. Unlike the original intake line, this line floats on the surface of Windy Lake and is susceptible to damage during ice break-up in the spring. For this reason, the longer intake line will be replaced with a sunken heat-traced line in 2017. The new line will be screened at the intake and of similar length to the intake line installed in 2016. Notification of this modification was provided on December 13, 2016. DFO guidance for the installation will be honored as with the current installation.

**8. A summary of any specific studies or reports requested by the Board, and a brief description of any future studies planned or proposed [see Part B Item 2 (h)]**

In response to the INAC inspection in July 2015, TMAC indicated that monitoring of seepage from the historical Patch Cuttings sump would be undertaken seasonally. Water quality monitoring of the sump and downstream impacted area was conducted in 2016. Chloride concentrations and conductivity measurements from samples of surface water near the sump indicated improvement in comparison to 2013 and 2014 results (i.e. the years prior to sump capping), and vegetation in the area has continued to show recovery (see Figure 1). Similar monitoring will continue in 2017 to confirm continued improvement and effectiveness of mitigation applied in 2015.



**Figure 1. July 2016 aerial view of Patch Cuttings Sump with cap (bottom right side of pad above) showing vegetation recovery downstream of the sump. Photo looking North-East.**

**9. Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported [see Part B Item 2 (i)]**

No other details on water use or waste disposal were requested by the Board by November 1, 2016.

**10. Report of any artesian flow occurrences [see Part F Item 3]**

No artesian flow occurrences were encountered in 2016.

**11. Where drilling activity has penetrated below the permafrost layer, the NWB requests that the proponent record the depth of permafrost and location of the drill hole to be included within the Annual Report [see Part F Item 4]**

For areas where exploration is carried out, depth of permafrost is calculated using thermistor strings that measure ground temperature, installed in geotechnical drill holes (thermistor strings are not installed in all drill holes). The thermistor strings are used because it is not possible to visually assess when a drill hole has passed through the permafrost layer. Results obtained from the thermistor strings are used to extrapolate the lower depth of permafrost using thermal gradient. There are several such thermistor strings throughout the Hope Bay Belt and measurements are taken on an on-going basis. Historically permafrost extrapolated from thermistor data has shown a depth of permafrost between 440m to 570m

## **Appendix A**

### **Annual Monitoring Report – 2BE-HOP1222**

#### **a) Summary of Monitoring Information**

The following tables summarize the results of sampling undertaken as part of the monitoring program detailed in Part J of 2BE-HOP1222.

The camp water treatment and wastewater treatment facility (WWTF) permitted under this licence was not operational in 2016, therefore no sampling was conducted at monitoring stations HOP-1 (freshwater intake), HOP-2 (WWTF discharge), or HOP-3 (point of entry of WWTF discharge to Windy Lake). Water was utilized from Windy Lake for domestic consumption at Doris Camp and the monitoring station ST-7a (HOP-1) was sampled for the monitoring criteria under the Doris North Water Licence 2AM-DOH1323. For the ST-7a results see the 2AM-DOH1323 annual report. The Landfarm at Windy Camp (HOP-4) was dismantled in 2008, so no sampling was conducted at this monitoring station.

The bulk fuel storage tanks at Windy Camp were moved to Doris Camp in winter 2009 for use there, and the bulk fuel storage berm (HOP-5) was dismantled in 2012. The bulk fuel storage berm at Patch Lake laydown (HOP-6) was also dismantled in 2012. No sampling was conducted at either of these monitoring stations.

No sampling occurred at monitoring stations HOP-7A HOP-7B, or HOP-7D (located in Quarries A, B, and D, respectively) during 2016 because there was no ponded water to sample.

On-ice exploration drilling did not occur in the licence area in 2016, therefore no samples were taken through lake ice (required by Part F Item 7 and Part J Item 7) to establish water quality prior to, and upon completion of, an on-ice drilling program.

#### **b) Quantities of water utilized for camp, drilling and other purposes**

During 2016, a total of 8437 m<sup>3</sup> of water was used from Windy Lake for domestic purposes at Doris Camp. This included consumption for drinking water, all camp domestic water supply, some ancillary domestic use for provisioning of portable wash cars, and filling site mobile fire suppression units. No water was used domestically at Windy Camp. A total of 336 m<sup>3</sup> of water was used from Windy Lake in 2016 for dust suppression on the Doris-Windy All-Weather Road. Exploration drill water usage occurred between April and July from Patch, Windy and Doris Lakes, and two unnamed lakes proximal to the drill locations. All drill usage from raw lake sources was metered or measured by truck haul load when holding tanks were filled. Water was recirculated from the drills to the holding tanks for equipment cooling and to prevent line freezing. Daily water utilization is provided in 2. No withdrawals exceeded water licence allotments.

No water was applied for the development of ice roads in the licence area in 2016.

**Table 2 - Volume of Water Utilized for Camp, Drilling and Other Purposes, 2016, in cubic meters (m<sup>3</sup>)\***

<b>Date</b>	<b>Dust Suppression (m<sup>3</sup>)</b>	<b>Regional Drill Water Usage Total (m<sup>3</sup>)</b>	<b>Domestic Water Consumption at Doris (m<sup>3</sup>)</b>	<b>Total Daily Usage (m<sup>3</sup>)</b>
Jan-01	0	0	20	20
Jan-02	0	0	20	20
Jan-03	0	0	20	20
Jan-04	0	0	20	20
Jan-05	0	0	20	20
Jan-06	0	0	20	20
Jan-07	0	0	20	20
Jan-08	0	0	20	20
Jan-09	0	0	10	10
Jan-10	0	0	30	30
Jan-11	0	0	20	20
Jan-12	0	0	20	20
Jan-13	0	0	10	10
Jan-14	0	0	10	10
Jan-15	0	0	15	15
Jan-16	0	0	10	10
Jan-17	0	0	10	10
Jan-18	0	0	20	20
Jan-19	0	0	10	10
Jan-20	0	0	30	30
Jan-21	0	0	20	20
Jan-22	0	0	0	0
Jan-23	0	0	25	25
Jan-24	0	0	15	15
Jan-25	0	0	15	15
Jan-26	0	0	20	20
Jan-27	0	0	20	20
Jan-28	0	0	20	20
Jan-29	0	0	20	20
Jan-30	0	0	20	20
Jan-31	0	0	10	10
Feb-01	0	0	30	30
Feb-02	0	0	20	20
Feb-03	0	0	10	10
Feb-04	0	0	20	20
Feb-05	0	0	20	20
Feb-06	0	0	20	20
Feb-07	0	0	20	20
Feb-08	0	0	20	20
Feb-09	0	0	20	20
Feb-10	0	0	20	20
Feb-11	0	0	20	20
Feb-12	0	0	20	20
Feb-13	0	0	10	10
Feb-14	0	0	20	20
Feb-15	0	0	30	30
Feb-16	0	0	20	20
Feb-17	0	0	20	20



<b>Date</b>	<b>Dust Suppression (m<sup>3</sup>)</b>	<b>Regional Drill Water Usage Total (m<sup>3</sup>)</b>	<b>Domestic Water Consumption at Doris (m<sup>3</sup>)</b>	<b>Total Daily Usage (m<sup>3</sup>)</b>
Feb-18	0	0	20	20
Feb-19	0	0	28	28
Feb-20	0	0	18	18
Feb-21	0	0	19	19
Feb-22	0	0	20	20
Feb-23	0	0	20	20
Feb-24	0	0	20	20
Feb-25	0	0	20	20
Feb-26	0	0	20	20
Feb-27	0	0	30	30
Feb-28	0	0	30	30
Feb-29	0	0	20	20
Mar-01	0	0	20	20
Mar-02	0	0	30	30
Mar-03	0	0	20	20
Mar-04	0	0	30	30
Mar-05	0	0	20	20
Mar-06	0	0	20	20
Mar-07	0	0	30	30
Mar-08	0	0	0	0
Mar-09	0	0	24	24
Mar-10	0	0	20	20
Mar-11	0	0	20	20
Mar-12	0	0	20	20
Mar-13	0	0	20	20
Mar-14	0	0	20	20
Mar-15	0	0	20	20
Mar-16	0	0	20	20
Mar-17	0	0	20	20
Mar-18	0	0	30	30
Mar-19	0	0	20	20
Mar-20	0	0	30	30
Mar-21	0	0	20	20
Mar-22	0	0	20	20
Mar-23	0	0	20	20
Mar-24	0	0	30	30
Mar-25	0	0	20	20
Mar-26	0	0	20	20
Mar-27	0	0	20	20
Mar-28	0	0	30	30
Mar-29	0	0	25	25
Mar-30	0	0	15	15
Mar-31	0	0	25	25
Apr-01	0	0	24	24
Apr-02	0	0	20	20
Apr-03	0	0	17	17
Apr-04	0	0	18	18
Apr-05	0	0	25	25
Apr-06	0	0	18	18
Apr-07	0	0	25	25
Apr-08	0	0	20	20

<b>Date</b>	<b>Dust Suppression (m<sup>3</sup>)</b>	<b>Regional Drill Water Usage Total (m<sup>3</sup>)</b>	<b>Domestic Water Consumption at Doris (m<sup>3</sup>)</b>	<b>Total Daily Usage (m3)</b>
Apr-09	0	0	28	28
Apr-10	0	0	20	20
Apr-11	0	0	15	15
Apr-12	0	0	10	10
Apr-13	0	0	20	20
Apr-14	0	0	20	20
Apr-15	0	0	20	20
Apr-16	0	0	20	20
Apr-17	0	32	20	52
Apr-18	0	16	20	36
Apr-19	0	0	30	30
Apr-20	0	15	20	35
Apr-21	0	0	30	30
Apr-22	0	0	20	20
Apr-23	0	14	30	44
Apr-24	0	0	20	20
Apr-25	0	0	30	30
Apr-26	0	10	25	35
Apr-27	0	5	20	25
Apr-28	0	0	19	19
Apr-29	0	6	28	34
Apr-30	0	6	23	29
May-01	0	0	20	20
May-02	0	0	25	25
May-03	0	0	28	28
May-04	0	12	10	22
May-05	0	0	35	35
May-06	0	0	25	25
May-07	0	10	20	30
May-08	0	12	19	31
May-09	0	3	20	23
May-10	0	5	30	35
May-11	0	0	20	20
May-12	0	0	20	20
May-13	0	16	30	46
May-14	0	0	30	30
May-15	0	16	20	36
May-16	0	0	30	30
May-17	0	0	20	20
May-18	0	0	30	30
May-19	0	16	20	36
May-20	0	15	30	45
May-21	0	0	20	20
May-22	0	0	30	30
May-23	0	16	20	36
May-24	0	0	20	20
May-25	0	0	20	20
May-26	0	16	30	46
May-27	0	12	20	32
May-28	0	12	27	39
May-29	0	0	19	19

<b>Date</b>	<b>Dust Suppression (m<sup>3</sup>)</b>	<b>Regional Drill Water Usage Total (m<sup>3</sup>)</b>	<b>Domestic Water Consumption at Doris (m<sup>3</sup>)</b>	<b>Total Daily Usage (m3)</b>
May-30	182	0	20	202
May-31	0	0	28	28
Jun-01	0	0	25	25
Jun-02	112	0	24	136
Jun-03	42	0	26	68
Jun-04	0	0	24	24
Jun-05	0	0	30	30
Jun-06	0	0	24	24
Jun-07	0	0	30	30
Jun-08	0	0	20	20
Jun-09	0	0	20	20
Jun-10	0	0	20	20
Jun-11	0	0	30	30
Jun-12	0	0	30	30
Jun-13	0	19	10	29
Jun-14	0	0	30	30
Jun-15	0	6	20	26
Jun-16	0	0	30	30
Jun-17	0	0	20	20
Jun-18	0	0	20	20
Jun-19	0	16	20	36
Jun-20	0	0	20	20
Jun-21	0	16	30	46
Jun-22	0	6	24	30
Jun-23	0	0	19	19
Jun-24	0	10	30	40
Jun-25	0	10	20	30
Jun-26	0	0	20	20
Jun-27	0	0	19	19
Jun-28	0	15	29	44
Jun-29	0	4	24	28
Jun-30	0	12	25	37
Jul-01	0	4	27	31
Jul-02	0	10	23	33
Jul-03	0	0	27	27
Jul-04	0	5	27	32
Jul-05	0	0	29	29
Jul-06	0	0	20	20
Jul-07	0	0	11	11
Jul-08	0	10	29	39
Jul-09	0	10	19	29
Jul-10	0	5	24	29
Jul-11	0	10	26	36
Jul-12	0	10	30	40
Jul-13	0	10	20	30
Jul-14	0	0	30	30
Jul-15	0	0	20	20
Jul-16	0	0	20	20
Jul-17	0	0	20	20
Jul-18	0	0	30	30
Jul-19	0	0	30	30

<b>Date</b>	<b>Dust Suppression (m<sup>3</sup>)</b>	<b>Regional Drill Water Usage Total (m<sup>3</sup>)</b>	<b>Domestic Water Consumption at Doris (m<sup>3</sup>)</b>	<b>Total Daily Usage (m3)</b>
Jul-20	0	0	20	20
Jul-21	0	0	20	20
Jul-22	0	0	20	20
Jul-23	0	0	20	20
Jul-24	0	0	20	20
Jul-25	0	0	20	20
Jul-26	0	0	17	17
Jul-27	0	0	20	20
Jul-28	0	0	25	25
Jul-29	0	0	28	28
Jul-30	0	0	15	15
Jul-31	0	0	24	24
Aug-01	0	0	24	24
Aug-02	0	0	30	30
Aug-03	0	0	20	20
Aug-04	0	0	26	26
Aug-05	0	0	20	20
Aug-06	0	0	24	24
Aug-07	0	0	24	24
Aug-08	0	0	23	23
Aug-09	0	0	25	25
Aug-10	0	0	20	20
Aug-11	0	0	25	25
Aug-12	0	0	28	28
Aug-13	0	0	18	18
Aug-14	0	0	25	25
Aug-15	0	0	28	28
Aug-16	0	0	30	30
Aug-17	0	0	20	20
Aug-18	0	0	20	20
Aug-19	0	0	20	20
Aug-20	0	0	0	0
Aug-21	0	0	20	20
Aug-22	0	0	20	20
Aug-23	0	0	30	30
Aug-24	0	0	31	31
Aug-25	0	0	19	19
Aug-26	0	0	30	30
Aug-27	0	0	20	20
Aug-28	0	0	20	20
Aug-29	0	0	30	30
Aug-30	0	0	28	28
Aug-31	0	0	61	61
Sep-01	0	0	30	30
Sep-02	0	0	20	20
Sep-03	0	0	20	20
Sep-04	0	0	20	20
Sep-05	0	0	25	25
Sep-06	0	0	25	25
Sep-07	0	0	25	25
Sep-08	0	0	20	20

<b>Date</b>	<b>Dust Suppression (m<sup>3</sup>)</b>	<b>Regional Drill Water Usage Total (m<sup>3</sup>)</b>	<b>Domestic Water Consumption at Doris (m<sup>3</sup>)</b>	<b>Total Daily Usage (m3)</b>
Sep-09	0	0	24	24
Sep-10	0	0	26	26
Sep-11	0	0	21	21
Sep-12	0	0	27	27
Sep-13	0	0	36	36
Sep-14	0	0	20	20
Sep-15	0	0	20	20
Sep-16	0	0	24	24
Sep-17	0	0	20	20
Sep-18	0	0	20	20
Sep-19	0	0	30	30
Sep-20	0	0	20	20
Sep-21	0	0	30	30
Sep-22	0	0	20	20
Sep-23	0	0	20	20
Sep-24	0	0	20	20
Sep-25	0	0	30	30
Sep-26	0	0	20	20
Sep-27	0	0	30	30
Sep-28	0	0	15	15
Sep-29	0	0	27	27
Sep-30	0	0	25	25
Oct-01	0	0	20	20
Oct-02	0	0	26	26
Oct-03	0	0	20	20
Oct-04	0	0	20	20
Oct-05	0	0	30	30
Oct-06	0	0	22	22
Oct-07	0	0	26	26
Oct-08	0	0	39	39
Oct-09	0	0	20	20
Oct-10	0	0	30	30
Oct-11	0	0	30	30
Oct-12	0	0	28	28
Oct-13	0	0	20	20
Oct-14	0	0	30	30
Oct-15	0	0	20	20
Oct-16	0	0	20	20
Oct-17	0	0	30	30
Oct-18	0	0	20	20
Oct-19	0	0	20	20
Oct-20	0	0	20	20
Oct-21	0	0	30	30
Oct-22	0	0	30	30
Oct-23	0	0	10	10
Oct-24	0	0	20	20
Oct-25	0	0	20	20
Oct-26	0	0	45	45
Oct-27	0	0	30	30
Oct-28	0	0	30	30
Oct-29	0	0	20	20

<b>Date</b>	<b>Dust Suppression (m³)</b>	<b>Regional Drill Water Usage Total (m³)</b>	<b>Domestic Water Consumption at Doris (m³)</b>	<b>Total Daily Usage (m3)</b>
Oct-30	0	0	20	20
Oct-31	0	0	30	30
Nov-01	0	0	20	20
Nov-02	0	0	26	26
Nov-03	0	0	38	38
Nov-04	0	0	29	29
Nov-05	0	0	18	18
Nov-06	0	0	26	26
Nov-07	0	0	30	30
Nov-08	0	0	20	20
Nov-09	0	0	30	30
Nov-10	0	0	20	20
Nov-11	0	0	30	30
Nov-12	0	0	20	20
Nov-13	0	0	20	20
Nov-14	0	0	20	20
Nov-15	0	0	30	30
Nov-16	0	0	20	20
Nov-17	0	0	30	30
Nov-18	0	0	20	20
Nov-19	0	0	20	20
Nov-20	0	0	30	30
Nov-21	0	0	30	30
Nov-22	0	0	20	20
Nov-23	0	0	30	30
Nov-24	0	0	31	31
Nov-25	0	0	20	20
Nov-26	0	0	30	30
Nov-27	0	0	21	21
Nov-28	0	0	30	30
Nov-29	0	0	31	31
Nov-30	0	0	26	26
Dec-01	0	0	24	24
Dec-02	0	0	30	30
Dec-03	0	0	30	30
Dec-04	0	0	28	28
Dec-05	0	0	30	30
Dec-06	0	0	30	30
Dec-07	0	0	20	20
Dec-08	0	0	30	30
Dec-09	0	0	0	0
Dec-10	0	0	55	55
Dec-11	0	0	30	30
Dec-12	0	0	28	28
Dec-13	0	0	20	20
Dec-14	0	0	30	30
Dec-15	0	0	30	30
Dec-16	0	0	30	30
Dec-17	0	0	20	20
Dec-18	0	0	30	30
Dec-19	0	0	40	40

<b>Date</b>	<b>Dust Suppression (m<sup>3</sup>)</b>	<b>Regional Drill Water Usage Total (m<sup>3</sup>)</b>	<b>Domestic Water Consumption at Doris (m<sup>3</sup>)</b>	<b>Total Daily Usage (m<sup>3</sup>)</b>
Dec-20	0	0	20	20
Dec-21	0	0	20	20
Dec-22	0	0	30	30
Dec-23	0	0	20	20
Dec-24	0	0	20	20
Dec-25	0	0	20	20
Dec-26	0	0	20	20
Dec-27	0	0	20	20
Dec-28	0	0	20	20
Dec-29	0	0	30	30
Dec-30	0	0	20	20
Dec-31	0	0	20	20

*\* values rounded to nearest whole cubic meter*

### **c) Quantity of effluent discharged**

Windy Camp was closed throughout 2016 therefore no discharges occurred related to the waste water treatment facility (WWTF) at monitoring station HOP-2.

No discharges occurred at the Windy Camp bulk fuel storage facility (HOP-5) in 2016 as this facility was decommissioned in 2012 and the containment berm removed.

No discharges occurred at the Patch Lake bulk fuel storage facility (HOP-6) in 2016 as this facility was decommissioned and the berm removed in 2012.

### **d) Volume of sludge removed from sewage disposal facility**

No sludge was removed from the Windy Camp WWTF in 2016 because this facility was not operational and the camp was closed.

### **e) Results of Toxicity Testing**

TMAC did not perform toxicity testing to demonstrate the non-acute toxicity of the effluent discharged from the WWTF at HOP-3 (at a point of entry to Windy Lake), as the camp is closed and no effluent was discharged (this facility has been removed). The testing is normally conducted in accordance with the following test procedures:

- i. Acute lethality to Rainbow Trout, *Oncorhynchus mykiss* (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/13); and
- ii. Acute lethality to the crustacean, *Daphnia magna* (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/14).