Subject: Marathon Platinum Group Metals and Copper Mine Project – Decision on Sufficiency of Environmental Impact Statement

Dear Ms. LeBlanc:

The Joint Review Panel (the Panel) responsible for reviewing the Marathon Platinum Groups Metals and Copper Mine project (the Project) has completed its review of the responses to information requests (IRs) provided by Stillwater Canada Inc. (SCI) between March 4 and June 27, 2013. The Panel also reviewed and considered all comments and information received from the various participants as part of the public comment period which ended July 31, 2013.

Based on its review of the responses and the comments received, the Panel has determined that the Environmental Impact Statement, supplemented by the additional information provided in response to the IRs, is not sufficient to proceed to the public hearing at this time.

The Panel has determined that SCI must provide additional information as requested in the attached deficiency statement. Once all the requested information is submitted, the Panel will post the responses on the Marathon public registry and may hold a public comment period on the additional information. The Panel will then determine within 30 days of the submission or the end of the public comment period, if one occurs, whether supplementary information is still needed or whether there is sufficient information for scheduling the public hearing.

Please note that the time required by SCI to respond to information requested by the Panel is not included in the regulatory timeline remaining for the Panel to complete its review.

The Panel is of the opinion that there are other outstanding issues that are not considered to be required for sufficiency determination. The details of these issues will be forwarded to SCI in a subsequent letter. The Panel will require that SCI respond to these issues prior to the hearing. This will allow for an efficient and procedurally fair public hearing, and enable all participants to prepare for the hearing.

If you have any questions or concerns, please do not hesitate to contact Marie LeGrow or Cindy Parker, the Panel Co-Managers, via email at MarathonMine.Review@ceaa-acee.gc.ca.
Sincerely,

<original signed by>

Louis LaPierre
Panel Chair

Cc: Terry Ackerman, Stillwater Mining Company
    Bruce Gilbert, Stillwater Mining Company
    Clark Gilbert, Stillwater Canada Inc.
    Kenjiro Fujimoto, Stillwater Canada Inc.
DEFICIENCY STATEMENT

Regarding the
Environmental Impact Statement for the proposed
Marathon Platinum Group Metals and Copper Mine Project

Issued to
Stillwater Canada Inc.

Supplemental Information Requests
from the
Marathon Joint Review Panel

August 30, 2013
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SUPPLEMENTAL INFORMATION REQUESTS

Supplemental Information Request 1

Assessment of Alternative Rail Load-out Locations and Rail Shunting Noise Criteria

Original IRs:
IR 5.1 – Assessment of Alternatives
IR 5.3 - Highly Impulsive Noise Sources at Rail Load-Out Facility

References:
EIS Guidelines – Section 2.4.3, p. 24 (PDF 29)
EIS Guidelines – Section 2.7.3.5, p. 68 (PDF 73)

Related Comments:
CEAR # 545 (Health Canada)
CEAR #557 (Ontario Ministry of the Environment)

Rationale:
Two alternative rail load-out locations in Marathon were identified and assessed in the EIS. SCI response to IR 5.1 stated that the following additional rail load-out facilities are also under consideration for transportation of concentrate:

- Existing rail siding in Schreiber
- Existing rail siding in Terrace Bay
- Existing rail siding in White River
- Existing rail siding in Struthers
- Existing rail siding in Manitouwadge

The response also stated that each of the locations identified above are existing commercial/industrial sites and no effects on biophysical VECs were identified. However, information to support this statement was not provided, and a preferred rail load-out location based on the effects assessment was not identified.

The response to IR 5.3 included the prediction of an impulsive sound pressure level of 90 dBAi arriving at points of reception in Marathon from rail shunting, which SCI states does not exceed the Ministry of the Environment single event criterion of 100 dBAi. In its review, Ministry of the Environment noted that SCI assessed rail shunting noise in terms of an older criterion, higher than Ministry of the Environment current practice. A Ministry of the Environment draft document, currently in the approvals process, contains lower figures of no more than 80/75 dBAi (day/night).

Information Request:

Describe the five alternative rail load-out locations presented in the response to IR 5.1. Provide details of the assessment of these alternatives and compare with the two rail load out locations in Marathon. Provide an update on the preferred rail load out location based on the assessment of alternatives.
Include an assessment of the impulsive sound emission levels from rail shunting operations at the rail load out locations under consideration against the Ministry of the Environment proposed limits for impulsive sound found in Draft NPC-300 of 80 dBAi daytime and 75 dBAi night time. Note that for more than one impulse per hour, lower limits may apply. If, through this new assessment, SCI determines that the Ministry of the Environment draft limits for impulsive sound are exceeded, explain how effects from shunting would be mitigated.
Supplementary Information Request 2

Measuring Baseline Noise Levels

Original IR:
IR 11.3 – Measuring Baseline Sound Levels

References:
SID #13 – Baseline Technical Report – Noise – Marathon PGM-Cu Project

Related Comments:
CEAR # 557 (Ontario Ministry of the Environment)

Rationale:
The EIS reports unusually high levels of background sound (40 dBA) at remote receptors, and may inappropriately minimise the possible acoustic impacts of the project.

The Ministry of the Environment commented that the background noise measurements reported by SCI may have been made using inappropriate equipment and methods. The sound level meters used by the consultant are not recommended by their manufacturer for measurement of noise levels lower than 40.0 decibels. The manufacturer has confirmed that these meters are not designed for this sort of measurement. The operating manual for one of the meters states that the noise floor (generated within the meter itself) is “approximately 35 dBA”, and that the minimum sound level with which the meter should be used is 40 dBA.

According to detailed measurement logs, provided to the Ministry upon request, a number of measurements were made with the 40 dB “threshold” setting engaged in the meter. Non-zero thresholds are intended for measurements of occupational (close-up worker exposure) noise, and not for environmental (distant community exposure) measurements.

Systemic errors in the measurement of existing background noise at remote receptors in the baseline Noise Report (SID #13), arising from equipment limitations and/or other measurement inaccuracies can lead to inappropriate noise criteria being established and predicted impacts being minimised. The discrepancy between the reported measured sound level and the modelled sound level from road traffic is of particular concern, as it means that the effect of the project might be misstated by quoting overly high background levels.

Information Request:

Re-measure the baseline ambient noise for Points of Reception N1 to N5 using equipment and methodologies acceptable to the Ministry of the Environment, or if it is not feasible to re-measure these Points of Reception, the predicted background levels of 18 dBA generated by the traffic modelling should be used for Points of Reception N1 to N5 rather than 40 dBA. Use these new baseline levels to re-assess the significance of noise impacts from the Project.
Supplemental Information Request 3

Acid Base Accounting

Original IR:
IR 9.4.1 - Neutralization Potential Predictions

References:
EIS Guidelines - Section 2.6.1.1, p. 32 (PDF 37)
EIS Guidelines - Section 2.7.2.3, p. 55 (PDF 60)
SID #5 – Geochemical Assessment of Mine Components for the Marathon PGM-Cu Project

Related Comments:
CEAR #550 (Natural Resources Canada)

Rationale:
In IR 9.4.1, the Panel requested that SCI clarify its acid base accounting (ABA) methodology used to measure neutralization potential (NP) and to justify the use of total NP in the neutralization potential ratio (NPR) calculation and discuss the implications of using NP rather than Carb-NP on the results. The use of total NP versus Carb-NP may have an impact on estimates of Type 1 and Type 2 materials quantities for the various mine waste components produced at the Marathon site.

SCI responded by stating that the Sobek method was used for the determination of NP as reported in its Environmental Impact Statement. Furthermore, the Sobek NP was used to calculate the NP/AP ratio (NPR). SCI indicated that this approach is commonly used for screening purposes.

SCI further stated that a more conservative approach to calculating NPR is to consider the NP that is attributed to carbonate minerals only (Carb-NP). SCI stated that the Carb-NP of the Marathon mine rock samples was explicitly calculated and presented in Table 9.4.2-1 in its response to IR 9.4.2 (Geochemical Assessment). In its analysis, SCI claimed that samples with NPR or Carb-NP less than 1 are considered to be potentially acid generating (PAG) and samples with NPR or Carb-NPR greater than 2 are considered to be non-PAG. In other words, in SCI analysis the PAG/non-PAG classification boundary is set at NPR or Carb-NPR = 1.

Recognizing that sulphur and/or sulphide content of the rock may have an effect on the acid generation potential for mine rock, SCI summarized comparative ABA results for all mine rock samples in plots of:

- NPR versus % total sulphur (Figure 9.4.1-1); and
- Carb-NPR versus % total sulphur (Figure 9.4.1-2)

Interpreting the results of these two plots, SCI concluded that using a PAG / non-PAG cut-off of 0.3% total sulphur, no net acid generation is predicted in the non-PAG (Type 1) mine rock, for reasons cited. As a conservative measure for water quality modelling however, SCI stated it incorporated a 5% estimate of Type 2 (PAG) material that will be mixed erroneously with Type 1 rock.
In its review Natural Resources Canada claimed that SCI has applied a non-PAG / PAG classification boundary that is lower than recommended by MEND (2009). The proponent’s choice of NPR of 1 (NP = AP), using total NP instead of Carb-NP may result in an unknown amount of PAG (Type 2) materials being classified as non-PAG materials (Type 1) which would have serious implications for both waste materials management and short and long-term environmental impacts. Natural Resources Canada recommended that the PAG and non-PAG materials classification boundary be selected based on Carb-NP only and set at Carb-NPR of 2 or higher to account for weathering related carbonate minerals dissolution and loss irrespective of the acid generation process.

Natural Resources Canada agreed with SCI that the geometric mean Carb-NP of mine rock is approximately 9 kg CaCO₃ / tonne. However Natural Resources Canada states this corresponds to a geomean AP value of ~ 4.3 kg CaCO₃ / tonne and total sulphide content of ~ 0.14% for NPR-Carb of 2.

Natural Resources Canada claimed that this demonstrates that a total sulphide value for the PAG / non-PAG classification boundary should be most appropriately set at 0.14% sulphur, and in a more conservative approach at 0.1% S. Natural Resources Canada further claimed that this would correspond to 85% mine rock being classified as non-PAG and 15% as PAG - significantly higher than SCI's estimated PAG mine rock quantity of 6% of total inventory assuming a sulphur classification boundary of 0.3% (EcoMetrix 2012, SID #5, p. 5-1).

There is a sizable difference in the percentage of PAG and non-PAG mine rock quantities estimated by SCI's consultants and those estimated by Natural Resources Canada. Further information is needed to better understand the impacts of a possible underestimation of PAG rock quantities as outlined by Natural Resources Canada. In addition, there may be some implications to the mine rock storage area (MRSA) management strategy related to PAG and non-PAG classification and quantities.

**Information Request:**

1. Consider and respond to Natural Resources Canada's opinion regarding the need to;
   a. Establish the PAG and non-PAG materials classification boundary based on carbonate NP;
   b. Use a Carb-NPR of 2 or higher to account for weathering related carbonate minerals dissolution and loss irrespective of the acid generation process; and
   c. Apply a total sulphide cut off boundary of ~ 0.1% sulphur for PAG (Type 2) and non-PAG (Type 1) classification of mine rock.

2. Recalculate the quantities of PAG and non-PAG rock, per 1a, b and c above.

3. Assess the effects of the recalculated estimates of PAG / non-PAG quantities on the existing mine plan, particularly on the design, location and management strategies for both temporary PAG rock stock piles, ore stock piles, MRSA, and any potentially impacted infrastructure.
Supplemental Information Request 4

COPC Loading Rates and Water Quality

Original IRs:
IR 9.8 - Loading Rates for Type 1 and Type 2 Mine Rock in the MRSA

References:
EIS Guidelines - Section 2.6.1.1, p. 30 (PDF 35)
EIS Guidelines - Section 2.7.1.2, p. 44 (PDF 49)
EIS Guidelines - Section 2.7.2.3.2, p. 57 (PDF 62)
MEND (2006) – Update on Cold Temperature Effects on Geochemical Weathering

Related Comments:
CEAR #550 (Natural Resources Canada)

Rationale:
IR 9.8 requested that SCI:
- Justify the use of the temperature correction factor applied to the laboratory humidity cell test results and correct the humidity cell test results to account for the exothermic release of heat;
- Justify the assumption that only very fine fractions of the waste materials contribute to contaminants of potential concern (COPC) loadings in the long-term and assess potential effects under the assumption that over the long term, an average load rate must be obtained for the entire particle size distribution of the mine rock in the MRSA; and
- Discuss implications of the temperature correction factor and the grain size distribution assumption in relation to representative long-term COPC loading rates and seepage quality including impacts of any non-PAG / PAG boundary redistribution to mine rock classification and long term drainage/seepage water quality management requirements, if any.

With respect to the temperature correction factor, SCI outlined its process to arrive at a temperature correction factor of 0.17. SCI recognized that this value is lower than the adjustment factor of 0.31 recommended by MEND (2006). As a sensitivity analysis, SCI stated that if the conservative adjustment factor of 0.31 was applied rather than the derived factor of 0.17, all calculated loading rates would increase by a factor of less than 2 as well. However, for simplicity, SCI stated that the loading rates reported in EcoMetrix (2010) could be multiplied by a factor of 2 to assess the sensitivity of the water quality estimates. If this were done, the predicted concentrations in the on-site waters affected by leaching from rock and process solids would then also be 2 times higher than those reported in the EIS. SCI went on to claim that the predicted concentrations still remain below the respective benchmark values even when multiplied by a factor of 2.

In commenting on SCI's response, Natural Resources Canada stated that for a conservative estimate, the calculated waste rock COPC loads should indeed be multiplied by an additional factor of 2 to account for the difference in the temperature correction factor of 0.17 in EcoMetrix (2010) and the MEND (2006) recommended value of 0.31. Natural Resources Canada further noted that the temperature correction factor of 2 should also be applied to Type 1 and 2 process solids drainage water quality predictions and the resulting COPC load to the environment.
With respect to grain size distribution, SCI stated that it applied a particle size adjustment factor of 0.01 to adjust laboratory rates to field conditions. For reasons cited, SCI claimed that the overall surface area that will affect the leaching rates from mine rock will be controlled by the fine fraction of particles that are less than 4.5 mm in diameter. This will represent about 1% of the total mine rock in the stockpiles. Mass percentages for grain size fractions less than 4.76 mm were not estimated in fragmentation modelling, however SCI stated that it conservatively assumed that the distribution in the field would be similar to that measured for the crushed samples in the humidity cells.

For reasons cited, Natural Resources Canada stated that it is imperative to conclude that the very fine fractions would be the only major and equal contributors to the COPC load both in the humidity cell tests and the proposed MRSA in the short and intermediate timeframe, irrespective of the larger particle size fractions present. Natural Resources Canada also demonstrated why it concluded that COPC loading rate for the very fine fractions of the waste rock in MRSA would be the same as that of the humidity cell measurements and more importantly, why no additional adjustment/correction factor of 0.01 corresponding to the relative proportion of the very fine fractions present in the waste rock pile is required in the scale-up of laboratory results to the actual field scenario as shown below.

As such, with respect to particle size distribution, Natural Resources Canada has recommended that SCI remove the additional correction factor of 0.01 pertaining to the very fine particle size fractions applied to obtain the field COPC mass loading of waste rock in the MRSA. In this regard, Natural Resources Canada noted that this would increase the calculated waste rock COPC load by a factor of 100. In addition and as noted earlier, Natural Resources Canada recommended that for a conservative estimate, the calculated waste rock COPC loads should further be multiplied by an additional factor of ~2 to account for the difference in the temperature correction factor of 0.17 in EcoMetrix (2010) and the MEND (2006) recommended value of 0.31. Natural Resources Canada's substantial concern is that, when combined, "applications of these appropriate correction factors would increase the EA estimated waste rock COPC load of MRSA by 200 which may profoundly impact the water quality of MRSA drainages, its receiving basins and ultimately that of Pic River".

The Panel requires an understanding of the implications of assuming different values for these factors.

Information Request:

1. Provide the methodology used to obtain the specific and total surface areas for various particle size fractions of the humidity cell test samples given in Table 9.8-1 and for the modeled waste rock particle size distribution given in Table 9.8-2.

2. Provide an explanation for the reported differences between the respective values of specific and total surface areas given as 1,179,260 m²/tonne and 15,3330 m² in Table 9.8-1 and the corresponding 31,059 m²/tonne and 331 m² in Table 9.8-2 for the very fine, silt and clay size fractions of diameter 0.001 mm.

3. Consider and respond to Natural Resources Canada’s opinion regarding the need to:
   a. Remove the additional correction factor of 0.01 pertaining to the very fine particle size fractions applied to obtain the field COPC mass loading of waste rock in the MRSA;
b. Recalculate waste rock COPC loads by multiplying by an additional factor of 2 to account for the difference in the temperature correction factor of 0.17 in EcoMetrix (2010) and the MEND (2006) recommended value of 0.31; and
c. Apply the temperature correction factor of 2 to type 1 and 2 process solids drainage water quality predictions.

4. Recalculate COPC loads as suggested by Natural Resources Canada. Using these new estimates, assess the impact on the water quality of MRSA and process solids management facility (PSMF) drainages, the receiving basins and ultimately that of Hare Lake / Creek and Pic River.
Supplemental Information Request 5

Impacts of PSMF Discharge to Hare Lake

Original IRs:
IR 12.1.1 Baseline Conditions in Hare Lake
IR 12.1.2 Effluent Discharge Location in Hare Lake
IR 12.11 Conclusions on Effects to Surface Water Quality
IR 12.2.2 Baseline Hydrology of Hare Creek
IR 12.6.1 Surface Water Temperature

References:
SID #1 Aquatic Resources Baseline Report
SID #3 Baseline Water Quality
SID #6 Water Quality and COPC Fate Modelling
SID #20 Baseline Hydrologic Conditions

Related Comments:
CEAR #544 (Ontario Ministry of Natural Resources)
CEAR #547 (Environment Canada)
CEAR #557 (Ontario Ministry of the Environment)

Rationale:
Hare Lake is currently a productive biological aquatic ecosystem. It will be receiving discharge from the PSMF and has the potential to be negatively impacted by the project. It is important that the baseline conditions and function of Hare Lake are adequately understood and described, and the potential impacts of effluent discharge to Hare Lake are fully assessed and presented. It is also important to understand any long term impacts which may occur over the length of the project, particularly with respect to variation in primary productivity and the consequences to the overall biological integrity of Hare Lake.

The response to original IR’s 12.1.1 and 12.1.2 stated that work needed to complete the final modelling of effluent discharge to Hare Lake is ongoing. SCI stated its intention to complete the modelling exercise prior to provincial permitting. However, this information is needed during the EA process in order to gain a better understanding of the potential impacts of PSMF discharge to Hare Lake.

In addition, Environment Canada recommended that information be provided to support the conclusion that the revised water balance approach presented in response to IR 12.2.2 and applied to the Hare Creek watershed will not change the water quality predictions for Hare Lake and Hare Creek.

Ministry of Natural Resources questioned the validity of SCIs suggestion in the response to IR 12.6.1 that the discharge from the PSMF will not be “warm”. Ministry of Natural Resources contends that the PSMF will be warmed by solar radiation and this should be taken into consideration when modelling effects of PSMF discharge on lake biota that are dependent upon a stratified environment. .Ministry of Natural Resources also recommended that SCI assess potential effects of the mitigation proposed in the response to IR 12.11 for a possible meromictic condition in Hare Lake, i.e. to proactively mix the lake.
Ministry of Natural Resources was concerned that this would ultimately remove the stratified condition of the lake.

Information Request:

1. Provide a comprehensive summary of baseline conditions and function for Hare Lake pulling together data and information collected as part of the EIS and additional data and information collected in 2013 as described in the response to IR 12.1.1. This should include the following information:
   a. hydrologic regime, quantity and quality of water to the lake including seasonal variation;
   b. chemical and nutrient influx to the lake;
   c. seasonal temperature profile of the lake and delineation of the lake thermal profile;
   d. primary productivity, including phytoplankton and zooplankton population diversity and structure;
   e. diversity and density of benthic invertebrate populations;
   f. identification of key indicator species;
   g. identification of fish species and their population dynamics (e.g. age structure);
   h. metal levels in fish tissue; and
   i. structure of the food chain, i.e. the energy pyramid

If information is not currently available, provide a study plan and timelines to obtain the information.

2. Provide a report that predicts and describes the impacts of the effluent from the PSMF on the aquatic ecosystem of Hare Lake and Hare Creek. This should include new modelling that incorporates the latest data collected and also a consideration/rationalization of:
   • any new estimates of COPC from the PSMF – see SIR 4;
   • modelled temperature of discharge from PSMF addressing Ministry of Natural Resources concerns related to IR response 12.6.1;
   • the proposed location of the diffuser; and
   • updated hydrologic data for the Hare Creek watershed mentioned in the response to IR 12.2.2.

The report is to include modelling results to predict:
   • the boundaries of a mixing zone;
   • predicted concentrations of contaminants in the mixing zone;
   • the effects of lake stratification and hydrology on plume dispersion;
   • the effects of a non-buoyant plume and final effluent mixing within the lake; and
   • lake retention time and its influence on contaminant retention/release downstream.

3. Using the results of the modelling exercise the report should present an evaluation of the potential impacts to the following:
   • primary productivity and effects on food chain;
   • phytoplankton and zooplankton species diversity and abundance;
   • fish communities in Hare Lake and Hare Creek, such as lake trout hypolimnetic habitat and salmonid habitat downstream of the outflow of Hare Lake;
   • bioaccumulation of metals or other contaminants;
• changes to hydrologic regime (increase or reduction of flow annual variations);
• variation to the thermal regime of the lake;
• chemical and physical composition of effluent discharge to the Lake (quantity over length of project);
• overview of deposition on the sediment for the duration of the project;
• impacts on the sediment from effluent deposition. Information should be provided on the potential impacts on the annual nutrient transfer to the lake during the spring and fall turnover; and
• assess possible impacts on benthic species and provide an overview of the impacts on the existing food chain.

If impacts are identified, the analysis report should also identify mitigation measures that would be undertaken to minimize impacts on the biological functions of Hare Lake and Hare Creek. Identify the criteria that are used to make this judgement, and contingency measures that could be undertaken if such mitigation is not effective.

For the mitigation proposed in the event of a meromictic condition in Hare Lake, i.e. artificial mixing of the lake, provide a description of the effects of the mitigation, including any changes to Hare Creek.
Supplemental Information Request 6

*Groundwater Recharge, Retention and the Effects of Climate Change*

**Original IRs:**
- IR 19 – Effects of the Environment on the Project
- IR 22.2 - PSMF Closure Design Under a Range of Climate Scenarios
- IR 24.5 - Hydrostratigraphic Units

**References:**
- EIS Guidelines – Section 2.6.1.4, p. 32 (PDF 37)
- EIS Guidelines - Section 2.6.1.1, p. 30 (PDF 35)
- EIS Guidelines – Section 2.7.7, p. 71 (PDF 76)
- EIS Main Report – Section 6.4, p. 6.180 (PDF 686)
- SID #8 – Green House Gas and Climate Change Assessment for the Marathon PGM-Cu Project
- SID #14 – Baseline Report – Hydrogeology – Marathon PGM-Cu Project

**Related Comments:**
- CEAR #547 (Environment Canada)
- CEAR #550 (Natural Resources Canada)

**Rationale:**

*Groundwater recharge*

In IR 24.5, the Panel requested SCI to provide additional information on the conceptual groundwater model, including details on the hydrostratigraphic units present (as per IR 24.4), the water budget and the groundwater flow system.

In SID#14, Section 4.3.4, it is stated that "recharge across the site was calibrated to a value of 79 mm/year". Natural Resources Canada noted that this value is similar to the recharge rate of 63 mm/year previously estimated by Golder (2007)\(^\text{a}\), and suggested that SCI's consultant has used the 63 mm/yr recharge rate determined by Golder as a starting point in their numerical groundwater model, and then adjusted this recharge rate during calibration to a value that optimized their calibration (79 mm/yr).

Natural Resources Canada further noted that SCI's consultant may have incorrectly used a monthly value as an annual value, i.e. 50% of 125 mm/month is 63 mm/month, not 63 mm/year as quoted in the SID #14 report. Natural Resources Canada stated its concern that the recharge values have likely been underestimated.

As groundwater recharge and retention are key components of the numerical groundwater modelling for the site, the Panel concludes that and additional information is required.

**Effects of Climate Change on the Design of the PSMF**

In SIR 22.2, the Panel requested SCI to provide supporting information regarding the effectiveness of the proposed PSMF closure design under a range of climate scenarios.
This IR was based on a premise that the effectiveness of the proposed closure method in the long term will depend on process solids pore water retention and the maintenance of saturated conditions over the Type 2 process solids. It was also noted that climate will be an influencing factor, especially during periods of drought and aggressive evaporation.

Environment Canada stated that its main consideration in relation to the PSMF is the ability to maintain moist conditions in the process solids in perpetuity to prevent acid mine drainage. In this regard, Environment Canada stated the need for SCI to consider the possibility of future multi-year drought scenarios and the impact they could have on the design objective for the PSMF, noting that SCI's current modelling efforts have not considered month to month persistence in low precipitation values particularly during dry periods.

Furthermore, Environment Canada claimed that SCI has based its assessment of future climate (EIS, Section 6.4 (p. 6.180-6.2) and SID#8 (p. 2.10-2.14)) on simulations from a single run from a single climate model. Environment Canada noted what it considers limitations of this approach, in that it does not capture the range of potential future climate change and related uncertainties, and suggested that these are best accounted for by considering projections from a number of different climate models for a range of scenarios.

As groundwater recharge and retention and the possible effects of climate changes are key parameters of the PSMF design more information is required to verify the related modelling assumptions made by SCI.

**Information Request:**

**Groundwater Recharge**
- Explain the rationale for the recharge rate used in the numerical groundwater model.
- Recalculate the annual recharge value and demonstrate to what extent the new value affects the numerical groundwater model through the operations, closure and post-closure phases of the project.
- Clarify whether and how the estimation of recharge can be improved beyond correcting the error. In this regard, note that the Golder (2007) report suggests that a more accurate measure of the groundwater recharge to the study area would require a hydrological assessment in determining base flows from main watersheds in the area during periods of low precipitation.

**Effects of Climate Change on the Design of the PSMF**
- With respect to current climate change modelling undertaken by SCI to date, explain the implicit assumption that monthly precipitation values are independent as opposed to assuming month to month persistence.
- Demonstrate through the application of new modelling - and assuming future multi-year drought scenarios and month to month persistence – the potential effects of increases in
temperature and evaporation through climate change on the maintenance of moist conditions of type 2 process solids within the PSMF, post closure.

- Demonstrate whether groundwater recharge and retention are the key factors in maintaining moist conditions of the Type 2 process solids within the PSMF, even under multi-year drought scenarios post closure.

- Identify the contingency plans in the event groundwater levels are not maintained in the PSMF as planned.
Supplemental Information Request 7

Socio-economic Effects Follow-up and Monitoring

Original IR:
IR 21.2 – Socio-economic follow-up program

References:
EIS Guidelines – Section 2.8.3, p.74 (PDF 79)
CEAR # 263 - Amended Terms of Reference

Rationale:
Although the EIS recognizes the importance of the socio-economic effects of the Project, plans for monitoring socio-economic effects or ensuring overall socio-economic benefits to the potentially affected communities were not included. SCI was requested to provide a conceptual follow-up and monitoring program, including appropriate indicators, to verify the predictions in the EIS regarding the potential socio-economic effects of the Project.

In its response, SCI states that “the provision of such services and infrastructure falls within the remit of governments...” and as such it is not the responsibility of the proponent to implement such programs.

In Section 2.8.3 the EIS Guidelines state that “the EIS shall outline a follow-up and effects monitoring program, designed to verify the accuracy of the conclusions of the environmental assessment and to determine the effectiveness of the measures implemented to mitigate the adverse environmental effects of the Project. The follow-up and effects monitoring program will also support the implementation of adaptive management measures to address previously unanticipated adverse environmental effects”

The Panel is required to prepare and submit to the federal Minister of the Environment and the provincial Minister of the Environment a report that includes any recommended mitigation measures and follow-up programs on potential changes to the Environment, including socio-economic issues (ToR; Section 3.15). The assessment by the Panel must include a consideration of subsection 6.1(2) of the Ontario Environmental Assessment Act and section 19 of the Canadian Environmental Assessment Act, 2012. This includes the requirements of any follow-up programs in respect of the Project (ToR; Section 2.2(xi)).

Further information on the follow-up and monitoring of socio-economic effects is needed.

Information Request:

Provide information on the design of a conceptual monitoring and follow-up program that will allow SCI to assess the actual socio-economic effects against the predictions, as well as to measure the effectiveness of proposed mitigation measures. The program should include key performance indicators and a monitoring strategy.
Supplemental Information Request 8

*Economic Cost and Benefit Analysis*

**Original IR**
IR 16.2 – Economic Issues

**References:**
EIS Guidelines - Section 2.7.3.3, p.63 (PDF 44)

**Related Comments:**
CEAR # 544 (Ontario Ministry of Natural Resources)

**Rationale:**
In IR 16.2 the Panel requested SCI to provide an assessment, in dollar terms, of the costs and benefits to the region for each phase of the Project and relative to the ‘do nothing’ alternative. The Panel stated that such an assessment needs to include costs to governments for infrastructure and services. In addition, the Panel requested SCI to provide a sensitivity analysis using ranges of reasonable values. The Panel notes that these elements of IR 16.2 were not provided in SCI’s response.

**Information Request:**

- Provide a full economic cost and benefit analysis of the Project compared to the Project not proceeding. Such an analysis should weigh the economic benefits to the region and to all levels of government against clear estimates of municipal, provincial and federal government expenditures that may be required as a result of development of the Project. Clearly explain and justify all key assumptions.

- Provide a sensitivity analysis using broad ranges of values for key assumptions, including local labour force, economic multipliers, leakage and projected government expenditures. Summarize the results in tabular form.

- Describe proposed measures, if any, to offset the government expenditures.
Supplemental Information Request 9

*Environmental Design Storm*

**Original IRs:**
IR 19 - Effects of the Environment on the Project

**References:**
EIS Guidelines - Section 2.7.7, p.71 (PDF 76)

**Rationale:**
In IR 19, the Panel requested SCI to identify where and how climate change had been factored into the assessment and to identify new extreme rainfall events that incorporate climate change. Where extreme rainfall is used in the EIS, the Panel requested SCI to provide revised analyses based on these new extreme rainfall events.

In its response SCI stated that a variety of extreme storm events and hydrologic conditions were estimated to identify baseline conditions and were also assessed with respect to surface water management. SCI stated that for the management of surface water that comes in contact with mine waste or mine infrastructure, a wide range of conditions were evaluated, including wetter and dryer than normal conditions (10-year through 25 year return periods and “extreme” 5\(^{th}\) and 95\(^{th}\) percentile monthly precipitation occurrences). SCI further stated that for the PSMF, other scenarios considered included the Timmins Storm for water management purposes.

While recognizing the Timmins Storm as the regulatory flood, the Panel notes a growing body of evidence suggesting that a new design storm may be required for major works across Ontario, based on the increasing frequency and intensity of extreme storm events. One such event is the Northwestern Ontario Flood of June 8 to 11, 2002. The extreme rainfall event associated with this flood generated over 400 mm of rain in 48 hours over NW Ontario in an area bordering Manitoba and Minnesota.

The Panel requires an understanding of the effect of future storm events significantly greater than the Timmins Storm due to climate change. For example, the 2002 storm is a known and useful benchmark against which to estimate the effect.

**Information Request:**

Where extreme rainfall (Timmins storm) is used in the EIS, provide revised analyses based on significantly greater storm events, such as the Northwestern Ontario storm of June 2002 and explain the implications for short and long term surface water management across the Project area, including impacts on the site water balance, water quality and the design and construction of the PMSF, retention ponds and spillways.
Supplemental Information Request 10

*Human Health Risk Assessment*

**References:**
EIS Guidelines – Section 2.7.1.5, p. 48 (PDF 53)
EIS Guidelines – Section 2.6.4.2, p. 42 (PDF 47)
EIS Guidelines – Section 2.7.3.5, p. 68 (PDF 73)

EIS Main Report – Section 6.2.11.3, p. 6.132 (PDF 638)
EIS Main Report – Section 5.11.3, p. 5.169 (PDF 494)
EIS Main Report – Section 6.2.11, p. 6.131 (PDF 637)

**Related Comments:**
CEAR #284 (Health Canada)
CEAR #306 (Ontario Ministry of the Environment)
CEAR #521 Ontario Ministry of the Environment letter dated June 27, 2013
CEAR #559 Health Canada’s Letter dated August 22, 2013
CEAR #560 Ministry of the Environment Letter dated August 22, 2013

**Rationale:**
In their letters, Health Canada and Ministry of the Environment noted the lack of a detailed human health risk assessment for this Project, as per section 2.7.3.5 of the EIS Guidelines. Specifically, the Guidelines require detailed, quantitative and qualitative risk assessment methods to examine the potential effects of the Project on human health, specifically related to potential chemical releases to the environment. Health Canada and Ministry of the Environment noted that in the absence of a human health risk assessment they are unable to verify statements made in the EIS regarding potential human health effects of the Project.

**Information Request:**

The Panel understands that SCI is in the process of completing a human health risk assessment and will be in consultation with Health Canada in this regard. The Panel requests that SCI provide the Panel with their assessment on impacts to human health.
Supplemental Information Request 11

**Cumulative Effects Assessment**

**Original IRs:**
IR 20.1 – Assessment of Cumulative Effects  
IR 20.2 – Sources of Cumulative Effects  
IR 20.3 – Existing and Future Projects in the Region  
IR 20.4 – Transparency of Conclusions

**References:**
EIS Guidelines – Section 2.7.1.4, p. 47 (PDF 52)  
EIS Main Report – Table 6.1-4, p. 6.15 (PDF 521)

**Related Comments:**
CEAR #544 (Ontario Ministry of Natural Resources)  
CEAR #547 (Environment Canada)  
CEAR #552 (Pic Mobert First Nation)

**Rationale:**
Subsection 19(1) of the *Canadian Environmental Assessment Act*, 2012 requires a cumulative effects assessment to be completed for the Project:

> “19. (1) The environmental assessment of a designated project must take into account the following factors:
>  
> (a) the environmental effects of the designated project, including ... any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out;
>  
> (b) the significance of the effects referred to in paragraph (a)”.

SCI’s original cumulative effects assessment provided very little detail regarding how it assessed the significance of cumulative effects of the Project in combination with other past, present and reasonably foreseeable projects and activities. SCI was requested to provide additional details on how the effects rating criteria in Table 6.1-3 were combined, weighted and applied to the cumulative effects analysis in order to determine significance.

The Ontario Ministry of Natural Resources, Environment Canada and the Pic Mobert First Nation all expressed concerns regarding the scope of the cumulative effects assessment. In particular these concerns included the exclusion of certain activities such as current use of lands and resources for traditional purposes (e.g. hunting, fishing, and trapping), exploration activities and the effects of noise and forest management plans on wildlife within the regional study area. In addition, the IR response did not detail cumulative effects but rather restated the impacts of the Project on VECs.

The Panel requires further information concerning the assessment of significance of the cumulative effects of the Project in order to comply with the requirements of *the Canadian Environmental Assessment Act*, 2012.
Information Request:

Provide a table similar to Table 6.1-4 for the assessment of significance of cumulative effects, as well as a description of how these criteria were combined and weighted to determine the significance of the potential cumulative effects. Include the potential cumulative effects from activities such as forest management and any present or future exploration on:

- Traditional Aboriginal activities such as hunting, fishing, trapping, harvesting; and
- Woodland caribou

The significance of the cumulative effects should be evaluated using the same criteria and methodology as the determination of significance for Project effects.