

EXECUTIVE SUMMARY

The Project

Generation PGM Inc. (GenPGM or the Proponent) is proposing to build and operate an open pit platinum group metal and copper mine and milling operation located approximately 10 km north of the Town of Marathon, Ontario. The Proponent could also produce magnetite concentrate containing vanadium if it becomes economically feasible.

Components for the Marathon Palladium Project (the Project) include three open pits, an onsite ore processing facility, a 115 kV transmission line, an access road, a mine rock storage area, a process solids management facility, a water management system, and an explosives production plant and associated storage area. Offsite infrastructure includes an employee accommodation complex and a potential rail load-out facility.

The north pit would be mined throughout the 12.7-year operating life of the Project, whereas the central and south pits would be mined at various times to supplement ore production. Approximately 25,200 tonnes of ore would be processed into concentrate per day. Concentrate would be delivered to a third-party facility for further processing either by truck or by train via the rail load-out facility.

The Proponent would undertake decommissioning and reclamation activities for a period of two to five years after operations, and would continue to implement a Closure Plan and to monitor restoration success for another 40 to 45 years.

This Summary

The Panel completed their environmental assessment of the proposed Project in accordance with the requirements of their Terms of Reference, the *Canadian Environmental Assessment Act 2012*, and Ontario's *Environmental Assessment Act*. This summary contains key findings from the report.

Need, Purpose and Alternatives

The Panel heard that platinum group metals (including palladium, platinum, and rhodium) are essential metals in the manufacture of automotive catalytic converters. GenPGM indicated that there is a limited supply of these metals and that the expectation is shortages will continue as more countries introduce more stringent vehicle exhaust controls. GenPGM stated that copper, which would also be mined, is a critical mineral for electric vehicles and associated charging infrastructure, and for the growth of renewable energy infrastructure.

The Proponent's economic analyses indicated that with the predicted grade, tonnage, mining and milling methods planned and with anticipated closure costs, the mine would be profitable and would provide both jobs and economic stimuli to an area which has seen some setbacks due to closures or scaling back of major industries. The Proponent estimated that the Project would generate approximately 430 full time jobs for an operational Project lifespan of 12.7 years, with expected spin-off increases in local employment along with net economic benefits to the Town of Marathon, Ontario and Canada from the Project.

The Panel concludes that the Proponent adequately demonstrated the purpose of and need for the Project as well as the assessment of alternatives associated with Project components. This information was supported with a feasibility study that demonstrated the economic viability of the Project.

Aquatic Environment

The Panel considered the environmental effects of the Project on the geology of the site, groundwater quantity and quality, surface water quantity and quality, and fish and fish habitat, including fish species at risk.

GenPGM performed a geochemical characterization of mine materials to understand the potential for acid generation and metal leaching, and how these could alter water quality near the Project site, either in effluent discharge or natural site drainage. The Proponent stated that 10 to 15% of mine rock has the potential for acid generation and metal leaching. These materials would be segregated and permanently stored in a saturated state to prevent exposure, oxidation, and acid generation either in the process solids management facility or the open pits in the closure stage. The Panel concludes the Proponent's approach to the geochemical characterization was satisfactory.

GenPGM modelled potential Project effects to groundwater quantity and quality, noting that no groundwater users are located near the Project. They indicated that groundwater seepage from mine facilities is not predicted to discharge to surface water for over one hundred years. The Proponent committed to monitoring changes in groundwater quantity and quality at a series of wells, including known drinking water wells along Highway 17. The Panel concluded the Project is not likely to cause a significant adverse environmental effect on groundwater quality or quantity.

The Proponent modelled the potential Project effects to surface water quantity. Hare Lake would see water level increases within the range of natural variation while flow changes to the Biigtig Zibi would be less than 1%. Angler Creek would experience flow decreases during construction and operations, as it would be largely overprinted by the process solids management facility. The Panel notes this effect would persist for at least 20 years. The Panel recommends that the Proponent engage with government agencies and Indigenous groups to identify feasible options to supplement flow to Angler Creek during construction and

operations. The Panel concludes the Project is likely to cause a significant adverse environmental effect on the hydrology of Stream 6 (Angler Creek).

GenPGM indicated the site water management would see all contact water collected and treated as required during the construction and operations phases, before release to Hare Lake. Water quality modelling revealed that contaminant concentrations in mine effluent would meet the water quality discharge limits considered protective of aquatic biota and/or human health. The Proponent stated the Project would not be a direct source of mercury, and added that indirect sources such as land clearing could be adequately mitigated or treated, and government agencies agreed. The Proponent also stated water would continue to be managed during active closure and post-closure until water quality is acceptable and flow is returned to a natural state.

Biigtigong Nishnaabeg stated that any increase of methylmercury in waterbodies would be unacceptable. The Panel understands that phosphorous and sulphate discharges from the Project could lead to anoxic conditions and increase the presence of methylmercury in local waterbodies. GenPGM proposed a suite of mitigation measures and a follow-up program to manage phosphorous and sulphate in effluent. The Panel is satisfied that the Proponent would have the capacity to treat water quality in all Project phases to acceptable levels prior to release in the environment. The Panel concludes that, if the recommended mitigation measures and monitoring and follow-up programs are implemented, the Project is not likely to cause a significant adverse environmental effect on water quality.

GenPGM described the main fish communities in waterbodies including Hare Lake, Hare Creek, the Biigtig Zibi, and Angler Creek. The Proponent identified five potential effects to fish and fish habitat as a result of the Project: fish mortality, change of fish habitat, change in water quantity (flow), change in water quality, and change to the benthic invertebrate communities. These effects would be caused by detonation of explosives near water, overprinting of water bodies, flow reduction to creeks and changes in water quality. The Proponent estimated that the Project would result in a direct and indirect loss of 12.33 ha of fish habitat and proposed offsets and compensation for the predicted Project effects. The Panel concludes that, if the recommended mitigation measures and follow-up programs, were implemented, and offsetting occurs, the Project is not likely to cause a significant adverse environmental effect on fish or fish habitat, including two species at risk: Northern Brook Lamprey and Lake Sturgeon. The Panel concludes, however, that as a result of a change in flow in the Biigtig Zibi the Project is likely to cause a significant adverse cumulative effect on Lake Sturgeon habitat.

Terrestrial Environment

The Panel considered environmental effects relating to terrain and soils, vegetation, wildlife and their habitat, including species at risk.

GenPGM described the Site Study Area as comprised primarily of mixedwood old growth forest with limited amounts of other vegetative ecosites. During site preparation and construction, all 1,116 ha of vegetation would be removed. The terrain would be altered, particularly during operations, and the soils would be stockpiled for subsequent site rehabilitation. GenPGM committed to preparing a regulatory Closure Plan that would restore the site to a self-sustaining ecosystem including areas of even-aged conifer dominated forest. The Proponent acknowledged that reclamation would take over 40 years and the site would host different species and landscape features than what is currently present. The Panel concludes that, although the existing vegetation would be completely removed, the Project is not likely to cause a significant adverse environmental effect on terrain, soils, and vegetation due to the abundance of similar vegetation communities in the region.

The Panel finds that while the loss of vegetation would negatively affect wildlife through habitat loss, mammals and birds were not habitat-limited in the region and would relocate during construction and operations. Amphibian habitat is abundant in the region and amphibians would be relocated from the Site Study Area by the Proponent. The closure landscape over time would restore some of the habitat lost due to the Project. Additionally, the Panel finds that the measures to reduce mortality risk to birds and mammals to be sufficient and recommended the Proponent conduct follow-up monitoring and adaptive management to verify the success of these measures. The Panel concludes that the Project is not likely to cause a significant adverse environmental effect on wildlife, amphibians, and migratory birds that are not listed species at risk.

The Proponent reported potentially suitable habitat occurs for about 15 federal or provincial species at risk in the Regional Study Area, and 10 species were confirmed in the Site Study Area and/or Local Study Area. The Project could affect these species at risk due to changes on the landscape associated with activities during the preparation, construction, operations, and active closure, and post-closure of the Project. These effects include habitat loss, sensory disturbance and effects from dustfall, and increased risk of direct mortality.

The Panel concludes that the Project is likely to cause a significant adverse effect on Little Brown Myotis and Northern Myotis, which are identified as endangered species federally and provincially, and on their respective habitats. The Panel concludes that, if the recommended mitigation is implemented, the Project is not likely to cause a significant adverse environmental effect on Canada Warbler, Rusty Blackbird, Eastern Wood Pewee, Olive-sided Flycatcher, Evening Grosbeak, Eastern Whip-poor-will and Common Nighthawk, Monarch Butterfly and Yellow-banded Bumble Bee. The Panel concludes that the Project is not likely to have a residual adverse environmental effect on Bald Eagle and Peregrine Falcon. The Panel also concludes that

the Project, in combination with other projects and activities is likely to cause a significant adverse cumulative effect on Little Brown Myotis, Northern Myotis and Eastern Whip-poor-will.

The Project is within the Lake Superior Coastal Range for Boreal Woodland Caribou, which is a 10 kilometre wide linear range along the north shore, including offshore islands where most animals are located. Caribou are less resilient than other ungulates. GenPGM reported the overall population in the Lake Superior Coastal Range dramatically declined within the last decade. GenPGM added there is no evidence of caribou use within the Site Study Area, the potential for caribou to interact with the Project is very low, and the mainland population could become locally extirpated before the Project is operational. Government agencies confirmed that all areas of the Lake Superior Coastal Range, including the Site Study Area, are considered critical habitat that could support the species.

GenPGM reported the primary Project effect on caribou would be the reduced connectivity with the Lake Superior Coastal Range and adjacent ranges. Other potential effects include the loss of potential habitat from clearing of the Site Study Area and sensory disturbances. GenPGM considered that no significant environmental effects would occur to caribou, particularly on habitat connectivity or critical habitat, however government agencies stated that the Proponent may have underestimated the effects to caribou. The Proponent presented mitigation and offsetting measures intended to reduce the effects of the Project on caribou, although government agencies generally believed that these actions would not be sufficient to offset the effects of the Project on caribou, especially with regard to habitat connectivity. Biigtigong Nishnaabeg and Michipicoten First Nation shared their own recovery strategies for caribou, and expressed an interest in a leadership role in recovery efforts.

The Panel is of the view that, considering the status of the species, and its vulnerability to extirpation, any additional effects have the potential to be severely detrimental. Despite the recommended mitigation measures outlined above, much uncertainty remains about the effects of the Project on caribou. Therefore, in applying the precautionary principle, the Panel concludes the Project is likely to cause a significant adverse effect on critical habitat for caribou, as well as on connectivity of habitat within the Lake Superior Coastal Range.

Atmospheric and Acoustic Environment

The Panel considered environmental effects of the Project relating to air quality, greenhouse gas emissions, and acoustics.

Project activities would produce a change in air quality from contaminants and dustfall. Sources include fuel combustion from vehicles and heavy equipment, travel on unpaved haul routes, and material movement and processing. Air quality dispersion modelling predicted there could be exceedances of air quality criteria or standards at special receptors in the Local Study Area, during the construction and operations phases. GenPGM stated the air quality dispersion modelling was conservative and that the model effectively overestimated the environmental

effects, and expert government departments generally agreed. The Proponent committed to implementing mitigation measures as well as a monitoring and follow-up program for air emissions, including a best management plan for dust. The Panel concludes the Project is not likely to cause a significant adverse environmental effect on air quality.

The Project would be a source of greenhouse gas emissions, the primary contributor to global climate change, from the combustion of fuels in vehicle engines, diesel generators, and other mining equipment. GenPGM stated the Project would emit 1,677.5 kt of CO₂e over its lifecycle, which represents a small fraction of provincial and national emissions. GenPGM reported the Project would perform well in terms of emissions intensity, when compared to similar mines in Canada and internationally. The Panel concludes the Project is not likely to cause a significant adverse environmental effect on greenhouse gases or climate change.

The Project's construction and operations activities (including blasting), traffic, and rail load-out activities would generate noise and vibration. GenPGM predicted that the Project would not result in exceedances above provincial guidelines for noise and vibration levels or federal guidelines for health effects. The Proponent committed to implementing mitigation measures to limit Project-related noise and to reduce or restrict noise at nighttime. They would also implement follow-up and monitoring measures to notify residents before noise-generating activities and to address any noise complaints or noise exceedances. The Panel concludes the Project is not likely to cause a significant adverse environmental effect on the acoustic environment.

Human Environment

The Panel considered the environmental effects of the Project relating to human health, socio-economics, land and resource uses, navigation, and archaeology and heritage resources.

Human Health

GenPGM assessed whether the Project could cause changes in human health from environmental effects on air quality, water quality, country foods, noise, and electromagnetic fields. The Proponent did not expect human health effects from surface water, as concentrations of contaminants were not predicted to exceed water quality benchmarks that are protective of human health. They concluded there would be no health effects from the Project related to noise, consumption of drinking water, or consumption of country foods.

GenPGM conducted a human health risk assessment for health effects from changes to air quality, based on exceedances of relevant regulatory criteria or notable deviations from background conditions. They assessed cancer risks quantitatively, and non-cancer risks qualitatively and reported that the exposure to each of these contaminants from Project activities would be below levels associated with health risks.

Indigenous groups were concerned with the potential for methylmercury to accumulate in fish tissue, as there are current fish consumption advisories in waterbodies near the Project site. GenPGM committed to implementing mitigation measures, as well as a monitoring and follow-up program, to monitor mercury levels and manage Project effects on country foods.

The Panel concludes the Project is not likely to cause a significant adverse environmental effect on human health. However, the Panel is of the view that any incremental increase in mercury levels in local waterbodies could contribute to existing adverse cumulative effects on human health. Although it is unlikely, if, despite mitigation, mercury levels in fish were to increase due to the Project, the Panel concludes that the Project, in combination with other projects and activities, would cause a significant adverse cumulative effect on human health.

Socio-economics

GenPGM stated the Project would result in employment opportunities and income, government revenue, and promote economic and business development, particularly in the construction and operations phases of the Project. They estimated there would be an average of 430 to 550 workers during the construction phase and 430 employees during the operations phase. The Panel concludes that there are no significant adverse effects on employment and the economy and that, if the recommended mitigation measures and follow-up programs are implemented, the Project is likely to have a positive effect on the economy and employment.

There is currently a very limited supply of housing in the Marathon area for transient workers moving into Marathon. The Proponent stated that they would build an accommodation complex to house workers. Additional housing developments are planned and under construction in Marathon. The Town expressed confidence that there is sufficient capacity in infrastructure and services to accommodate workers and their families. This would be augmented by the Proponent who would provide employees with physical, mental, and social health services.

Biigtigong Nishnaabeg has constraints on almost all social services within their community and a long wait list for housing. The Panel was advised that there would be community members that would want to return to the reserve but would not be able to in light of the absence of sufficient services and housing. Biigtigong Nishnaabeg stated there is clear evidence in the literature of how resource extraction projects that attract large groups of out-of-town men for employment have contributed to increases in violence, assaults, discrimination, unplanned pregnancies, drug use, and safety concerns for women and children in Indigenous communities. GenPGM has committed to cultural sensitivity training and the establishment of a code of conduct. The Panel believes this is best developed in collaboration with Indigenous groups. The Panel concludes the Project is not likely to cause significant adverse effects on the socio-economic environment with regards to off reserve accommodation, infrastructure and non-Indigenous services.

The proposed Project would result in the loss of 1,116 hectares for land and resource use. The Project would not affect lands currently set aside for forestry operations and would not conflict with established federal, provincial, or municipal land use designations, policies, or by-laws. The Panel concludes the Project is not likely to cause a significant adverse effect on the land and resource use by non-Indigenous users.

GenPGM conducted an archaeological study which identified Hare Lake as having high potential for archaeological resources. They indicated they would complete further archaeological assessments and, if necessary, adjust the location of the discharge structure in Hare Lake if additional archaeological resources are found. The Proponent committed to implementing a chance-find protocol and to inform Indigenous groups, including Biigtigong Nishnaabeg, of any further archaeological studies and their results. The Panel concludes that, if the recommended mitigation measures are implemented, the Project is not likely to cause a residual effect on physical or cultural heritage resources.

Natural and Operational Hazards

GenPGM assessed the effects of the environment on the Project including climate change, extreme weather forest fires, and seismic activity. They highlighted Project design features and/or low probabilities of occurrence in assessing the risks of each of these effects of the environment on the Project. The Panel concluded that with the implementation of the recommended mitigation, the Project could be designed to adequately account for possible adverse effects of the environment on the Project.

GenPGM assessed numerous accident and malfunction scenarios, which included a dam breach, unanticipated seepage, and fuel and chemical releases during transport. The Proponent concluded there would be a low overall risk to the environment associated with the remote scenarios with high consequence. With respect to a potential dam breach, the Panel finds that such an event, or other event resulting in accidental discharge of process-affected water to the Biigtig Zibi and/or Angler Creek, would result in severe deterioration of the environment comprising a significant adverse environmental effect. The Panel is of the view however that the likelihood of such an occurrence is remote. The Panel is satisfied that proposed design features, regulatory requirements, the Proponent's commitment to establish an independent tailings review board, and the Panel's own recommendations would minimize the risk to the extent possible. With respect to all other accident and malfunction scenarios, the Panel concluded that, if the recommended mitigation measures and follow-up programs are implemented, the Project is not likely to cause a significant adverse environmental effect.

Indigenous Matters

The Panel considered Project effects on Indigenous communities on their current use of lands and resources for traditional purposes, physical and cultural heritage, and health and socio-economic conditions. The perspectives provided by Indigenous groups in the region were crucial to understanding the biophysical environmental effects of the Project.

The traditional territories of several First Nations and Métis communities overlap with the area where the Project is proposed along the north shore of Lake Superior. The Project is wholly on land claimed by Biigtigong Nishnaabeg as their Exclusive Title Area. Other Indigenous communities in proximity to the Project are:

- Netmizaaggamig Nishnaabeg
- Pays Plat First Nation
- Michipicoten First Nation
- Ginoogaming First Nation
- Jackfish Metis Association
- Red Sky Métis Independent Nation
- Métis Nation of Ontario

The Project's footprint and mining activities would result in a loss of access to preferred areas, and changes to lands and resources used for traditional purposes for all Indigenous groups who reported harvesting in the area. The perception of contamination, as well as sensory disturbances, would further alter the behaviour of traditional harvesters, notably fish harvesters in Hare Lake, Angler Creek, and the Biigtig Zibi.

The Panel finds that Biigtigong Nishnaabeg would be most affected by the Project. The Project would remove the use of Biigtigong Nishnaabeg's sole community trapline, which also holds cultural importance for Biigtigong Nishnaabeg. The Panel is of the view that access in Biigtigong Nishnaabeg's Exclusive Title Area is already limited, such that harvesters and community members could not readily go elsewhere to practice current use activities.

The Panel heard from Biigtigong Nishnaabeg of the sacredness of the Biigtig Zibi, as well as the cultural importance of Angler Creek and the community trapline. Biigtigong Nishnaabeg expressed particular concern over planned discharges to the Biigtig Zibi during mine closure. The Proponent committed to continue to pursue feasible alternatives to address this concern.

The Panel heard Biigtigong Nishnaabeg associate many aspects of their health with the health of the Biigtig Zibi, the safe practice of current use on the land, and the protection of their cultural heritage. Further, the community shared that perception of contamination could lead to changes in harvesting practices and compromise a very important part of Biigtigong Nishnaabeg's diet.

The Panel heard information on the economic value extracted from Biigtigong Nishnaabeg's community trapline that would be lost. The Panel also heard that harvesters would be unlikely to continue using Camp 19 Road while the mine was in operation, regardless of which mitigation measures are employed – this displacement would result in additional costs for Biigtigong Nishnaabeg members.

The Panel concludes that the Project is likely to cause a significant adverse environmental effect, and cumulative effects on Biigtigong Nishnaabeg's current use of lands and resources for traditional purposes, physical and cultural heritage, and health and socio-economic conditions.

The Panel recognizes that there are existing constraints on Biigtigong Nishnaabeg's housing, and social and health services, which would be exacerbated by the Project, the Panel concludes the Project is likely to cause considerable impacts on Biigtigong Nishnaabeg's socio-economic conditions, related to housing, social services, education, infrastructure, health, and safety.

Pays Plat First Nation shared that they were profoundly connected through cultural history with the Angler area, and considered Lake Superior as sacred. The Panel concludes that the Project is likely to cause a significant adverse environmental effect on Pays Plat First Nation's physical and cultural heritage in relation to their cultural ties to Angler.

The Panel expects the Project could cause residual adverse environmental effects, and cumulative effects, on other communities, although they would be neither significant nor likely to occur.

The Panel invited, and received, information from Indigenous communities related to the nature and scope of potential or established Aboriginal and Treaty rights in the area of the Project, as well as information on the potential adverse environmental effects the Project may have on these rights. The Panel heard that Indigenous communities exercise rights through a deeply rooted connection to the land that is used for their way of life, including traditional activities such as trapping, harvesting, hunting, fishing, and ceremony. The Panel makes recommendations to the Proponent and the Crown regarding measures that could address impacts of the Project on Indigenous rights.

Concluding Remarks

The Panel has completed their assessment which will now be referred to the federal and provincial Ministers of Environment. The Panel is of the view that should the Government of Ontario and/or Government of Canada decide to approve the Project, it would be with the understanding that the Project is likely to cause significant adverse effects, which by definition are adverse effects that cannot be fully mitigated.

To minimize the adverse effects from the Project, recommendations have been set out in this Panel report for the Proponent, and both the federal and provincial governments. The Panel recommends, if the Ministers decide to approve the Project, that the full set of recommendations that fall within the respective government's jurisdiction, be implemented.

The Panel is mindful that this proposed Project would also provide economic and employment benefits. The Panel was advised that the Project would contribute to the critical mineral strategy. However, Indigenous communities who have occupied the lands since time immemorial, would experience adverse effects. The Panel notes that while the Project could provide employment benefits, measures need to be taken by the Proponent, and potentially the Government of Ontario and/or Government of Canada, to ensure Project benefits are equitably experienced, and for Indigenous communities to realize a long-term, net benefit from the Project, beyond limited-term employment opportunities.