



Magino Gold Project

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# **MAGINO GOLD PROJECT**

Finan Township, Algoma District, Ontario

**RESPONSES TO INFORMATION**

**REQUIREMENT #3 (PART 2) FOR THE**

**MAGINO GOLD PROJECT**

**ENVIRONMENTAL IMPACT STATEMENT**

**Submitted to:**

Canadian Environmental Assessment Agency

Ontario Region

55 St. Clair Avenue East, Room 907

Toronto, Ontario M4T 1M2

Telephone: 416-952-1576

CEAA Reference Number: 80044

**September 2018**

# PRODIGY

GOLD INCORPORATED

TODAY'S DISCOVERY, TOMORROW'S FUTURE.

## TABLE OF CONTENTS

1.0	IE(3)-30: ARCHAEOLOGY.....	1
2.0	MFN-2: WATER MANAGEMENT SYSTEM.....	7
3.0	MFN-3: HYDROLOGY / RUNOFF.....	8
4.0	MFN-4: NUTRIENT BUDGETS AND LOADING.....	9
5.0	MFN-5: WATER TREATMENT.....	11
6.0	MFN-6: DUST MANAGEMENT.....	12
7.0	MFN-7: ECOLOGY.....	13
8.0	MFN-8: SPECIES AT RISK (SAR).....	15

## ATTACHMENT LIST

Attachment 1: Description of Fugitive Dust Best Management Practices Plan for the Proposed Magino Mine Project

Attachment 2: Description of Air Quality Management Plan for the Proposed Magino Mine Project

## 1.0 IE(3)-30: ARCHAEOLOGY

### **Reference to EIS:**

- Chapter 7, Section 7.7.3;

### 1.1 CEAA Context and Rationale

In comments submitted to the Canadian Environmental Assessment Agency, Michipicoten First Nation stated that members have identified sites of archaeological significance within the project study area, including near the effluent discharge point at Otto Lake.

The proponent's assessment of potential effects to any structure, site or thing of historical, archaeological, paleontological or architectural significance does not consider these sites. The proponent did not identify any archaeological sites or potential effects to archaeological sites or the uses of these sites for spiritual or cultural purposes in Chapter 7, Section 7.7.3 of the EIS.

The EIS Guidelines Part 2, Section 6.2.6, require the proponent to assess the potential effects of the project to any structure, site or thing of historical, archaeological, paleontological or architectural significance including but not limited to the loss or destruction of physical and cultural heritage and changes to access to physical and cultural heritage. The proponent should engage Indigenous groups in order to inform its effects assessment, including identifying appropriate mitigation measures to address any effects identified.

### **Specific Question/ Request for Information:**

A. Identify whether sites of archaeological importance identified by Michipicoten First Nation could potentially be disturbed by the project during construction, operation, decommissioning or abandonment;

B. Provide information about the use, whether for spiritual, cultural or other purpose, of the identified sites and clarify whether Michipicoten First Nation's concern is focused on preserving the sites of archaeological importance or the community also wishes to access the sites of archaeological importance during construction, operation, decommissioning or abandonment ;

C. Provide an assessment of the potential effects of the project to any structure, site or thing of historical, archaeological, paleontological or architectural significance identified, and to the experience of using these sites for spiritual or cultural purposes. Where potential impacts are identified, provide a description of the existing environment (for example: nature of the site, accessibility of the site, nature and frequency of any use of the site), and the nature and extent of the effect;

D. Describe mitigation measures to reduce the effects to the sites or use of the sites identified;

E. Characterize residual effects, if any, after the mitigation measures have been implemented;

F. Assess the significance of effects to any structure, site or thing of historical, archaeological, paleontological or architectural significance identified, and to the use of these sites for spiritual or cultural purposes;

G. Provide a follow-up program for potential effects to any structure, site or thing of historical, archaeological, paleontological or architectural significance identified, and to the use of these sites for spiritual or cultural purposes, including objectives and any monitoring measures that will be implemented

to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. Describe how Michipicoten First Nation would be engaged as part of the follow-up program, including for the development and implementation of any contingency mitigation measures that may be required;

H. Provide information about the engagement with Michipicoten First Nation that contributed to the effects assessment and identification of mitigation and follow-up measures.

## **1.2 Prodigy Response**

### **1.2.1 Response to CEAA Comment Part A**

To date no archaeological sites have been identified through the past work on the Magino Project. No specific sites of archaeological importance have been identified by MFN, nor are any archaeological sites registered in the MTCS' Archaeological Sites Database. Prodigy is continuing to work closely with MFN to ensure any specific areas that may be identified are adequately assessed. As stated at the July 23 meeting with MFN, and as subsequently sent to MFN by Prodigy as part of the Sept. 4 responses:

*“As discussed with Michipicoten First Nation (MFN) during our meeting together in Toronto on July 23, Prodigy will be pleased to have our registered archaeologist work closely with MFN to further assess areas of concern. While the Magino Archaeology Report has been accepted by the Provincial Ministry of Tourism, Cultural & Sport, we recognize that MFN would like to see additional work completed in certain areas to ensure additional mitigation is suitably developed and implemented where required. We suggest a workshop session together with appropriate MFN representatives followed by field verification.”*

Further, during a teleconference between MFN, Prodigy and their respective consultants on September 14, 2018, the two parties agreed on an approach/plan for moving forward together on additional coordinated archaeological field work where needed. MFN also stated that they do not wish to delay the EA process, and do not oppose the project.

Therefore, a process is in place to understand any specific sites of value to MFN from an archaeological perspective. Please also see the responses to Parts D and G below.

### **1.2.2 Response to CEAA Comment Part B**

As no specific sites of archaeological importance have been identified by MFN, it is not possible to provide information about such sites, or the specific nature of MFN's concern about the site(s). If archaeological sites are located, Prodigy will work with MFN to ensure that the sites be protected where possible, and protocols will be established to determine the procedures required for access to these sites.

### **1.2.3 Response to CEAA Comment Part C**

As no specific sites of archaeological importance have been identified by MFN, Prodigy cannot assess potential effects of the project on them. Prodigy has previously provided additional detail on the potential effects of the project to any structure, site or thing of historical, archaeological, paleontological or architectural significance in the responses to IE(2)-03 (Current Use of Lands and Resources for Traditional Purposes; Physical and Cultural Heritage; Any Structure, Site or Thing that is of Historical, Archaeological, Paleontological or Architectural Significance) in particular (including 'Clarification on Archaeological Assessment'), as well as the responses to IE(1)-06 (Assessment of Impact on Aboriginal and Treaty Rights) and IE(2)-06 (Potentially Impacted Aboriginal and Treaty Rights & Mitigation for Each Indigenous Group).

#### **1.2.4 Response to CEAA Comment Part D**

Although no specific sites of archaeological importance have been identified by MFN, Prodigy has developed mitigation measures related to archaeological resources, as summarized below in the extract from 'Mitigation Measures' for MFN Cultural Activities and Special Places VC in response to IE(2)-06 on Aboriginal Rights (June 2018):

##### **1. "3rd Party Review Process and Outcomes"**

MFN participated in the 3rd party review process along with MCFN, BFN and GRFN. Through their participation, no additional concerns regarding project effects to cultural activities and special place and/or mitigation measures in respect of these historic uses were identified by MFN. MFN identified other general environmental management and monitoring measures with respect to their ongoing participation in the Project through the Environmental Monitoring Committee (specifically, measures address components that include water quality, fish/fish habitat, vegetation, site operations, and closure planning). Prodigy has included these measures in its Commitments Table (see Appendix A – IR(1) submission).

##### **2. Environmental Management System**

###### *Historic Resources Management Plan*

Prodigy will prepare a Historic Resources Management Plan to identify and manage any objects or artifacts found during project development. All Aboriginal groups involved in the Project's environmental assessment process will be provided with the opportunity to review the management plan once a draft has been completed. The plan will:

- Identify and manage the treatment any objects or artifacts found during project development;
- Be prepared in advance of construction;
- Be available for review by all Aboriginal communities; and
- List who should be contacted in the event of an archaeological find. [Commitments Table – ID# MFN-8; BFN 7-1, 7-28; GRFN-27]

##### **3. Follow-up and Monitoring**

A follow-up program to ensure that any changes in traditional use patterns and updated traditional knowledge information that would be used in design and operations, can be developed and implemented via some or all of the following mechanisms:

- a. Ongoing engagement with identified land users;
- b. Aboriginal groups' participation in the Environmental Monitoring Committee;
- c. Adaptive management plans, and
- d. Consideration as part of the planning process for the final Closure Plan. [Commitments Tables – ID# GRFN-39]

##### **4. Bilateral Agreements**

Compensation provided through the terms and conditions of Impact Benefit Agreement(s) with Aboriginal groups (IE(1)-B07; source: extract from Table 7-243, p. 7.513 of June 2017 EIS "Project Interactions with Traditional Use of Land and Resources"). Prodigy is negotiating a Community Benefits Agreement with MFN to accommodate potential effects of the Project on MFN's traditional activities and Aboriginal and Treaty rights."

### 1.2.5 Response to CEAA Comment Part E

As no specific sites of archaeological importance have been identified by MFN, Prodigy cannot assess potential residual effects of the project on them.

### 1.2.6 Response to CEAA Comment Part F

As no specific sites of archaeological importance have been identified by MFN, Prodigy cannot assess potential residual effects of the project on them, nor their significance.

### 1.2.7 Response to CEAA Comment Part G

Although no specific sites of archaeological importance have been identified by MFN, Prodigy has developed a follow-up program related that could incorporate archaeological resources, as summarized above in Part D.

### 1.2.8 Response to CEAA Comment Part H

Engagement with MFN throughout the environmental assessment process is described in EIS Chapter 12 and Appendix 12-1; subsequently additional detail is provided in the responses to IE(1)-07 'Record of Aboriginal Engagement' and IE(1)- 08 'Record of Engagement Activities After December 2016' (Appendix D: Consolidation of Updated Aboriginal Engagement IR Responses (IE(1)-07 & IE(1)-08, January 2018); and other IR responses related to both archaeology as well as mitigation/follow-up more generally. A chronology of engagement activities specifically related to MFN and archaeology and the identification of related mitigation and follow-up measures is provided below.

Year	Activities
<b>2012</b>	<ul style="list-style-type: none"> <li>• Engagement Prodigy/MFN initiated in February 2012</li> </ul>
<b>2014</b>	<ul style="list-style-type: none"> <li>• April 22, 2014 – Prodigy sent MFN the Stage 1 Archaeological Assessment report</li> <li>• MFN's TKS lead and field studies team attended a July 3, 2014 guided site tour with Prodigy staff.</li> <li>• July 28, 2014 a meeting was held by the proponent/its technical and archaeology consultants, with MFN Chief and Council, staff and technical experts to go over the archaeology assessment process and how this baseline data would inform the EIS.</li> <li>• Site tours were held with MFN on July 3 and 29, 2014. Further details on these site tours are provided in Chapter 12 of the EIS (see p. 12.40 (MFN). The July 29 site tour with MFN included ground transportation and helicopter fly-over tours of the Project site – including Goudreau Lake, the western narrows of which were later determined in the revised Stage 1 report (March 2015) to have archaeological potential<sup>1</sup> .</li> <li>• October 2014 MFN TK report submitted to Prodigy (Hamilton Archaeological Consulting). Traditional Land Use and Occupancy Study for Michipicoten First Nation regarding Magino Mine Site.               <ul style="list-style-type: none"> <li>○ In their TK report, MFN did identify historic uses in the PSA that were addressed in the EIS and subsequently expanded upon in the IRs (i.e., previous commercial trapping 30+years ago, historic trails/ portage area in vicinity of project (no longer used), non-Indigenous cemetery at Goudreau etc.) - but did not specifically identify archaeological potential or archaeological sites.</li> </ul> </li> </ul>
<b>2015</b>	<ul style="list-style-type: none"> <li>• July 2015 –Correspondence re: proposed Sept. archeological fieldwork / invite for field monitor</li> <li>• An MFN-selected field monitor (Councillor Bill Swanson) attended the September 8 &amp; 9 2015 Stage 2 Archaeology Property Assessment.</li> </ul>

<sup>1</sup> Revised 'Final' Stage 1 Archaeological Impact Assessment Report, March 17, 2015; p. 8

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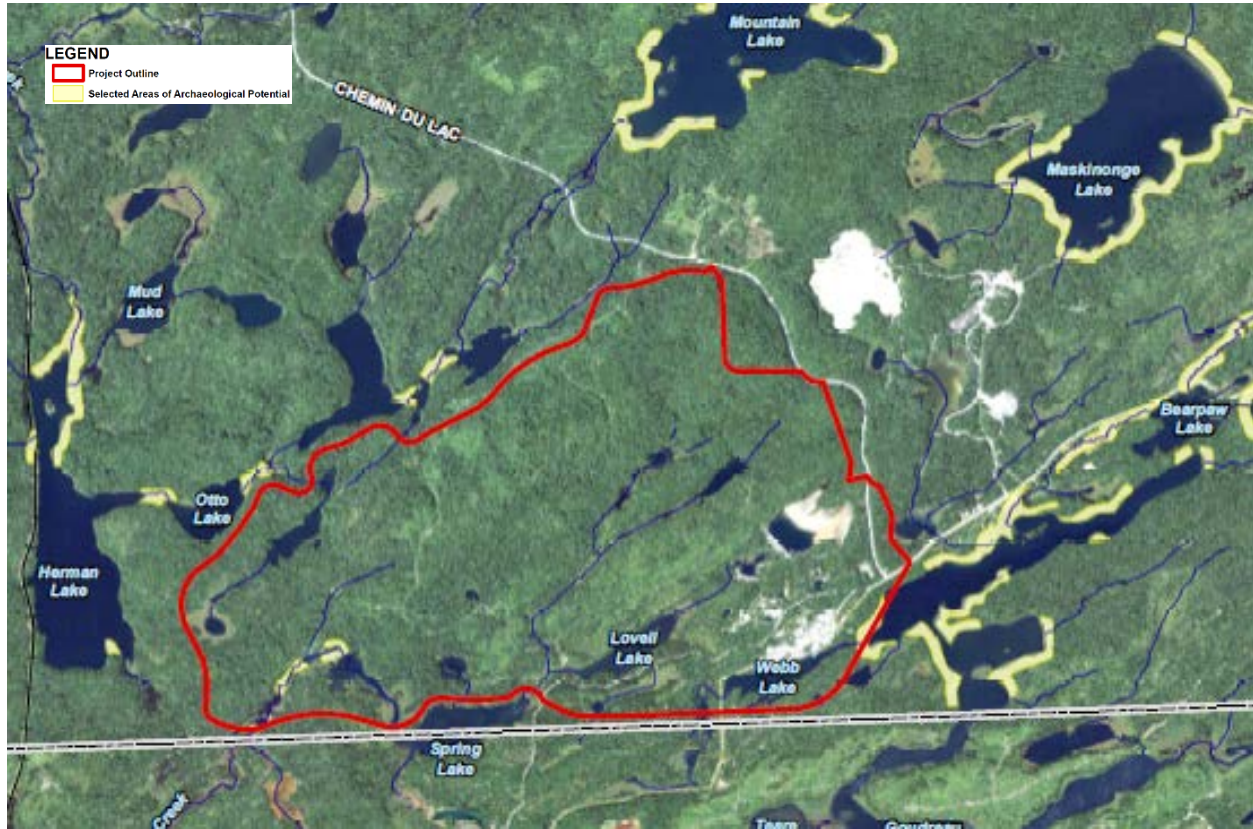
Year	Activities
2017	<ul style="list-style-type: none"> <li>• September 22 MFN Comments to CEAA on June 2017 EIS – Public Review Period               <ul style="list-style-type: none"> <li>○ Comment MFN-8: “1800 HA has archaeological potential and sensitive sites may have been missed. No reference to Michipicoten traditional knowledge or land use and no reference to any Intuitive Archaeological issues related to spiritual or sensitive cultural practices. The Stage Two Archaeological Study is noted as being only one day in length. More work is required to understand Michipicoten interests and concerns. No discussion on how to treat artifacts should any be found. A reference to an historic resources management plan for First Nations review but Michipicoten is unaware of this plan... One area of possible omission regards the incorporation of Intuitive Archeology, that is, the capture and reference of spiritual sites, culturally sensitive areas, and myths and belief systems that may have an impact on Michipicoten traditional peoples.” (MFN -3 also referred more generally to ‘intuitive archaeology’). Note – this MFN comment did not distinguish between archaeology and traditional knowledge/land use.</li> <li>○ Prodigy responded to MFN / CEAA January 2, 2018 (comment document dated Dec. 2017)</li> <li>○ October 4 3rd party review meeting MFN, MCFN, BFN, GRFN – Historical Resources Management Plan was one topic; MFN advisor noted archaeological potential is a concern (amongst other topics)</li> </ul> </li> </ul>
2018	<ul style="list-style-type: none"> <li>• March 21, 2018 JKB email to Prodigy re: Phase 2 archaeology and MFN consultation; subsequently noted error of wrong version of Stage 1 report being posted on CEAA registry (see IE(1)-09 for a detailed response/explanation)</li> <li>• April 19, MFN sent table of environmental issues/comments (including areas of archaeological potential in Magpie FMP)</li> <li>• Subsequent Prodigy responses were sent July 10, including a map ‘Selected Areas of Archaeological Potential’ July 2018 (overlying the 2008 FMP ‘Areas of Archaeological Potential’ with an aerial photo of the site/PSA), which shows 3 areas of potential within the PSA, with others beyond the property boundary. See Figure 1.</li> <li>• July 23 meeting Prodigy/MFN: one outcome was commitment re: archaeological field work in 2019 to further assess archaeological potential</li> <li>• August 20 MFN provided additional comments to Prodigy, including one on archaeological assessment (see ‘Summary of Archaeological Issue’, below, for specific details)</li> <li>• On Sept. 4, 2018, Prodigy sent the following response (and others) to MFN's Aug 20 comments: “As discussed with Michipicoten First Nation (MFN) during our meeting together in Toronto on July 23, Prodigy will be pleased to have our registered archaeologist work closely with MFN to further assess areas of concern. While the Magino Archaeology Report has been accepted by the Provincial Ministry of Tourism, Cultural &amp; Sport, we recognize that MFN would like to see additional work completed in certain areas to ensure additional mitigation is suitably developed and implemented where required. We suggest a workshop session together with appropriate MFN representatives followed by field verification.”</li> <li>• MFN also submitted their comments to CEAA on August 23, prior to Prodigy's Sept 4 response to MFN</li> <li>• September 7, CEAA issued IR#3 Part 2, which includes issues identified by MFN. Annex 1 includes IE(3)-30 on the archaeological assessment; Annex 2 includes comments submitted by MFN to the Agency “The Agency recommends Prodigy discuss these comments with Michipicoten First Nation, before providing the Agency with a table of how these comments were discussed and addressed.”</li> <li>• September 14 teleconference MFN/Woodland Heritage Northeast/DPRA/Prodigy to discuss archaeology. The parties agreed upon the approach/plan for moving forward together on additional coordinated archaeological field work and interviews with elders. MFN also stated that they do not wish to delay the EA process, and do not oppose the project.</li> </ul>

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**Figure 1. Selected Areas of Archaeological Potential**  
(adapted from Magpie Forest Management Plan, 2008)





## **2.0 MFN-2: WATER MANAGEMENT SYSTEM**

### **2.1 Comment**

[Is the] proposed mine water capture system seem adequate for such a large mine site?

Given the massive volumes of groundwater that are to be pumped, the WQCP seems overly small. Also, the ditches that ring the site will also transfer surface runoff to the WQCP. It seems very likely that insufficient runoff storage capacity exists in the WQCP. Need a forecast to confirm the capacity of the pond to capture runoff for: 1 in 100-year storm and runoff from spring snow melt (freshet). The current analysis of drainage is insufficient.

The WCQP seems overly small to handle the large drainage area and ditches that will collect water from varied sources.

Review of TSD 7 – Site Water Balance and Quality suggests the volume of the WQCP is not correctly assessed relative to the flows from an extreme event runoff and freshet. Need more detailed water balance and storage capacity analysis.

### **2.2 Prodigy Response**

The design and layout of the WQCP and storm water drainage channels, as well as the water balance analyses, have further developed since issuing TSD 6 and site water balance and quality TSD (TSD 7) in December 2016. The current design of the WQCP is sized to provide storage for approximately 1.4 million cubic meters plus the 1 in 100-year 24-hour storm water runoff for the WQCP watershed (which include the plant area and all runoff from the TMF embankment and MRMF). This storage volume includes 1 m of operational freeboard in the WQCP.

The 1.4 million cubic meters maximum operating storage for the pond was determined using the water balance model as the maximum monthly storage needed the spring snowmelt (freshet). The monthly site water balance developed for the site accounts for water volumes into and out of the WQCP as part of the overall site wide water balance.

The storm water drainage channels have been sized to accommodate the 1 in 100-year storm water runoff.

### **3.0 MFN-3: HYDROLOGY / RUNOFF**

#### **3.1 Comment**

Will the ditch system be sufficiently efficient to capture water and prevent runoff to adjacent watersheds? Site exists on a ridge and the current design of the ditches includes areas that will not be fully drained. Such scenarios exist, for example, on the north east side and south west side. When this water drains to other watersheds, potential for impacts to these habitats exists that were not assessed in the EIS.

Since the ditch system will likely not capture 100% of the runoff, then this water will flow away from the WCQP and possibly disturb adjacent watersheds. Since this water missed by the ditches has not been quantified, it is unknown what the total runoff to adjacent watersheds will be.

#### **3.2 Prodigy Response**

The design and layout of the WCQP and storm water drainage channels, as well as the water balance analyses, have been further developed. The design concepts include capturing 100% of the runoff from the disturbed areas. Storm water runoff at the eastern side of the site will be routed to the open pit through storm water drainage ditches in the process plant area and pit access road. Storm water runoff from the northern and southwestern sides of the site will be routed to the WCQP through the storm water drainage channels. There are also various sumps, detention ponds, and pumping stations around the perimeter of the TMF and MRMF to capture and manage runoff.

## **4.0 MFN-4: NUTRIENT BUDGETS AND LOADING**

### **4.1 Comment**

What might pre-mine nutrient (i.e., phosphorus) loading to Otto Lake and Herman Lake be?

Nutrient (i.e., phosphorus) data for Otto Lake and Herman Lake from field surveys is missing from the EIS. Since this phosphorus data is missing from the EIS, it is not feasible to assess the total loadings to Otto Lake and Herman Lake. Since this information on total loadings is missing, it is not feasible to evaluate the risk of eutrophication to Otto and Herman Lakes. Since these phosphorus observations are missing, it is not feasible to complete an evaluation of the risk to Otto Lake and Herman Lake from water from the mine site.

The EIS includes a paucity of observations for phosphorus for Otto Lake and Herman Lake. Specifically, phosphorus is only reported in Otto Lake for two dates while the lake was sampled 10 times for water quality. Similarly, phosphorus was only reported in Herman Lake on one date for the epilimnion although the lake was sampled nine times for water quality. Interestingly, the Otto Lake samples for phosphorus were October 17 and February 27 whereas the Herman Lake sample was from February 25. Hence, the phosphorus data available for analysis shows small sample sizes from times of the year when the phosphorus would be expected to be not at peak concentration. Please refer to TSD 16A, Table A1 for Otto Lake, and Tables A2 and A3 for Herman Lake. Also see Chapter 7 of the EIS, Table 7-75, page 7.119, to see how this limited phosphorus data was used as the basis of the effects analysis. It is unclear how these limited observations can be used to then estimate the 75th percentile for the nutrient analysis.

In addition, this limitation then indicates that it is difficult to complete an analysis of total loadings for phosphorus currently and in the future to Otto and Herman Lakes.

### **4.2 Prodigy response**

While a limited number of data points were used in the development of the 75th percentile used in the EIS effects analysis, additional data are provided in TSD-16, Appendix E.1.2 (Summary of Water Quality Statistics). Interim Provincial Water Quality Objectives (PWQOi) for total phosphorus are applicable to the ice free (open water) period. The PWQOi values for total phosphorus are 0.02 mg/L for lakes and 0.03 mg/L for creeks and rivers. These values are set to protect aquatic systems from the potential for excess algal growth, and the associated potential for oxygen depletion which can be harmful to aquatic life.

Current PWQOi values notwithstanding, in 2010 the Environmental Sciences & Standards Division of the then MOE recommended a revised PWQO for phosphorus for lakes located on Ontario's Precambrian Shield (Appendix A of MOE 2010). In this document the MOE recommended that a new criteria should be applied to total phosphorus, wherein any increase from background conditions should be limited to a 50 percent increase, with the proviso that any such increase should not result in a value that is greater than the current PWQOi values applicable to lakes and flowing waters. The MOE (2010) criterion was stressed to Prodigy by representatives of the Michipicoten First Nation, as part of the engagement process between the two parties, and Prodigy has agreed to work cooperatively with the First Nation in an effort to achieve the 2010 criterion during the permitting process.

A summary of all applicable (ice free) phosphorus water quality data for the Herman Lake / Otto Lake system is provided in Table 1. A number of the values included in Table 1 were not included as part of the modeled data set used to determine effects in the EIS due to difficulties in ascertaining the original sampling location at the time of the numerical analysis, and thereby establishing a high level of confidence in their

appropriateness for inclusion in the modelled results. All of the results, however, are at or below the PWQOI value for phosphorus of 0.02 mg/L / 0.03 mg/L for lakes and rivers respectively, suggesting that the 75th percentile values used in the EIS effects analysis (0.125 mg/L for Otto Lake and 0.016 mg/L for Herman Lake) are conservative.

That being said, and traditional use of 75<sup>th</sup> percentile values in the determination of water quality effects by the MECP notwithstanding, Prodigy has agreed to work with the MFN through the permitting process to achieve a total phosphorus loading to the receiving water that will not result in a projected total phosphorus increase in the receiver that exceeds 50 percent of the baseline condition. Methods to achieve this objective could include additional effluent treatment as has been provided for in the EIS, such as the use of passive wetlands for additional nutrient uptake prior to discharge, or further optimization of the final effluent discharge point during the permitting process.

Prodigy is also committed, as part of an adaptive management approach, to the collection of additional background water quality sampling for total phosphorus, to provide a more robust baseline data set, against which the 50 percent increase criterion can be applied during the permitting process. This will improve the data set presented in Table 1.

**Table 1: Herman Lake / Otto Lake System Total Phosphorus Concentrations (Ice Free Period)**

Location	Date	Concentration (mg/L)
Herman Lake A	17/10/2012	0.009
Herman Lake B	18/10/2012	<b>&lt;0.002</b>
Herman Lake Outlet (site 8)	16/10/2012	0.006
Herman Lake Outlet (site 8)	12/06/2013	0.0101
Herman Lake Outlet (site 8)	31/07/2013	0.0158
Herman Lake Outlet (site 8)	11/09/2013	0.0036
Herman Lake Outlet (site 8)	22/10/2013	0.0085
Herman Creek	07/05/2013	0.0076
Herman Creek	12/06/2013	0.0063
Herman Creek	30/07/2013	0.0127
Herman Creek	10/09/2013	0.0034
Otto Lake A	17/10/2012	<0.002
Otto Lake B	17/10/2012	<b>0.0043</b>
All Data 75th percentile		0.009
Average		0.007

*Note: Bold values are averages of multiple samples collected at the same location on the same day.*

**Reference:**

Ontario Ministry of the Environment. 2010. Lakeshore Capacity Assessment Handbook: Protecting Water Quality in Inland Lakes on Ontario's Precambrian Shield. 106 pp.

## **5.0 MFN-5: WATER TREATMENT**

### **5.1 Comment**

Will the proposed water treatment plant be sufficient to treat parameters of concern beyond metals?

Monitoring observations indicated that metals, metalloids like arsenic, mercury, and nutrients such as Phosphorus have all been documented at concentrations above environmental guidelines in water on-Site.

Proposed water treatment plant is described in the context of being designed to treat metals. We are concerned this water treatment plant also needs to have the ability to treat metalloids like arsenic, mercury, and nutrients like Phosphorus.

### **5.2 Prodigy Response**

Based on the projections of water quality in the WQCP (TSD 7) and the extensive geochemical characterization (TSD 2 and TSD 20 8), a water treatment plant is not necessary to meet applicable water quality objectives so no treatment plant is included as part of the Proposed Project. There is a contingency for water treatment described in the EIS and supporting documents should monitoring indicate unanticipated effluent water quality, and the treatment plant would be designed for optimal treatment of any constituent that must be removed from the effluent stream.

Note that the monitoring observations mentioned in the answer to address question are for baseline conditions.

## **6.0 MFN-6: DUST MANAGEMENT**

### **6.1 Comment**

Will the dust management applied on-Site be sufficient to avoid dust deposition to surface waters, wetlands, woodlands? Also, will dust transport over long distances be avoided?

It is unknown how effective dust control will be for the project. The Site exists on a ridge and dust could migrate in all four cardinal directions. Impacts from dust can be direct and indirect on water and land. This topic was treated superficially in the EIS.

Impacts are possible on all habitats that receive dust. For example, if dust deposits in surface waters, it will impact aquatic species directly and transport phosphorus to these habitats, leading to eutrophication. Dust transport to wetlands could harm plants. Dust transport to woodlands could cause edible plant production (e.g., berries) to decline. Dust deposition in the woodlands could harm other plants of importance to members of MFN. Dust can also harm wildlife.

### **6.2 Prodigy Response**

In response to previous CEAA comments concerning dust management, Prodigy has prepared a technical memorandum entitled "Description of Fugitive Dust Best Management Practices Plan for the Proposed Magino Mine Project" (Attachment 1). This document outlines the purpose and contents of the Fugitive Dust Best Management Practices Plan (BMPP) which will be implemented during all phases of the Magino Mine Project (the Project) where fugitive dust emissions may occur. It should be noted that the Fugitive Dust BMPP process involves the "check" and "act" steps which facilitate continual improvement of the dust management practices.

Furthermore, in consultation with CEAA, Prodigy has also developed an air quality management plan (AQMP) as outlined in the technical memorandum entitled "Description of Air Quality Management Plan for the Proposed Magino Mine Project" (Attachment 2). The stated purpose of the AQMP is to confirm the findings of the air quality assessment for the Project and verify that proposed in-design mitigation and the Fugitive Dust BMPP mentioned above are effective in maintaining indicators of good air quality. The AQMP includes a proposed ambient air monitoring program for fugitive dust. Trigger levels have been identified for dust, above which a review of the Fugitive Dust BMPP will be completed to assess the effectiveness of dust management measures and refine if necessary.

It is anticipated that implementation of the proposed Fugitive Dust BMPP, along with dust monitoring proposed for the AQMP will be sufficient to avoid significant effects on air quality due to fugitive dust emissions from the Project.

## **7.0 MFN-7: ECOLOGY**

### **7.1 Comment**

Wildlife species such as Moose, Marten, Bear, or Lynx of importance to members of MFN are not fully assessed for impacts in the EIS.

The Magpie Forest Management Plan identifies critical habitat for featured species such as Moose across the proposed mine site. This critical habitat use is not addressed at all in the EIS. For example, areas upstream and downstream of Otto Lake represent Moose habitat and these areas will be totally lost to the mine activities.

Detailed studies are required, to quantify habitat use by featured species, and then management actions identified to reduce disturbance. Such studies will then resolve impacts on important wildlife like Moose, Bear, and Lynx.

### **7.2 Prodigy Response**

Aspects relating to wildlife habitat use are described in Section 4.3.9.1 of the EIS for the Regional Study Area (RSA), and in Section 4.3.9.2 for the Local Study Area (LSA).

Relative to moose, it was determined that virtually all of the RSA represents suitable moose habitat and therefore habitat quantity and quality are not considered to be limiting. Moose Late Winter Cover and Moose Aquatic Feeding Areas were noted as Significant Wildlife Habitat (SWH) features in the RSA. Moose aquatic feeding areas, calving areas, and late winter cover habitats were identified for the LSA in Figure 4-8 of Technical support Document 17 (Terrestrial Ecology Baseline Study). Virtually all of the RSA was also considered to represent suitable black bear habitat. However no black bear dens were observed during field studies.

Habitats for lynx were considered limited, as lynx generally favour old-growth boreal forest with an undercover of thickets and windfalls. Such habitats are uncommon in the RSA. Three visual sightings of lynx were made during field studies. Overall, lynx populations in the Magpie Forest were considered to be low, possibly as a result of overharvesting and natural prey cycles (Dubreuil Forest Products Limited 2008).

The principal management action to reduce the potential for adverse effects to moose, black bear, lynx and other wildlife species is the development of a compact mine site footprint. This not only reduces the area of direct disturbance, but also reduces noise and other related disturbances that would otherwise be associated with a more spread out site. In addition, terrestrial habitats suitable for wildlife will be developed at closure to restore local wildlife carrying capacity after the mine closes. Other mitigation measures designed to limit the potential for adverse effects to wildlife are described in Section 7.4.6.6 of the EIS, and include:

- Putting constraints of the timing of habitat removal, such as removing beaver dams or dens during late summer when young are dispersing, and not draining waterbodies in late fall or winter;
- To the extent practical, clearing from headwaters/upstream locations toward the downstream to allow mammals associated with watercourses and wetlands (e.g., mink, beaver, shrews) to migrate to larger bodies of water downstream;
- Retain some woody debris around the site periphery during clearing and grubbing operations to provide winter caches of food for disturbed furbearers and small mammals;
- Enforcing speed limits on the site roads to limit the potential for wildlife collisions;

- Limiting facility owned snowmobiles and ATV to specific uses such as remote sampling, with recreational use of such vehicles by mine personnel being prohibited;
- Where technically and economically feasible, undertake measures to limit access by mammals to water management ponds;
- Constructing the Tailings Management Facility and the Mine Rock Management Facility in a manner such that habitats associated with these features, after reclamation, will be accessible to mammals;
- Directing lighting downward and not toward adjacent wildlife habitat;
- Implementing a seed collection program in support of post closure reclamation that includes berry species (e.g., dwarf raspberry, pin cherry, velvet-leaf blueberry, and dwarf blueberry) that will provide a food source for wildlife; and
- Ensuring that putrescible garbage is managed to avoid attracting wildlife such as bears and foxes, and prohibiting staff from feeding wildlife.

**References:**

Dubreuil Forest Products Limited, 2008. Forest Management Plan for the Magpie Forest for the Ten Year Period from April 1, 2009 to March 31, 2019.



## **8.0 MFN-8: SPECIES AT RISK (SAR)**

### **8.1 Comment**

Studies for SAR Woodland Caribou seem inadequate and require further analysis.

Historical surveys demonstrate Woodland Caribou was evident in the area. This history and demonstration of recent presence near the Site identifies that Woodland Caribou needs to be included in the mitigation strategies for the Site.

The future mitigation and closure plan need to include activities to enhance Woodland Caribou habitat as well as actions to help implement a Woodland Caribou Management strategy. Recovery of Woodland Caribou is a high priority for members of MFN.

### **8.2 Prodigy Response**

Prodigy very much appreciates the perspective of the MFN on this issue, and is supportive of efforts to promote and enhance species at risk, where it is reasonably feasible to do so. We recognize that the issue with respect to Woodland Caribou, is quite complex.

Prodigy would be willing to work cooperatively with the MFN, outside of the environmental assessment framework, to support their efforts directed at Woodland Caribou recovery. The exact nature of any such support would have to be determined cooperatively with the MFN.

#### **References:**

Environment Canada. 2011. Recovery Strategy for the Woodland Caribou, Boreal population (*Rangifer tarandus caribou*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series.  
Parks Canada. 2014. Pukaskwa National Park of Canada. Management Plan.



## **Attachment 1**

### **Description of Fugitive Dust Best Management Practices Plan for the Proposed Magino Mine Project**

## TECHNICAL MEMORANDUM

**DATE** March 5, 2018

**Project No.** 1659317-2050

**TO** Kyle Stanfield  
Argonaut Gold Inc.

**CC**

**FROM** Natalie Jones

**EMAIL** njones@golder.com

### **DESCRIPTION OF FUGITIVE DUST BEST MANAGEMENT PRACTICES PLAN FOR THE PROPOSED MAGINO MINE PROJECT**

Golder Associated Ltd. (Golder) was retained by Argonaut Gold Inc. (Argonaut) to prepare a technical memorandum to describe the content of the Best Management Practices Plan (BMPP) that will be prepared to manage the fugitive dust associated with the proposed Magino Mine (the Project) prior to permitting and construction phase.

#### **Purpose of the Best Management Practices Plan**

The purpose of the BMPP will be to document the Best Management Practices (BMPs) for the control of fugitive dust emissions from the Project and outline the decision-making process that was used to develop these BMPs, which will be implemented during all phases of the Project where fugitive dust emissions may occur.

The BMPP will be prepared in accordance with the following:

- The Guide to the Preparation of a Best Management Practices Plan for the Control of Fugitive Dust for the Ontario Mining Sector document, dated June 2010, prepared by the Centre for Excellence in Mining Innovation<sup>1</sup>
- Environment and Climate Change Canada's guidance document Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities (ChemInfo, 2005)
- Appendix E (Technical Bulletin - Review of Approaches to Manage Industrial Fugitive Dust Sources) of the Procedure for Preparing an Emission Summary and Dispersion Modelling Report (January 2004)
- The anticipated requirements of the Environmental Compliance Approval (ECA) required for the operations phase of the Project

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<sup>1</sup> <https://www.cemi.ca/SustainMine/fugitive-dust-best-practices-manual/>

Although the typical ECA requirements will apply to the operations phase of the Project only, the BMPP will provide the following details for all phases of the Project. Specifically:

- identify the sources of fugitive dust emissions associated with the Project
- review the composition and size distribution of the fugitive dust particulate including an analysis of the metals composition of the road dust
- describe how fugitive dust can be controlled from each significant source and describe the BMPs in place at the Project
- contain a schedule by which the BMPP will be implemented
- describe how the BMPP will be implemented, including the training of personnel
- describe inspection and maintenance procedures
- describe methods of monitoring and record-keeping to verify and document ongoing compliance with the BMPP

## **Contents of the Best Management Practices Plan**

For ease of implementation and to promote clarity, the BMPP will be prepared according to the following structure:

- Section 2 will provide a brief description of the Project.
- Section 3 will summarize the roles and responsibilities of each employment level associated with the Project that pertain to the BMPP.
- Section 4 will document the BMPs that will be in place during construction and operation of the Project and the decision-making process used to develop these BMPs. This section will follow the Plan Do Check and Act (PDCA) cycle according to ISO guidelines. The “Plan” section will include identification and characterization of the emission sources. The “Do” section will include a schedule for implementation of the proposed improvements. The “Check” section will include a description of monitoring procedures and a recordkeeping system. The “Act” section will include a description of how the sampling and monitoring will be used to assess and modify the BMPPs as required, as well as guidelines for periodic review of the BMPs in order to promote its continuous improvement.

Appendix A of the BMPP will contain regulator comments pertaining to the development and maintenance of the BMPP. An example Table of Contents is attached.

As stated above, Section 4 of the BMPP will document the BMPs that will be implemented at the Project. During the Environmental Approval process, Argonaut has committed to BMPs and these have been considered in the air quality assessment. Table 1 summarizes the BMPs that will be included in the BMPP.

**Table 1: Summary of Fugitive Dust Sources and BMPs that will be implemented at the Project**

Emission Source	Emission Source Description	BMP	BMP Description	Frequency
Unpaved Roadways	Fugitive dust associated with vehicle traffic along facility unpaved roadways. Emissions depend on roadbed silt content, vehicle weight and speed, traffic volume.	Watering	Water will be applied as a dust suppressant during non-freezing conditions	At least 2 litres/m <sup>2</sup> after 24 of dryness
		Speed Limits	Speed limits will reduce speed and dust production	Permanent control
		Re-grading	Applying coarser material to surface of roadways	Annually in spring and whenever necessary as determined through monitoring
Material Handling and Stockpiles	Emissions resulting from material handling depend on location, material throughput, moisture content, drop height. Emissions due to wind erosion depend on exposure to wind, surface area, moisture content and wind speed.	Stockpile Placement	Stockpiles will be placed below grade where possible to minimize wind erosion	Continual
		Maintain Minimum Drop Height	Material will be dropped from the shortest possible distance  If material is on the ground, it will be pushed up with a loader to prevent the material from being dropped	Continual
		Good Housekeeping	Minimize dust accumulation in material handling areas, reducing the probability of re-entrainment and generation of fugitive dust emissions	Continual
		Cease Activity	Material handling activities will be stopped in high wind conditions	When wind speeds are greater than 25 km/hr
		Progressive Rehabilitation	Stockpiles will be developed in stages and	Continual

Emission Source	Emission Source Description	BMP	BMP Description	Frequency
			progressively closed off (i.e., capped) to minimize the area susceptible to wind erosion.	
Material Processing	Emissions resulting from processing of material such as crushing and screening.	Equipment placement	Equipment will be located below grade where possible to reduce the susceptibility to wind erosion	Continual
		Maintain Minimum Drop Height	Material is to be dropped from the shortest possible distance	Continual
		Good Housekeeping	Minimize dust accumulation on equipment and in material processing areas, reducing the probability of re-entrainment and generation of fugitive dust emissions	Continual
		Cease Activity	Material processing activities will be stopped in high wind conditions	When wind speeds are greater than 25 km/hr
Drilling/Blasting	Emissions resulting from drilling blastholes and blasting activities.	Location	Blasting will be completed below grade reducing the susceptibility of emitting fugitive dust	Continual
		Procedure	Wet drilling will take place at all times	Continual
		Cease Activity	Drilling and blasting activities will be stopped in high wind conditions	When wind speeds are greater than 25 km/hr

In addition to the BMPs listed above, Argonaut has committed to the monitoring programs detailed in Table 2.

**Table 2: Monitoring Programs associated with the Project**

Program	Description
Unpaved Road Sampling	<p>During the operations phase, sampling of the unpaved roadways will be completed annually during the summer months. A technical memo outlining the sampling procedure and showing the full results of the sampling will be included as an appendix to the BMPP. The memo will include the silt content on unpaved roads and will show a comparison between the Project’s road surface material metals concentrations and typical silt content and metals concentrations in Ontario identified in the literature review document (Golder 2010).</p>
Ambient Air Monitoring	<p>An ambient air monitoring program for particulates will be conducted on site close to the property line to represent the concentrations in the surrounding environment. Guidance provided in the MOECC document <i>“Operations Manual for Air Quality Monitoring in Ontario”</i>, dated March 2008 (PIBS 6687e), will be considered when developing the sampling protocols.</p> <p>Argonaut will retain an air quality specialist to assist in the site selection, installation and training of the mine personnel in instrument operation, quality assurance/quality control, and reporting. The monitoring will follow the National Air Pollutant Surveillance (NAPS) schedule, which requires a single 24-hour sample collected every sixth day. The sampling program will be initiated during the construction phase and will continue until closure.</p> <p>A technical memo outlining the monitoring procedure and showing the full results of the sampling, as they pertain to the BMPP, will be included as an appendix to the BMPP.</p>

Each fugitive dust source associated with the Project during construction and operations will be assessed using the risk management tool described in the guidance document (CEMI 2010) to assess if the BMPs that are in place adequately manage the risk associated with each source. The relative risk score for each source will be documented in the BMPP and revised as required. The goal of the BMPP is to have no sources that are still considered to be “high” risk after the implementation of the BMPs so that it can be assumed that the planned BMPs adequately manage the risk associated with each fugitive dust source.

Note that the BMPP process involves the “Check” and “Act” steps which facilitate continuous improvement of fugitive dust management practices. A major component of the “Act” step will be the trigger levels which will be set to initiate BMP review. Table 3 summarizes the potential trigger levels for the Project. This process makes the BMPP a living document that will be updated, as required, throughout the life of the Project.

**Table 3: Potential BMPP Review Trigger Levels**

Sampling/Monitoring Program	Trigger Level	Required Action
Unpaved Road Sampling	Silt content greater than 5.8%	Road will be re-graded with coarser material  Confirmatory sampling will be completed after the re-grading
Ambient Air Monitoring (during the first year of each Project Phase)	Daily average TSP concentration that is greater than 120 µg/m <sup>3</sup> at offsite locations	A review/update of the risk tool will be completed and sources with the highest risk score will be targeted for more comprehensive control measures
Ambient Air Monitoring (after the first year of each Project Phase)	Daily average TSP concentration that is greater than the <i>maximum daily TSP concentration</i> * for 5 consecutive samples.	A review/update of the risk tool will be completed and sources with the highest risk score will be targeted for more comprehensive control measures

\*the maximum daily TSP concentration measured during the first year of each phase of the Project

## Closure

We trust that this memo meets your needs at this time. If you have any questions or concerns, please don't hesitate to contact the undersigned.

Yours very truly,

**GOLDER ASSOCIATES LTD.**

<Original Signed By>

<Original Signed By>

Natalie Jones, P.Eng.  
Associate/Senior Air Quality Specialist

Sean Capstick, P.Eng.  
Principal

NCJ/SC/RLP/ca

Attachments: Example Table of Contents

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## Example Table of Contents

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# Table of Contents

<b>1.0 INTRODUCTION</b>	<b>1</b>
<b>2.0 FACILITY DESCRIPTION</b>	<b>1</b>
<b>3.0 RESPONSIBILITIES</b>	<b>1</b>
3.1 Senior Management Representative	1
3.2 Accountable Site Representative	1
3.3 Unit Operations Supervisor	1
3.4 Site Personnel and Contractors	1
<b>4.0 FUGITIVE DUST EMISSIONS BEST MANAGEMENT PRACTICES PLAN</b>	<b>1</b>
4.1 PLAN – Identification and Classification of Fugitive Dust Emission Sources	1
4.1.1 Identification of the Sources of Fugitive Dust Emissions	1
4.1.2 Fugitive Dust Characterization	1
4.1.3 Fugitive Dust Best Management Practices	1
4.2 DO – Implementation Schedule for the BMP Plan	1
4.2.1 Training	1
4.3 CHECK – Inspection, Maintenance and Documentation	2
4.4 ACT – BMP Plan Review and Continuous Improvement	2
<b>5.0 REFERENCES</b>	<b>2</b>

## TABLES

Table 1: Facility Description	1
Table 2: Sources of Fugitive Dust Emissions during the Construction Phase and Potential Causes for High Emissions	1
Table 3: Sources of Fugitive Dust Emissions during the Operations Phase and Potential Causes for High Emissions	1
Table 4: Sources of Fugitive Dust Emissions during the Closure Phase and Potential Causes for High Emissions	1
Table 5: Description of Preventative Procedures and Control Measures for Fugitive Dust Emissions under Development at the Facility	1
Table 6: Fugitive Dust Sources and Associated Relative Risk Scores for the Construction Phase	1
Table 7: Fugitive Dust Sources and Associated Relative Risk Scores for the Operations Phase	1

---

Table 8: Implementation Process for New Emission Sources.....	1
Table 9: Inspection Frequency Summary.....	2
Table 10: Inspection Documentation for the Facility Organized by Emission Source Type.....	2
Table 11: BMPP Review Trigger Levels.....	2

## FIGURES

Figure 1 – Fugitive Dust Sources Location Plan

## APPENDICES

### APPENDIX A

Ministry Comments

### APPENDIX B

Monitoring Programs Technical Memo

### APPENDIX C

Fugitive Dust Source Risk Ranking

### APPENDIX D

Start Up Checklists

### APPENDIX E

Dust Control Inspection Form

### APPENDIX F

Dust Control Activity Logs

### APPENDIX G

Non-Conformance Log



## **Attachment 2**

### **Description of Air Quality Management Plan for the Proposed Magino Mine Project**

## TECHNICAL MEMORANDUM

**DATE** March 5, 2018

**Project No.** 1659317-2080

**TO** Kyle Stanfield  
Argonaut Gold Inc.

**FROM** Natalie Jones

**EMAIL** njones@golder.com

### DESCRIPTION OF AIR QUALITY MANAGEMENT PLAN FOR THE PROPOSED MAGINO MINE PROJECT

Golder Associated Ltd. (Golder) was retained Argonaut Gold Inc. (Argonaut) to prepare a technical memorandum to describe the Air Quality Management Plan (AQMP) that will be implemented through construction and operations of the proposed Magino Mine (the Project).

#### Purpose of the AQMP

The purpose of the AQMP is to confirm the findings of the air quality assessment for the Project and verify that proposed in design mitigation measures and Best Management Practices Plan to Control Fugitive Dust (Fugitive Dust BMPP) are effective, allowing the Project to meet Ministry of the Environment and Climate Change (MOECC) Ontario Regulation 419/05 air quality standards and CCME air quality guidelines as indicators of good air quality.

The proposed program will accomplish this for the following reasons:

- For each of the monitored compounds there are additional controls or onsite measurements that will better assess the operations. For example, the Fugitive Dust BMPP will require that on-site silt measurements be taken periodically on mine roads. The silt loading has the greatest influence on the fugitive dust emissions and measurements lower than the conservative values used in the emission estimates will result in lower emissions. In addition, the BMPP also requires visual observations of fugitive dust emissions and corrective action such as road watering can be implemented.
- For some of the monitored compounds there are no additional controls available to further reduce the emissions. For example, the use of Tier 4 vehicles, with the lowest emissions of PM available is considered the best available control technology and it has been mandatory in Canada since 2012 that new vehicles conform to Tier 4 standards. Therefore, the majority of the off-road vehicles used in the future at the Project site will likely meet Tier 4 limits. In addition to assuming the greatest vehicle use, the conservative emission estimates used in the air quality assessment assumed the vehicles were Tier 3 and therefore the actual tailpipe emissions will be lower than the conservative values used in the emission estimates which will result in lower measured concentrations.
- Once the detailed mine infrastructure design is completed and areas that can be serviced by electrical power are known, the location of the maximum predicted concentrations and location of the maximum predicted

frequency above the AAQC values as well as prevailing wind directions will be considered to assess the appropriate location for the ambient air monitoring equipment. Due to the remote nature of the site, the monitors will be sited to collect the most useful data without adding equipment/infrastructure that, in of itself, would create additional potential impacts (i.e. generators for power, access roads, etc.). Concentrations of all compounds decrease as the distance increases from ground level-based sources therefore monitoring results at locations closer to the operations will be monitor higher concentrations than locations that are further away. The location(s) of the monitoring sites will be selected in consultation with the MOECC as part of the Environmental Compliance Approval (ECA) application process.

- The sampling will provide a baseline of monitoring data that can be used for comparison purposes throughout the project. After the baseline data trends are established, sampling may be reduced upon approval of the MOECC.
- A typical condition of an ECA that includes monitoring will require Argonaut will provide an annual monitoring report to the local MOECC which summarizes the data collected for the previous year and any actions that were implemented based on the results. The report will also detail any proposed modifications to the monitoring program that will be implemented for the subsequent year for MOECC comment.

## Proposed Ambient Air Monitoring Program

The proposed monitoring program is based on the recommendations of the Air Quality TSD (TSD9) and the Human Health TSD (TSD14) which focus mostly on particulate matter. The following table outlines the proposed monitoring program for the Project.

In the Fugitive Dust BMPP, each fugitive dust source associated with the Project during construction and operations will be assessed using the risk management tool described in the guidance document (CEMI 2010) to assess if the BMPs that are in place adequately manage the risk associated with each source. The relative risk score for each source will be documented in the BMPP and revised as required. The goal of the BMPP is to have no sources that are still considered to be “high” risk after the implementation of the BMPs so that it can be assumed that the planned BMPs adequately manage the risk associated with each fugitive dust source.

Note that the BMPP process involves the “Check” and “Act” steps which facilitate continuous improvement of fugitive dust management practices. A major component of the “Act” step will be the trigger levels which will be set to initiate BMP review. Table 1 summarizes the potential trigger levels associated with the proposed Ambient Air Monitoring Program. If a trigger level is exceeded, a review/update of the risk tool will be completed and sources with the highest risk score will be targeted for more comprehensive control measures, such as:

- increasing the frequency of watering or implementing a different type of dust suppressant
- paving sections of roadways
- building enclosures around material storage or handling areas
- ceasing the activity during high dust conditions

**Table 1: Proposed Ambient Air Monitoring Program**

Compound	Duration	Frequency	Potential Monitoring Equipment	Significant Sources	Implemented Mitigation Measures	Comments	Trigger Levels to Initiate Fugitive Dust BMPP Review	
TSP	All phases	Samples should be collected on the 6-day National Air Pollutant Surveillance (NAPS) Cycle for the operations phase of the Project.  The focused sampling can be discontinued once the data are available and consistent.	Hi-vol	Mobile equipment – fugitive dust	Fugitive Dust BMPP	Recommended to be monitored in TSD9	During first year of Project Phase - Daily average TSP concentration that is greater than 120 µg/m <sup>3</sup> at offsite locations	
Material handling				Dust collectors on process sources	After the first year of each Project Phase - Daily average TSP concentration that is greater than the maximum daily TSP concentration measured during the first year of the Project Phase for 5 consecutive samples.			
Process sources								
PM <sub>10</sub>				Mobile equipment – fugitive dust	Fugitive Dust BMPP	PM <sub>10</sub> was identified as “not significant” in TSD9 however monitoring was recommended to confirm the assessment	Recommended to be monitored in TSD14	During first year of Project Phase - Daily average PM <sub>10</sub> concentration that is greater than 50 µg/m <sup>3</sup> at offsite locations
	Material handling	Dust collectors on process sources	After the first year of each Project Phase - Daily average PM <sub>10</sub> concentration that is greater than the maximum daily PM <sub>10</sub> concentration measured during the first year of the Project Phase for 5 consecutive samples.					
	Process sources							
PM <sub>2.5</sub>				Mobile equipment – tailpipe exhaust	Tier 3 or greater equipment to be used	PM <sub>10</sub> was identified as “not significant” in TSD9 however monitoring was recommended to confirm the assessment	During first year of Project Phase - Daily average PM <sub>2.5</sub> concentration that is greater than 28 µg/m <sup>3</sup> at offsite locations	
				Process combustion sources	Dust collectors on process sources			Recommended to be monitored in TSD14
Cadmium				Mobile equipment –fugitive dust	Fugitive Dust BMPP	Recommended to be monitored in TSD14	During first year of Project Phase - Daily average concentration that is greater than 0.025 µg/m <sup>3</sup> at offsite locations	
				Material handling	Dust collectors on process sources			After the first year of each Project Phase - Daily average concentration that is greater than the maximum hourly concentration measured during the first year of the Project Phase for 5 consecutive samples.
				Process sources				

## Content of the AQMP

In addition to the monitoring program outlined above, the AQMP will also include the following:

- Calibration requirements of the selected equipment
- Monitoring equipment location siting criteria and how it was applied
- Sample preparation and laboratory analysis procedures
- Results QA/QC procedures
- Reporting requirements which will detail how the meteorology and results will be documented
- A communication plan detailing who will receive copies of the monitoring plan as well as how potential receptors will be notified of adverse monitoring results

An example Table of Contents is included as Attachment 1

## Closure

We trust that this memo meets your needs at this time. If you have any questions or concerns, please don't hesitate to contact the undersigned.

Yours very truly,

**GOLDER ASSOCIATES LTD.**

<Original Signed By>

<Original Signed By>

Natalie Jones, P.Eng.  
*Associate/Senior Air Quality Specialist*

Sean Capstick, P.Eng.  
*Principal*

NCJ/SC/ca

Attachments: Example Table of Contents



APPENDIX A

# Example Table of Contents

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# Table of Contents

<b>1.0 INTRODUCTION</b>	<b>1</b>
1.1 Facility Description	1
1.2 Emission Sources	1
1.3 Receptors	1
<b>2.0 AIR QUALITY MONITORING PROGRAM</b>	<b>1</b>
2.1 Program Objectives	1
2.2 Program Duration	1
2.3 Monitoring Sites	1
2.3.1 General Criteria for Selecting Monitoring Sites	1
2.3.2 Preliminary Siting Process	1
2.3.3 Detailed Siting Process	1
2.3.4 Selection of Monitoring Sites	1
2.3.4.1 Monitoring Equipment	1
2.4 Meteorological Site	1
2.5 Air Quality Parameters to be Monitored and Frequency	1
2.6 Monitoring and Analytical Methods	2
2.6.1 Equipment Calibration Requirements	2
2.7 Laboratory Services Support	2
2.8 Quality Assurance and Quality Control Plan	2
2.9 Data Reporting Procedures	2
<b>3.0 COMMUNICATION PLAN</b>	<b>2</b>
<b>4.0 REFERENCES</b>	<b>2</b>

## TABLES

Table 1: Site Description	1
Table 2: Description of Receptors	1
Table 3: Compounds to Monitor	1

## FIGURES

- Figure 1: Locations of Air Emission Sources
- Figure 2: Receptors
- Figure 3: Windrose
- Figure 4: Proposed Monitoring Sites

## APPENDICES

### APPENDIX A

Ministry Comments