



Marathon Palladium Project Environmental Impact Statement Addendum

VOLUME 1 OF 2

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Executive Summary

Prepared for:

GENERATIONPGM

Prepared by:



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Abbreviations – Volume 1

°C	Degrees Celsius
AIRs	Additional information requests
ANFO	Ammonium-nitrate fuel oil
AOC	Area of Concern
APS	Anishinabek Police Service
AUT	Marathon, Marathon Airport, and Pukaskwa
B	Billion
BEV	Battery Electric Vehicles
BH	Borehole
CAAQ	Canadian Ambient Air Quality Standards
CAC	Criteria Air Contaminants
CEAA	Canadian Environmental Assessment Agency
CEAA, 2012	<i>Canadian Environmental Assessment Act, 2012</i>
Chl a	Chlorophyll a
CIAR	Canadian Impact Assessment Registry
cm	Centimetres
CP1	Collection Pond 1
CRA	Commercial, Recreational and Aboriginal
CSDs	Census Subdivisions
CSI	Crime Severity Index
Cu	Copper

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CWB	Community Well-Being
CWQG	Canadian Water Quality Guidelines
DEM	Digital Elevation Model
EA	Environmental Assessment
EA Act	Ontario <i>Environmental Assessment Act</i>
ECA	Environmental Compliance Approval
ECCC	Environment Canada and Climate Change
EDS	Environmental Design Storm
EIS	Environmental Impact Statement
ELC	Ecological Land Classification
EMS	Environmental Management System
FCEV	Fuel Cell Electric Vehicle
FMZ	Fisheries Management Zone
FRI	Forest Resource Inventory
GCDWQ	Guidelines for Canadian Drinking Water Quality
GDP	Gross Domestic Profit
GenPGM	Generation PGM Inc.
GHG	Greenhouse Gas
ha	Hectares
HDPE	High Density Polyethylene
HPGR	High Pressure Grinding Roll
IAA	<i>Impact Assessment Act</i>
IAAC	Impact Assessment Agency of Canada

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ICE	Internal Combustion Engines
IJC	International Joint Commission
IR	Information Request
JV	Joint Venture
kg	Kilogram
km	Kilometre
kV	Kilovolt
L	Litre
L/s	Litres per second
LGS	Layered Gabbro Series
LHIN	Local Health Integration Network
LIDAR	Light Detection and Ranging
LSA	Local Study Area
m	Metre
M	Million
M2W Line	Terrace Bay-Manitouwadge transmission line
masl	Metres Above Sea Level
MBR	Membrane Bioreactor
MDMER	Metal and Diamond Mining Effluent Regulations
MECP	Ministry of the Environment, Conservation and Parks
mg/L	Milligrams per Litre
MHSTCI	Ministry of Heritage, Sport, Tourism and Culture Industries
MIBC	Methyl Isobutyl Carbinol

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mm	Millimetre
MNRF	Ministry of Natural Resources and Forestry
MOE	Ministry of the Environment (now MECP)
MRSA	Mine Rock Storage Area
MTO	Ministry of Transportation
MVA	Mega Volt Amp
MW	Megawatt
NA	Not Applicable
NAD	North American Datum
NAG	Non-acid generating
NAPS	National Air Pollution Surveillance
NFMC	Nawiinginiima Forest Management Corporation
NH ₃	Ammonia
NHIC	Natural Heritage Information Centre
Ni	Nickel
NPP	Navigation Protection Program
NRCan	Natural Resources Canada
O. Reg.	Ontario Regulation
ODWQS	Ontario Drinking Water Quality Standards
OPP	Ontario Provincial Police
P ₁₀₀	100% passing (maximum material size)
P ₈₀	80% passing (size range comprising 80% of material)
PAG	Potentially Acid Generating

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PAX	Potassium Amyl Xanthate
PCB	Polychlorinated Biphenyls
Pd	Palladium
PGM	Platinum Group Metals
pH	Potential of Hydrogen
ppm	Parts per Million
PSMF	Process Solids Management Facility
PTTW	Permit to Take Water
ROM	Run of Mill
ROW	Right-of-Way
RSA	Regional Study Area
SAG	Semi-Autonomous Grinding
SIDs	Supporting Information Documents
SIRs	Supplemental Information Requests
SME	Site Mixed Emulsion
SSA	Site Study Area
SWM	Stormwater Management
TDS	Total Dissolved Solids
ToR	Terms of Reference
TSX	Toronto Stock Exchange
USG	US Gallon
UTM	Universal Transverse Mercator
VA	Voluntary Agreement

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VC	Valued Component
VEC	Valued Ecosystem Component
w/w	percent concentration weight / weight
WMP	Water Management Pond
WSC	Water Survey of Canada
WTP	Water Treatment Plant

EXECUTIVE SUMMARY

Generation PGM Inc. (GenPGM) proposes to develop the Marathon Palladium Project (the “Project”), which is a platinum group metals (PGM) and copper (Cu) mine and milling operation near the Town of Marathon, Ontario. The Project is being assessed in accordance with the *Canadian Environmental Assessment Act* (CEAA, 2012) and Ontario’s *Environmental Assessment Act* (EA Act) through a Joint Review Panel (the Panel) pursuant to the *Canada-Ontario Agreement on Environmental Assessment Cooperation* (2004).

The Joint Review Panel process was put on hold by Stillwater Canada Inc. (the original Proponent of the Project) and ultimately postponed in 2014. Since 2014, the Project has been acquired by GenPGM and the Panel review process to assess the potential effects of the Project has resumed. This report has been prepared as part of an addendum (Volume 1 of 2) to the original EIS (2012) to verify and update the original assessment of environmental effects for the Project.

THE PROJECT

GenPGM proposes to construct, operate and decommission a new platinum group metals (PGM) and copper (Cu) open-pit mine and milling operation approximately 10 km north of the Town of Marathon, Ontario. An updated Mineral Resource Estimate for the Project effective January 6, 2020 was prepared by P&E Mining Consultants Inc. (P&E, 2020). The Mineral Resource Estimate reported a total Measured and Indicated Mineral Resource Estimate of 179.2 M tonnes and an Inferred Mineral Resource Estimate of 0.7 M tonnes, for a total 179.9 M tonnes. The Project has an average process rate of 25,200 tonnes/per day, and an estimated operating life of 12.7 years. During operation, the mine workforce is anticipated to be 375 workers, with a construction workforce ranging from approximately 450 to 550 people.

The Marathon Palladium ore body contains deposits of palladium, platinum, and rhodium (PGMs) and copper (Cu). PGMs are rare and precious metals essential in automotive manufacturing (to convert harmful air pollutants to relatively harmless emissions). They are also used in the manufacturing of electronics, chemical refinement, dentistry, and jewelry, among other uses. Copper is one of the oldest metals mined by humans and is used for multiple purposes, including electrical uses (i.e., power transmission and generation, building wiring, telecommunication, and electrical and electronic products). Copper is a key element necessary for the expansion of electric and fuel-cell vehicles and is expected to face critical supply shortages in the near future as that developing industry begins to expand into the mainstream. Furthermore, a large proportion of both PGMs and copper supply worldwide is sourced from countries with well-known geopolitical and/or developmental issues, making uninterrupted supply from these regions something that cannot be taken for granted. This increasing demand for PGM and copper results in the need for a North American source of these materials.

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The Project will consist of the following key mine components:

- Three open pits (North, Central, and South Pits)
- Ore handling facilities, including a Crusher and conveyor system
- Process Plant for the processing of ore and recovery of minerals and metal recovery
- Concentrate handling, storage and transportation
- Mine Rock Storage Area (MRSA)
- Process Solids Management Facility (PSMF)
- Water Management System, including Water Management Pond, Stormwater Management (SWM) Pond and various water pipelines
- Water Treatment Plant (WTP)
- Site Access Road and internal road network
- Electrical Transmission Line and substation
- Explosives Magazine and Site Mixed Emulsion (SME) Facility
- Aggregate Plant and Concrete Batch Plant
- Maintenance, Administration and On-Site Support Facilities
- Off-site Accommodations Complex
- Off-site Concentrate Rail Load-out facility
- Sample Prep / Assay Lab

The Project will be implemented in three phases, as follows:

- Phase I – Site Preparation and Construction
- Phase II – Operations
- Phase III – Decommissioning and Closure

ENVIRONMENTAL SETTING

The Project is proposed within an area characterized by relatively dense vegetation, comprised largely of a birch and spruce-dominated mixed wood forest. The terrain is moderate to steep, with frequent bedrock outcrops and prominent east-west oriented valleys. Several watercourses and lakes traverse the area, with drainage flowing either eastward to the Pic River or westward to lakes or streams draining into Lake

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Superior. The climate of this area is typical of northern areas within the Canadian Shield, with long winters and short, warm summers.

The Project is proposed on Crown Land, with GenPGM holding surface and mineral rights for the area. Regional land use activities in the area include hunting, fishing, trapping and snowmobiling, as well as mineral exploration (and mining) and forestry. Other localized land uses in the area include several licensed aggregate pits, the Marathon Municipal Airport, the Marathon Landfill, a municipal works yard, and several commercial and residential properties.

The primary industries in the area have historically been forestry, pulp and paper, mining, and tourism. Exploration for copper and nickel deposits in the area extend as far back as the 1920s. A large copper-PGM deposit was discovered in 1963. Advanced exploration programs have continued across the area since then. These programs have been supported by various feasibility studies to confirm the economic viability of extracting the deposits.

Several First Nation and Métis groups were originally identified as having a potential interest in the Project based on asserted traditional territory, Treaty Rights and proximity to the Project. Traditional uses which they have identified as occurring in the area include hunting, trapping, fishing, and plant harvesting, with activities generally focused on the larger waterways, such as the Pic River, Bamooos Lake, and Hare Lake.

To update the effects assessment, a series of baseline update reports were prepared for each Valued Ecosystem Component (VEC) (under separate cover) and submitted to the Impact Assessment Agency of Canada (IAAC) on November 13, 2020 (CIAR# 722). These updates informed the preparation of an updated description of the environmental setting for the Project and the broader surrounding area to provide a contextual description of the geographic area as a whole, focusing on components of the environment that reasonably may be affected by the Project.

PROJECT CHANGES

Although most of the planning phase for major mine components was completed between 2009 and 2014, GenPGM has implemented a series of refinements to the Project to improve the efficiency of mining operations, address changes to mining practices, and to reduce potential effects to the environment. Many of these refinements were also informed through the comments received during consultation and engagement activities for the Project. The following is a list of the key changes and refinements to design of the Project:

- Open Pits – Reconfiguration of the Open Pits, albeit within the same general location, to enhance Project economics and provide greater access and efficiency to mine the ore body
- MRSA – Refinement of the footprint of the MRSA by storing mine rock within the open pits during later stages of mine life, which reduces the overall footprint of the MRSA and alterations within Subwatershed 108 that drains to the Pic River

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- PSMF – Reconfiguration of the PSMF to accommodate increased mine production and segregation and storage of Type 2 process solids and mine rock and reduce the amount of contact water in Cell 1 and Cell 2; although this results in a slightly larger footprint
- Process Plant – Westward relocation of the Process Plant placing it more centrally within the mine site, providing a more efficient mining operation, as well as changes to the Process Plant operation to improve mineral recovery, create the potential to produce other concentrates, and improve environmental management at the site
- Access Road – Realignment of the proposed access road to increase separation from the Pic River, based on feedback received from Indigenous communities, and to better align with the revised location of the Process Plant, which also allows for the addition of the SWM Pond to collect runoff from the Process Plant area, Truck Shop / Warehouse area, Laydown area and Aggregate site.
- Explosives – Revised the technology used to produce emulsion explosives at the site, resulting in a modified storage and manufacturing facility, which allows for the safer use of explosives on site
- Crusher – Relocation of the Crusher to the west side of the open pits to reduce the length of on-site haulage routes, thereby reducing fuel usage and improving site traffic circulation, while simplifying the management of contact water and eliminating the potential for runoff to the Pic River
- Aggregate Plant Site – Relocation of the Aggregate Plant and Concrete Batch Plant eastward within a depression to the east of the Process Plant, which reduces potential acoustic impacts and facilitates the management of stormwater runoff
- Transmission Line – Refinement to the alignment of the transmission line eastward to optimize its location and shorten the overall length of the corridor required to connect to the existing transmission line
- Hare Lake Discharge Corridor – Realignment of the discharge pipe from the PSMF to Hare Lake to the upstream side of the PSMF perimeter road located in Subwatershed 105 to protect Subwatershed 106 if an unplanned event were to occur
- Mine Schedule – Revised mining schedule to allow for the North Pit to remain operational for the life of the mine, while sequentially mining the South Pit (within the first six years of operation) followed by the Central Pit, which allows for the storage of Type 2 materials and Type 1 waste rock within these pits (eliminates rehandling of material) to improve Project economics and facilitate mine closure

ALTERNATIVES ASSESSMENT

An update to the assessment of “Alternatives To” the Project has been prepared to incorporate GenPGM’s perspectives as the Proponent of the Project. GenPGM has identified that there is a business case that supports the Project based on market demand for PGMs, the critical role of PGMs and copper in technologies that will be instrumental in the transition towards renewable energy, and the Project fit within GenPGM’s corporate objectives.

An update to the “Alternative Means” of carrying out the Project has also been prepared that focuses on project components for which alternatives have been identified or for which changes have been made relative to the Project design presented in the original EIS (2012) and corresponding information request (IR) responses, specifically in regard to the site access road, transmission line and waste storage strategy. An alternate alignment for the proposed site access road based on aligning more directly with the location of the more centralized Process Plant in the reconfigured mine plan proved to be preferred for its reduced potential impacts on fish and species at risk (SAR) and reduced costs relative to the originally proposed alignment. However, both alternative alignments were considered acceptable.

While an alternate potential connection location and corresponding alignment for the proposed transmission line was identified, the original proposed connection to the Terrace Bay-Manitouwadge transmission line (M2W Line) was preferred over a potential connection to the East-West Tie. The shorter length, straighter orientation, and technical feasibility (i.e., availability of property and potential to avoid interaction with existing infrastructure) of the proposed transmission line is preferred over an alternate connection to the East-West Tie. While both alternative connection locations and corresponding alignments were considered acceptable, the connection to the East-West Tie would be more costly, requiring additional design, and requiring additional agreements to construct the transmission line on properties outside of the care and control of GenPGM.

The proposed mine storage strategy for the Project remains consistent with preferred alternatives identified in the alternatives assessment developed for the original EIS. Type 1 mine rock would be stored in the Option 4 location along the east side of the open pits. Type 2 mine rock would be stored in the base of the South Pit (Option 2) and within the PSMF (Option 3). One temporary ore stockpile would be maintained adjacent to the Primary Crusher west of the Central Pit (similar location as Option E). The Combined Storage Area PSMF would provide storage for all of the Type 1 process solids and most of the Type 2 process solids. Type 2 process solids would be deposited in the Central Pit during the last three years of operations. The mine waste storage strategy allows for all Type 2 (PAG) material to be encapsulated by Type 1 (NAG) material.

SCOPE OF THE EIS ADDENDUM

Information about the Project and the environment within which it is proposed was considered in preparing the EIS Addendum. This report has been prepared as an addendum to the original EIS (2012) to verify and update the original assessment of environmental effects. The report relies on the original effects assessment from the EIS and responses to the IRs, additional information requests (AIRs), and supplemental information requests (SIRs) submitted to the Panel. The update pertains to addressing relevant 'changes' that have occurred since the original assessment that may alter previous conclusions, including:

- Changes to the characterization of existing baseline conditions since previous baseline studies
- Changes to applicable criteria, standards, and/or thresholds for determining the significance of potential residual environmental effects
- Changes to the Project, including refinements to project components and activities implemented by GenPGM

To scope the assessment of potential effects, VECs were identified in the original EIS (2012) as a means of focusing on those elements that have been deemed to be of some importance. For the purposes of the EIS Addendum, no changes to the identified VECs have been made, although some re-organization has occurred to group similar VECs throughout the assessment in order to simplify and clarify the discussion of potential effects. The following VECs have been identified:

- Atmospheric Environment
- Acoustic Environment
- Water Quality and Quantity
- Fish and Fish Habitat
- Terrain and Soils
- Vegetation
- Wildlife
- Species at Risk
- Socio-Economic Environment
- Human Health
- Physical and Cultural Resources
- Indigenous Considerations

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Spatial and temporal boundaries were confirmed to provide a frame of reference to inform the identification and assessment of effects. The temporal boundaries identify when an environmental effect may occur in relation to specific Project activities and/or components. The temporal boundaries are based on the timing and duration of Project activities (i.e., phases) and the nature of the interactions with each individual VEC. Spatial boundaries have been established to assist in the quantification of environmental effects by framing the geographic extent of the assessment. Three spatial scales were considered in the EIS, including (a) the Site Study Area (SSA), (b) the Local Study Area (LSA) and (c) the Regional Study Area (RSA). While the SSA reflects the direct footprint of the Project, both the LSA and RSA vary among VECs depending on the nature of the potential environmental effects, and reflect the geographic range over which the Project's potential environmental effects may occur.

EIS ADDENDUM ORGANIZATION

This report is Volume 1 of 2. Volume 1 of the EIS Addendum contains the following:

- An update on the Proponent, process and regulatory framework, an update on the need for and purpose of the Project, and an updated description of project components, activities and timing of the Project
- An update on the general factors considered in the assessment, including factors used to characterize residual environmental effects, description of the VECs, and the spatial and temporal boundaries for the assessment
- An update on the assessment of Project alternatives and alternative means of carrying out the Project
- An overview of the physical, biological, and social environmental setting within which the Project is proposed

Volume 2 of the EIS Addendum will contain the following:

- An update on consultation and engagement activities and outcomes with Indigenous communities, agencies, municipalities, and the public since 2014
- An update and/or verification of the significance of residual environmental effects, including cumulative effects, in consideration of updates to baseline conditions, significance thresholds and Project refinements
- An update of the proposed Environmental Management System, including follow-up and monitoring programs, to be implemented during operations and closure of the mine
- An updated Table of Commitments, including mitigation measures, to be implemented based on commitments made in the original EIS (2012), various IR responses, and any new commitments resulting from the EIS Addendum
- An updated summary on the findings and conclusions of the EIS Addendum