

# **Appendix C**

**Drilling Report and  
Groundwater Permit  
Documents**



December 5, 2012

Manitoba Conservation and Water Stewardship  
ATTN: Lorraine Thibert  
Water Licensing Technologist  
Box 16 – 200 Saulteaux Crescent  
Winnipeg, MB  
R3J 3W3

**RE: Revision of Groundwater Withdrawal Rate**

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Dear Ms. Thibert:

Further to our phone conversation on December 5<sup>th</sup>, I am writing to request an amendment to the annual groundwater withdrawal rate of the initial May 7, 2012 application for the Reed Mine Project wells (see attached copy).

The initial application requested an annual withdrawal of 80 dam<sup>3</sup> / year, which is the expected average rate for the Reed Mine in full operation. However, we anticipate there will be some variation around that average and that an annual withdrawal rate of 100 dam<sup>3</sup> / year would be more appropriate for periods when above average water consumption may occur. As per the direction of your branch (Rob Matthews), we have not included any water withdrawal associated with the Fire Protection well.

The two wells associated with this application (Mine Process Water well and Fire Protection well) will replace the Advanced Exploration Phase well previously approved under License to Use Water for Industrial Purposes 2012-025.

If you have any questions, please contact me at (204) 687-2667.

Regards,

  
Jay Cooper  
Assistant Superintendent - Environment

c.c. Stephen West  
Joel Nilsen  
Heather Brickner

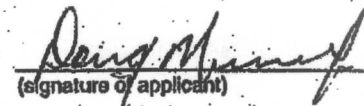
P.O. Box 1500  
#1 Company Road  
Flin Flon, Manitoba  
Canada R8A 1N9  
hudsonbayminerals.com

# Application for Licence to Construct A Well and Divert Groundwater

Manitoba Conservation  
Water Branch  
200 Sauleteaux Crescent  
Winnipeg MB R3J 3W3



Pursuant to The Water Rights Act

APPLICANT'S NAME: HUDSON BAY MINING AND SMELTING COMPANY LTD.					ATT. DOUG MURRAY	TELEPHONE: 1-204-687-2081
POST OFFICE ADDRESS: P.O. Box 1500 FLIN FLON, MANITOBA RBA 1N9						
I hereby apply for authority to construct a water well on the following described lands:						
		30/31 25/36	64 64	21 22	WPM WPM	E OR W
LSD	OR QUARTER	SECTION	TOWNSHIP	RANGE		
or otherwise described as REED LAKE SITE						
and divert groundwater for INDUSTRIAL + FIRE PROTECTION purposes on the following described land: <small>(domestic, municipal, agricultural, industrial, irrigation, other)</small>						
		30/31 25/36	64 64	21 22	WPM WPM	E OR W
LSD	OR QUARTER	SECTION	TOWNSHIP	RANGE		
or otherwise described as REED LAKE SITE						
at the following rates:						
			_____ cubic metres per second			
			_____ cubic decametres per day			
			80 cubic decametres per year			
Number of hectares to be irrigated _____ (if applicable)						
The above described lands are held as follows: (check applicable box)						
<input type="checkbox"/> Registered owner		<input type="checkbox"/> purchased under agreement for sale			<input checked="" type="checkbox"/> lessee	
<input type="checkbox"/> to be negotiated		(SEE ATTACHED)				
Copy(s) of Certificate(s) of Title or Title Numbers must be included.						
Date: MAY 07 2012			 (signature of applicant)			
<b>FOR OFFICE USE ONLY</b>  Application filed with the Director, Water Branch, at Winnipeg, Manitoba on _____, 20____  _____ (Signature of Director)				<b>** PLEASE NOTE **</b>  FEE OF \$50.00 MUST ACCOMPANY THIS APPLICATION, CHEQUE AND APPLICATION TO BE MAILED TO:  MANITOBA CONSERVATION CASHIER'S OFFICE BOX 42, 200 SAULTEAUX CRESCENT WINNIPEG MB R3J 3W3		



# Friesen Drillers Ltd.

307 PTH 12 N Steinbach, MB. R5G 1T8 Phone 204-326-2485 Fax 204-326-2483 Toll Free-1-888-794-9355

November 21, 2012

Mr. Douglas J Murray  
QC Inspector/Project Piping Supervisor  
AWS Certified Welding Inspector  
CWB Level I Welding Inspector  
Hud Bay  
PO Box 1500  
Flin Flon, Manitoba, Canada R8A 1N9

Dear Mr. Murray,

**Subject Fire Protection and Water Supply Well Installation – Reed Lake Project – Hudson Bay Mining and Smelting Ltd.  
30/31 -64-21 WPM and 25/36-64-22WPM – Reed Lake – Grass River Provincial Park, Manitoba**

Friesen Driller is pleased to provide this report detailing the results of our installation of a supply and fire protection well at the Hud Bay Minerals Reed Lake Project, which is located in the Grass River Provincial Park. The purpose of this project was to install a fire protection well, and an additional water supply well for industrial purposes. The following report details the installation results, pumping test results, data analysis, and operational recommendations.

## Background

Hudson Bay Mining and Smelting Limited (Hud Bay Minerals) is currently developing a mine site at Reed Lake, along PR39, near the Grass River Park. The site is located about 50 km west of the Town of Snow Lake, in an area that has been highly active with the mining and processing of heavy metals. The proposed advanced exploration site will apparently hopes to locate heavy metal resources of copper, zinc, and some gold. An exploration portal will be constructed, along with several buildings and workshops at surface. In order to provide fire protection, a water supply of approximately 1,100 to 1,200 U.S.G.P.M. is required. In addition, a water supply for industrial processing and washing is also required. The proposed flow rate would be about 100 to 200 U.S.G.P.M. It is our understanding that the site is currently being developed.

In October 2011, Hud Bay retained Golder Associates Inc. to undertake a groundwater investigation for water supply. Several test wells were drilled, a 72 hour long pumping test was undertaken. The report concluded that a water supply of approximately 42 U.S.G.P.M. would be feasible for the site, based on the 102 U.S.G.P.M pumping test performed on the site. Additional testing was recommended.

In order to undertake the installation of the fire protection and industrial supply well, Hud Bay retained Friesen Drillers to undertake the drilling, construction, testing, and engineering of the two well installations. A preliminary scope of work was developed, and submitted to the Manitoba Conservation and Water Stewardship (MCWS) Water Rights Licensing Section for approval and issuance of a groundwater exploration permit. A copy of Friesen Drillers permit application, date May 9, 2012 is attached. The department approved the scope of work for the study on June 6, 2012, and issued a groundwater exploration permit to conduct the work. A copy of the MCWS exploration permit is attached.

## Site Setting

### *Physical Setting*

The Reed Lake Project is located in Grass River Provincial Park, along PR 39. The site is located about 50 km west of the Town of Snow Lake, Manitoba. The lands are owned by her Majesty the Queen, in the right of Canada, and are controlled by the Provincial Government. Hud Bay has signed a land use agreement with Manitoba Conservation. The site is located on the south side of PR 39, which extends from Flin Flon to Snow Lake. The site is currently undeveloped forest lands, but there appears to be have been previous mineral exploration drilling on the site. There are numerous unnamed lakes in the area, including one immediately south of the site. Surface drainage appears to be towards this lake.

*Physical Setting (cont'd)*

The legal description of the Reed Lake site is described as follows:

- Sections 30 and 31 of township 64, in range 21 WPM
- Sections 25 and 36 of township 64, in range 22 WPM

The following properties surround the site:

- North: PR 39, followed by undeveloped forest lands.
- East: Undeveloped forest
- South: Unnamed lake, followed by additional forest.
- West: Undeveloped forest.

The site location and surrounding land use is shown below as Figure 1.



Figure 1 – Site location (source – Google Earth, 2011)

*Geology/Hydrogeology*

The Reed Lake area is located within the northern portion of the Western Canadian Sedimentary Basin (WCSB). The geological conditions in the area have been determined based on a review of the background information and reports available from the province of Manitoba. Precambrian igneous and metamorphic rocks form the basal geologic unit across the site. The Precambrian basement occurs approximately 50 to 60 feet below grade, based on the test drilling undertaken by Golder Associates. The WCSB is quickly pinching out to the north, and the outcrop around Reed Lake is largely Precambrian. The Precambrian bedrock in the area consists mainly of a Tonalite/Granodiorite of the Churchill Superior Province. The overlying WCSB has a gentle dip to the south of approximately 10 m per km drop towards the centre of the WCSB (McCabe, 1978). There is likely some groundwater flow in the Precambrian, but it is expected to be minimal.





*Geology/Hydrogeology (cont'd)*

In most areas of the WCSB, the basal formation directly overlying the Precambrian is the Ordovician Winnipeg Formation sandstone and shale. In the area north of Lake Winnipeg, this formation does not appear to be present in the outcrop or sub crop.

Overlying the Precambrian in the Reed Lake area is the Ordovician Red River Formation. This formation consists of dolomitic limestone and dolomite. This unit is approximately 40 to 60 feet in thickness in the study area, based on local test well logs and stratigraphic mapping. Within the Ordovician carbonate bedrock groundwater flow occurs predominantly through fractures, joint sets, voids, and karstic sinkhole features. As a result of this type of permeability, well yields and aquifer capacity can vary substantially (within several orders of magnitude) within very short distances (Betcher et al, 1995). Groundwater flow directions are not known in the area on a local scale. Regionally, groundwater flow is likely towards the north. More specifically to the site, groundwater flow likely occurs from any upland areas that exist, with flow towards the local lakes and rivers.

Groundwater quality in the carbonate is expected to be of the calcium/magnesium/bicarbonate type, with relatively low total dissolved solids. This is expected, as there is generally very little overburden cover in the area. The carbonate aquifer in the area is likely unconfined nearby, and as such, water quality is expected to be of good quality. Due to the shallow burial of the aquifer, groundwater quality could also be easily impacted by surface activities, and is likely connected hydraulically to local surface water bodies.

Overlying the carbonate bedrock sequence is a thin cover of glacial drift. At the Reed Lake site, the drift, which consists of silts, clays, sands, and gravels/boulders, is known to be increasingly thin, with less than 10 to 20 feet of cover in most areas. Due to the shallow nature of the bedrock cover in the area, it is highly likely that the thin wedge of carbonate bedrock is highly fractured and damaged from the Pleistocene glaciations.

The bedrock geology map in the Reed Lake area is shown below as Figure 2.

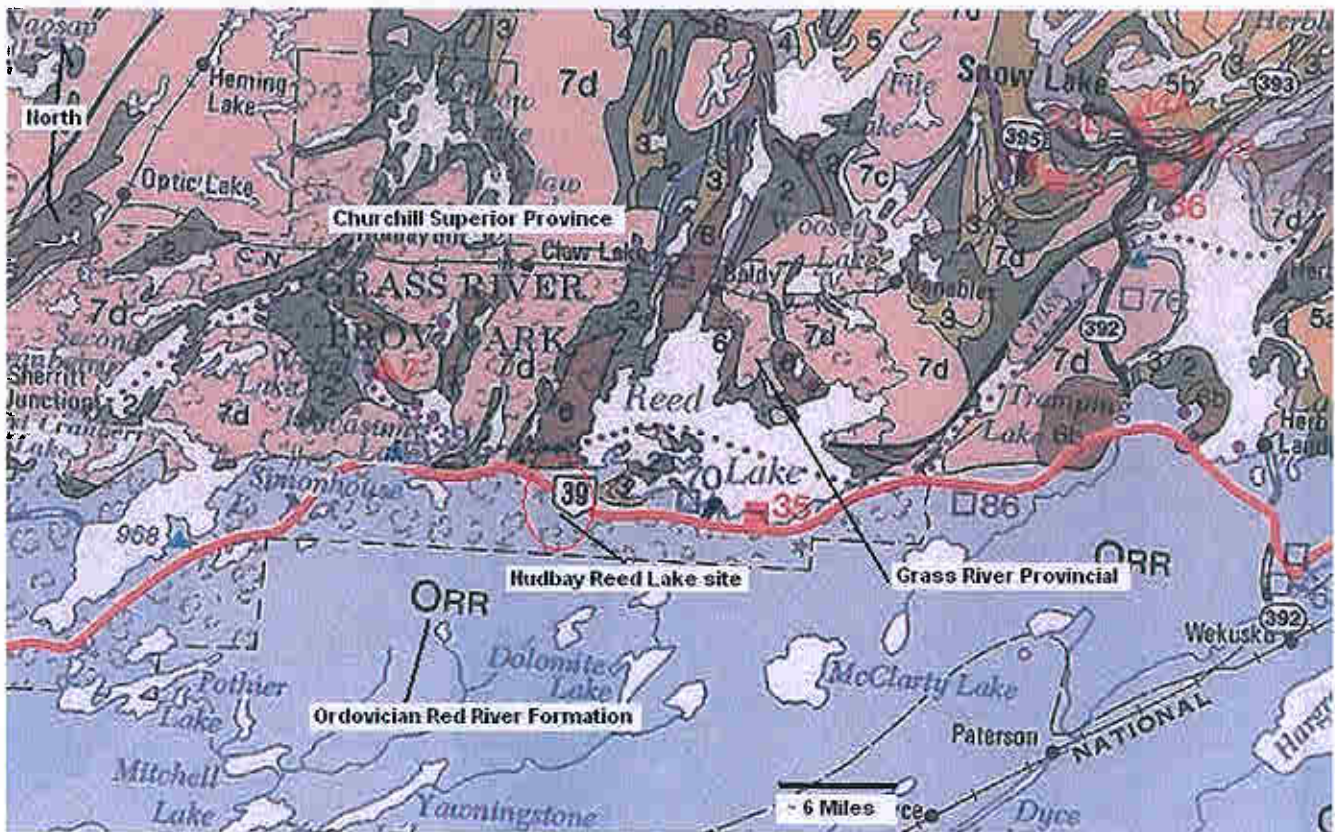


Figure 2 – Bedrock geology – Reed Lake area – (source – Corkery et. al, 1987)

It should be noted that MCWS does not maintain any long term hydrograph stations in the area. As such, groundwater fluctuations and static water levels are not well known in the area. It is expected that static water levels will fluctuate significantly with seasonal and climatic variations. Due to the shallow nature of the burial of this carbonate aquifer in this area, static water levels would be expected to respond extremely rapidly.



*Well Inventory*

A review of the hydrogeological information specific to the area around the Reed Lake site involved the use of air photos and the MCWS water well database (GWDRILL). In addition, a site inspection was undertaken in the area.

As part of the licensing requirements, a water well inventory of known groundwater users was conducted in an area within a 2.0 mile radius of the Reed Lake site. Other than the 4 test wells installed under the Golder Associates investigation, 2 additional supply wells were found in the GWDRILL database. These wells were noted to be located within the Grass River Provincial Park, within two camping areas. Both wells are noted to be equipped with hand pumps. It is not certain as to if these wells are still in use. The exact locations of the campgrounds in the park where the wells are present are also unknown.

Table 1 GWDRILL Water Wells – 2.0 Mile Radius Hudson Bay Mining and Smelting Ltd. – Reed Lake Project									
Well Owner	Driller	Date	Casing Diameter	Casing Depth	Total Depth	Aquifer	Static Water Level	Pumping Water Level	Pumping Rate
Parks Dept.	Waters	1977	4 inch	27 ft.	32 ft.	S + G, C	10 ft.	24 ft.	2 I.G.P.M.
Parks Dept.	Waters	1977	4 inch	12.3 ft.	18 ft.	S + G	6 ft.	15 ft.	4 I.G.P.M.
<b>Notes</b> All information contained in this table is taken from Manitoba Water Stewardship GWDRILL (2010) database. None of the information contained has been verified and is assumed to be correct. N.A. – Not available b.g. – Below grade a.g. – Above grade C – Carbonate aquifer S+G – Inter till aquifer									

Table 1 – Well Inventory – HudBay Reed Lake site

All the above noted information is obtained from the May, 2010 version of Manitoba Water Stewardship GWDRILL database.

**Investigations**

*Well Drilling and Construction*

Friesen Drillers Limited mobilized to the Reed Lake site in July, 2012. A Foremost DR-24 dual rotary air drill rig was used to drill both wells at the site. Prior to commencing test hole drilling, staff from Hud Bay Minerals arranged for the marking of the test hole locations and the clearing all underground services.

The 8 inch diameter industrial water supply well was drilled first. In order to case off the overburden, 12 inch diameter steel casing was drilled through the overburden to competent bedrock, which was located about 20 feet below grade. Glacial drift with large boulders and cobbles were present to about 16 feet. The bedrock was then drilled open hole at 11 inch diameter to a depth of 70 feet below grade. The upper layer of carbonate rock extended from 16 feet to 21 feet below grade. Precambrian bedrock was encountered at 54 feet below grade. The borehole was then drilled to a depth of 70 feet below grade in the weathered Precambrian bedrock.

An 8 inch diameter steel casing was installed to a depth of 35 feet below grade. In order to provide stabilization in the borehole, a 30 foot section of 10 inch diameter, telescoping stainless steel wire wound screen was installed. The slot sizing was chosen as #50, which gives a maximum screen flow rate of 1,189 U.S.G.P.M. at 0.1 ft/sec entrance velocity. In order to attach the screen, a 5 foot section of zero wrap stainless was installed. The screen also had a plate bottom with a left hand internal thread for placement. The screen and casing were installed with centralizers.

Following the well construction, the well was developed with compressed air for a 4 hour period. The discharge was noticeably clean during the development.

The 16 inch diameter fire protection water supply well was drilled second, as additional air compressor capability was required. In order to case off the overburden, 24 inch diameter steel casing was drilled through the overburden to competent bedrock, which was located about 17 feet below grade. Glacial drift with large boulders and cobbles were present to about 16 feet. The bedrock was then drilled open hole at 23 inch diameter to a depth of 70 feet below grade. The upper layer of carbonate rock extended from 16 feet to 21 feet below grade. Precambrian bedrock was encountered at 54 feet below grade. The borehole was then drilled to a depth of 70 feet below grade in the weathered Precambrian bedrock.

A 16 inch diameter steel casing was installed to a depth of 39 feet below grade. In order to provide stabilization in the borehole, a 30 foot section of 16 inch diameter, telescoping (13.1 inch I.D.) stainless steel wire wound screen was installed. The slot sizing was chosen





*Well Drilling and Construction (cont'd)*

as #100, which gives a maximum screen flow rate of 1,189 U.S.G.P.M. at 0.1 ft/sec entrance velocity. The screen was attached directly to the casing with a stainless steel weld ring. The screen also had a plate bottom with a left hand internal thread for placement. The screen and casing were installed with centralizers.

Following the well construction, the well was developed with compressed air for a 6 hour period. The discharge was noticeably clean during the development.

Complete geologic and borehole construction logs for both wells are attached. The specific well construction details are also presented in Table 2, shown below.

Following the site clean up, each well site was located using a portable GPS unit. The readings were recorded in UTM zone 14, along with vertical elevations above sea level. It should be noted that all GPS readings are subject to the normal error (+/- 5 feet both horizontally and vertically). The location is shown on the construction and geologic log. The well locations details are presented in Table 3, also shown below.

Table 2 Well Construction Details Hudson Bay Mining and Smelting Ltd. – Reed Lake Project								
Well Name	Depth of Surface Casing	Open Hole Depth	Diameter of Internal Casing	Depth of Internal Casing	Screen Length	Slot Size	Screen Maximum Flow Rate	Developing Time
Fire Protection	17 ft.	70 ft.	16 in.	39 ft.	30 ft.	#100	2,570 USGPM	6 hours
Industrial supply	20 ft.	70 ft.	8 in.	35 ft.	30 ft.	#50	1,189 USGPM	4 hours
<b>Notes</b> Maximum screen flow rate calculated at 0.1 ft/sec, as recommended by the screen manufacturer.								

Table 2 – Well construction details – HudBay Reed Lake site

Table 3 Well Location Details Hudson Bay Mining and Smelting Ltd. – Reed Lake Project						
Well Name	UTM – Zone 14		Decimal Degrees		Degrees/Minutes/Seconds	
	Easting	Northing	Latitude	Longitude	Latitude	Longitude
Fire Protection	393918.44 m	6048812.30 m	N 54.57567 °	W 100.64114 °	N 54° 34' 32.412"	W 100° 38' 28.104"
Industrial supply	393917.90 m	6048816.76 m	N 54.57571 °	W 100.64115 °	N 54° 34' 32.556"	W 100° 38' 28.140"

Table 3 – Well location details – HudBay Reed Lake site

*Pumping Test*

In order to obtain preliminary aquifer parameters and to determine how each well responds to pumping, two pumping and recovery tests were performed on each well. A 6 hour test was performed on the fire protection well, while the industrial well was tested for 2 hours. A 10 hp Goulds submersible pump and motor was installed in each well at a depth of 50 feet below grade. The pumping rates were set using valves, and maintained through the test by using an orifice meter. Water levels were monitored using a Powers M-scope well sounder. There were no other accessible wells available for observation in the close proximity to the site.

The following water levels and pumping rates, shown in Table 1, below were recorded during the pumping test.

Table 4 Pumping Test Details Hudson Bay Mining and Smelting Ltd. – Reed Lake Project						
Well Name	Casing Depth	Total Depth	Static Water Level	Pumping Water Level	Pumping Rate	Specific Capacity
Fire Protection	39 ft.	70 ft.	15.35 ft.	26.63 ft.	480 U.S.G.P.M.	42.55 U.S.G.P.M./ft.
Industrial supply	35 ft.	70 ft.	17.80 ft.	29.22 ft.	480 U.S.G.P.M.	42.03 U.S.G.P.M./ft.

Table 4 – Water levels recorded during pumping tests – HudBay Reed Lake site





*Groundwater Analytical Sampling*

Groundwater samples were collected from the pump discharge in laboratory supplied sample bottles. These samples were submitted to ALS Laboratories in Winnipeg for analysis, with the results attached. The significant results (L1185960) are shown below in Table 5:

Table 5 Geochemistry Results Hudson Bay Mining and Smelting Ltd. – Reed Lake Project							
Well Name	Total Dissolved Solids	Chloride	Nitrate	Conductivity	Sodium	Turbidity	Sulfate
Fire Protection	320 mg/L	4.33 mg/L	<0.050 mg/L	566 umhos/cm	4.85 mg/L	0.53 NTU	18.4 mg/L
Industrial supply	318 mg/L	4.06 mg/L	<0.050 mg/L	562 umhos/cm	4.82 mg/L	1.90 NTU	18.3 mg/L

Table 5 – Geochemical results – HudBay Reed Lake site

Overall, the water quality is reportedly to be very good, and typical of shallow burial carbonate aquifer groundwater. The groundwater quality is a calcium/magnesium/bicarbonate type, which is also expected. The results are also presented in a piper plot, which is shown below as Figure 3.

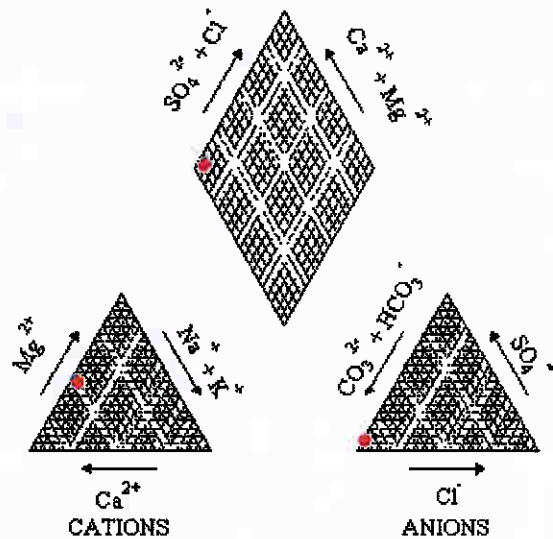


Figure 3 – Piper plot of geochemical results – Hud Bay Reed Lake site.

**Data Analysis**

*Aquifer Testing Analysis - Single Well Constant Rate Pumping Test*

The Theis method (1935) method is the most common method for analyzing the results from aquifer pumping tests. Some critical assumptions of the method were noted during the development. They are detailed as follows:

- Darcy's law is valid
- The aquifer is horizontal and constant thickness
- The aquifer is infinite in areal extent
- The aquifer is bounded by impermeable strata above and below
- Uniform hydraulic conductivity
- Isotropic hydraulic conductivity
- Head always remains above the top of the pumped aquifer
- There are no water level changes that are not due to the pumping.
- Infinitesimal diameter of well
- Fully penetrating the aquifer formation
- Perfectly efficient well
- Single pumping well
- Constant pumping rate
- Constant storage properties through time
- The head is known everywhere prior to pumping.

Through a review of the assumptions, it can be seen that some of the conditions for the analysis of the pumping tests conducted at the



*Aquifer Testing Analysis - Single Well Constant Rate Pumping Test (cont'd)*

on the Reed Lake well are invalid for the Theis (1935) approach. The Theis (1935) approach is highly idealized to the assessment of the aquifer, and represents the state of the art for the determination of aquifer parameters. The conditions are also not being violated overly severely, so this approach will be used for the analysis.

The data was entered into Waterloo Hydrogeologic's AquiferTest Professional v4.20, for analysis of aquifer parameters. The data was analyzed using the Theis (1935), Cooper-Jacob (1946) and Theis (1935) Recovery methods, although the exact same result should be expected, as the Cooper -Jacob (1946) method is simply a straight line approximation of the Theis (1946) method. In order to determine the acceptability of the results, a derivative analysis was used, which is also shown on the attached plot (Bourdet, et. al., 1989). Well efficiency could not be determined due to the lack of acceptable monitoring wells at distance. In general, the hydraulic parameters that were determined are shown in Table 6, below:

Table 6 Aquifer Parameters Hudson Bay Mining and Smelting Ltd. - Reed Lake Project				
	Fire Protection Well		Industrial Well	
Drawdown	11.28 feet		11.42 feet	
Static Water Level	15.35 feet		17.80 feet	
Specific Capacity	42.55 U.S.G.P.M./ft. @ 6 hours		42.55 U.S.G.P.M./ft. @ 2 hours	
Available Drawdown	23.65 feet		17.20 feet	
Method	Transmissivity	Storativity <sup>4</sup>	Transmissivity	Storativity <sup>4</sup>
Theis Method <sup>1</sup>	21,400 U.S.G./day/ft	1.0 x 10 <sup>-4</sup>	N.A.	N.A.
Cooper - Jacob Method <sup>2</sup>	21,400 U.S.G./day/ft	1.0 x 10 <sup>-4</sup>	N.A.	N.A.
Theis Recovery <sup>3</sup>	21,400 U.S.G./day/ft	1.0 x 10 <sup>-4</sup>	N.A.	N.A.
Notes	<sup>1</sup> Theis (1935) method using Waterloo Hydrogeologic Limited - Aquifer Test Professional v4.20 <sup>2</sup> Cooper - Jacob (1946) method using Waterloo Hydrogeologic Limited - Aquifer Test Professional v4.20 <sup>3</sup> Theis Recovery (1935) method using Waterloo Hydrogeologic Limited - Aquifer Test Professional v4.20 <sup>4</sup> Storativity coefficient cannot be determined without a monitoring well.			

Table 6 - Aquifer Parameters - HudBay Reed Lake site

In general, the aquifer was determined to have an estimated transmissivity of about 21,000 U.S.G./day/ft., based on the results of the four hour single well test. This estimation would improve with additional monitoring well observations during pumping. During the analysis, the  $t_{critical}$  was assumed to be less than approximately 30 minutes for casing storage; therefore, the data previous to 30 minutes was not used in the analysis. The Cooper-Jacob (1946) method was used, since emphasis is not placed on early time measurements. The pumping well configuration was fully penetrating. The aquifer is not continuous, or isotropic, and displays a strong spatial variability. These conditions indicate a fundamental breach in the conditions of Theis (1935). Due to amount of data present, and the lack of monitoring wells, the aquifer was assumed to be Theissian, although this may or may not be totally correct in this instance. This approach will be used for comparison purposes only in this evaluation. It was assumed that skin effects for the supply well would be minimal since the well is an open hole style of construction. A negative boundary was noted to occur at 80 minutes into the test.

The drawdown versus time, Theis (1935) method and Cooper - Jacob method (1946), are shown on below as Figure 4, 5, and 6.



*Aquifer Testing Analysis - Single Well Constant Rate Pumping Test (cont'd)*

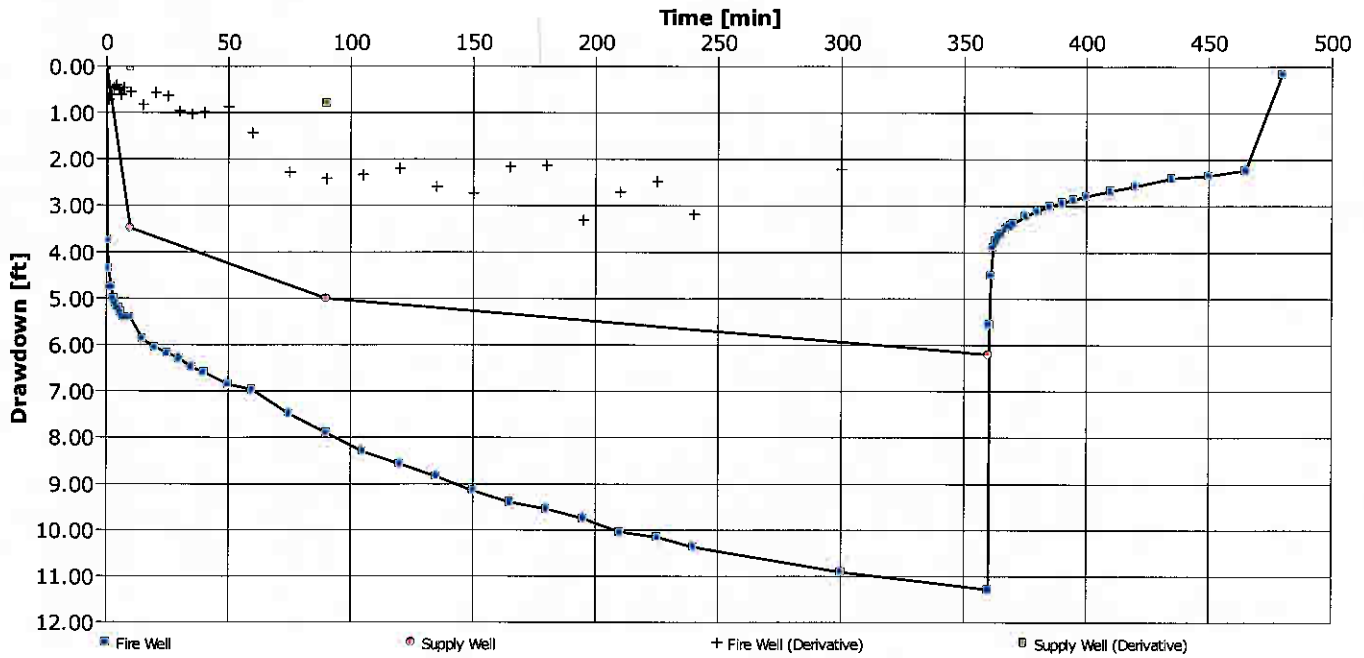


Figure 4 – Drawdown vs. Time with derivative analysis shown. The constant pumping rate is 480 U.S.G.P.M.

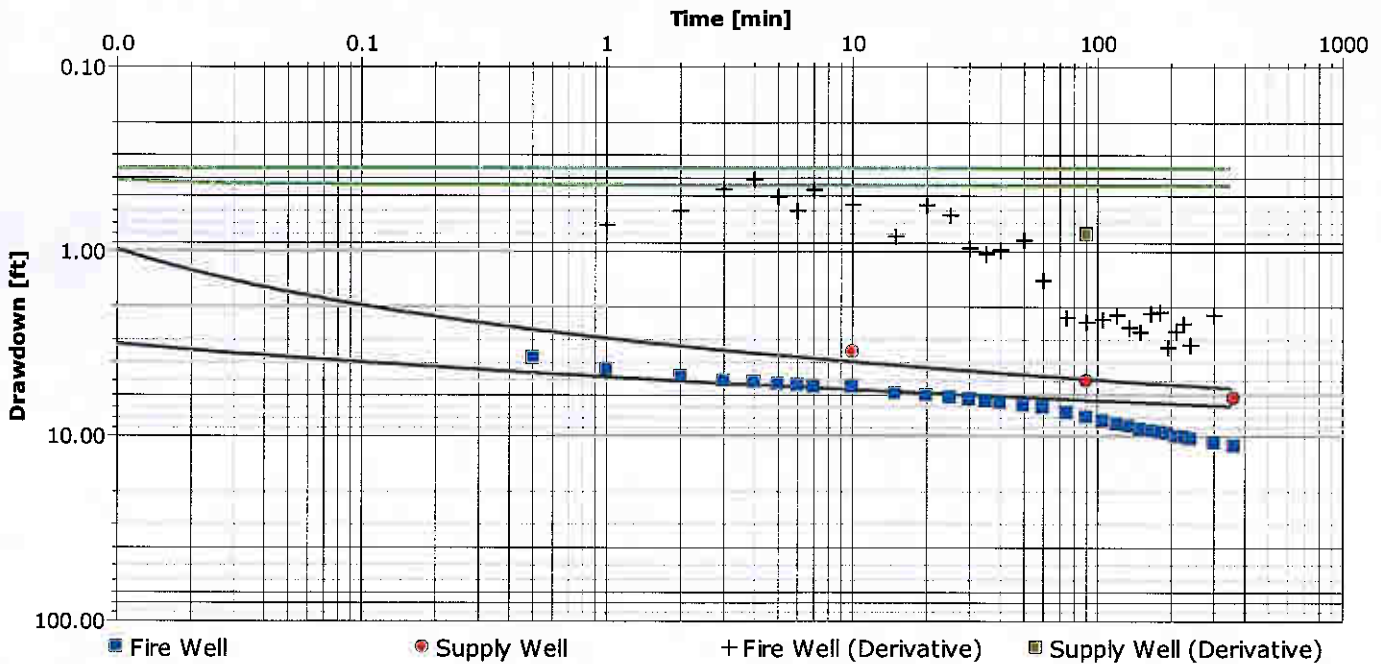


Figure 5 - The Theis (1935) plot with derivative analysis for the Reed Lake site. Note the departure from the Theis (1935) curve at the 80 minute mark, indicating a negative boundary condition in the aquifer.



*Aquifer Testing Analysis - Single Well Constant Rate Pumping Test (cont'd)*

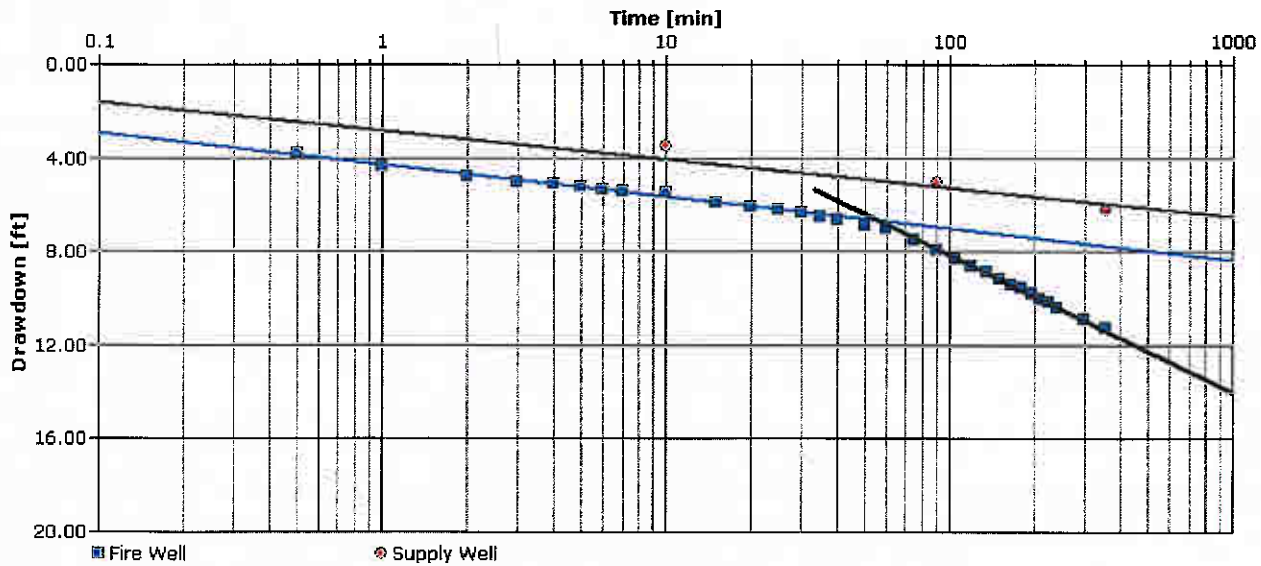


Figure 6 – The Cooper – Jacob (1946) plot for the Reed Lake site. Note the departure at 80 minutes, indicating the negative boundary condition.

Additional monitoring wells and geological characterization would be needed to determine more effective aquifer hydraulic parameters.

*Water Supply Requirements*

In order to determine the long term effects of the industrial water supply system, the drawdown was calculated at distance using the Theis equation at an average pumping rate of 100 U.S.G.P.M., after one year of operation for the site, assuming 365 days of pumping per year. These drawdowns follow all the assumptions of the Theis method. Drawdowns were calculated using Walton's B8.BAS Fortran code (Walton, 1983). It is very important to note that this predicted drawdown follows the negative boundary condition slope that occurs at the 80 minute mark. If additional negative boundaries are present at distance, additional drawdown will result. The drawdown at various distances, under the conditions detailed above is shown below in Table 7.

Table 7 Predicted Drawdown at Radial Distance After One Year of Industrial Pumping Operations Hudson Bay Mining and Smelting Ltd. – Reed Lake Project								
Well	500 ft.	1,000 ft.	1,500 ft.	2,000 ft.	2,500 ft.	3,000 ft.	3,500 ft.	4,000 ft.
13.02 ft.	6.24 ft.	5.48 ft.	5.04 ft.	4.72 ft.	4.48 ft.	4.28 ft.	4.11 ft.	3.97 ft.

Table 7 – Predicted drawdown at various distances after one year – Hud Bay Reed Lake site

The drawdown at a radial distance of 1,000 feet was determined to be approximately 5.48 feet after pumping one year continuously at a rate of 100 U.S.G.P.M.. In order to provide a conservative estimation, the local aquifer transmissivity was assumed to be uniform across the area at 20,000 U.S.G./day/ft, with an assumed storage coefficient of  $1.0 \times 10^{-4}$ . These calculations are all based on the assumption that the negative boundary that was encountered at 80 minutes stays consistent. If additional boundary conditions are encountered, additional drawdown will result. The aquifer is known to be pinching out in the area, so the permeability conditions in the aquifer may be changing. It is not possible to determine the cause of this negative boundary without additional test drilling and observation well installations.

The area is not well populated, and to a large extent, the aquifer is not well utilized for consumptive supply. The operation of the Reed Lake project is not expected to have negative effects for the nearby users. The drawdown in the supply wells will have to be closely monitored.

The fire protection well should have the capacity to provide the 1,100 U.S.G.P.M for fire protection requirements of less than 2.0 hours, providing the static water levels are similar to the tested values. Should static water levels decline, or drop dramatically, this well may have difficulty in supplying the requirement. Static water levels will have to be monitored closely.





**Pump Installation and Set Up**

The pumping installations at the Reed Lake site should have full venting, and be accessible for monitoring of static water levels. Full spool pitless units should be used, or a pump house built to accommodate the hoisting of pumps through the roof. Appropriate roof hatches should be built to allow for this to occur.

It is our understanding that a line shaft turbine pump is to be installed in the fire protection well. A tail pipe will be needed to be installed on the turbine bowls, to allow the pump to remain submerged. The pump bowls are likely too large to enter the screen assembly.

Static water level monitoring in both wells is critical to the long term operation of these wells.

**Recommendations**

Based on review at the supply wells at the Reed Lake site, we recommend the following activities with respect to the activities with respect to the use to the wells for water supply:

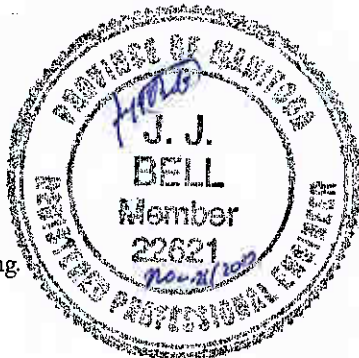
- This report should be submitted to MCWS – Groundwater Licensing Section for review. The water rights license is required prior to the operation of the wells.
- An electrical clock timer that would record the operation of the pump should be installed. This would allow the total volume of water pumped annually to be determined for submission to MCWS. Alternatively, an inline flow meter could also be installed.
- The static water levels should be monitored regularly in the well daily, along with the water consumption and flow rate.
- Static water levels and pumping water levels should be recorded in the pumping wells to determine the well performance and condition. This information would allow for the detection of any losses in well performance/specific capacity.
- The well should be permanently vented and remain vented at all times.
- Water quality samples should be taken annually during operation. These samples should be analyzed for routine water quality.
- There is little overburden protection of this aquifer at the site. As such, surface activities nearby may impact the water quality in the aquifer. A groundwater protection program should be developed for the site.
- The old test wells on the site should be properly abandoned by a licensed drilling contractor.
- The well may require air lifting/cleaning/servicing from time to time. A licensed drilling contractor should perform this service work.
- During dry/drought seasons, and lower static water levels in the carbonate aquifer, the use of the wells should be reviewed.

We thank you for the opportunity to be of service to Hudson Bay Mining and Smelting Ltd. We thank you for the opportunity to work with you on this project.

Sincerely

Friesen Drillers Limited

J.J. (Jeff) Bell, B.Sc.(G.E.), P.Eng.  
Hydrogeological Engineer



**Attachments** Manitoba Conservation and Water Stewardship – Groundwater exploration permit and application  
Geologic/Construction report and electric log – July, 2012  
ALS Laboratories Analytical Report L1185960 – July, 2012  
Pumping test field report – Friesen Drillers Ltd.

## References

- Betcher, R.N., Grove, G., and Pupp, C, 1995. *Groundwater in Manitoba*. NHRI Contribution No. CS-93017
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- Cooper H.H., Jr. and Jacob, C.E. 1946, *A generalized graphical method for evaluating formation constants and summarizing well field history*. Transactions, American Geophysical Union, Vol. 27., No. 4.
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- Google Maps, 2010. [www.googlemaps.com](http://www.googlemaps.com).
- Manitoba Water Stewardship, 2010. GWDRILL database
- McCabe, H, 1978. *Reservoir Potential of the Deadwood and Winnipeg Formations in Southwestern Manitoba*. Manitoba Mineral Resources Division, Geological Paper 78-3.
- Theis, C.V., 1935. *The Lowering of the Piezometer Surface and the rate and discharge of a well using ground-water storage*. Transactions, American Geophysical Union 16:519-24.

## Limitations

The scope of this report is limited to the matters expressly covered and is intended solely for the client to whom it is addressed. Friesen Drillers Limited makes no warranties, expressed or implied, including without limitation, as to the marketability of the site, or fitness to a particular use. The assessment was conducted using standard engineering and scientific judgment, principles, and practices, within a practical scope and budget. It is based partially on the observations of the assessor during the site visit in conjunction with archival information obtained from a number of sources, which is assumed to be correct. Except as provided, Friesen Drillers Limited has made no independent investigations to verify the accuracy or completeness of the information obtained from secondary sources or personal interviews. Generally, the findings, conclusions, and recommendations are based on a limited amount of data (e.g. number of boreholes drilled or water quality samples submitted for laboratory analysis) interpolated between sampling points and the actual conditions on the site may vary from that described above. Any findings regarding the site conditions different from those described above upon which this report was based will consequently change Friesen Drillers Limited's conclusions and recommendations.

## Disclaimer

This Friesen Drillers Limited report has been prepared in response to the specific requests for services from the client to whom it is addressed. The content of this document is not intended to be relied upon by any person, firm, or corporation, other than the client of Friesen Drillers Limited, to who it is addressed. Friesen Drillers Limited denies any liability whatsoever to other parties who may obtain access to this document by them, without express prior written authority of Friesen Drillers Limited and the client who has commissioned this document.



**Work Permit**  
**Permis d'exploitation**

Conservation  
Manitoba  
Manitoba  
Conservation



Permit No./N° de permis

▶ WP 2011 2 25 086  
YEAR REGION DISTRICT NUMBER  
ANNÉE RÉGION DISTRICT NUMÉRO

This permit, issued under the authority of The Crown Lands Act, and/or The Wildfires Act, and, subject to all Acts and regulations in effect from time to time, authorizes/Le présent permis, délivré conformément à la Loi sur les terres domaniales, et/ou la Loi sur les incendies échappés, sous réserve des textes législatifs et des textes réglementaires en vigueur actuellement ou à l'avenir, autorise:

Name of permittee Nom du titulaire	HudBay Minerals	Contact name Nom de contact	Steve Polegato		
Address Adresse	Box 1500	City/Town Ville	Flin Flon	Province Province	MB
Postal Code Code postal	R7A 7J8	Telephone No. N° de téléphone	[Business/Affaires] 1-204-687-2686	Fax No. N° de fax	204-687-2774
			[Cell/Cellule] 204-687-0727		

to carry out an operation on the following described  Crown (Manitoba) lands  Other lands  
à effectuer des travaux sur  des terres domaniales (Manitoba)  d'autres terres décrites ci-après

South of Reed Lake, Grass River Provincial Park As per attached map labeled Z-Map.  
Location: Sec 30, S31 Twp. 64 Rge 21 WPM & Sec. 25, 36 Twp. 64 Rge 22 WPM (64 deg 34.34'N X 100 deg 38.33'W)

for the purpose of:(describe purpose or objective of operation)/à fin de:(décrire la raison des travaux) Clear, site prep. & construct mine site	Authority (enter # of permit, tender, contract, etc., if applicable) Autorisation (inscrire le n° de permis, de soumission, de contrat, etc., le cas échéant) Lease No.66082 Advanced Exploration
---	---

Subject to the following conditions: (attach list if additional space is required)/Sous réserve des conditions suivantes: (annexer une liste, s'il n'y a pas d'espace)

1 This permit must be available at all times on the operation site, produced at the request of an Officer, and may be cancelled by an Officer without advance notice.  
Ce permis doit pouvoir être présenté à tout moment sur le chantier si un agent demande à le voir; il peut être annulé par un agent préavis.

2  as per attached appendix dated:  
voir l'annexe en date du: Feb 29, 2012 Appendix A, R-ROW, F-FER, Z-MAP

3  The permittee must contact the Snow Lake District Office prior to starting work.

4  A timber permit will be required for all merchantable wood removed. A Burning Permit will be required for any burning after April 01

5  All work to be completed within the tree clearing boundray marked on the attached map

**"THIS PERMIT AND THE RIGHTS AND PRIVILEGES GRANTED THEREUNDER ARE NOT TRANSFERABLE"**  
**\*\*LE PRÉSENT PERMIS AINSI QUE LES DROITS ET PRIVILÈGES QUI S'Y RATTACHENT NE SONT PAS TRANSMISSIBLES\*\***

I hereby certify that the information given to obtain this permit is true and that I understand the conditions set out herein./Je certifie que les renseignements fournis pour l'obtention de ce permis sont exacts et que je comprends les conditions indiquées ci-dessus.   Signature of Permittee/Signature de l'utilisateur <b>STEVE POLEGATO</b> Print Name/Letres moulées Not valid unless signed by permittee or authorized representative. N'est valide que signé par le titulaire ou son représentant légal.	Date issued/Date de délivrance (y/m/d) (a/m/j)  2012-02-29	 Signature of Issuing Authority/Signature de l'autorité émettrice  <b>Jamie Davison</b> Print Name/Letres moulées
	Expiry Date/Date d'expiration (y/m/d) (a/m/j)  2012-04-30	for Minister of Conservation/pour le ministre des Conservation Issuing District or Office/District ou bureau émetteur  <b>Snow Lake</b>

Copy To: PERMITTEE - DISTRICT - REGION  
Copie: TITULAIRE - DISTRICT - RÉGION

Work Permit Conditions

Appendix "A"

Work Permit # 2011 2 25 086

Date: February 29, 2012

HudBay Minerals.

The following conditions are in addition to those conditions listed on the face of the work permit:

1. Existing trails, portages and other travel ways shall not be altered so as to interfere with other users.
2. The permittee will ensure that any work done in or near a waterbody is done in accordance with the *Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, May 1996*.
3. There shall be no bulldozing of vegetation into standing timber. Any vegetation and debris removed during the operation shall be piled and burned or compacted in windrows. Windrows shall be compacted to lie as close to the ground as possible (maximum height of 0.6 of a meter) and shall be no closer than 1 meter to the bush line. Burn piles must be located a minimum of 15 metres from standing timber.
4. The permittee shall locate fuel storage and equipment servicing areas established for the operation a minimum distance of 100 metres from any waterbody.
5. The Natural Resource Officer in Snow Lake, (204) 358 2521, shall be notified no less than one week prior to completion of operations to allow for final inspection of the operation.
6. All Operations must be completed to the approval of the local Natural Resource Officer.
7. The local Natural Resource Officer on behalf of the Minister of Conservation, shall have the authority to, at any time, amend or cancel this permit or to suspend operations, should non-compliance of any of the terms or conditions of this permit occur.

IMPORTANT: The Crown Lands Amendment Act assented to July 5<sup>th</sup>, 1994 states that failure to comply with the terms and conditions of a Work Permit issued under this Act is an offence punishable by a fine of up to \$10,000.

- The onus is on the Permittee (you) to comply with the terms and conditions of this permit.
- You are responsible for the actions of your employees or contractors.
- Corrective action can be ordered at any time during or after the operation.
- The permittee is responsible for consulting with and obtaining all necessary authorizations from the Department of Fisheries and Oceans and Transport Canada.
- All operations are subject to the appropriate Acts and Regulations, i.e.: The Crown Lands Act, The Fisheries Act, The Wildfires Act, The Forest Act, The Mines Act, The Environment Act, etc.
- A burning permit is required, for open fires, between April 1 and November 15.
- All non hazardous waste, litter and debris from the operation must be cleaned up in accordance with the requirements of Manitoba Regulation 92/88R respecting Litter, and deposited at an approved waste disposal ground.
- All dangerous goods must be dealt with according to The Dangerous Goods Handling and Transportation Act.
- To ensure that you are not working on mining restricted lands it is recommended that you consult with Manitoba Science, Technology, Energy and Mines or their website at <http://www.gov.mb.ca/stem/mrd/geo/gis/minesmaps.html>
- Should your operation require unusual activities or something not clearly identified by this permit consult your local Natural Resource Officer.

St. Palzth  
Signature of permittee

March 1 / 2012  
Date

[Signature]  
Natural Resource Officer

Feb 29 2012  
Date



## Right-of-Way Construction or Clearing - Work Permit Conditions

### Appendix "R-ROW"

Work Permit # 2011 2 25 086

Date: February 29, 2012

HudBay Minerals

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The following conditions are in addition to those conditions listed on the face of the permit:

1. Construction / clearing will occur within the area as outlined on the attached map and in accordance with the attached project description.

#### Heavy Equipment Conditions:

2. By-pass roads or trails will utilize existing clearings unless prior separate approval has been obtained from the supervising Natural Resource Officer.
3. There shall be no bulldozing of woody debris into standing timber. All vegetation and debris removed from the road right-of-way shall be piled and burned or compacted in windrows. Windrows shall be compacted to lie as close to the ground as possible (maximum height of 0.6 of a meter) and shall be no closer than 1 meter to the bush line. Burn piles must be located a minimum of 15 metres from standing timber.
4. Any merchantable wood removed may be stockpiled outside and immediately adjacent to the ROW. Stockpile sites shall be located in existing clearings or areas of non-merchantable timber. Stockpile sites shall not be located within 100 m of a water body. ~~All stockpiled material must be removed from Crown land by~~ . Timber dues will be payable on all merchantable timber removed.

#### Hand clearing conditions:

5. All timber and brush cut for the line is to be cut to lie as close to the ground as possible. No trees are to be left hanging in standing timber.

#### General Conditions:

6. The permittee will ensure that creek crossings are done in accordance with the *Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, May 1996*.
7. Existing trails, portages and other travelways shall not be altered so as to interfere with other users.
8. The Natural Resource Officer in Snow Lake, (204) 358 2521, shall be notified no less than one week prior to completion of operations to allow for final inspection of the operation.
9. All Operations must be completed to the approval of the local Natural Resource Officer.
10. The local Natural Resource Officer on behalf of the Minister of Conservation, shall have the authority to, at any time, amend or cancel this permit or to suspend operations, should non-compliance of any of the terms or conditions of this permit occur.

**IMPORTANT:** The Crown Lands Amendment Act assented to July 5<sup>th</sup>, 1994 states that failure to comply with the terms and conditions of a Work Permit issued under this Act is an offence punishable by a fine of up to \$10,000.

- The onus is on the Permittee (you) to comply with the terms and conditions of this permit.
- You are responsible for the actions of your employees or contractors.

Permittees Initials: SP

Page 1 of 2

Right-of-Way Construction or Clearing - Work Permit Conditions - Continued

Appendix "R-ROW"

Work Permit # 2011 2 25 086

Date: February 29, 2012

HudBay Minerals

- Corrective action can be ordered at any time during or after the operation.
- The permittee is responsible for consulting with and obtaining all necessary authorizations from the Department of Fisheries and Oceans and Transport Canada.
- All operations are subject to the appropriate Acts and Regulations, i.e.: The Crown Lands Act, The Fisheries Act, The Wildfires Act, The Forest Act, The Mines Act, The Environment Act, etc.
- A burning permit is required, for open fires, between April 1 and November 15.
- All non hazardous waste, litter and debris from the operation must be cleaned up in accordance with the requirements of Manitoba Regulation 92/88R respecting Litter, and deposited at an approved waste disposal ground.
- All dangerous goods must be dealt with according to The Dangerous Goods Handling and Transportation Act.
- To ensure that you are not working on mining restricted lands it is recommended that you consult with Manitoba Science, Technology, Energy and Mines or their website at <http://www.gov.mb.ca/stem/mrd/geo/gis/minesmaps.html>
- Should your operation require unusual activities or something not clearly identified by this permit consult your local Natural Resource Officer.

*St. Palgott*  
Signature of permittee

~~028~~ March 1/2012  
Date

*[Signature]*  
Natural Resource Officer

Feb 29 2012  
Date

Updated: 080521

Fire Equipment Requirements during Wildfire Season Work Permit Conditions

Appendix "F-FER"

Work Permit # 11 225 086

Date: February 29, 2012

Hudbay Minerals

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The following conditions are in addition to those conditions listed on the face of the work permit:

1. Functional fire suppression equipment is required during the wildfire season, April 1 – November 15. The minimum requirements are dependent on the type of operation and are outlined below;

**Road Construction:** Each heavy equipment unit (crawler tractor, excavator, skid steer loader, graders) shall be equipped with a minimum of:

- 1 – 20 lb. ABC type fire extinguisher or 2 – 10 lb. ABC type fire extinguishers.
- 1 shovel.

**Haulage Trucks:** Each truck engaged in log / gravel haulage shall be equipped with a minimum of:

- 1 – 5 lb. ABC type fire extinguisher.
- 1 shovel.

**Service / Utility Vehicles:** Each service / utility vehicle such as pick-ups or fuel tenders shall be equipped with:

- 1 – 5 lb. ABC type fire extinguisher.

**Power Saws / Brush Saws:** Each power saw or power hand tool kit shall be equipped with a minimum of:

- 1 – 2 lb. ABC type fire extinguisher.

**Logging Operations / Scarification:** Each heavy equipment unit (skidder / slasher / forwarder / feller buncher ) shall be equipped with in minimum of:

- 1 – 20 lb. ABC type fire extinguisher or equivalent.
- 1 pack pump (full) or equivalent container able to hold a minimum of <sup>15</sup>20 litres of water.
- 1 shovel.

**Forest Camps / Work Crews (drilling / tree planting / line cutting etc.):** Each camp shall have the following minimum type of equipment on site;

~~2-5~~ Person Crew <sup>2-4</sup>

- 1 pack pump (full) or equivalent container able to hold a minimum of <sup>15</sup>20 litres of water.
- 1 shovel.

~~5-10~~ Person Crew <sup>5-9</sup>

- 2 pack cans (full) or equivalent
- 1 shovel.
- 1 axe.

10 Person Crew Plus

Permittees Initials: SP

Fire Equipment Requirements during Wildfire Season Work Permit Conditions - Continued

Appendix "F-FER"

Work Permit # 11 225 086

Date: February 29, 2012

Hudbay Minerals

- 1 pumping unit (min 50 p.s.i.) c/w 600 feet of forestry hose and accessories.
- 3 pack cans or equivalent.
- 3 shovels.
- 2 axes.

Established Camps / Sawmill Sites etc.: Each camp or sawmill site shall have the minimum type of equipment on site.

- 1 pumping unit (min 50 p.s.i.) c/w 600 feet of forestry hose and accessories.
- 1 -- 500 gallon tank wagon / water tender or equivalent (where there is no readily accessible water source)
- 6 pack cans or equivalent.
- 6 shovels.

Other: \_\_\_\_\_: If none of the above apply the operation shall have the following minimum equipment:

\_\_\_\_\_ ABC type Fire Extinguisher(s), size \_\_\_\_\_ Pack can(s)  
 \_\_\_\_\_ Shovel(s) \_\_\_\_\_ Axe(s) \_\_\_\_\_ Other: \_\_\_\_\_

2. The operation must have a means of reporting a forest fire from the work site.

The local Natural Resource Officer on behalf of the Minister of Conservation, shall have the authority to, at any time, amend or cancel this permit or to suspend operations, should non-compliance of any of the terms or conditions of this permit occur.

IMPORTANT: The Wildfires Act states that failure to comply with the terms and conditions of a Work Permit issued under this Act is an offence punishable by a fine of up to \$10,000 for an individual and up to \$50,000 for a corporation.

- The onus is on the Permittee (you) to comply with the terms and conditions of this permit.
- You are responsible for the actions of your employees or contractors.
- Spark arrestors are required by law on all internal combustion engines.
- Further conditions or restrictions may be imposed if the wildfire danger levels or specific activity warrants such action.
- A burning permit is required, for open fires, between April 1 and November 15.
- Should your operation require unusual activities or something not clearly identified by this permit consult your local Natural Resource Officer.

Signature of permittee [Signature]

Date March 1 / 2012

Natural Resource Officer [Signature]

Date Feb 29 2012





Manitoba



Conservation and Water Stewardship

Water Use Licensing Section  
Box 16, 200 Saultheaux Crescent  
Winnipeg, Manitoba, Canada R3J 3W3  
T 204-945-6118 F 204-945-7419  
Rob.Matthews@gov.mb.ca

June 6, 2012

File: Hudson Bay Mining & Smelting Co. Limited -23

Hudson Bay Mining and Smelting Co. Limited  
C/O Doug Murray  
Box 1500  
Flin Flon, MB R8A 1N9

Dear Mr. Murray:

Attached herewith is a **Groundwater Exploration Permit** issued in response to the application registered on May 16, 2012 to construct well(s) and divert groundwater for a licence to construct wells and divert groundwater for industrial and fire fighting purposes on Sections 30 and 31 of 64-21W and Sections 25 and 36 of 64-22W in Manitoba as described in Lease Agreement No. 66082 between the Province of Manitoba and Hudson Bay Mining & Smelting Co. Limited.

The Groundwater Exploration Permit authorizes Hudson Bay Mining and Smelting Co. Limited to construct wells and conduct aquifer pump testing, as outlined in the cover letter from Friesen Drillers Limited accompanying the application. The purpose of the pump testing is to determine if sufficient water is available from the wells, and the aquifer, to support the project and to determine water level impacts on existing local wells and/or proposed project with an earlier precedence date associated with the proposed project. Please familiarize yourself with the terms and conditions of the Groundwater Exploration Permit.

**A licensing decision on this project will be held pending submission of the required information. Please note that diversion of water without a Water Rights Licence or written authorization would constitute a violation of *The Water Rights Act* and may be subject to enforcement.**

One important condition of any licence that may be issued for this project, in due course, is that a flow meter must be installed on the pipeline from the supply well(s), positioned to accurately measure instantaneous pumping rate and accumulative withdrawals

Please contact Lorraine Thibert directly at (204) 945-6693 should you have any questions regarding the requirements outlined in this letter and the attached permit or the water rights licensing aspects of this project.

Yours truly,

Rob Matthews, P. Geo.  
Manager, Water Use Licensing Section

c: Lorraine Thibert, Water Use Licensing

Attachment - Form H / Permit

**Groundwater Exploration Permit**

Pursuant to The Water Rights Act

**Hudson Bay Mining & Smelting Co. Limited**

is hereby permitted to construct a water well or wells on the following described lands to explore for groundwater.

		30 & 31	64	21	W
		25 & 36	64	22	W
LSD	OR QUARTER	SECTION	TOWNSHIP	RANGE	E OR W

for industrial purposes, subject, however, to the following conditions:

1. **The permittee must have legal access to the site.**
2. Prior to undertaking any work or construction of any works authorized by this permit the permittee is required to retain the services of a hydrogeologist registered with Association of Professional Engineers and Geoscientists of Manitoba, who would be required to:
  - Plan and supervise the drilling of boreholes, production wells, and aquifer and well pump testing as authorized by this permit. The drilling of boreholes should be directed towards defining the shape and size of the aquifer.
  - Conduct a constant rate aquifer pumping test on the proposed production well in accordance with Form H (attached), for a period of time as deemed necessary by the consulting hydrogeologist.
  - Carry out an inventory of domestic and licensed wells within a two (2) mile radius of the project well site.
  - Prepare and submit to the Water Use Licensing Section a technical report on the drilling of boreholes and wells, pump testing of wells, and well inventory. The report would contain, but not be limited to, such things as: well driller's reports for test wells and production wells, a plan showing the location of these wells with measurements to two property lines and/or GPS locations of the wells, an analysis of aquifer pumping tests, calculations of transmissivity, and a description of the amount of drawdown interference that would be expected to occur at existing local wells that are located within a two (2) mile radius of the project well site. The report would also indicate if any local wells are expected to be adversely affected by the proposed use of water and where these wells are located.
3. During any pumping tests that may be conducted, pumping must cease immediately if any local water supplies are negatively impacted as a result of the tests. The permittee is also responsible to correct any water supply problems or provide temporary water supply to anyone whose water supplies are negatively impacted as a result of the tests.
4. This permit expires within twelve (12) months of the date of issuance.
5. Please note that diversion of water without a Water Rights Licence or written authorization would constitute a violation of The Water Rights Act and may be subject to enforcement.

Issued at the City of Winnipeg in the Province of Manitoba, this 6<sup>th</sup> day of June, A.D. 20 12

  
 for The Honourable Minister of Conservation and Water Stewardship



# Friesen Drillers Ltd.

307 PTH 12 N Steinbach, MB. R5G 1T8 Phone 204-326-2485 Fax 204-326-2483 Toll Free-1-888-794-9355

May 9, 2012

Ms. Kristina Anderson, P.Geol.  
Groundwater Licensing Section  
Manitoba Water Stewardship  
200 Saulteaux Crescent  
Winnipeg, MB R3J 3W2

Dear Kristina

**Subject Groundwater Investigation for Industrial Water Supply and Fire Protection  
Reed Lake Project – Hudson Bay Mining and Smelting Company Limited**

Friesen Drillers Ltd. has been retained by Hudson Bay Mining and Smelting Company Limited (Hud Bay) to undertake a groundwater investigation for industrial and fire protection water supply at the Reed Lake site. It is our understanding that the Hud Bay is developing the Reed Lake site, and requires about 950 U.S.G.P.M. for fire protection requirements, and about 100 to 200 U.S.G.P.M. for industrial use washing water.

Hud Bay is currently using the Reed Lake site from a lease with the Province of Manitoba. A copy of the lease and work permit is attached.

Our proposed scope of services with Hud Bay includes the following activities:

#### *Phase I – Background Data Review and Groundwater Exploration Permit Application*

We propose to review the previous hydrogeological investigation that was undertaken in the area by Golder Associates Inc. We understand that some test wells were installed during this investigation. A 24 hour pumping test was undertaken to determine aquifer parameters.

Friesen Drillers has also been asked to submit a groundwater exploration permit for the site prior to undertaking any well constructions or on-site testing.

#### *Phase II – Field Investigations*

##### *Well Inventory*

We propose to undertake a well inventory within a two mile radius of the around the proposed production wells at the Reed Lake site. The well inventory will be correlated with well logs contained in the GWDRILL database, where available. Hud Bay would also assist in the identification of wells on the site.

##### *Test Well Drilling and Well Installations*

The carbonate aquifer is exposed at surface the Reed Lake site. It is proposed to construct a steel cased, 16 inch diameter well, along with an 8 inch diameter steel cased well as a back up. The test wells installed previously would be maintained by Hud Bay, and would be used in the pumping test analysis.

##### *Pumping Test*

Upon completion of the well installations, we propose to undertake a 6 hour pumping test on the completed production well. The proposed rate of pumping is 1000 U.S.G.P.M. The testing duration was chosen as a long term pumping test had previously been performed at the site by Golder Associates.



May 9, 2012

During the testing, we propose to monitor the two of the previously installed monitoring wells. One of the wells will have a conductivity transducer, which will record water level, temperature, and electrical conductivity of water. Standard pressure transducers will be used in the remaining wells. The casing elevation in all wells will also be surveyed to a common datum. The wells will also be marked with a hand held GPS unit.

During the testing, water quality samples would be collected at regular intervals. We would record unstable field parameters on the hour. We would collect three water samples for routine analysis

Upon completion of the test, we would leave the transducers in the wells for up to one week to monitor recovery and background static water levels. We would remove the transducers from the wells, and download the data for analysis and presentation.

*Phase III – Data Analysis and Plotting*

Following the data collection, the pumping and recovery testing data will be plotted and analyzed. We propose to utilize Waterloo Hydrogeologic's Aquifer Test Pro. Version 4.20 to undertake the aquifer parameter analysis. The software can generate the required distance drawdown and forward projected solutions required, with the proper input and manipulations. The data analysis will also look at static water levels with the potential effects on the well operation. We will also review local groundwater flow directions, and prepare a radius of influence of the production well on the nearby wells, if any. Plots of the aquifer parameter analysis would also be provided.

*Phase IV – Reporting*

With the completion of the preceding three phases, we would generate a report detailing the investigations and results. We would provide details on the background geology, hydrogeology, along with the results of the well inventory. The report would provide the results of the analysis, along with the predictions for water level impacts on nearby residents and private wells. We would detail the water quality sampling results, and provide comments on the possible changes/issues with water quality. Recommendations and discussions would also be included.

*Schedule*

Pending your approval, we propose to complete the project during the month of May/June, 2012.

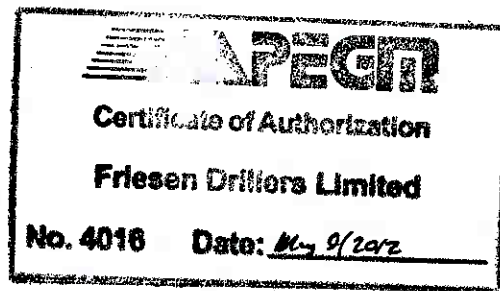
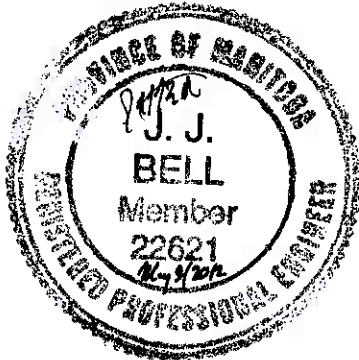
Should you require anything further or have any additional questions, please call me at (204) 326-2485.

Sincerely

Friesen Drillers Limited

J.J.(Jeff) Bell, B.Sc.(G.E.), P.Eng.  
Hydrogeological Engineer

Attachments



# Application for Licence to Construct A Well and Divert Groundwater

Manitoba Conservation  
Water Branch  
200 Saulteaux Crescent  
Winnipeg MB R3J 3W3



Pursuant to The Water Rights Act

APPLICANT'S NAME: HUDSON BAY MINING AND SMELTING COMPANY LTD.	ATT. DOUG MURRAY	TELEPHONE: 1-204-687-2081
---	------------------	---------------------------

POST OFFICE ADDRESS: P.O. Box 1500 FLIN FLON, MANITOBA RBA 1N9

hereby applies for authority to construct a water well on the following described lands:

LSD	OR QUARTER	30/31 25/36 SECTION	64 64 TOWNSHIP	21 22 RANGE	WPM WPM E OR W
-----	------------	---------------------------	----------------------	-------------------	----------------------

or otherwise described as REED LAKE SITE  
and divert groundwater for INDUSTRIAL + FIRE PROTECTION purposes on the following described land:  
(domestic, municipal, agricultural, industrial, irrigation, other)

LSD	OR QUARTER	30/31 25/36 SECTION	64 64 TOWNSHIP	21 22 RANGE	WPM WPM E OR W
-----	------------	---------------------------	----------------------	-------------------	----------------------

or otherwise described as REED LAKE SITE

at the following rates:  
 \_\_\_\_\_ cubic metres per second  
 \_\_\_\_\_ cubic decametres per day  
80 cubic decametres per year

Number of hectares to be irrigated \_\_\_\_\_ (if applicable)

The above described lands are held as follows: (check applicable box)

- Registered owner
  - purchased under agreement for sale
  - lessee
  - to be negotiated
- (SEE ATTACHED)

Copy(s) of Certificate(s) of Title or Title Numbers must be included.

Date: MAY 07 2012 Doug Murray  
(signature of applicant)

**FOR OFFICE USE ONLY**

Application filed with the Director, Water Branch,  
at Winnipeg, Manitoba on \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
(Signature of Director)

**\*\* PLEASE NOTE \*\***

FEE OF \$50.00 MUST ACCOMPANY THIS APPLICATION, CHEQUE AND APPLICATION TO BE MAILED TO:

MANITOBA CONSERVATION  
CASHIER'S OFFICE  
BOX 42, 200 SAULTEAUX CRESCENT  
WINNIPEG MB R3J 3W3

**Manitoba**



**Conservation**

Parks & Natural Areas

Box 51, 200 Saulteaux Crescent, Manitoba R3J 3W3

T 204 945-6796 F 204 945-0012

[Sandy.Thomson@gov.mb.ca](mailto:Sandy.Thomson@gov.mb.ca)

January 9, 2012

Mr. Stephen West  
Hudson Bay Mining and Smelting Co. Limited  
P.O. Box 1500  
Flin Flon, Manitoba  
R8A 1N9

U600-7

Dear Mr. West:

Please find attached your copy of a new fully executed Lease Agreement for Hudson Bay Mining and Smelting Co. Limited in Grass River Provincial Park.

If you require additional information concerning this matter please contact me.

Yours truly,

A handwritten signature in black ink that reads "Sandy Thomson".

Sandy Thomson  
Head, Park Districts Programs

cc: Rod MacCharles

(Format Revised September 1993)

## PROVINCE OF MANITOBA

## MANITOBA CONSERVATION

Lease No. 66082

LEASE OF PARK LAND PROPERTY FOR THE OPERATION OF  
ADVANCED EXPLORATION MINING PROJECT IN GRASS RIVER PROVINCIAL PARK,  
MADE IN DUPLICATE, DATED DECEMBER 31, 2011.

## BETWEEN:

HER MAJESTY THE QUEEN IN RIGHT OF THE  
PROVINCE OF MANITOBA, REPRESENTED BY THE  
HONOURABLE MINISTER OF CONSERVATION,

("the Crown"),

- and -

HUDSON BAY MINING AND SMELTING CO., LIMITED  
P.O. BOX 1500  
FLIN FLON, MANITOBA  
R8A 1N9

("the Lessee"),

made pursuant to The Provincial Parks Act and The Short Forms Act.

The Crown and the Lessee agree as follows:

**PART 1 - TERM OF AGREEMENT AND DESCRIPTION OF PROPERTY AND PREMISES**

- 1(1) Subject to the terms of this Agreement, the Crown hereby leases to the Lessee the property described in the attached Schedule "A" ("the property") for the term of five (5) years, commencing on May 1, 2011, and ending on April 30, 2016.
- 1(2) Unless otherwise provided herein, the property described in paragraph 1(1) is limited to the real property which is owned by the Crown, and the Lessee acknowledges that all other buildings, improvements and the assets and undertakings of any business operated by the Lessee (all of which are collectively described as the "Assets"), are governed by the terms and conditions of this Lease.

**PART 2 - QUIET ENJOYMENT**

- 2(1) Subject to the terms of this Agreement, the Crown covenants with the Lessee for the quiet enjoyment of the premises.

**PART 3 - RENT AND SERVICE FEES**

- 3(1) The Lessee shall pay once annually to the Crown:
- (a) a land rental fee determined in accordance with this Part and the Regulations under the Provincial Parks Act; and
  - (b) service fees prescribed from time to time by Regulation under the Provincial Parks Act,

within 30 days of receipt of an invoice therefor from the Crown. The Lessee acknowledges that the land rental fee as of the date of this Agreement is

\$1000.00 and the service fee as of the date of this Agreement is \$25.00.

- 3(2) Payments of the land rental fee and the service fees shall be made in accordance with the directions contained in the invoice from the Crown.
- 3(3) The Lessee acknowledges that:
- (a) the Minister may grant to an applicant a lease of a commercial lot in a provincial park for a term not exceeding 21 years, renewable for such additional term not exceeding 21 years as may be specified in the lease; and
  - (b) the fees payable in respect of permits and leases are those set out in a regulation under The Provincial Parks Act.
- 3(4) The Crown may at its option in any year establish a new annual rent to take effect May 1st by providing notice of the change of the annual rent in writing to the Lessee on or before January 15th of that year.
- 3(5) The Crown may establish a new rental rate where there is a change in one or more of the following factors to reflect those changes:
- (a) the appraised value of the raw land as determined by the Crown; and
  - (b) the policy of the Crown as set out in an Act of the Legislature or a Regulation relating to the determination of annual rent as a percentage of the appraised value of the raw land.
- 3(6) Where the Crown establishes a new rental rate under subsection 3(5)(a) to reflect a change in the appraised value of the raw land as determined by the Crown, and the Lessee disputes the reasonableness of the determination of the appraised value, the Lessee may, by providing notice in writing to the Crown, submit the matter in dispute to arbitration under The Arbitration Act (Manitoba).
- 3(8) The Lessee shall pay to the Crown interest on any arrears of annual rent and service fees at a rate fixed from time to time by a regulation under The Provincial Parks Act.

#### **PART 4 - OPERATION OF PREMISES**

- 4(1) The Lessee shall use the premises solely for the operation of a facility consisting of an advanced exploration or mining project. At such time as an Environment Act License is obtained by the Lessee for development and operation of a mine, and the Crown is notified in writing of same, a new twenty-one (21) year Lease Agreement may be entered into for the operation of such a facility.
- 4(2) The Lessee may, with the approval of the Crown, construct and operate additional facilities on the premises in accordance with plans approved by the Crown and on terms and conditions set by the Crown. The Crown will not unreasonably withhold approval provided that the construction and operation of the additional facilities are consistent with the use clause being paragraph 4(1) hereof. In the event that the Crown withholds approval, the Crown will forthwith, by notice in writing, inform the Lessee of the reason(s) for withholding approval for the construction and operation of additional facilities.
- 4(3) The Lessee shall provide experienced, capable and courteous staff as necessary to ensure proper on-site operation of the premises in accordance with paragraph 4(1).
- 4(4) The Lessee agrees to furnish the premises in a manner suitable to enable the operation of the premises for the purposes set out in paragraph 4(1).



- 4(5) The Lessee shall not use or allow the use of the premises as a chief place of residence for the Lessee or any other person without permission in writing from the Crown. The Crown will not unreasonably withhold permission for the Lessee to use or allow the use of the premises as a chief place of residence for the Lessee and any other person, in order to provide for the operation of the facility in accordance with paragraph 4(1) including but not limited to security personnel in temporary trailer accommodations.
- 4(6) The Lessee agrees to obey and comply with The Provincial Parks Act and all regulations thereunder.
- 4(7) The Lessee shall comply with all federal, provincial and municipal laws and regulations.
- 4(8) The Lessee shall obtain all licenses or permits necessary for the lawful operation of the premises.
- 4(9) The Lessee shall not allow any advertising, signing or promotional materials to be placed on the premises, except reasonable on-site and directional advertising and/or signs.

#### **PART 5 - MAINTENANCE OF PREMISES**

- 5(1) Subject to paragraphs 5(2) and 5(3), the Lessee agrees:
- (a) to keep the premises in a clean and sanitary condition free from inflammable materials;
  - (b) to comply with The Environment Act and all regulations thereunder;
  - (c) not to commit waste or damage the premises;
  - (d) to keep the premises in good repair; and
  - (e) to allow a person or persons on behalf of the Crown to enter the premises at all reasonable times to examine the state of repair.
- 5(2) If during the term of this Agreement the premises are damaged by fire, flood or act of God, so that they cannot be repaired with reasonable diligence within one hundred and eighty (180) days of the damage or such other reasonable period from the date of the damage as may be stated in a Certificate of an Architect provided by the Lessee to the Crown within thirty (30) days of the date of the damage, this Agreement shall terminate from the date of the damage and the Lessee shall immediately surrender the premises and all interest therein to the Crown and the Lessee shall pay rent until the time of the damage.
- 5(3) Subject to paragraph 5(4), if the premises are damaged by fire, flood or act of God, and can be repaired with reasonable diligence within one hundred and eighty (180) days from the date the damage occurred or such other reasonable period from the date of the damage as may be stated in a Certificate of an Architect provided by the Lessee to the Crown within thirty (30) days of the date of the damage, and if the damage is such as to render the premises unfit for operation for the purposes of this Agreement, the Lessee shall repair the premises with all reasonable speed and rent shall not accrue for sixty (60) days, but shall accrue in respect of the rent component for the land and for those service levies, as in the opinion of the Crown, relate to services used by the Lessee for the period beyond sixty (60) days and, if the Lessee does not complete the repairs to the extent that the premises are operational within one hundred and eighty (180) days from the date of the damage or the reasonable period from the date of the damage specified in the Architect's Certificate, the Crown may, at its option, terminate the lease and re-enter the premises.
- 5(4) All rent shall accrue in respect of the premises once the premises are repaired such that they are suitable for operation for the purposes of this Agreement.

- 5(5) **The Short Forms Act** does not apply to paragraphs 5(1)(d) and 5(1)(e).

#### **PART 6 - PAYMENT OF TAXES AND UTILITIES**

- 6(1) The Lessee agrees to pay taxes.
- 6(2) The Lessee agrees to pay all electric power charges and assessments in respect of the premises.
- 6(3) If the Lessee fails to pay any or all taxes or electric power charges and assessments as required by paragraphs 6(1) and 6(2), the Crown may pay them or any of them and charge those payments to the Lessee who shall reimburse the Crown forthwith and the Crown may take the same steps for the recovery of those payments as it would for the recovery of rent and arrears.
- 6(4) This Agreement creates no obligation for the Crown to survey or resurvey the premises.

#### **PART 7 - NO ASSIGNMENT OR SUBLEASE WITHOUT CONSENT**

- 7(1) The Lessee shall not assign or sublet the premises without the consent of the Crown, that consent not to be unreasonably withheld.
- 7(2) Subject to paragraph 7(3), the Crown shall not unreasonably withhold consent to the assignment of a Lease for collateral (financing and security) purposes.
- 7(3) In instances where an assignment for collateral purposes is consented to by the Crown, the Crown will maintain a record thereof, and not consent to a further assignment of the Lease by the Lessee itself (except for secondary or additional assignments for collateral purposes) to third parties without the consent of prior holders of assignments for collateral purposes.

#### **PART 8 - INSURANCE AND INDEMNITIES**

- 8(1) The Lessee shall use due care in the operation of the premises to ensure that no person is injured, no property is damaged or lost and no rights are infringed.
- 8(2) The Lessee shall be solely responsible for:
- (a) any injury to persons (including death), damage or loss to property or infringement of rights caused by, or related to the operation of the premises or the performance of this Agreement or the breach of any term or condition of this Agreement by the Lessee or any agent or employee of the Lessee, and
  - (b) any omission or wrongful or negligent act of the Lessee, or of any agent or employee of the Lessee;

and shall save harmless and indemnify the Crown, its officers, employees and agents from and against all claims, liabilities and demands with respect to clauses (a) and (b). This paragraph shall survive the termination or expiration of this Agreement.

- 8(3) The Lessee shall provide, maintain and pay for comprehensive general liability insurance protecting the Lessee and its employees against claims by third parties for any injury to persons (including death), damage or loss to property which may arise directly or indirectly out of the occupation of the premises or the performance of this Agreement by the Lessee. That insurance shall be placed with an insurance company or companies and be in such form as may be acceptable to the Crown and shall be for an amount of not less than TWO MILLION DOLLARS (\$2,000,000.00), inclusive of any one occurrence and shall name the Crown as an additional named insured with respect to the operations of the Lessee under this Agreement. The policy of insurance shall include a standard form of Cross Liability Clause and extend to cover the Lessee's public liability and property interest. Evidence of insurance in the form of a Certificate of Insurance shall be provided to the Crown by the Lessee within thirty (30) days of the execution of this Agreement. Evidence of renewal of insurance in the form of a Certificate of Renewal of Insurance shall be provided to the Crown by the Lessee at least thirty (30) days prior to the expiry of an insurance policy. The Lessee agrees not to vary the insurance policy in any manner which may adversely affect the Crown's interest therein.
- 8(4) In the event that the Lessee fails to maintain the insurance policy referred to in paragraph 8(3), the Crown may require the Lessee to remedy that default forthwith and if the Lessee fails to do so within thirty (30) days of receipt of that notice, the Crown may forthwith by notice in writing terminate this Agreement and re-enter the premises.
- 8(5) In addition to the rights of the Crown under paragraph 8(4), in the event that the Lessee fails to maintain the insurance policy referred to in paragraph 8(3), the Crown may, at its option, obtain the required insurance policy and may add the cost of the insurance policy plus an administration cost equal to twenty (20) percent of the cost of the insurance policy as additional rent. If the Lessee fails to pay that additional rent within thirty (30) days of receipt of a notice in writing from the Crown that the additional rent is due and payable, the Crown may forthwith, by notice in writing, terminate this Agreement and re-enter the premises. The Crown may maintain that insurance policy until such time as the Lessee provides evidence in the form of a Certificate of Insurance that it has obtained the insurance policy required by paragraph 8(3).

#### **PART 9 - TERMINATION AND EXTENSION**

- 9(1) At the end of the lease period this Agreement will expire.
- 9(2) The Crown or the Lessee may terminate this Agreement on April 30th of any year of this Agreement by giving notice in writing to the other party at least one (1) year prior to the date of termination.
- 9(3) In the event that the Crown terminates this Agreement in accordance with paragraph 9(3), the Crown agrees to pay to the Lessee due compensation for the Lessee's estate or interest, including the property referred to in clause 1(1) of the Lease and the assets referred to in clause 1(2) of the Lease, taking into account the unexpended portion of the Lease including the Lease renewal period, and the provisions of The Expropriation Act of Manitoba relating to the determination of due compensation and costs shall apply. Due compensation shall be determined based on the date of notice of termination and will be reduced by any amounts owing to the Crown from the Lessee arising pursuant to this Agreement.
- 9(4) In addition to its rights under paragraph 9(3), and without restricting any other remedies available, and subject to the provisions of paragraph 9(6) hereof, the Crown may, at its sole option, immediately terminate this Agreement in writing if the Lessee has failed to comply with any term or condition of this Agreement including the payment of rent and has not remedied that failure to comply within ninety (90) days of receipt of notice in writing from the Crown.

- 9(5) The Crown agrees not to terminate this agreement in accordance with paragraph 9(5) in instances where collateral assignments are recorded, without providing notice in writing to the holder of such collateral assignments (the "Security Holder"). The Crown acknowledges that the Security Holder:
- (a) has the authority to cure defaults of the Lessee, within a reasonable time frame of not less than 90 days as stipulated in the notice, so as to avoid termination of the Lease;
  - (b) shall not be obligated to go into possession, nor to operate the Lessee's business, but the Crown may at its option and its own expense unless otherwise agreed, in cooperation with the Security Holder, manage or operate the Lessee's business on terms to be agreed between the Crown and the Security Holder; and
  - (c) has the authority to assign the Lessee's interest in the Lease to a third party purchaser, subject to the consent of the Crown being required, but which shall not be unreasonably withheld; provided that as a condition of any such assignment, such subsequent assignee shall be obligated to execute such documentation as the Crown considers reasonable to bind the assignee directly to the Crown on the terms and conditions as contained in the original Lease, and all defaults of the Lease shall be cured and brought to good standing.
- 9(6) In the event that the Crown terminates this Agreement in accordance with paragraphs 5(2), 5(3), 8(4), 8(5) or 9(5), or the Lessee terminates this Agreement, or the lease expires either at the end of the lease term or at the end of the lease renewal period, the Lessee shall within six (6) months of the termination date either:
- (a) remove all or any part of the structures, improvements and appurtenances (the Assets) added to the property by or on behalf of the Lessee; or
  - (b) dispose of the Assets added to the property by or on behalf of the Lessee in a manner satisfactory to the Crown;
- and at the end of six (6) months, the Lessee shall be deemed to have fully completed such removal, and any Assets left on the property as at such date shall vest in the Crown, and the Lessee shall be deemed to have released and quit-claimed any interest therein to and in favour of the Crown.
- 9(7) Other than in accordance with this Agreement or with conditions in writing provided by the Crown, the Lessee shall not remain in possession of the property following the expiration or termination of this Agreement.

#### **PART 10 - ENTIRE AGREEMENT**

- 10(1) This document and the attached Schedules contain the entire agreement between the parties. There are no undertakings, representations or promises, express or implied, other than those contained in this Agreement.
- 10(2) No amendment or change to, or modification of, this Agreement shall be valid unless it is in writing and signed by both parties.

#### **PART 11 - APPLICABLE LAW**

- 11(1) This Agreement shall be interpreted, performed and enforced in accordance with the laws of Manitoba.
- 11(2) In the event of any dispute, the parties shall resolve same by reference to The Arbitration Act, and each party hereto shall appoint its own representative.

**PART 12 - NOTICES**

- 12(1) Any notice or other communication to the Crown under this Agreement shall be in writing and shall be delivered or sent by registered mail, postage prepaid to: Parks and Natural Areas Branch, Manitoba Conservation, Box 51, 200 Saulteaux Crescent, Winnipeg, Manitoba R3J 3W3.
- 12(2) Any notice or other communication to the Lessee under this Agreement shall be in writing and shall be delivered personally to the Lessee or an officer or employee of the Lessee or sent by registered mail, postage prepaid, to: Hudson Bay Mining and Smelting Co. Limited; P.O. Box 1500; Flin Flon, Manitoba; R8A 1N9
- 12(3) Any notice or communication sent by registered mail shall be deemed to have been received on the third (3rd) business day following the date of mailing. If mail service is disrupted by labour controversy, notice shall be delivered personally.
- 12(4) Either party may provide notice of change of address to the other in writing and thereafter all notice shall be provided to the new address.

This Agreement has been executed by the Minister of Conservation on behalf of the Province of Manitoba and by the Lessee by its duly authorized representative on the dates noted below.

**SIGNED IN THE PRESENCE OF:**

**FOR THE GOVERNMENT OF MANITOBA**

Sandy Thuman  
Witness

[Signature]  
Minister of Conservation  
December 21, 2011.  
DATE

**FOR THE LESSEE**

B. D. [Signature]  
Witness

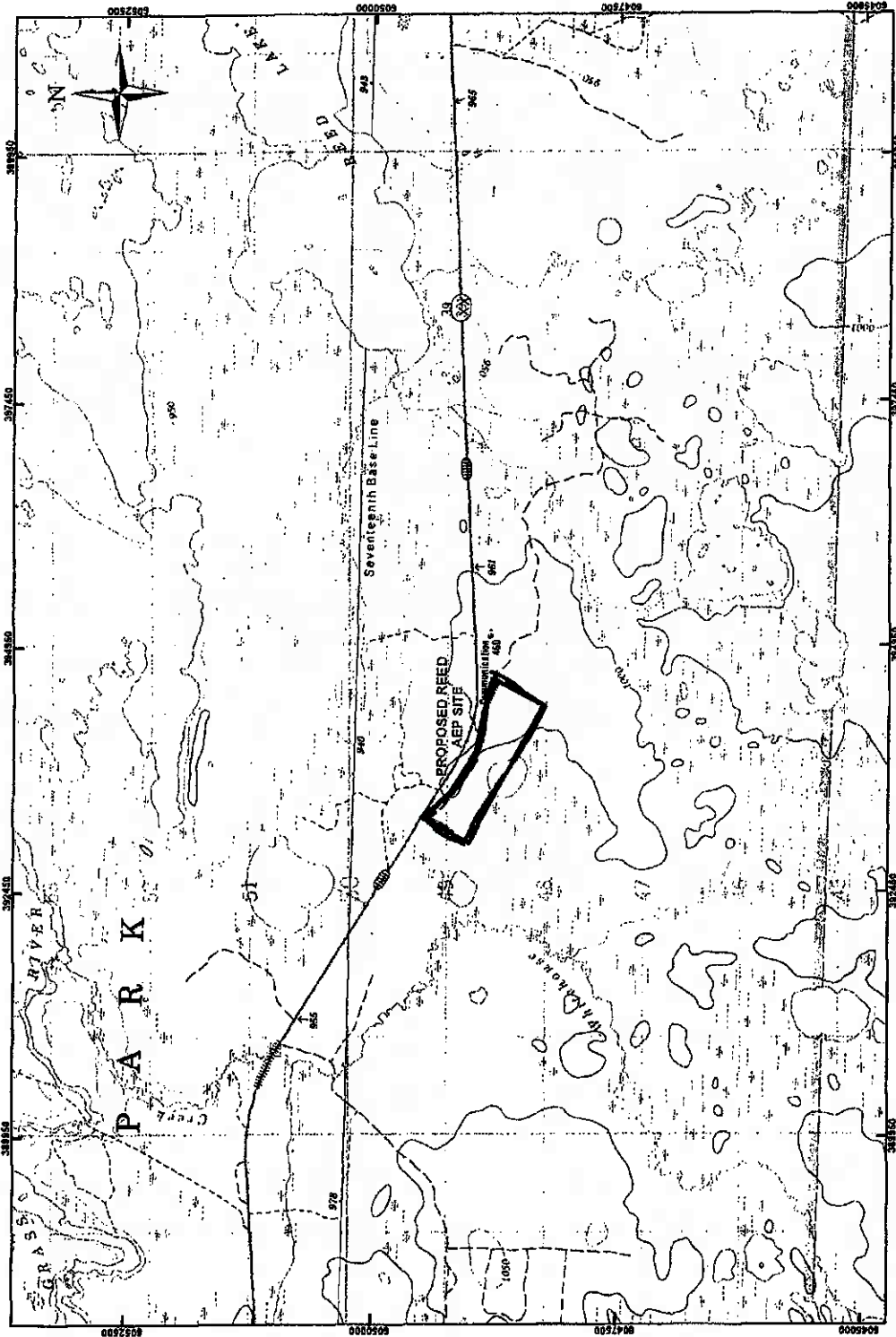
[Signature]  
Per **TOM A. GOODMAN**  
**SENIOR VICE PRESIDENT & COO**  
**HUBBAY MINERALS INC**  
2011/12/20  
DATE



**SCHEDULE "A"****LEGAL DESCRIPTION OF PROPERTY**

All that certain parcel or tract of land lying, situate and being in the Province of Manitoba and more particularly described as being 72 hectares near Reed Lake in Grass River Provincial Park and shown outlined in red on the attached maps marked as Schedule "A-1" and "A-2".

SCHEDULE "A - 1"



**REED ADVANCED EXPLORATION PROJECT**  
**Proposed Surface Lease**

1:50,000  
0 250 500 1,000 1,500 2,000  
Meters

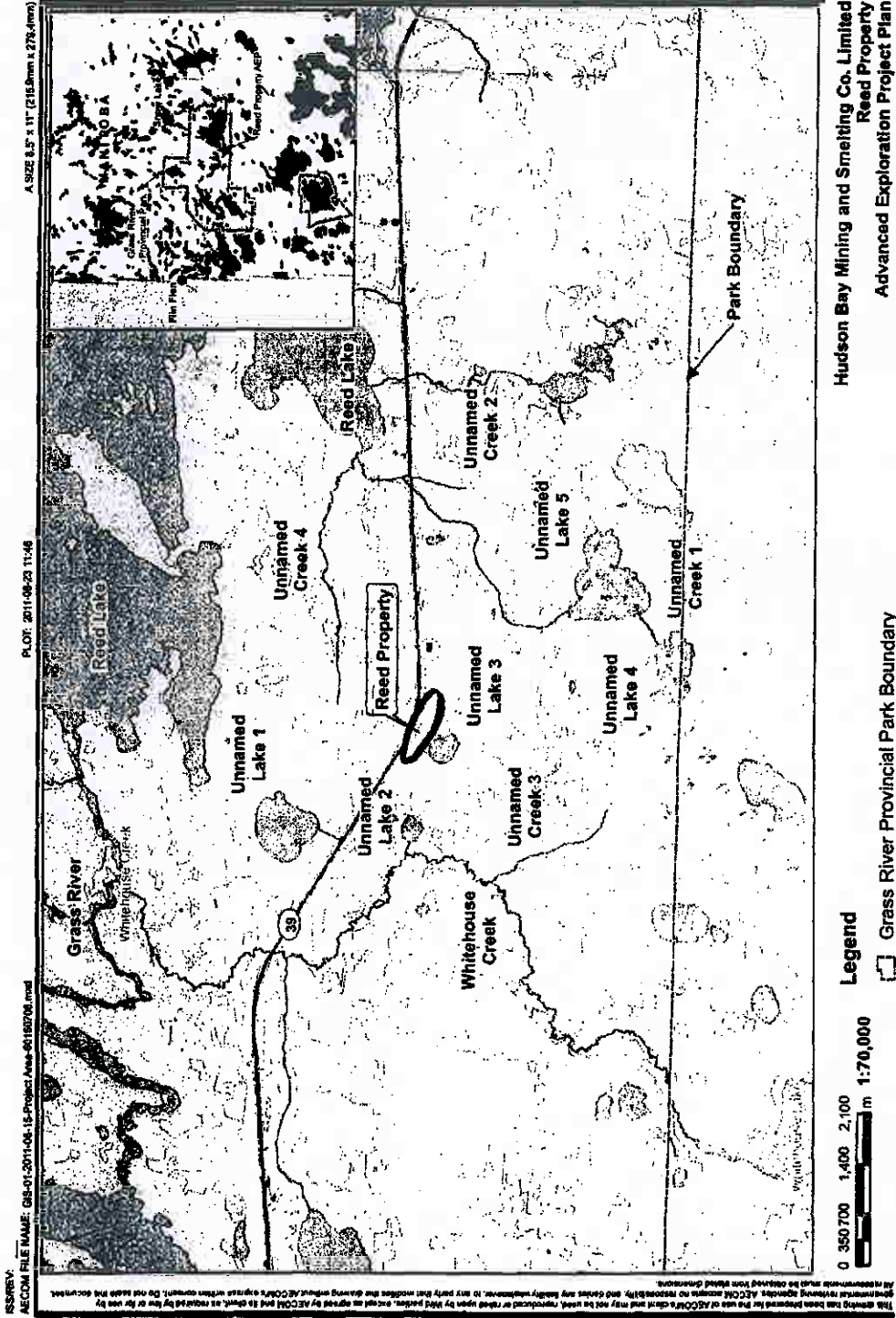
UTM: NAD83 ZONE14



Produced at HBED, Flin Flon on 2011/09/16

NTS: 63K10

SCHEDULE "A-2"



Hudson Bay Mining and Smelting Co. Limited  
 Reed Property  
 Advanced Exploration Project Plan  
 Location Plan & Project Area

**Legend**  
 [Symbol] Grass River Provincial Park Boundary  
 [Symbol] Existing MTS Communication Tower  
 [Symbol] Densely Wooded Area



RSREV: AECOM FILE NAME: GS-01-2011-06-18-Project Area-01180706.mxd PLOT: 2011-09-23 11:46 A SIZE 8.5" x 11" (216.5mm x 279.4mm)

This drawing has been prepared for the use of AECOM's client and may not be used, reproduced or made open by third parties, without the express written consent of AECOM. AECOM assumes no responsibility for any errors or omissions in this drawing. The client shall be responsible for the accuracy of the data provided to AECOM. AECOM shall not be held liable for any errors or omissions in this drawing. The client shall be responsible for the accuracy of the data provided to AECOM. AECOM shall not be held liable for any errors or omissions in this drawing. The client shall be responsible for the accuracy of the data provided to AECOM.

**Work Permit**  
**Permis d'exploitation**

Conservation  
Manitoba  
Manitoba  
Conservation



Permit No./N° de permis			
▶ WP	2011	2	25 086
YEAR ANNÉE	REGION RÉGION	DISTRICT DISTRICT	NUMBER NUMÉRO

This permit, issued under the authority of The Crown Lands Act, and/or The Wildfires Act, and, subject to all Acts and regulations in effect from time to time, authorizes/Le présent permis, délivré conformément à la Loi sur les terres domaniales, et/ou la Loi sur les incendies échappés, sous réserve des textes législatifs et des textes réglementaires en vigueur actuellement ou à l'avenir, autorise:

Name of permittee Nom du titulaire	HudBay Minerals	Contact name Nom de contact	Steve Polegato	
Address Adresse	Box 1500	City/Town Ville	Flin Flon	Province Province
Postal Code Code postal	R7A 7J8	Telephone No. N° de téléphone	[Business/Affaires] 1-204-687-2686	Fax No. N° de fax
			[Cell/Cellule] 204-687-0727	204-687-2774

to carry out an operation on the following described  Crown (Manitoba) lands  Other lands  
à effectuer des travaux sur  des terres domaniales (Manitoba)  d'autres terres décrites ci-après

South of Reed Lake, Grass River Provincial Park As per attached map labeled Z-Map.  
Location: Sec 30, S31 Twp. 64 Rge 21 WPM & Sec. 25, 36 Twp. 64 Rge 22 WPM (54 deg 34.34'N X 100 deg 38.33'W)

for the purpose of (describe purpose or objective of operation)/à fin de (décrire le raison des travaux)	Authority (enter # of permit, tender, contract, etc., if applicable) Autorisation (inscrire le n° de permis, de soumission, de contrat, etc., le cas échéant)
Clear, site prep. & construct mine site	Lease No. 86082 Advanced Exploration

Subject to the following conditions: (attach list if additional space is required)/Sous réserve des conditions suivantes: (annexer une liste, s'il n'y a pas d'espace)

- This permit must be available at all times on the operation site, produced at the request of an Officer, and may be cancelled by an Officer without advance notice.  
Ce permis doit pouvoir être présenté à tout moment sur le chantier si un agent demande à le voir; il peut être annulé par un agent préavis.
- as per attached appendix dated: Feb 29, 2012  
voir l'annexe en date du: Appendix A, R-ROW, F-FER, Z-MAP
- The permittee must contact the Snow Lake District Office prior to starting work.
- A timber permit will be required for all merchantable wood removed. A Burning Permit will be required for any burning after April 01
- All work to be completed within the tree clearing boundary marked on the attached map

**"THIS PERMIT AND THE RIGHTS AND PRIVILEGES GRANTED THEREUNDER ARE NOT TRANSFERABLE"**  
**"LE PRÉSENT PERMIS AINSI QUE LES DROITS ET PRIVILÈGES QUI S'Y RATTACHENT NE SONT PAS TRANSMISSIBLES"**

I hereby certify that the information given to obtain this permit is true and that I understand the conditions set out herein./Je certifie que les renseignements fournis pour l'obtention de ce permis sont exacts et que je comprends les conditions indiquées ci-dessus.   Signature of Permittee/Signature de titulaire  STEVE POLEGATO Print Name/Letres moullées Not valid unless signed by permittee or authorized representative. N'est valide que signé par le titulaire ou son représentant légal.	Date Issued/Date de délivrance (y/m/d)a (a/m/j)	 Signature of Issuing Authority/Signature de l'autorité émettrice  Jamie Davison Print Name/Letres moullées for Minister of Conservation/pour le ministre des Conservation Issuing District or Office/District ou bureau émetteur  Snow Lake
	2012-02-29	
	Expiry Date/Date d'expiration (y/m/d)a (a/m/j)	
	2012-04-30	

Copy To: PERMITTEE - DISTRICT - REGION  
Copie: TITULAIRE - DISTRICT - RÉGION

Work Permit Conditions

Appendix "A"

Work Permit # 2011 2 25 086

Date: February 29, 2012

HudBay Minerals.

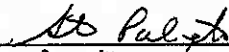
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The following conditions are in addition to those conditions listed on the face of the work permit:

1. Existing trails, portages and other travel ways shall not be altered so as to interfere with other users.
2. The permittee will ensure that any work done in or near a waterbody is done in accordance with the *Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, May 1996*.
3. There shall be no bulldozing of vegetation into standing timber. Any vegetation and debris removed during the operation shall be piled and burned or compacted in windrows. Windrows shall be compacted to lie as close to the ground as possible (maximum height of 0.6 of a meter) and shall be no closer than 1 meter to the bush line. Burn piles must be located a minimum of 15 metres from standing timber.
4. The permittee shall locate fuel storage and equipment servicing areas established for the operation a minimum distance of 100 metres from any waterbody.
5. The Natural Resource Officer in Snow Lake, (204) 358 2521, shall be notified no less than one week prior to completion of operations to allow for final inspection of the operation.
6. All Operations must be completed to the approval of the local Natural Resource Officer.
7. The local Natural Resource Officer on behalf of the Minister of Conservation, shall have the authority to, at any time, amend or cancel this permit or to suspend operations, should non-compliance of any of the terms or conditions of this permit occur.

**IMPORTANT:** The Crown Lands Amendment Act assented to July 5<sup>th</sup>, 1994 states that failure to comply with the terms and conditions of a Work Permit issued under this Act is an offence punishable by a fine of up to \$10,000.

- The onus is on the Permittee (you) to comply with the terms and conditions of this permit.
- You are responsible for the actions of your employees or contractors.
- Corrective action can be ordered at any time during or after the operation.
- The permittee is responsible for consulting with and obtaining all necessary authorizations from the Department of Fisheries and Oceans and Transport Canada.
- All operations are subject to the appropriate Acts and Regulations, i.e.: The Crown Lands Act, The Fisheries Act, The Wildfires Act, The Forest Act, The Mines Act, The Environment Act, etc.
- A burning permit is required, for open fires, between April 1 and November 15.
- All non hazardous waste, litter and debris from the operation must be cleaned up in accordance with the requirements of Manitoba Regulation 92/88R respecting Litter, and deposited at an approved waste disposal ground.
- All dangerous goods must be dealt with according to The Dangerous Goods Handling and Transportation Act.
- To ensure that you are not working on mining restricted lands it is recommended that you consult with Manitoba Science, Technology, Energy and Mines or their website at <http://www.gov.mb.ca/stem/mrd/geo/gis/minesmaps.html>
- Should your operation require unusual activities or something not clearly identified by this permit consult your local Natural Resource Officer.

  
\_\_\_\_\_  
Signature of permittee

March 1 / 2012  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Natural Resource Officer

Feb 29 2012  
\_\_\_\_\_  
Date

Updated: 08/05/20



## Right-of-Way Construction or Clearing - Work Permit Conditions

### Appendix "R-ROW"

Work Permit # 2011 2 25 086

Date: February 29, 2012

HudBay Minerals

---

The following conditions are in addition to those conditions listed on the face of the permit:

1. Construction / clearing will occur within the area as outlined on the attached map and in accordance with the attached project description.

#### Heavy Equipment Conditions:

2. By-pass roads or trails will utilize existing clearings unless prior separate approval has been obtained from the supervising Natural Resource Officer.
3. There shall be no bulldozing of woody debris into standing timber. All vegetation and debris removed from the road right-of-way shall be piled and burned or compacted in windrows. Windrows shall be compacted to lie as close to the ground as possible (maximum height of 0.6 of a meter) and shall be no closer than 1 meter to the bush line. Burn piles must be located a minimum of 15 metres from standing timber.
4. Any merchantable wood removed may be stockpiled outside and immediately adjacent to the ROW. Stockpile sites shall be located in existing clearings or areas of non-merchantable timber. Stockpile sites shall not be located within 100 m of a water body. ~~All stockpiled material must be removed from Crown land by~~ . Timber dues will be payable on all merchantable timber removed.

#### Hand clearing conditions:

5. All timber and brush cut for the line is to be cut to lie as close to the ground as possible. No trees are to be left hanging in standing timber.

#### General Conditions:

6. The permittee will ensure that creek crossings are done in accordance with the *Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, May 1996*.
7. Existing trails, portages and other travelways shall not be altered so as to interfere with other users.
8. The Natural Resource Officer in Snow Lake, (204) 358 2521, shall be notified no less than one week prior to completion of operations to allow for final inspection of the operation.
9. All Operations must be completed to the approval of the local Natural Resource Officer.
10. The local Natural Resource Officer on behalf of the Minister of Conservation, shall have the authority to, at any time, amend or cancel this permit or to suspend operations, should non-compliance of any of the terms or conditions of this permit occur.

IMPORTANT: The Crown Lands Amendment Act assented to July 5<sup>th</sup>, 1994 states that failure to comply with the terms and conditions of a Work Permit issued under this Act is an offence punishable by a fine of up to \$10,000.

- The onus is on the Permittee (you) to comply with the terms and conditions of this permit.
- You are responsible for the actions of your employees or contractors.

Permittees Initials: SP

Page 1 of 2

Right-of-Way Construction or Clearing - Work Permit Conditions - Continued  
Appendix "R-ROW"

Work Permit # 2011 2 25 086

Date: February 29, 2012

HudBay Minerals

- Corrective action can be ordered at any time during or after the operation.
- The permittee is responsible for consulting with and obtaining all necessary authorizations from the Department of Fisheries and Oceans and Transport Canada.
- All operations are subject to the appropriate Acts and Regulations, i.e.: The Crown Lands Act, The Fisheries Act, The Wildfires Act, The Forest Act, The Mines Act, The Environment Act, etc.
- A burning permit is required, for open fires, between April 1 and November 15.
- All non hazardous waste, litter and debris from the operation must be cleaned up in accordance with the requirements of Manitoba Regulation 92/88R respecting Litter, and deposited at an approved waste disposal ground.
- All dangerous goods must be dealt with according to The Dangerous Goods Handling and Transportation Act.
- To ensure that you are not working on mining restricted lands it is recommended that you consult with Manitoba Science, Technology, Energy and Mines or their website at <http://www.gov.mb.ca/stem/mrd/geo/gis/minesmaps.html>
- Should your operation require unusual activities or something not clearly identified by this permit consult your local Natural Resource Officer.

*St Palgout*  
Signature of permittee

~~088~~ March 1/2012  
Date

*Arnie D.*  
Natural Resource Officer

Feb 29 2012  
Date

Updated: 080521

Fire Equipment Requirements during Wildfire Season Work Permit Conditions

Appendix "F-FER"

Work Permit # 11 225 086

Date: February 29, 2012

Hudbay Minerals

---

The following conditions are in addition to those conditions listed on the face of the work permit:

1. Functional fire suppression equipment is required during the wildfire season, April 1 – November 15. The minimum requirements are dependent on the type of operation and are outlined below;

**Road Construction:** Each heavy equipment unit (crawler tractor, excavator, skid steer loader, graders) shall be equipped with a minimum of:

- 1 – 20 lb. ABC type fire extinguisher or 2 – 10 lb. ABC type fire extinguishers.
- 1 shovel.

**Haulage Trucks:** Each truck engaged in log / gravel haulage shall be equipped with a minimum of:

- 1 – 5 lb. ABC type fire extinguisher.
- 1 shovel.

**Service / Utility Vehicles:** Each service / utility vehicle such as pick-ups or fuel tenders shall be equipped with:

- 1 – 5 lb. ABC type fire extinguisher.

**Power Saws / Brush Saws:** Each power saw or power hand tool kit shall be equipped with a minimum of:

- 1 – 2 lb. ABC type fire extinguisher.

**Logging Operations / Scarification:** Each heavy equipment unit (skidder / slasher / forwarder / feller buncher ) shall be equipped with in minimum of:

- 1 – 20 lb. ABC type fire extinguisher or equivalent.
- 1 pack pump (full) or equivalent container able to hold a minimum of <sup>15</sup>20 litres of water.
- 1 shovel.

**Forest Camps / Work Crews (drilling / tree planting / line cutting etc.):** Each camp shall have the following minimum type of equipment on site;

~~2-5~~ Person Crew <sup>2-4</sup>

- 1 pack pump (full) or equivalent container able to hold a minimum of <sup>15</sup>20 litres of water.
- 1 shovel.

~~5-10~~ Person Crew <sup>5-9</sup>

- 2 pack cans (full) or equivalent
- 1 shovel.
- 1 axe.

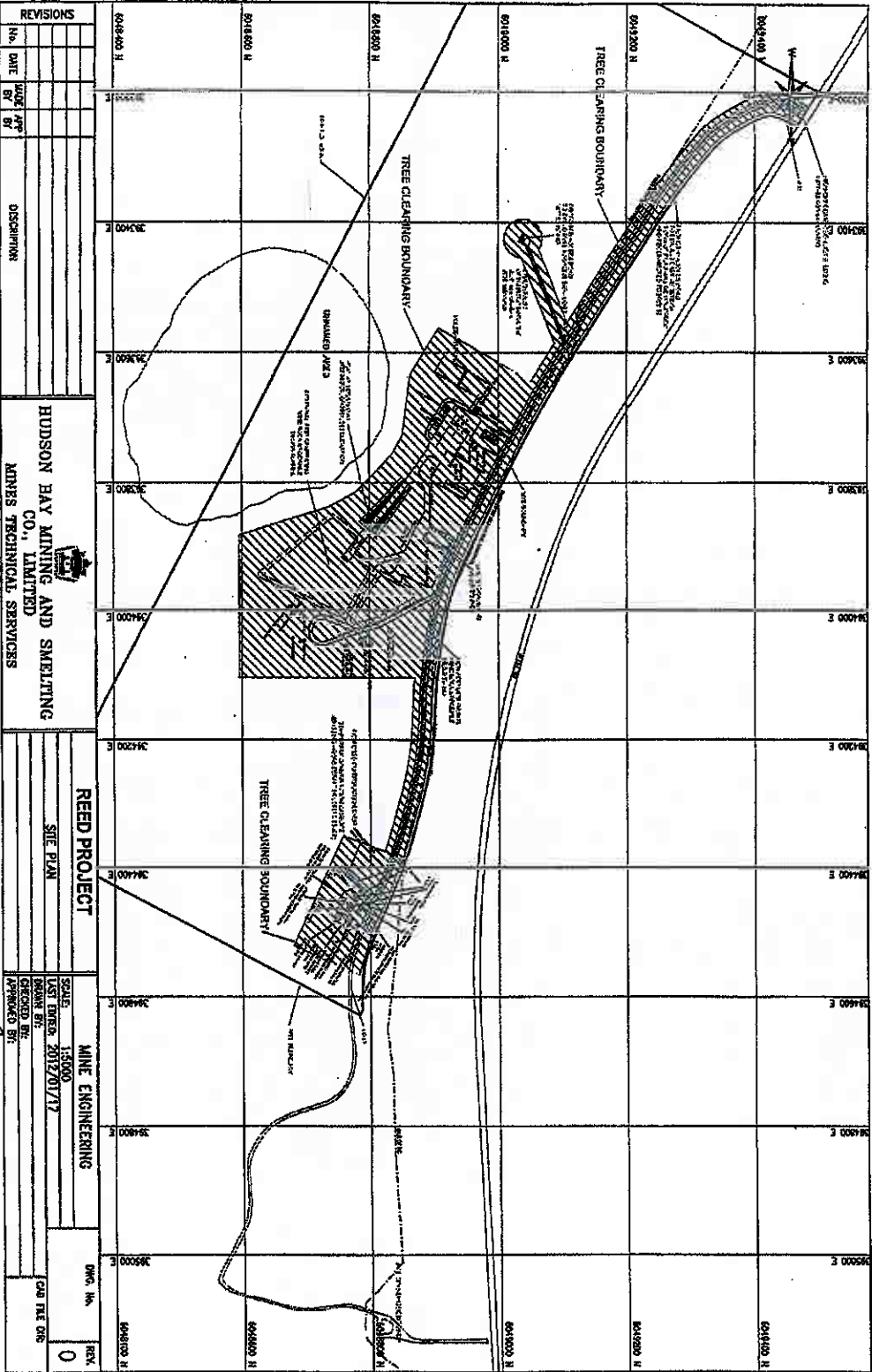
10 Person Crew Plus

Permittees Initials: SP

Page 1 of 2



# Appendix Z - map



REVISIONS	
No.	DATE

HUDSON BAY MINING AND SMELTING  
CO., LIMITED  
MINES TECHNICAL SERVICES

REED PROJECT  
SITE PLAN

SCALE: 1:5000  
DATE: 2017/07/17  
DRAWN BY:  
CHECKED BY:  
APPROVED BY:  
MINE ENGINEERING  
DWG. No. 0  
REV. 0

*Jamie Davis*  
*Asst. Eng.*



# Driller's Report

Well Location	QTR	SEC	TWP	RGE	E	<input checked="" type="checkbox"/> W	<input type="checkbox"/>	GPS Reading			
	R. Lot	Parish						Lat. N°	54.57571		
	Remarks	Reed Lake Project-PR39						Long W°	100.64115		
Well Owner	Name	Hudson Bay Mining & Smelting Ltd.						Accuracy:			
	Address	Box 1500			Phone			Location Sketch of Well			
	Flin Flon, MB R8A 1N9			Cell Phone							
Well Identification											
Well Use	Production	<input checked="" type="checkbox"/>	Test Well	<input type="checkbox"/>	Recharge	<input type="checkbox"/>	Observation	<input type="checkbox"/>			
Water Use	Domestic	<input type="checkbox"/>	Livestock	<input type="checkbox"/>	Industrial	<input checked="" type="checkbox"/>	Irrigation	<input type="checkbox"/>			
	Air-condition	<input type="checkbox"/>	Other	<input type="checkbox"/>	Specify						
Date well completed	July 16, 2012										
Depth Below Ground in Feet	DESCRIPTION WELL LOG							Water Record			
0	16	Bouldery Glacial Till									
16	21	Soft Brown Limestone									
21	54	Limestone with fractures @ 25, 34 & 50 feet.									
54	70	Granite (Weathered)									
WELL CONSTRUCTION											
Depth Below Ground Level	Casing	Open Hole	Perforations	Gravel Pack	Casing Grout	Inside Diameter	Outside Diameter	Screen Slot size	TYPE	MATERIAL	MAKE
0	20	x				12			Black ERW	Steel	Welded
20	70		x			11					
0	35	x				8			Black ERW	Steel	Welded
35	40		x					0	Zero Wrap	Stainless Steel	Variperm
40	70		x				10	50	Screen WW	Stainless Steel	Variperm
Top of Casing      2½      Feet above      X      Below											
<b>REMARKS:</b> Industrial Supply well- Reed Lake Site- Hud Bay Minerals Well must be vented											
PUMPING TEST						CONTRACTOR					
Date of Test:      July 16, 2012						License Number      607      12					
Pumping <input checked="" type="checkbox"/> Flowing <input type="checkbox"/> Rate      400 I.G.P.M.						Name      Friesen Drillers Ltd					
Water level before pumping      17.80 Above <input type="checkbox"/> Below <input checked="" type="checkbox"/>						Address      307 PTH 12 N Steinbach, MB. R5G 1T8					
Pumping level at end of test      29.22 Above <input type="checkbox"/> Below <input checked="" type="checkbox"/>						Drill Operator      Peter Friesen					
Duration of test      2 HRS      Minutes											
Recommended pumping rate      100 I.G.P.M.											
With pump intake at      35 Feet below ground level											

# Driller's Report

Well Location	QTR	SEC	TWP	RGE	E	<input checked="" type="checkbox"/>	W	<input type="checkbox"/>	GPS Reading		
	R. Lot _____ Parish _____								Lat. N°	54.57567	
	Remarks Reed Lake Project-PR39								Long W°	100.64114	
Well Owner	Name Hudson Bay Mining & Smelting Ltd.								Accuracy:		
	Address Box 1500 Flin Flon, MB R8A 1N9				Phone _____ Cell Phone _____				Location Sketch of Well		
Well Identification											
Well Use	Production	<input checked="" type="checkbox"/>	Test Well	<input type="checkbox"/>	Recharge	<input type="checkbox"/>	Observation	<input type="checkbox"/>			
Water Use	Domestic	<input type="checkbox"/>	Livestock	<input type="checkbox"/>	Industrial	<input type="checkbox"/>	Irrigation	<input type="checkbox"/>			
	Air-condition	<input type="checkbox"/>	Other	<input checked="" type="checkbox"/>	Specify	Fire Protection					
Date well completed	July 18, 2012										
Depth Below Ground in Feet	DESCRIPTION WELL LOG								Water Record		
0	16	Bouldery Glacial Till									
16	21	Soft Brown Limestone									
21	54	Limestone with fractures @ 25, 34 & 50 feet.									
54	70	Granite									
WELL CONSTRUCTION											
Depth Below Ground Level	Casing	Open Hole	Perforations	Gravel Pack	Casing Grout	Inside Diameter	Outside Diameter	Screen Slot size	TYPE	MATERIAL	MAKE
0	17	x				24			Black ERW	Steel	Welded
17	70		x			23					
0	39	x				16			Black ERW	Steel	Welded
39	69			x		13.1	15.7	100	Screen WW	Stainless Steel	Variperms
Top of Casing $2\frac{1}{2}$ Feet above <input checked="" type="checkbox"/> Below <input type="checkbox"/>											
REMARKS:	Fire Protection well- Reed Lake Site- Hud Bay Minerals <b>Well must be vented</b>										
PUMPING TEST						CONTRACTOR					
Date of Test:	July 18, 2012					License Number 607 12					
Pumping	<input checked="" type="checkbox"/>	Flowing	<input type="checkbox"/>	Rate	400 I.G.P.M.						
Water level before pumping	15.35			Above	<input type="checkbox"/>	Below	<input checked="" type="checkbox"/>	Name Friesen Drillers Ltd			
Pumping level at end of test	26.63			Above	<input type="checkbox"/>	Below	<input checked="" type="checkbox"/>	Address 307 PTH 12 N Steinbach, MB. R5G 1T8			
Duration of test	6 HRS		Minutes _____								
Recommended pumping rate	-		I.G.P.M. _____								
With pump intake at	Feet below ground level _____										



Friesen Drillers Ltd.  
307 PTH 12 N  
Steinbach, Manitoba  
R5G 1T8

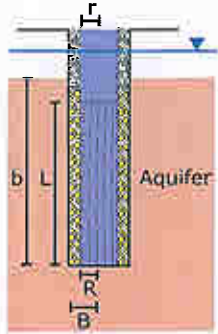
**Wells**

Project: Hudson Bay Mining and Smelting Limited

Number: 2012-06-199

Client: HudBay Minerals

Location: Reed Lake, Manitoba



	Name	X [ft]
1	Fire Well	0
2	Supply Well	0



Friesen Drillers Ltd.  
307 PTH 12 N  
Steinbach, Manitoba  
R5G 1T8

**Pumping Test - Water Level Data**

Project: Hudson Bay Mining and Smelting Limited

Number: 2012-06-199

Client: HudBay Minerals

Location: Reed Lake, Manitoba

Pumping Test: Pumping Test - Main Well

Pumping Well: Fire Well

Test Conducted by: Peter Friesen

Test Date: 7/18/2012

Discharge: variable, average rate 366 [U.S. gal/min]

Observation Well: Fire Well

Static Water Level [ft]: 15.35

Radial Distance to PW [ft]: -

	Time [min]	Water Level [ft]	Drawdown [ft]
1	0	15.35	0.00
2	0.5	19.10	3.75
3	1	19.70	4.35
4	2	20.10	4.75
5	3	20.35	5.00
6	4	20.45	5.10
7	5	20.55	5.20
8	6	20.65	5.30
9	7	20.75	5.40
10	10	20.76	5.41
11	15	21.23	5.88
12	20	21.40	6.05
13	25	21.52	6.17
14	30	21.65	6.30
15	35	21.83	6.48
16	40	21.95	6.60
17	50	22.20	6.85
18	60	22.32	6.97
19	75	22.85	7.50
20	90	23.25	7.90
21	105	23.65	8.30
22	120	23.93	8.58
23	135	24.20	8.85
24	150	24.50	9.15
25	165	24.75	9.40
26	180	24.90	9.55
27	195	25.10	9.75
28	210	25.40	10.05
29	225	25.50	10.15
30	240	25.72	10.37
31	300	26.26	10.91
32	360	26.63	11.28
33	360.5	20.90	5.55
34	361	19.85	4.50
35	362	19.25	3.90
36	363	19.10	3.75
37	364	19.00	3.65
38	365	18.95	3.60
39	367	18.85	3.50
40	368	18.80	3.45
41	369	18.77	3.42
42	370	18.74	3.39
43	375	18.57	3.22
44	380	18.45	3.10
45	385	18.36	3.01
46	390	18.27	2.92
47	395	18.21	2.86
48	400	18.14	2.79
49	410	18.02	2.67
50	420	17.92	2.57
51	435	17.75	2.40



Friesen Drillers Ltd.  
307 PTH 12 N  
Steinbach, Manitoba  
R5G 1T8

**Pumping Test - Water Level Data**

Page 2 of 2

Project: Hudson Bay Mining and Smelting Limited

Number: 2012-06-199

Client: HudBay Minerals

	Time [min]	Water Level [ft]	Drawdown [ft]
52	450	17.70	2.35
53	465	17.58	2.23
54	480	15.51	0.16





Friesen Drillers Ltd.  
307 PTH 12 N  
Steinbach, Manitoba  
R5G 1T8

**Pumping Test - Water Level Data**

Project: Hudson Bay Mining and Smelting Limited

Number: 2012-06-199

Client: HudBay Minerals

Location: Reed Lake, Manitoba

Pumping Test: Pumping Test - Main Well

Pumping Well: Fire Well

Test Conducted by: Peter Friesen

Test Date: 7/18/2012

Discharge: variable, average rate 366 [U.S. gal/min]

Observation Well: Supply Well

Static Water Level [ft]: 15.05

Radial Distance to PW [ft]: 15

	Time [min]	Water Level [ft]	Drawdown [ft]
1	0	15.05	0.00
2	10	18.53	3.48
3	90	20.05	5.00
4	360	21.25	6.20



Friesen Drillers Ltd.  
307 PTH 12 N  
Steinbach, Manitoba  
R5G 1T8

**Pumping Test Analysis Report**

Project: Hudson Bay Mining and Smelting Limited

Number: 2012-06-199

Client: HudBay Minerals

Location: Reed Lake, Manitoba

Pumping Test: Pumping Test - Main Well

Pumping Well: Fire Well

Test Conducted by: Peter Friesen

Test Date: 7/18/2012

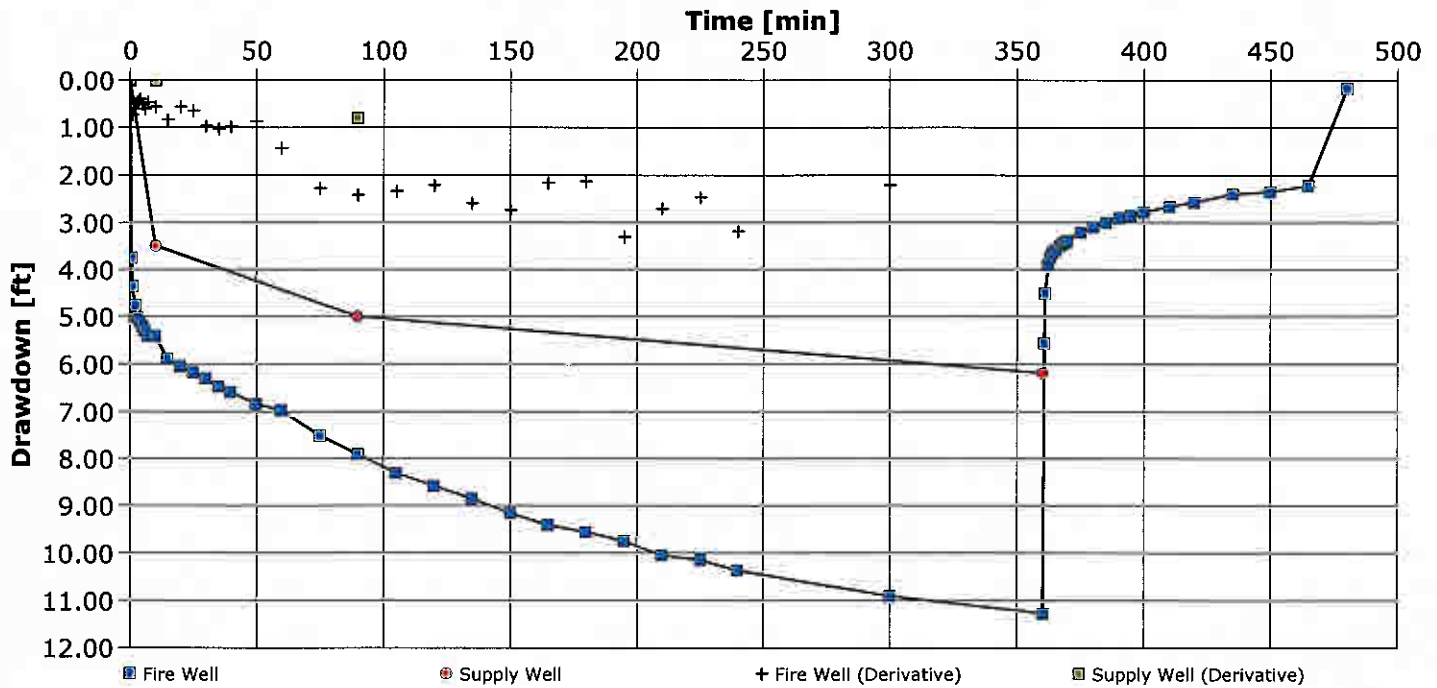
Analysis Performed by: Jeff Bell, P.Eng.

Time vs. Drawdown

Analysis Date: 11/20/2012

Aquifer Thickness:

Discharge: variable, average rate 366 [U.S. gal/min]





Friesen Drillers Ltd.  
 307 PTH 12 N  
 Steinbach, Manitoba  
 R5G 1T8

**Pumping Test Analysis Report**

Project: Hudson Bay Mining and Smelting Limited

Number: 2012-06-199

Client: HudBay Minerals

Location: Reed Lake, Manitoba

Pumping Test: Pumping Test - Main Well

Pumping Well: Fire Well

Test Conducted by: Peter Friesen

Test Date: 7/18/2012

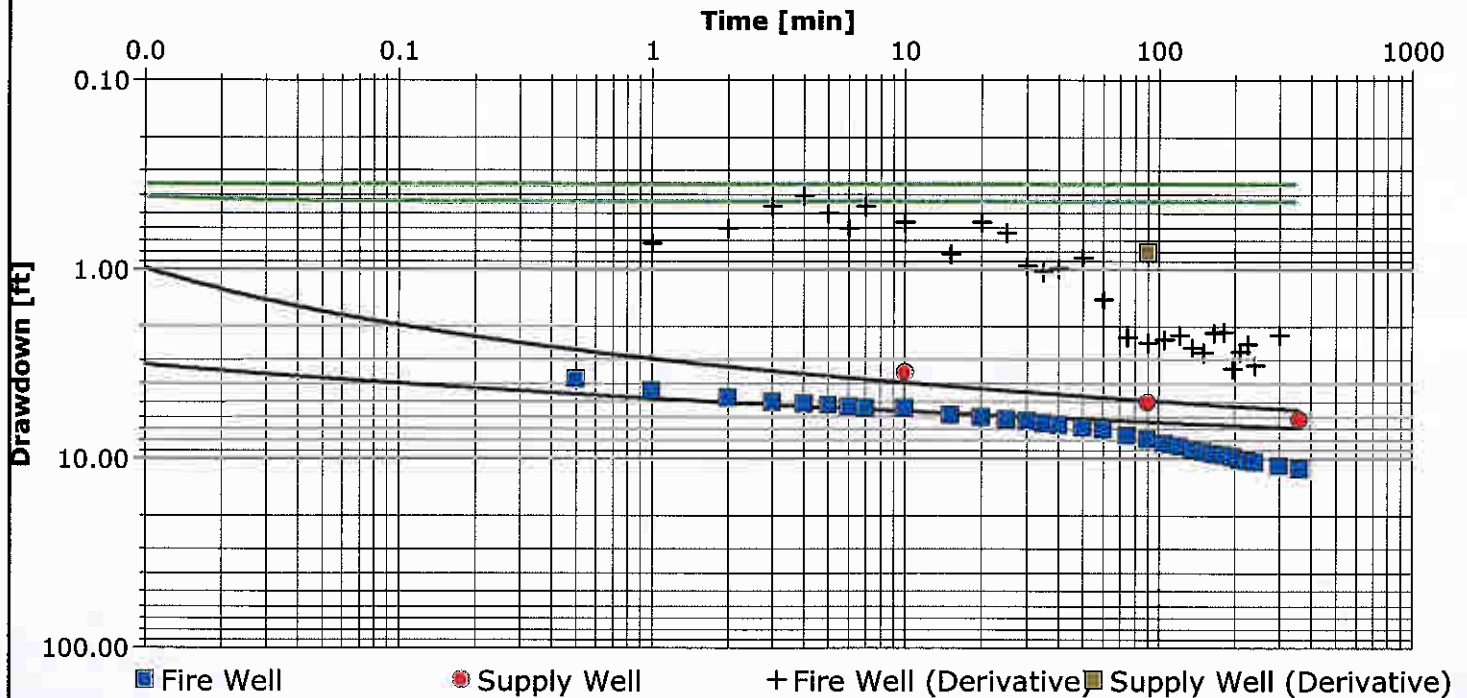
Analysis Performed by: Jeff Bell, P.Eng.

Theis Analysis

Analysis Date: 11/20/2012

Aquifer Thickness:

Discharge: variable, average rate 366 [U.S. gal/min]



Calculation after Theis

Observation Well	Transmissivity [U.S. gal/d-ft]	Storage coefficient	Radial Distance to PW [ft]
Fire Well	$1.19 \times 10^5$	$1.00 \times 10^{-4}$	0.55
Supply Well	$9.60 \times 10^4$	$1.00 \times 10^{-4}$	15.0
Average	$1.07 \times 10^5$	$1.00 \times 10^{-4}$	



Friesen Drillers Ltd.  
 307 PTH 12 N  
 Steinbach, Manitoba  
 R5G 1T8

**Pumping Test Analysis Report**

Project: Hudson Bay Mining and Smelting Limited

Number: 2012-06-199

Client: HudBay Minerals

Location: Reed Lake, Manitoba

Pumping Test: Pumping Test - Main Well

Pumping Well: Fire Well

Test Conducted by: Peter Friesen

Test Date: 7/18/2012

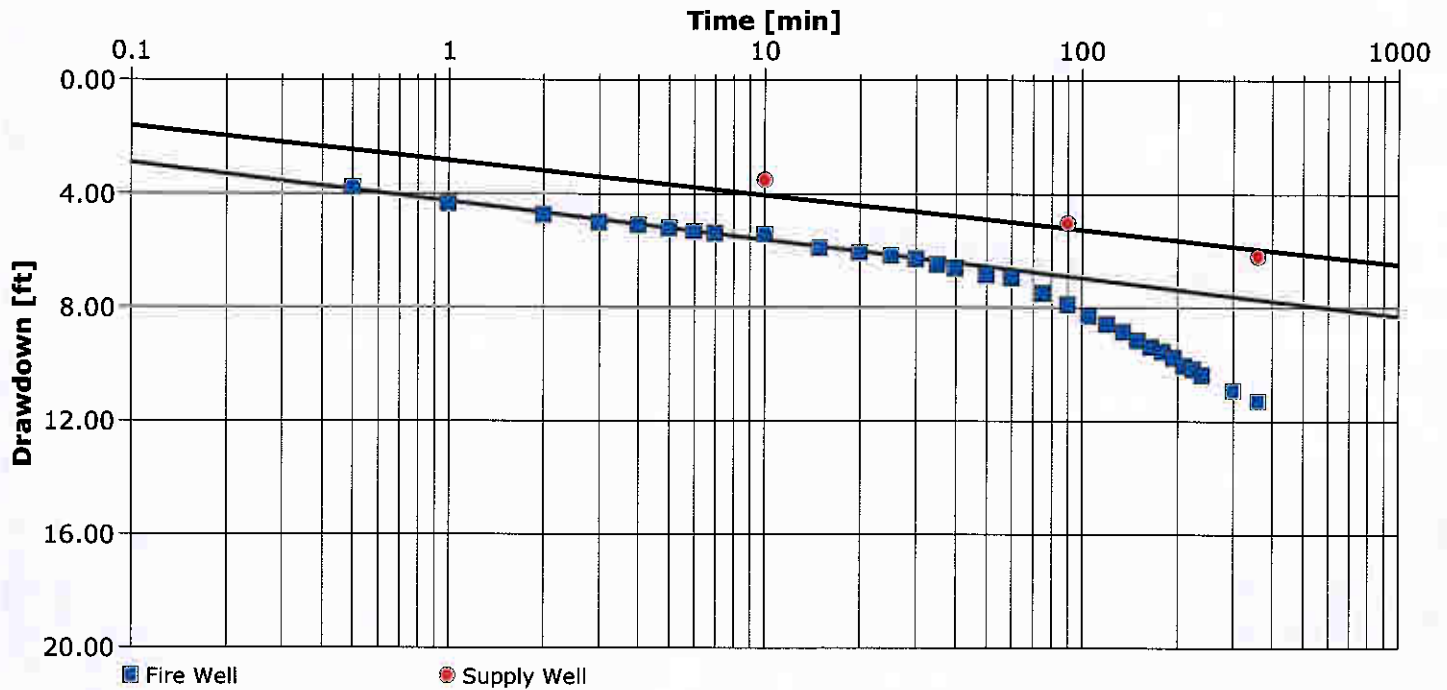
Analysis Performed by: Jeff Bell, P.Eng.

Cooper-Jacob Analysis

Analysis Date: 11/20/2012

Aquifer Thickness:

Discharge: variable, average rate 366 [U.S. gal/min]



Calculation after Cooper & Jacob

Observation Well	Transmissivity [U.S. gal/d-ft]	Storage coefficient	Radial Distance to PW [ft]
Fire Well	$7.12 \times 10^4$	$3.56 \times 10^{-2}$	0.55
Supply Well	$7.92 \times 10^4$	$3.48 \times 10^{-4}$	15.0
Average	$7.52 \times 10^4$	$1.80 \times 10^{-2}$	



FRIESEN DRILLERS LTD  
ATTN: JEFF BELL  
307 PTH 12 N  
STEINBACH MB R5G 1L9

Date Received: 28-JUL-12  
Report Date: 03-AUG-12 15:23 (MT)  
Version: FINAL

Client Phone: 204-326-2485

## Certificate of Analysis

Lab Work Order #: **L1185960**  
Project P.O. #: NOT SUBMITTED  
Job Reference: REED LAKE  
C of C Numbers:  
Legal Site Desc:

GARRETT RONCERAY  
Biology Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721  
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company



# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
<b>L1185960-1 16 INCH WELL</b> Sampled By: PETER FRIESEN on 24-JUL-12 @ 14:00 Matrix: WATER							
<b>ROU4W total</b>							
<b>Alkalinity</b>							
Alkalinity, Total (as CaCO3)	311		20	mg/L		31-JUL-12	R2408608
Bicarbonate (HCO3)	379		24	mg/L		31-JUL-12	R2408608
Carbonate (CO3)	<12		12	mg/L		31-JUL-12	R2408608
Hydroxide (OH)	<6.8		6.8	mg/L		31-JUL-12	R2408608
<b>Chloride by Ion Chromatography</b>							
Chloride	4.33		0.50	mg/L		01-AUG-12	R2409920
<b>Conductivity</b>							
Conductivity	566		20	umhos/cm		31-JUL-12	R2408608
<b>Fluoride by Ion Chromatography</b>							
Fluoride	<0.10		0.10	mg/L		01-AUG-12	R2409920
<b>Hardness Calculated</b>							
Hardness (as CaCO3)	304		0.30	mg/L		02-AUG-12	
<b>Nitrate as N by Ion Chromatography</b>							
Nitrate-N	<0.050		0.050	mg/L		01-AUG-12	R2409920
<b>Nitrate+Nitrite</b>							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		02-AUG-12	
<b>Nitrite as N by Ion Chromatography</b>							
Nitrite-N	<0.050		0.050	mg/L		01-AUG-12	R2409920
<b>Sulfate by Ion Chromatography</b>							
Sulfate	18.4		0.50	mg/L		01-AUG-12	R2409920
<b>TDS calculated</b>							
TDS (Calculated)	320		5.0	mg/L		02-AUG-12	
<b>Total Metals by ICP-MS</b>							
Calcium (Ca)-Total	66.9		0.20	mg/L	01-AUG-12	01-AUG-12	R2409601
Iron (Fe)-Total	<0.10		0.10	mg/L	01-AUG-12	01-AUG-12	R2409601
Magnesium (Mg)-Total	33.3		0.050	mg/L	01-AUG-12	01-AUG-12	R2409601
Manganese (Mn)-Total	0.0369		0.0010	mg/L	01-AUG-12	01-AUG-12	R2409601
Potassium (K)-Total	5.34		0.10	mg/L	01-AUG-12	01-AUG-12	R2409601
Sodium (Na)-Total	4.85		0.050	mg/L	01-AUG-12	01-AUG-12	R2409601
<b>Turbidity</b>							
Turbidity	0.53		0.10	NTU		31-JUL-12	R2408711
<b>pH</b>							
pH	8.26		0.10	pH units		31-JUL-12	R2408608
<b>L1185960-2 8 INCH WELL</b> Sampled By: PETER FRIESEN on 24-JUL-12 @ 19:00 Matrix: WATER							
<b>ROU4W total</b>							
<b>Alkalinity</b>							
Alkalinity, Total (as CaCO3)	308		20	mg/L		31-JUL-12	R2408608
Bicarbonate (HCO3)	376		24	mg/L		31-JUL-12	R2408608
Carbonate (CO3)	<12		12	mg/L		31-JUL-12	R2408608
Hydroxide (OH)	<6.8		6.8	mg/L		31-JUL-12	R2408608
<b>Chloride by Ion Chromatography</b>							
Chloride	4.06		0.50	mg/L		01-AUG-12	R2409920
<b>Conductivity</b>							
Conductivity	562		20	umhos/cm		31-JUL-12	R2408608
<b>Fluoride by Ion Chromatography</b>							
Fluoride	<0.10		0.10	mg/L		01-AUG-12	R2409920
<b>Hardness Calculated</b>							

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1185960-2 8 INCH WELL							
Sampled By: PETER FRIESEN on 24-JUL-12 @ 19:00							
Matrix: WATER							
<b>Hardness Calculated</b>							
Hardness (as CaCO3)	312		0.30	mg/L		02-AUG-12	
<b>Nitrate as N by Ion Chromatography</b>							
Nitrate-N	<0.050		0.050	mg/L		01-AUG-12	R2409920
<b>Nitrate+Nitrite</b>							
Nitrate and Nitrite as N	<0.071		0.071	mg/L		02-AUG-12	
<b>Nitrite as N by Ion Chromatography</b>							
Nitrite-N	<0.050		0.050	mg/L		01-AUG-12	R2409920
<b>Sulfate by Ion Chromatography</b>							
Sulfate	18.3		0.50	mg/L		01-AUG-12	R2409920
<b>TDS calculated</b>							
TDS (Calculated)	318		5.0	mg/L		02-AUG-12	
<b>Total Metals by ICP-MS</b>							
Calcium (Ca)-Total	66.8		0.20	mg/L	01-AUG-12	01-AUG-12	R2409601
Iron (Fe)-Total	0.18		0.10	mg/L	01-AUG-12	01-AUG-12	R2409601
Magnesium (Mg)-Total	35.3		0.050	mg/L	01-AUG-12	01-AUG-12	R2409601
Manganese (Mn)-Total	0.0417		0.0010	mg/L	01-AUG-12	01-AUG-12	R2409601
Potassium (K)-Total	4.45		0.10	mg/L	01-AUG-12	01-AUG-12	R2409601
Sodium (Na)-Total	4.82		0.050	mg/L	01-AUG-12	01-AUG-12	R2409601
<b>Turbidity</b>							
Turbidity	1.90		0.10	NTU		31-JUL-12	R2408711
<b>pH</b>							
pH	8.24		0.10	pH units		31-JUL-12	R2408608

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## Reference Information

**Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TOT-WP	Water	Alkalinity	APHA 2320B
<p>Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO<sub>3</sub><sup>-</sup> and H<sub>2</sub>CO<sub>3</sub> endpoints indicated electrometrically.</p>			
CL-IC-WP	Water	Chloride by Ion Chromatography	EPA 300.1 (modified)
<p>Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.</p>			
EC-WP	Water	Conductivity	APHA 2510B
<p>Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.</p>			
ETL-HARDNESS-TOT-WP	Water	Hardness Calculated	HARDNESS CALCULATED
ETL-SOLIDS-CALC-WP	Water	TDS calculated	CALCULATION
F-IC-WP	Water	Fluoride by Ion Chromatography	EPA 300.1 (modified)
<p>Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.</p>			
IONBALANCE-OP05-WP	Water	Ion Balance Calculation No Reporting	APHA 1030E
MET-T-MS-WP	Water	Total Metals by ICP-MS	U.S. EPA 200.8-T
<p>Total Metals by ICP-MS: This analysis is carried out using sample preparation procedures adapted from Standard Methods for the examination of Water and Wastewater Method 3030E and analytical procedures adapted from U.S EPA Method 200.8 for analysis of metals by inductively coupled-mass spectrometry.</p>			
NO2+NO3-CALC-WP	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-WP	Water	Nitrite as N by Ion Chromatography	EPA 300.1 (modified)
<p>Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.</p>			
NO3-IC-WP	Water	Nitrate as N by Ion Chromatography	EPA 300.1 (modified)
<p>Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.</p>			
PH-WP	Water	pH	APHA 4500H
<p>The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.</p>			
SO4-IC-WP	Water	Sulfate by Ion Chromatography	EPA 300.1 (modified)
<p>Anions in aqueous matrices are analyzed using ion chromatography with conductivity and/or UV absorbance detectors.</p>			
TURBIDITY-WP	Water	Turbidity	APHA 2130B (modified)
<p>Turbidity in aqueous matrices is determined by the nephelometric method.</p>			

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

**Chain of Custody Numbers:**

## Reference Information

**Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
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**GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample  
 mg/kg wwt - milligrams per kilogram based on wet weight of sample  
 mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight  
 mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.







Conservation and Water Stewardship

Water Use Licensing Section  
Box 16, 200 Saulteaux Crescent  
Winnipeg MB R3J 3W3

Telephone : 204-945-3983  
Fax : 204-945-7419

March 28, 2012

**File:** Hudson Bay Mining & Smelting Co. Ltd. -22

Jay Cooper  
Assistant Superintendent Environment  
Hudson Bay Mining & Smelting Co. Ltd.  
Box 1500  
Flin Flon, MB R8A 1N9

Dear Mr. Cooper:

Herewith you will find your copy of Licence No. **2012-025** issued under *The Water Rights Act*. Licence No. **2012-025** will expire on **March 26, 2022**. You may apply for renewal of this licence not more than 365 days and not less than 90 days prior to the expiry date.

I have also enclosed a copy of a form that may be used to record your **weekly** and annual water use as per Clause 12 of your licence. This form is to be completed each year and returned to this office no later than February 1<sup>st</sup> of the following year. Additional water use forms are available on-line at [www.gov.mb.ca/waterstewardship](http://www.gov.mb.ca/waterstewardship) under *Licensing, Regulation & Policy – Water Use Licensing – Forms*.

**You may also e-mail your water usage to us at [wateruse@gov.mb.ca](mailto:wateruse@gov.mb.ca). Please remember to include in your message (a) your Water Rights licence number (b) the year for which you are reporting, and (c) the unit of measurement (e.g. litres, US gallons, Imperial gallons, clock time, etc.) applicable to your system.**

If you have any questions regarding this licence, please contact the undersigned at 204-945-3983.

Yours truly,



Christopher McCombe  
Database Manager  
Water Use Licensing Section



**Annual Water Use Report for 20\_\_**  
**Rapport annuel de 20\_\_**  
**sur l'utilisation de l'eau conformément à**

Pursuant to **The Water Rights Act/**  
la Loi sur les droits d'utilisation de l'eau

LICENSEE'S NAME/ NOM DU TITULAIRE DE LA LICENCE				LICENCE NO./ N° DE LA LICENCE	
POST OFFICE ADDRESS/ ADRESSE POSTALE				PHONE NO. N° DE TÉLÉPHONE	
SOURCE OF WATER SUPPLY (CHECK ONE)/ SOURCE D'APPROVISIONNEMENT EN EAU (COCHER UNE CASE)				<input type="checkbox"/> WELL/ PUITS	
LOCATION OF PUMP (OR WELL):/ EMPLACEMENT DE LA POMPE OU DU PUIITS:				<input type="checkbox"/> SURFACE WATER/ EAU DE SURFACE	
<small>(Name of River, Creek, etc.)/(nom de la rivière, du ruisseau, etc.)</small>					
QUARTER/ QUART	SECTION/ SECTION	TOWNSHIP/ TOWNSHIP	RANGE/ RANG	OR OTHER (SPECIFY) OU AUTRE EMPLACEMENT (PRÉCISER)	
DESIGN PUMPING RATE:/ DEBIT DE POMPAGE ENVISAGE:		LITRES PER SECOND/ LITRES À LA SECONDE		OR OTHER (SPECIFY)/ OU AUTRE DÉBIT (PRÉCISER)	
NOTE 1:/ NOTA 1:					
QUANTITIES OF WATER IN TABLE BELOW EXPRESSED IN (CHECK ONE)/ LES QUANTITÉS D'EAU FIGURANT CI-DESSOUS SONT INDIQUÉES (COCHER UNE CASE):					
<input type="checkbox"/> LITRES/ EN LITRES		<input type="checkbox"/> DECAMETRES EN DÉCAMÈTRES			
<input type="checkbox"/> OTHER (SPECIFY):/ AU MOYEN D'UNE AUTRE UNITÉ DE MESURE (PRÉCISER) _____					
METER READING DECEMBER 31, 20__ / RELEVÉ DU COMPTEUR 31 DÉCEMBRE 20__					
WEEK/ SEMAINE	METER READING/ RELEVÉ DU COMPTEUR	WEEKLY CONSUMPTION/ CONSOMMATION PAR SEMAINE	WEEK/ SEMAINE	METER READING/ RELEVÉ DU COMPTEUR	WEEKLY CONSUMPTION/ CONSOMMATION PAR SEMAINE
1			27		
2			28		
3			29		
4			30		
5			31		
6			32		
7			33		
8			34		
9			35		
10			36		
11			37		
12			38		
13			39		
14			40		
15			41		
16			42		
17			43		
18			44		
19			45		
20			46		
21			47		
22			48		
23			49		
24			50		
25			51		
26			52		
<b>TOTAL/TOTAUX</b>					
NOTE2:/NOTA2:					
LICENSEE MUST COMPLETE "ANNUAL WATER USE REPORT" FOR EACH CALENDAR YEAR AND FORWARD THE REPORT TO THE WATER LICENSING BRANCH AT THE ABOVE ADDRESS NOT LATER THAN FEB. 1 OF THE FOLLOWING YEAR. / CHAQUE ANNÉE CIVILE, LE TITULAIRE DOIT REMPLIR LE RAPPORT ANNUEL SUR L'UTILISATION DE L'EAU ET LE RETOURNER, AU PLUS TARD LE 1 <sup>er</sup> FÉVRIER DE L'ANNÉE SUIVANTE, DIRECTION DES LICENCES D'UTILISATION DE L'EAU, SISE À L'ADRESSE SUSMENTIONÉE.					

**Licence to Use Water for  
Industrial  
Purposes**

Project: Reed Lake

Issued in accordance with the provisions of  
**The Water Rights Act** and regulations made thereunder.

Licence No.: **2012-025**

U.T.M.: Zone 14      394011 E  
6048789 N

Know all men by these presents that in consideration of and subject to the provisos, conditions and restrictions hereinafter contained, the Minister of Conservation and Water Stewardship for the Province of Manitoba does by these presents give full right and liberty, leave and licence to **Hudson Bay Mining and Smelting Co. Limited** of the Province of Manitoba (hereinafter called "the LICENSEE") to divert water from a **fractured limestone** aquifer by means of a water well, pump, pipeline(s) and other appurtenances (hereinafter called "the WORKS"), located on the following described lands:

**The Southeast Quarter of Section 36, Township 64, Range 22 West of the Principal Meridian in  
Manitoba**

and more particularly shown on a plan filed in the office of Manitoba Conservation and Water Stewardship, a copy of which plan is hereto attached and marked Exhibit "A".

This licence is issued upon the express condition that it shall be subject to the provisions of The Water Rights Act and Regulations and all amendments thereto and, without limiting the generality of the aforesaid, to the following terms and conditions, namely:

1. The water shall be used solely for **industrial** purposes.
2. The WORKS shall be operated in accordance with the terms herein contained.
3. a) The maximum rate at which water may be diverted pursuant hereto shall not exceed **0.072 cubic metres per second (2.5 cubic feet per second)** .  
b) The total quantity of water diverted in any one year shall not exceed **38.08 cubic decametres (30.87 acre feet)** .
4. The LICENSEE does hereby remise, release and forever discharge Her Majesty the Queen in Right of the Province of Manitoba, of and from all manner of action, causes of action, claims and demands whatsoever which against Her Majesty the LICENSEE ever had, now has or may hereafter have, resulting from the use of water for **industrial** purposes.
5. In the event that the rights of others are infringed upon and/or damage to the property of others is sustained as a result of the operation or maintenance of the WORKS and the rights herein granted, the LICENSEE shall be solely responsible and shall save harmless and fully indemnify Her Majesty the Queen in Right of the Province of Manitoba, from and against any liability to which Her Majesty may become liable by virtue of the issue of this Licence and anything done pursuant hereto.
6. This Licence is not assignable or transferable by the LICENSEE and when no longer required by the LICENSEE this Licence shall be returned to Manitoba Conservation and Water Stewardship for cancellation on behalf of the Minister.
7. Upon the execution of this Licence the LICENSEE hereby grants the Minister or the Minister's agents the right of ingress and egress to and from the lands on which the WORKS are located for the purpose of inspection of the WORKS and the LICENSEE shall at all times comply with such directions and/or orders that may be given by the Minister or the Minister's agents in writing from time to time with regard to the operation and maintenance of the WORKS.
8. This Licence may be amended, suspended or cancelled by the Minister in accordance with The Water Rights Act by letter addressed to the LICENSEE at **Box 1500, Flin Flon, MB, R8A 1N9, Canada** and thereafter this Licence shall be determined to be at an end.
9. Notwithstanding anything preceding in this Licence, the LICENSEE must have legal control, by ownership or by rental, lease, or other agreement, of the lands on which the WORKS shall be placed and the water shall be used.
10. The term of this Licence shall be **ten (10) years** and this Licence shall become effective only on the date of execution hereof by a person so authorized in Manitoba Conservation and Water Stewardship. The LICENSEE may apply for renewal of this Licence not more than 365 days and not less than 90 days prior to the expiry date.
11. This Licence expires automatically upon the loss of the legal control of any of the lands on which the WORKS are located or on which water is used, unless the Licence is transferred or amended by the Minister upon application for Licence transfer or amendment.
12. The LICENSEE shall keep records of weekly and annual water use and shall provide a copy of such records to Manitoba Conservation and Water Stewardship not later than February 1st of the following year.
13. A flow meter must be installed, positioned to accurately measure instantaneous pumping rate and accumulative withdrawals from the water source.

- 14. The LICENSEE does hereby agree to correct, to the satisfaction of the Minister, any water supply problems to other currently existing wells, dugouts, or other forms of supply, which are partly or wholly attributable, in the opinion of the Minister, to the diversion of water as authorized by this Licence.
- 15. The LICENSEE shall hold and maintain all other regulatory approvals that may be required and shall comply with all other regulatory requirements for the construction, operation, or maintenance of the WORKS or to divert or use water as provided by this Licence.

In witness whereof I the undersigned hereby agree to accept the aforesaid Licence on the terms and conditions set forth therein and hereby set my hand and seal this 21<sup>st</sup> day of March A.D. 20 12.

SIGNED, SEALED AND DELIVERED  
in the presence of

\_\_\_\_\_ } Brook Lutz (Seal)  
Witness Licensee

Canada, PROVINCE OF MANITOBA To Wit:

I, \_\_\_\_\_ of the \_\_\_\_\_  
of \_\_\_\_\_ in the Province of Manitoba, MAKE OATH AND SAY:

- 1. That I was personally present and did see \_\_\_\_\_ the within named party, execute the within Instrument.
- 2. That I know the said \_\_\_\_\_ and am satisfied that he/she is of the full age of eighteen years.
- 3. That the said Instrument was executed at \_\_\_\_\_ aforesaid and that I am subscribing witness thereto.

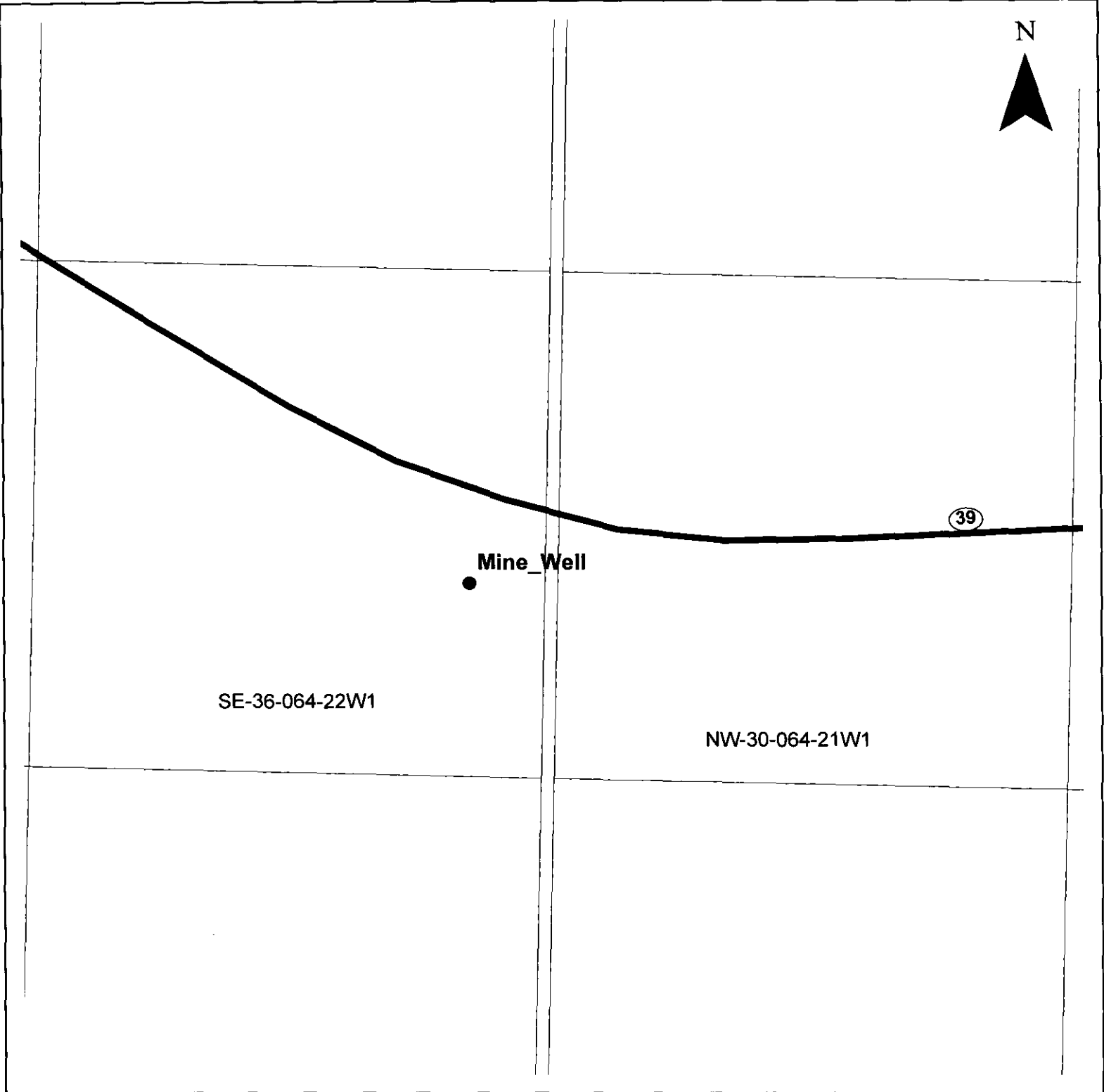
SWORN BEFORE me at the \_\_\_\_\_  
in the Province of Manitoba this \_\_\_\_\_ day of \_\_\_\_\_ A.D. 20 \_\_\_\_\_.

\_\_\_\_\_ } \_\_\_\_\_  
A COMMISSIONER FOR OATHS in and for the Province of Manitoba Witness

My Commission expires \_\_\_\_\_

Issued at the City of Winnipeg, in the Province of Manitoba, this 21<sup>st</sup> day of March A.D. 20 12.

  
The Honourable the Minister of Conservation and Water Stewardship

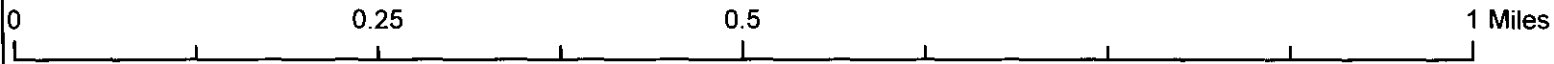


SE-36-064-22W1

NW-30-064-21W1

Mine Well

39



**Location of Mine Well on  
SE 36-64-22W for  
Hudson Bay Mining and  
Smelting Co. Limited for  
Industrial Purposes**

**EXHIBIT "A"  
THIS PLAN IS AN INTERGRAL PART OF  
LICENCE NO 2012-025  
ISSUED UNDER THE WATER RIGHTS ACT**