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File No.: 2007-103

David Pearson and Philip Byer  
Panel Members  
Marathon PGM-Cu Mine Panel Secretariat  
160 Elgin Street, 22nd Floor  
Ottawa, ON K1A 0H3

Dear Mr. Pearson and Mr. Byer:

**Re: Marathon Platinum Group of Metals and Copper Mine Project  
-Review of Proponent's Responses to Supplemental Information Requests**

Thank you for your November 19 letter inviting Environment Canada (EC) to review Stillwater Canada Incorporated's responses to the supplemental information requests (SIRs) issued by the Joint Review Panel (JRP) on August 30, 2013. EC focused its review on the responses to SIRs 3, 4, 5, 6, 9, and 11 as they relate to our mandate and areas of expertise. We have considered the adequacy and technical merit of these responses as measured against the SIRs that were issued by the JRP.

EC's findings as described below are based on the proponent's characterization of tailings and waste rock, including their potential to generate acid and leach contaminants of potential concern, and their predictions in relation to groundwater. EC defers to Natural Resources Canada's (NRCan's) expertise in these areas, and will consider NRC's advice in the development of final conclusions on impacts of the project related to EC's mandate.

EC has not identified any major outstanding deficiencies with the proponent's SIR responses, and is of the view that sufficient information has been presented to proceed to public hearings.

In some cases, EC has identified considerations related to the adequacy and technical merit of the information responses that the JRP may find helpful in determining the next steps in the review process. For example, EC has asked for further information to clarify some of the proponent's responses. We recommend that this information be provided along with the other information the JRP has requested to be provided 30 days in advance of the public hearings. Attachment 1 contains a table that lists the SIR responses we reviewed and our related comments.

EC looks forward to further opportunities to contribute expert advice to the JRP for the ongoing environmental assessment of the proposed Marathon PGM and Cu Mine Project. If you have any questions regarding these comments, please contact Rob Dobos at (905) 336-4953 or [rob.dobos@ec.gc.ca](mailto:rob.dobos@ec.gc.ca), or Rob Read at (905) 336-4954 or [rob.read@ec.gc.ca](mailto:rob.read@ec.gc.ca).

Sincerely,

<original signed by>

Nardia Ali   
A/Regional Director  
Environmental Protection Operations Division – Ontario

Cc: Rob Dobos, EC  
Rob Read, EC  
Caroline Caza, EC  
Chris Doiron, EC

**Attachment 1 – Environment Canada (EC) Comments on Sufficiency and Technical Merit of Stillwater’s SIR responses**

SIR and Contributors	EC Comments
<p>SIR 3 - Acid Base Accounting</p> <ul style="list-style-type: none"> <li>• NRCan</li> </ul>	<p>EC did not contribute to the development of this SIR and defers to NRCan for their expertise to determine if the response is sufficient. However, we did review the response based on our water quality mandate and have the following points of clarification to ask about the technical merit of the response:</p> <ul style="list-style-type: none"> <li>• The proponent’s response to question 1c of SIR 3 states that “Other than sulphate, the sulfur content has little to no effect on leaching rates below a sulfur content of 1%S.” The basis for this conclusion has not been provided in the response. EC recommends that the proponent provide an explanation for this statement. In particular, we recommend that the proponent clarify if the conclusion related to sulphur content is based on lab or general observations.</li> <li>• The proponent’s response to question 3 of SIR 3 initially indicates that the updated estimate of Type 2 rock shows a reduction in quantity by 25%. Then the proponent indicates that the updated inventory of Type 1 rock in the MRSA is less than the original quantity proposed in the EIS. If Type 2 rock is decreasing in quantity, then Type 1 rock should increase in quantity. Both Type 1 and 2 rocks could only decrease in quantity if the total amount of mine rock produced is less than what the proponent had stated in the original EIS. EC recommends that the proponent provide a rationale for suggesting that “the updated inventory of Type 1 rock in the MRSA is less than the original quantity proposed in the EIS.”</li> </ul>
<p>SIR 4 - COPC Loading Rates and Water Quality</p> <ul style="list-style-type: none"> <li>• NRCan</li> </ul>	<p>EC did not contribute to the development of this SIR and defers to NRCan for their expertise to determine if the response is sufficient. However, we did review the response based on our water quality mandate and have the following points of clarification to ask about the technical merit of the response:</p> <ul style="list-style-type: none"> <li>• In Tables 1b, 1c, and 1d, the concentrations for aluminum and iron never change. EC recommends that the proponent be asked to provide a rationale for the consistent concentrations of these parameters over the different scenarios.</li> <li>• In Table 3, the COPC concentrations for the Scenarios are not the same as those in Year 11 of Tables 1b to 1d. EC recommends that the proponent be asked to provide a rationale for the difference in values.</li> </ul>
<p>SIR 5 - Hare Lake discharge</p> <ul style="list-style-type: none"> <li>• EC</li> <li>• MNR</li> </ul>	<p>EC believes the response provided by the proponent is sufficient; however, we have the following comments concerning the technical merit of the response with respect to the water balance, baseline and effluent predictions:</p> <p><u>Water Balance:</u></p> <p>EC contributed to the development of this SIR by way of our recommendation that information be presented to support the</p>

	<p>proponent's conclusion that the revised water balance for the Hare Creek watershed will not change the water quality predictions for Hare Lake. Unfortunately the document with details of the water balance analysis does not appear to be available. The document is listed in the reference section of the response to this SIR as: "<i>Knight Piesold Inc. (KPI). 2013. Technical memo to Stillwater Canada Inc. Process Solids Management Facility Solids and Water Balance.</i>" EC has requested this report from the proponent. We recommend that it be supplied for consideration at least 30 days in advance of the hearings.</p> <p><u>Baseline:</u></p> <p>EC is of the view that the baselines established for water quality, sediment quality, primary productivity, benthic invertebrate community, fish community, and fish tissue metal burdens are adequate.</p> <p><u>Effluent Predictions - Accounting for Blasting Residues:</u></p> <p>The potential for increased nitrogen inputs to the Hare Lake system based on residual blasting components is a concern as the lake is oligotrophic, which means it is nutrient poor and sensitive to nutrient inputs. Increased nitrogen inputs could lead to eutrophication and other changes in the system. Based on our review of SIR 5 and the EIS documentation that describes how effluent quality is predicted, it is unclear to EC how blasting residues have been factored into the effluent quality predictions. EC recommends that the proponent be asked to clarify how blasting residues were factored into the effluent predictions with an emphasis on the nitrogen concentrations predicted in the discharge to Hare Lake from the PSMF.</p>
<p>SIR 6 - Ground Water Recharge, Retention and the Effects of Climate Change</p> <ul style="list-style-type: none"> <li>• EC</li> <li>• NRCan</li> </ul>	<p>EC has the following comments concerning the technical merit of the water and moisture balance and climate change assessment.</p> <p><u>Water and Moisture Balance:</u></p> <p>The methodology used by the proponent to assess moisture balance follows normal practice and the results appear reasonable. However, the results of the assessment are dependent on the following assumptions that we believe should be brought to the attention of the JRP for consideration:</p> <ul style="list-style-type: none"> <li>• The results are based on an assumed runoff coefficient of 0.3 for the tailings and assumed infiltration measures (e.g. infiltration trenches) capable of infiltrating a substantial portion of snowmelt in the spring. EC notes that performance of infiltration trenches in the spring frozen/melt conditions would be difficult to predict. As such, performance monitoring of the infiltration strategies will be important in post-closure.</li> <li>• The moisture balance results are sensitive to estimated seepage rates and small variations in seepage rates would affect results. EC defers to NRCan for their expertise in hydrogeology to determine if the seepage rates used in the assessment are appropriate.</li> </ul>

Climate Change Assessment:

EC advises that the Proponent has not adequately addressed the impacts of possible climate changes on post-closure water balance for the PSMF. The projected increases in annual temperature by 2070 used by the Proponent (1.5°C based on estimates from a single Global Climate Model or GCM) are on the low end of projections provided by a broader range of GCMs. These models project increases in annual temperatures of as much as 6-10°C<sup>1</sup> for the region by the end of the 21<sup>st</sup> century, with greater warming projected for the winter season. Under these scenarios, there would be significant changes to the hydrological regime at the Project site. In the future, temperatures in March may be more like those currently experienced in April and temperatures in December may be more like those currently experienced in November. This would consequently reduce the period of snowpack accumulation (the period of snowpack accumulation may be reduced by 1/3). The difference in the change of potential evapotranspiration associated with a 1.5°C temperature increase compared to a 6-10°C temperature increase is also substantial. Given the higher temperatures projected for early spring and late autumn, future evapotranspiration will likely be higher overall. The proponent should have explicitly considered the impacts of a much larger temperature increase on water balance during the post-closure period. In particular, the proponent should have considered the possibility that this increase may lead to changes in the hydrological regime and evaporation that may alter spring infiltration and yield a longer dry period.

The estimates of water balance for dry conditions that the Proponent provides are based on precipitation extremes only (temperature changes are not explicitly considered) that are derived from the observed climate record. This is not a sufficient consideration for the post-closure period because climate over the post-closure period has been projected to be different from the current and past climate for the area. Furthermore, once established, drought conditions tend to persist and climate in this region exhibits decadal-scale variability that can yield persistent precipitation anomalies.

EC also notes that, in some instances, inconsistencies and a lack of supporting information made it difficult to analyze the Proponent's response to SIR 6. For example, we were unable to determine how the Proponent established that the dry November-June period they discuss is a 1/300 year event. We note that the values for November in Tables 4 and Tables 6 and Tables 5 and 7 are the same though one would expect smaller values in Tables 6 and 7 when considering the Proponent's discussion.

EC suggests that the Proponent's analysis should have considered the possible impact of extended, multi-year dry periods on water balance (not dry conditions solely in a single month, year or season) for the PSMF during the post-closure period.

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<sup>1</sup> The Ontario chapter (Chp. 6) of NRCAN's 2007 report "From Impacts to Adaptation: Canada in a Changing Climate" <http://www.nrcan.gc.ca/earth-sciences/climate-change/community-adaptation/assessments/132>, p. 238.

	<p>Water balance calculations should have explicitly considered scenarios that project higher temperature increases than the proponent has evaluated and the resultant changes in the hydrological regime.</p> <p>In the absence of a proper assessment of the effects of climate change on the water balance, there remains some uncertainty over predictions of effects on water quality over the long term closure period. As a result, EC advises that the Type 2 process solids may need to be routinely monitored in perpetuity to ensure moist conditions persist. If it is found that the Type 2 materials are drying out and could lead to acidic mine drainage, contingencies would need to be developed (e.g., pumping water to the PSMF) to replace the moist conditions in the zone where Type 2 process solids are to be placed in the PSMF.</p>
<p>SIR 9 - Environmental Design Storm</p> <ul style="list-style-type: none"> <li>• JRP</li> </ul>	<p>EC did not contribute to the development of this SIR; however, we have the following comments on the technical merit of the response:</p> <p>EC understands that the JRP requested that the proponent provide a revised analysis based on the Northwestern Ontario Flood of June 8-11, 2002. On page 6 of SIR 9, the proponent states that they have not been able to obtain hourly data for the June 2002 storm event from the Meteorological Service of Canada climate stations. As a result, the proponent has had to estimate the temporal distribution of the historical storm over the 48 hour period, which they have assumed to be two back-to-back synthetic SCS Type II 24 hour design storms. Given that peak flows and runoff volumes are both sensitive to a storm temporal distribution and that these variables are key to assess the appropriateness of the current PSMF design, a more robust method would have included an assessment of effects of the design storm assumption on results ( i.e. comparison of results for different synthetic storms). This information is not considered as essential for proceeding to the hearings; however; EC recommends that it be requested for inclusion with the additional information that the proponent has been asked to provide 30 days in advance of the hearings.</p> <p>EC is reviewing what information we possess on the temporal distribution of the June 2002 storm and may be able to provide some data to the proponent to strengthen their analysis. We will follow-up with the proponent by way of the JRP with any information we are able to provide in this regard.</p>
<p>SIR 11 - Cumulative Effects Assessment</p> <ul style="list-style-type: none"> <li>• EC</li> <li>• MNR</li> <li>• Pic Moberg FN</li> </ul>	<p>EC believes the response provided by the proponent is sufficient; however, we have the following comments to provide concerning the technical merit of the response concerning Boreal Woodland Caribou.</p> <p><u>Boreal Woodland Caribou</u></p> <p>The response includes a comprehensive list of projects within the LSA and RSA, along with a brief description of those projects. The Potential Cumulative Effects column states that there are potential cumulative effects from the project in combination with forest management planning (FMP) and other projects/activities; however the remainder of the table only</p>

discusses the effects of forestry during the operation and reclamation phases of the project.

With respect to the cumulative effects of forestry management activities, it is recognized that Stillwater has corresponded with the Ontario Ministry of Natural Resources (ONMNR) regarding wildlife habitat compensation (off-sets) and site reclamation while setting objectives for boreal woodland caribou habitat. These discussions should provide the opportunity for the combined effects of the development and closure of the mine site along with forest management activities to be appropriately evaluated.

With respect to cumulative effects with other projects, the proponent has stated in the Spatial Extent column of Table 2 that the “spatial extent of the footprint of the SCI and other reasonably foreseeable projects other than forestry is relatively small”, and has therefore dismissed the potential for cumulative impacts with other projects or activities. EC is, however, of the opinion that additional projects on the list, notably the mining exploration, Coldwell Wind Energy Project and East-West Tie Transmission Line Expansion, should not be dismissed as having no potential to result in cumulative effects. Linear disturbance is of particular importance with respect to boreal woodland caribou, and these projects are likely to increase the amount of linear disturbance in the area (for instance as a result of road infrastructure to construct and maintain these facilities), and may thereby influence the wildlife habitat compensation and reclamation plans for the Marathon Mine project. EC also expects that future planning on the Coldwell Wind Energy Project and East-West Tie Transmission Line Expansion projects will need to consider the residual effects of the Marathon project in conjunction with their predicted effects on Caribou habitat connectivity.

In addition to other projects/activities, EC suggests that any future mine exploration activities that may occur in adjacent areas associated with the Marathon Mine also have the potential to influence the characteristics (structure) and use of the area by wildlife, including areas that are intended to be reclaimed. Therefore, any development of reclamation and closure plans need to address the impact of potential future exploration activities, as well as any related forest management activities on adjacent land.