



Marathon Palladium Project Environmental Impact Statement Addendum

VOLUME 2 OF 2

6.0 Assessment of Potential Impacts

6.1 Assessment Framework

Prepared for:

GENERATIONPGM

Prepared by:



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Abbreviations

AIRs	additional information requests
CEA Agency	Canadian Environmental Assessment Agency
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
EA	Environmental Assessment
EIS	Environmental Impact Statement
GenPGM	Generation PGM Inc.
IR	information request
LSA	Local Study Area
RSA	Regional Study Area
SIR	supplemental information request
SSA	Site Study Area
VECs	Valued Ecosystem Component

6.0 ASSESSMENT OF POTENTIAL IMPACTS OF THE PROPOSED MARATHON PALLADIUM PROJECT

6.1 ASSESSMENT FRAMEWORK

This document is an update to the effects assessment provided in the original Environmental Impact Statement (EIS) (2012) and subsequent responses to IRs to verify the conclusions of the original assessment. Updates have been made in consideration of refinements to the Project description, updated baseline information, and changes in regulatory thresholds and policies.

To verify the original conclusions, the methods used to conduct the update to the environmental effects assessment have been developed in consideration of the EIS Guidelines (Appendix B of the EIS Addendum [Vol2]), and were informed by federal and provincial regulatory requirements. A Table of Concordance with the EIS Guidelines is provided in Appendix A of the EIS Addendum (Vol 2).

6.1.1 Overview of Approach

The environmental assessment approach incorporates the following key considerations:

- Reviewing, understanding and relying on the results of the original effects assessment provided in the original EIS (2012) and subsequent responses to information requests (IRs), additional information requests (AIRs) and supplemental information requests (SIRs)
- Identifying the components and activities of the Project, including any refinements made by Generation PGM Inc. (GenPGM)
- Predicting and evaluating potential changes to the environment and the likely effects on identified Valued Ecosystem Component (VECs)
- Proposing measures to mitigate adverse environmental effects, including a review of those originally proposed to verify applicability and to identify any other measures to address project refinements
- Determining whether residual adverse environmental effects (i.e., effects after the implementation of mitigation measures) are likely to occur and whether such residual adverse effects are considered significant
- Identifying the follow-up and monitoring programs to be implemented to verify both the accuracy of the effects assessment and the effectiveness of mitigation measures

Integral to the environmental assessment process was the consideration and incorporation of knowledge from the local community and from Indigenous communities, including traditional knowledge. This information that was acquired through public participation and engagement with Indigenous communities, including information that the Proponent had access to from Project-specific traditional land and resource

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use studies, has been incorporated into this EIS Addendum, while maintaining any confidentiality agreed to with communities.

The update to the assessment of environmental effects starts with the description of the Project (including any refinements made relative to the original project description) and the identification of existing environment which informs the identification of VECs, specifically those elements of the environment, as required by the EIS Guidelines (Appendix B of this EIS Addendum [Vol 2]), that could be affected by the Project and are of importance or interest to regulators, Indigenous communities and other potentially affected members of the public or interested parties. Potential Project interactions with the VECs are then identified, along with mitigation measures and management programs to avoid or reduce adverse effects, and the residual effects (those remaining after mitigation has been applied) are characterized. The residual Project-related environmental effects are characterized using specific criteria (e.g., direction, magnitude, geographic extent, timing, duration, frequency, reversibility, and ecological / socio-economic context). The significance of the Project-related environmental effects is then determined based on established criteria or thresholds, recognizing any changes to these criteria that may have occurred since completion of the original assessment.

The environmental effects assessment methods address both Project-related and cumulative environmental effects based on the Project description presented in Section 1.5 of the EIS Addendum (Vol 1) ([CIAR #727](#)). Project-related environmental effects, as defined in EIS Guidelines (Appendix B of the EIS Addendum [Vol 2]) may result from changes to the physical, biological, or human (social, health, cultural) environment that are caused by an activity arising as a result of the Project. Cumulative environmental effects are changes to the physical, biological, or human environment that are caused by the effects of an activity associated with the Project, in combination with the effects of other past, present, or reasonably foreseeable future projects or activities that have been or will be carried out.

As part of the engagement process for this assessment (see Chapter 5 of this EIS Addendum [Vol 2]), opportunities were provided for public participation to the local community in the form of sharing information on the Project and obtaining feedback to understand local interests and concerns; and gathering of traditional knowledge from participating Indigenous communities. Section 5(1)(c) of *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and the EIS Guidelines (Appendix B of the EIS Addendum) require specific consideration of environmental effects on Indigenous peoples. The Proponent engaged with potentially affected Indigenous communities early in the project planning process as part of the original EIS, and this engagement continued to inform this EIS Addendum. A more detailed discussion of the methods used to conduct the effects assessment, including the consideration of traditional knowledge, is provided below.

Throughout project planning, the Proponent has implemented design measures and proposed management strategies to avoid or reduce potential adverse effects of the Project. This environmental assessment employs a precautionary, conservative approach. Conservative assumptions were generally applied to overstate rather than understate potential adverse effects. Aspects of the project have been examined and planned in a careful and precautionary manner in order to avoid significant adverse environmental effects.

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The environmental effects assessment method used in the EIS Addendum is shown graphically in Figure 6.1-1. This method involved the following generalized steps:

- **Scope of Assessment** – Scoping of the assessment includes the selection of VECs and the rationale for their selection, which was completed in the original EIS (see Chapter 2, EIS Addendum [Vol 1]) ([CIAR #727](#)); identification of the potential environmental effects; description of measurable parameters; description of temporal and spatial boundaries (see Chapter 2, EIS Addendum [Vol 1]); and selection of thresholds of significance for residual effects. Engagement input, including comments from Indigenous communities informed the scope of assessment, as discussed in Chapter 2 (EIS Addendum [Vol 1]) and 5 (EIS Addendum [Vol 2]).
- **Existing Conditions** – Updates to existing (baseline) environmental conditions are established for each VEC. In many cases, existing conditions include those environmental effects that may have been or may be caused by other past or present projects or activities that have been or are being carried out. Project-specific information from indigenous communities has been considered in the existing conditions section of the VEC Chapters (Section 6.2 of this EIS Addendum [Vol 2]). Engagement input that informed the baseline field surveys is discussed in Chapter 5 of this EIS Addendum (Vol 2).
- **Assessment of Project-Related Environmental Effects** – The assessment of Project-related effects includes descriptions of how an environmental effect will occur or how the Project will interact with the environment, the mitigation and environmental protection measures proposed to reduce or eliminate the environmental effect, and the characterization of the residual environmental effects of the Project. This assessment is provided in the context of the original conclusions of the EIS (2012) and SIR responses, updated to reflect project changes, baseline and threshold updates. The influence of engagement on the identification of issues and the assessment process, and the consideration of Indigenous information and traditional knowledge is provided in each VEC Section (Sections 6.2.1 to 6.2.13 of EIS Addendum [Vol 2]).
- **Assessment of Cumulative Environmental Effects** – Cumulative environmental effects of the Project are identified in consideration of other past, present, or reasonably foreseeable future projects or activities that have been or will be carried out (updated project and activity inclusion list, see Section 6.6 of this EIS Addendum [Vol 2]), the identification of which has been updated to reflect changes since the original EIS (2012). The residual cumulative environmental effects of the Project in combination with the updated project and activity inclusion list are then evaluated, including the contribution of the Project to those cumulative environmental effects (as applicable).
- **Determination of Significance** – The significance of residual Project-related and residual cumulative environmental effects, is then determined, in consideration of significance criteria, which have been reviewed and where appropriate updated to reflect changes in regulatory standards, criteria and guidelines.
- **Assessment of Potential Accidents or Malfunctions and Effects of the Environment on the Project** – The assessment of accidents and malfunctions includes descriptions of the events that

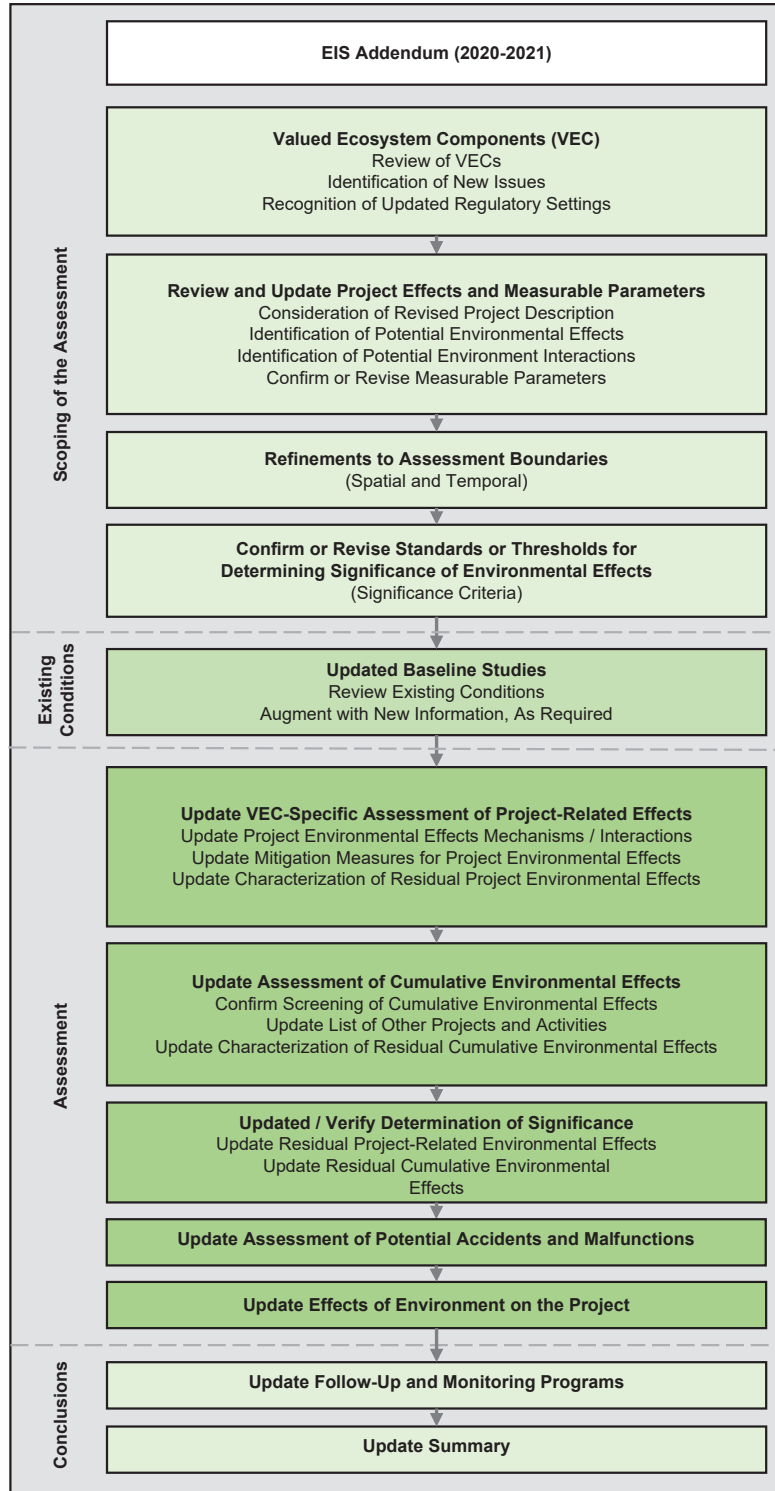
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may occur outside the normal planned function or activity of the Project, and mitigation and contingency plans to reduce or eliminate the risks of such events. Effects of the environment (e.g., extreme weather and effects of climate change) on the Project is not a VEC, but are considered in accordance with the EIS Guidelines (Appendix B of the EIS Addendum [Vol 2]) and as required under CEAA 2012.

- **Environmental Management and Monitoring Programs** – Environmental assessment follow-up and monitoring programs that are required to verify key environmental effects predictions or to verify the effectiveness of the key mitigation, as well as management plans to implement mitigation measures and procedures for the construction and operation of the mine, are proposed where appropriate and applicable. This item is discussed in Chapter 7 (Environmental Management System) of this EIS Addendum (Vol 2).

Original EIS & Supporting Documents (2012-2014)
 Supplemental Information Documents
 Responses to:
 · Information Requests
 · Supplemental Information Requests
 · Additional Information Requests



Notes
 This method includes the consideration of TK where appropriate.



Client/Project
 GENERATION PGM INC.
 MARATHON PALLADIUM PROJECT

Figure No.

6.1-1

Title

**Summary of Environmental
 Effects Methodology**

6.1.2 Identification of Potential Effects and Measurable Parameters

The assessment of potential effects begins with a description of the mechanisms whereby specific Project activities could result in a measurable change in the environment that may affect VECs. For the purposes of this EIS Addendum, one or more measurable parameter(s) are selected for the quantitative (where possible) or qualitative measurement of potential Project and cumulative effects. Examples of measurable parameters include the area of wildlife habitat that may be affected, or the expected number of workers required for Project construction. The amount of change in these measurable parameters is used to help characterize the environmental effects and to assist in evaluating their significance (see Section 6.1.4 of this report).

6.1.3 Characterization of Residual Project-related Environmental Effects

Following the analysis of environmental effects pathways and mitigation measures, the residual environmental effects (i.e., the environmental effects that remain after mitigation has been applied) are described. Characterizations of residual environmental effects include:

- **Direction** – the relative change compared to existing conditions (i.e., positive, or adverse).
- **Magnitude** – the amount of change in a measurable parameter or variable relative to existing conditions, defined for each VEC as low, medium, high, or other qualifier as deemed appropriate.
- **Geographic Extent** – the geographic area where the residual environmental effect of a defined magnitude occurs, defined for each VEC based on definitions of Site Study Area (SSA), Local Study Area (LSA), and Regional Study Area (RSA), as appropriate.
- **Timing** - considers when the residual environmental effect is expected to occur, where relevant and applicable to the VEC. Note that timing was not included in the original EIS.
- **Frequency** – how often the residual environmental effect might occur (e.g., one time or multiple times) in a specified time period.
- **Duration** – the length of time required until the residual environmental effect can no longer be measured or perceived (e.g., short-term, mid-term, long-term).
- **Reversibility** – whether a measurable parameter or the VEC can return to its existing condition or other target (such as a remediation target) after the Project activity ceases, including through active management techniques (e.g., habitat restoration).
- **Ecological/Societal Value** – considers unique characteristics or value of the area, a community and/or ecosystem, including biodiversity that may be affected by the Project and or whether the VEC is important to the functioning of an ecosystem or community of people (i.e., resiliency), and considers the importance with which it is perceived by Indigenous peoples, stakeholders, regulators, and/or the public.

These characterization criteria are not used to determine the significance of an effect, rather to provide a characterization of the effects as input to the explanation rationalizing the determination of significance. For each of the above characterizations, criteria are provided to rank the overall residual effect. As applicable, these criteria provide high, medium, low, and minimal terms (or equivalent) to describe the residual effect, in accordance with the EIS Guidelines (Appendix B of this EIS Addendum [Vol 2]). The term “negligible” is used to represent the minimal category for many characterizations. In other cases, as explained in the Characterization of Residual Effects table presented in every VEC section, categories may have been combined to less than 4 categories for clarity. Quantitative measures are used where possible.

The definitions of each term are typically standard across all VECs, with the exception of magnitude and timing that are VEC-specific (as described in each of the VEC assessment sections).

6.1.4 Thresholds and Benchmarks for Determining the Significance of Residual Environmental Effects

This document updates the findings of the original EIS (2012) and IR responses, including significance conclusions. The methodology used to determine significance in the original EIS was described in AIR #3. For the purposes of the EIS Addendum, the process for determining the significance of residual adverse environmental effects follows standard methodologies.

Criteria or established thresholds for determining the significance of residual adverse environmental effects are identified for each VEC. These criteria or thresholds are defined:

- using information obtained during stakeholder and Indigenous engagement
- using available information on the status and characteristics of each VEC
- using applicable regulatory documents, environmental standards, guidelines, or objectives where available
- using the professional judgment of the Environmental Assessment (EA) Project team

For each environmental effect, threshold criteria or standards beyond which a residual environmental effect is considered significant are identified. The thresholds are defined in consideration of federal and provincial regulatory requirements, standards, objectives, or guidelines as applicable to the VEC. These criteria or thresholds establish a level beyond which a residual environmental effect would be considered significant (i.e., an unacceptable change). Thresholds may be based on regulations, standards, resource management objectives, scientific literature, or ecological processes (e.g., desired states for fish or wildlife habitats or populations). Any changes that have been made to these significance thresholds are highlighted in the applicable VEC section (Section 6.2.1 to 6.2.13 of this EIS Addendum [Vol 2]).

Where thresholds are not set by guidelines or regulations, a threshold is developed using the measurable parameters established for the VEC. The thresholds define the limits of a change in a measurable parameter or state of the VEC beyond which it would be considered significant, based on resource

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management objectives, community standards, scientific literature, or ecological processes (e.g., desired states for fish or wildlife habitats or populations) along with professional judgement of the assessors. Quantitative thresholds are preferred; however qualitative thresholds for significance may be used where quantitative thresholds are lacking.

6.1.5 Potential Project-VEC Interactions

For each VEC, a table is used to identify potential interactions between the environment and proposed Project activities and components, based on the Project Description provided in Section 1.5 of the EIS Addendum (Vol 1) ([CIAR #727](#)). These tables identify, for each potential effect, the physical activities that might interact with the VEC to result in an identified effect. The comparison is assigned as follows:

- No interaction or associated environmental effects are anticipated. Further assessment is considered unnecessary.
- ✓ Interaction may occur or interaction could result in an effect of concern. Further assessment is warranted and is provided in the respective VEC analysis section (where applicable).

Any new interactions resulting from changes to the Project relative to what was presented in the original EIS (2012) have been identified. Justifications for the comparison of each interaction are provided in the corresponding VEC section in consideration of the nature of the interactions and the implementation of any applicable standards or measures. Where interactions have been deemed 'no interaction', there are no predicted environmental effects and therefore these interactions are not considered further in the EIS Addendum.

6.1.6 Assessment of Project-Related Environmental Effects

The potential environmental effects resulting from the interactions with the Project require further assessment for each individual VEC. As such, the assessment includes:

- identification of environmental effects pathways (i.e., identification of the means by which the Project could result in an environmental effect on the VEC)
- description of the mitigation measures proposed to avoid, reduce or control potential adverse environmental effects (which include restitution for any damage to the environment caused by those effects through replacement, restoration, compensation or any other means), including industry standards, best management practices and environmental protection measures that GenPGM will implement
- identification and characterization of the nature and extent of residual environmental effects (i.e., those environmental effects that remain after the proposed mitigation measures have been applied) through application of specific analysis criteria (i.e., magnitude, geographic extent, duration, timing, frequency, reversibility, and context)
- determination of significance

The specific analysis criteria used to identify and characterize residual environmental effects and determine their significance have been identified for each VEC. Where standards or established thresholds are available, the potential environmental effects of the Project on each VEC are evaluated against these standards or thresholds. Established thresholds reflect – but are not necessarily determinative of – the limits of an acceptable state for an environmental component based on resource management goals, scientific literature, or ecological processes.

A determination of the significance of any residual Project effect is included for each VEC. The level of confidence is provided for each determination of significance, which is typically based on professional judgment, prior experience, and scope and quality of available information. If an environmental effect is determined to be significant, there is further consideration of the likelihood of occurrence of that significant environmental effect.

Following the determination of significance, follow-up and monitoring measures are recommended as appropriate to verify environmental effects predictions or to assess the effectiveness of proposed mitigation measures. The EIS Addendum reviews the follow-up and monitoring program commitments from the original EIS (2012) and updates these as appropriate in Chapter 7 of this EIS Addendum (Vol 2).

6.1.7 Cumulative Effects Assessment

The cumulative effects assessment identifies and assesses Project residual adverse environmental effects that are likely to interact cumulatively with residual adverse environmental effects from other physical activities (past, present and reasonably foreseeable). The Project's contribution to the cumulative effect is then assessed. The approach used for conducting the cumulative effects assessment for the Project is informed by the *Operational Policy Statement for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* (CEA Agency 2016), *Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* (CEA Agency 2014), and the EIS Guidelines.

The effects of past and current projects contribute to baseline conditions upon which Project effects are assessed. Cumulative effects are described as those resulting from residual adverse effects from the Project combined with the effects of certain and reasonably foreseeable future projects and activities. Future projects that are reasonably foreseeable are those that (a) have obtained the necessary authorizations to proceed or are in the process of obtaining the required authorizations, or (b) have been publicly announced with the intention to seek the necessary authorizations to proceed. Note that other such projects or physical activities do not have to be located within the RSA, but their effects have to interact cumulatively with those of the Project.

Two conditions must be met to initiate an assessment of cumulative effects on a VEC, including:

- the project has residual effects on the VEC, whether such effects are significant or not, and
- the residual effects are likely to act cumulatively with residual effects of other past, present, or reasonably foreseeable future physical activities

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If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

An updated project and activity inclusion list (Section 6.6.4 of this EIS Addendum [Vol 2]) provides known past, present and reasonably foreseeable future projects and physical activities that could act cumulatively with the Project's residual environmental effects. Section 6.6.6 of this EIS Addendum (Vol 2) evaluates residual environmental effects of the Project in the context of residual effects from past, present and certain or reasonably foreseeable future physical activities (i.e., projects or activities) to determine the potential for cumulative effects.

For cumulative environmental effects, the determination of significance is made using the same VEC thresholds as for Project environmental effects. The assessment of significance of cumulative environmental effects includes an analysis of the Project's contribution to any cumulative effects that may be determined.