Potash and Agri Development Corporation of Manitoba Ltd. (PADCOM) – Potash Mine Environment Act Proposal – File No. 6126.00

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Comments on PADCOM Potash Mine EAP Manitoba Environmental Assessment and Licensing Public Registry 6126.00

by
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On Behalf of What the Frack Manitoba

1. Introduction

The PADCOM potash mining project is massive in scale extending over 212 square miles (54,900 hectares) along the western portion of the Assiniboine River Valley in southwest Manitoba near the border with Saskatchewan. The projected project lifetime is over one hundred years. About 250,000 tonnes of potash are to be produced per year by a solution mining method. The potential for environmental detriment and significant greenhouse gas emissions far beyond the 2050 target for net zero emissions is very large. The necessary extensive pipeline network to convey hot potash brine to the processing plant from potash recovery wells and waste brine to disposal wells is not included in the PADCOM EAP. The environmental detriment from potential brine spills from the pipelines over the large project area is not discussed. The PADCOM EAP for the potash solution mining project in southwest Manitoba along the Assiniboine River Valley is deficient in many aspects.

- The EAP states that no surface pipelines would be used implying all the pipelines to convey hot water, recovered brine and brine disposal would be buried. The location, number of such pipelines and landowner agreements for the pipelines over the approximately 212 square miles of project area is not mentioned.
- The total greenhouse gas (GHG) per year that would be emitted from the propane dryer that is to be used for potash drying is not given directly.
- The energy required to cool hot potash brine to crystallize out the KCL (potash) and then reheat the brine for disposal is not given.
- The CO2 emissions are not given from diesel generators that could be used for heating and cooling the brine.
- The total energy required to heat the aquifer water to 85 C to recover potash is not given.
- The potential GHG from heating water to recover potash if diesel generators are used is not given.
- Leak detection and automatic shutdown for the hot water and brine pipelines is not discussed.
- Potential pollution of surface waters, domestic and irrigation wells, crop and pasture land, and fish habitat from pipeline brine spills is not evaluated.
- Leakage to surface aquifers from the potash withdrawal and disposal wells is not considered. In the original mining proposal by Canamax Resources in 1989 the ground around the potash wells was to be frozen to prevent leakage to potable aquifers.[4]
- Brine spills and leaks are considered only within the plant site area. Potential brine leakage from the pipelines necessary to convey brine throughout the 212 sq. mile project area is not discussed. This is a major omission from the EAP.
- The yearly total draw on the Hatfield Valley Aquifer to supply hot water for potash ore dissolution is not given.

- The Hatfield Valley Aquifer in Saskatchewan is heavily used primarily by the potash industry. No attempt is made to determine the sustainable withdrawal on the Hatfield Valley Aquifer from all uses including the additional use from the PADCOM potash mining.
- Toxic crude oil is to be used as dust suppressant and toxic octadecyl amine is to be used for anti-caking for the potash stockpile inside the processing plant. These toxins would enter the food chain and surface potable water courses when the potash is used for fertilizing. The risk of food chain and biological accumulation of these toxins is not evaluated.
- Use of non-toxic substitutes for dust suppressant and anti-caking of the potash is not investigated.
- The potash has not been analyzed for heavy metal, fluoride and selenium content.
- The potash stockpile in the processing plant could generate harmful levels of PM10 ad PM2.5 particulate. Ventilation measures to minimize particulate exposure to workers are not described nor are monitors to measure dust levels planned.
- The proponent has not communicated with the Impact Assessment Agency of Canada (IAAC) and with Strategic Assessment for Climate Change (SAAC) as required under the IAAC guidelines and under Part E of the Information and Management of Time Limits Regulations SOR/2019-283 with respect to potential adverse effects in areas of federal jurisdiction and with respect to the GHG emissions associated with the project.[1,2,3]
- The IAAC, CP Rail, CN Rail have not been notified and permission obtained for PADCOM pipeline crossings of federally regulated railways as required under the Canada Railway Safety Act Standards Respecting Pipeline Crossing Under Railways.[5]
- The IAAC and Manitoba Hydro have not been notified and permission obtained for the PADCOM pipeline crossings of the Birtle interprovincial transmission line as required by the Canada Energy Regulator Act. [6]
- The proponent has identified the PADCOM pipeline crossings of provincial roads and has not notified and obtained permission from Manitoba Infrastructure for the crossing of the provincial roads.
- The proponent has not identified the municipal roads to be crossed by the PADCOM pipelines and obtained permission from the municipalities.
- The proponent has not communicated with the IAAC on any adverse impact the project may have on the rights of the Indigenous peoples of Canada recognized and affirmed by Section 35 of the Constitution Act, 1982.[1]
- The measures to be taken as specified by the Environment Act for a class 3 development are not determined.

These deficiencies are discussed in more detail below.

2. Manitoba Class 3 Project

Under the Environment Act Regulations of Manitoba potash mining and milling is a class three development. The Minister may convene public hearing under that Clean Environment Commission (CEC) for a class three development. The Act states,

"*where the minister receives objections with respect to a proposed development and reasons for the objections, the minister may, within such time as may be set out in the regulations, cause the commission to hold public hearings thereon; but if the minister decides not to hold public hearings the minister shall provide the objectors with written reasons therefore and shall cause a copy of those reasons to be filed in the public registry*."

Reasons for objections not to hold public hearings are given in this submission. If hearings are not held I request the minister provide written reasons why the hearings are not being held as required under the Environment Act. The Manitoba Approvals and Licensing process should not proceed until the minster has made a decision on the CEC Hearings or has provided written reasons as to why hearings are not being held. Considering that the original proposal for a potash mine at Harrowby by Canamax Resources in 1989 required a CEC Hearings it is inconceivable that the PADCOM project would not require CEC hearings.[4]

The Environment Act states;

"*For the purpose of assessing a proposed Class 3 development, the minister, in consultation with the departments may do any or all of the following things:*
(a) require from the proponent additional relevant information"

The additional relevant information in the form of a full environmental impact statement should include all information documented as missing in this and other submissions to the Manitoba approvals process.

3. Effects in Areas of Federal Jurisdiction

Potential effects in areas of federal jurisdiction include,

- adverse effects to fish and fish habitat such as effects of hot brine spills into the Assiniboine River and Qu'Appelle River watershed,
- changes to the water levels of the Assiniboine River, a navigable waterway under the Canadian Navigable Water Act due to the large water withdrawal from the Hatfield Valley aquifer,
- GHG emissions that do not conform to the requirements of Environment and Climate Change Canada (ECCC) and the SAAC to provide a credible plan that describes how the project will achieve net- zero emissions by 2050.[2]

The proponent is obligated to contact the IAAC about federally regulated issues to determine if the project should be designated. The proponent must supply information to the IAAC that is missing in the EAP such as the extent and locations the brine and hot water pipelines to be built over the duration of the project that may impact fisheries from spills, information on GHG implications, information on water levels, and any other information the IAAC may need to asses the project impacts within federal jurisdiction. The Manitoba Approvals and Licensing process should not proceed until the IAAC has made a ruling on project designation and the SAAC has approved a credible plan that describes how the project will achieve net- zero emissions by 2050.

4. Amount of Water Required to Dissolve the Potash

According to SYSCAD a plant simulation company[7]

"*The solubility of KCl in Potash facilities is a function of temperature and is also influenced by the presence of other species in solution, most importantly NaCl and MgCl2. The curve for KCl solubility as a single species is not valid when other species are present, in this case the saturated value for KCl is lower than the saturated for the solution where only KCl is present*."

A paper by R. J. Bodnar et. al (1997) gives a relationship for the solubility, *S*, in wt% as a function of temperature, *T,* (C) and weight % MgCl2 (*M*) for a NaCl to KCl mixture ratio of 1 to 1.[8] The ore for

PADCOM is 50% KCl corresponding to a ratio of about of 1 to 1 NaCl to KCl for very little magnesium or other species in the potash ore.

From Bodnar et al. (1997),

$$S = a+bM^{1.5} + cT, \quad (1)$$

where a = 24.56279446, b= -0.14535233 and c = 0.165011651.

The temperature to the extraction wells is given in Table 3 of the PADCOM EAP to be 85C

Using equation (1), the solubility of the brine at 85C with no magnesium (MgCl) would be 38.6 wt%
With 5% MgCl the brine solubility would be 37.8 wt%.

Thirty-eight weight percent brine at a ratio of 1 to 1 NaCl to KCl by weight would require 815,750 tonnes of water to dissolve 250,000 tonnes of KCl separated from the brine mixture. At a density of one tonne per cubic meter at least 815,750 cubic meters of water would be required per year from the aquifer. Not all the water injected will be recovered in the saturated brine. The solubility limit (saturation) would not be achieved in practice. Therefore the 3260 litres of water per tonne of KCL produced is the minimum theoretical upper bound. This theoretical upper bound on the water required based on solubility gives a ratio of 3.26 tonnes (3260 litres) of water per tonne of potash produced. The amount of water actually used could be much greater due to incomplete saturation and water loss to the formation. The amount of water drawn from the aquifer per year for 250,000 tonnes of KCl production would be in excess of 815,000 cubic meters per year.

Section 2.8.3 of the EAP states

"*Fresh water for the mine is limited to the water used to produce the brine that remains in the open mined out area. Our calculations indicate this is a maximum of 0.5 tonnes of water (132 gallons) per tonne of product. The actual consumption will be less than this as the mine matures, and closure occurs*."

The 0.5 tonnes (500 litres) of water per tonne of KCL produced contradicts the maximum solubility of a predominately KCl and NaCl brine in water at a weight ratio of 1 to 1 (50% KCL in the ore) in water. At 0.5 tonnes of water per tonnes of potash produced there would be more potassium ore to dissolve than water by weight. To further underscore the underestimate of water required in the EAP, below is a graph of the solubility of pure KCl and pure NaCl is water as a function of temperature. According to the graph 420 grams of pure KCL requires 1000 litres of water or 1 kg of water to dissolve to saturation. One tonne of pure KCl would require 2.38 tonnes of water to dissolve to the solubility limit, far greater than the 0.5 tonnes in specified in the EAP.

This evidence establishes that the estimates in the EAP of 0.5 tonnes of water required to produce one tonne of potash are inaccurate and far below what would actually be required.

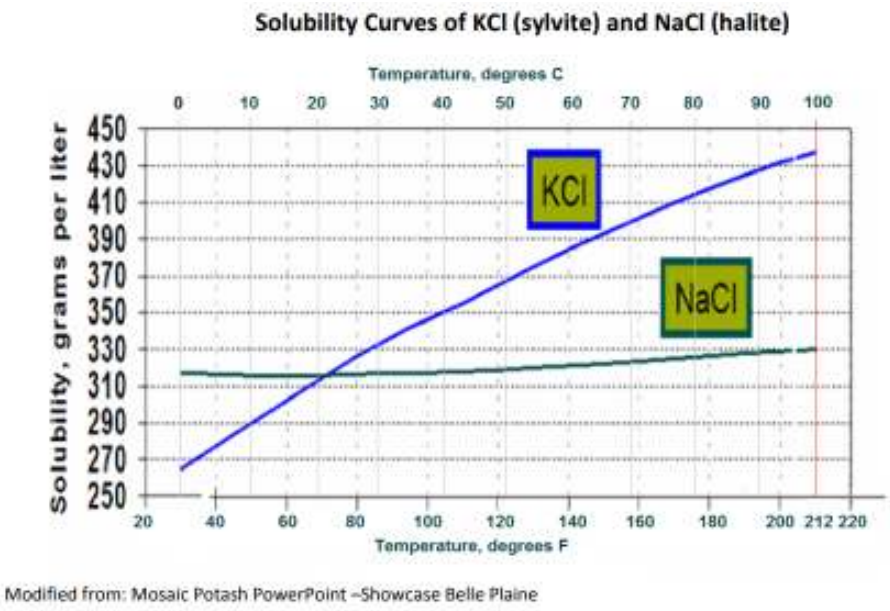

Figure 1. Solubility curves for KCL and NaCL[9]

Table 3 of the EAP gives the flow of water to wells at 5.7 cubic meters per minute for 250,000 tonnes of potash production per year. The available hours per year is given in Table 3 as 8760 (24 hours per day for 365 days per year). The rate of 5.7 cubic metres per minute gives 3 million cubic meters per year for 250, 000 tonnes of potash production. From Table 3 values 12 tonnes of water per tonne of potash produced would be required (not 0.5 tonnes).

The PADCOM EAP states typical Saskatchewan potash mines currently use 900-5000 gallons (4092–22,730 litres) of water per tonne of potash produced. This is 4 to 22 tonnes of water per tonne of potash which is the same range as for the PADCOM Project. The estimates of reduction in water usage for PADCOM process are exaggerated.

5. Aquifer Sustainability

The Assiniboine West Watershed District of southwest Manitoba[10] as specified under the Manitoba Watershed Districts Act[12] and the Saskatchewan Water Security Agency[11] must be consulted to review this project and determine the sustainability of this large draw of water from the Hatfield Valley Aquifer and all other interconnected groundwater resources. The city of Brandon, the town of St. Lazare and other nearby towns must be consulted regarding the potential harm to their drinking water supply from brine spills. Regional groundwater modelling must be done to evaluate the sustainability of the aquifer system and the effect of all the accumulated withdrawals on water resources in the area and on the water levels in the Assiniboine River pertaining to the Navigable Water Act.

6. GHG emissions

The executive summary of the EAP states;

"*Under the current technology, the CO2 per tonne of produced potash ranges from 0.15 to almost 1 tonne per tonne of product based on the Beechy technology an example of 0.25 tonnes of CO2 per tonne of produced potash the technology has the potential to reduce Canada's GHG production by 5,000,000 tonnes*

per year, about 0.5% per year based on current production. As 50% of the world's fertilizers are mineral based and in Saskatchewan, where some of the largest potash mines in the world exist, they typically emit 330-2000 lbs (149.7 – 907.1 kg) C02 for each tonne of potash they produce.

The PADCOM project predicts an emission of. 21 oz (596 g) of CO2 per 1 tonne of produced."

However, table 10 and section 6.1.6 of the EAP gives the CO2 emission as 0.12 tonnes of CO2 per tonne (t) of potash. The EAP gives contradictory information on GHG emission rates. Which value is to be used 0.25 tonnes of CO2, 0.121 tonnes of CO2 or 596 g of CO2 per tonne of potash? Table 10 shows that the factor of 0.12 t CO2 per tonne of product applies to natural gas that would be used for the processing plant. The EAP states;

"*Manitoba Hydro provides gas distribution in the province. They have determined that there is not enough supply at Russell, Manitoba, so a significant capital expenditure is required to supply the mine. The rotary dryer for the initial phase will operate on propane. A decision has to be made for the next expansion, to use some gas or to convert entirely to electricity as an energy source.*"

Based on the natural gas factor of 0.12 t CO2 per tonne of product, eventual production of 250,000 tonnes per year would give 30 kilotonnes (kt) CO2 per year. Propane produces about 1.19 times the GHG per unit of heat energy than natural gas.[13] For propane based heating that would be done initially and very likely for some time after, the GHG from the processing plant would be 35.7 kt CO2.

The Section 2.7 of the EAP states;

"*The heated brine, along with a portion of the production brine that has been reheated, is pumped back to the mine feed injection wells.* At *100,000 tpa the flow to the processing site will be 2 cubic meters per minute at about 90 degrees C*."

A brine flow per year of 2 cubic meters per minute gives one million cubic meters per year for a potash production rate of 100,000 tones per year (tpa). At 250,000 tpa, production the brine flow would be 2.5 million cubic meters per year. The aquifer water flow to the wells from table 3 of the EAP, 5.7 m^3/min for a total of 3 million cubic meters per year from table 3, would be an underestimate since considerable injected water would not be recovered in the brine delivered to the plant.

The energy required to reheat the brine is not quantified. The brine in the return pipelines, the brine to the disposal wells and the aquifer water in pipelines to the injection wells must be heated resulting in either electrical energy displaced from GHG mitigation or direct GHG emitted from diesel generators for the heat. The energy required for these operations has not been quantified.

The EAP gives heat required for heating the ore as of the order of 0.5 to 1 gigajoule per hour for a 1600 m potash horizontal recovery drill leg. PADCOM has an application to Manitoba Hydro to access power for the Project site. A 1.0 megawatt transmission line is required. If installation is delayed, the EAP states the project would proceed using a diesel generator until installation can be completed by Manitoba Hydro. The diesel generation would produce an un-quantified amount of GHG. The number of horizontal drill recovery legs required per year is not given. One gigajoule per hour would require 8760 gigajoules of energy per year. The CO2 emission per gigajoule of diesel fuel is 74.1 kg CO2/GJ[14] Thus the CO2 yearly emissions for diesel generation would be 649 tonnes of CO2 for heating the ore for one injection well.

Table 4 of the EAP shows that the volume of ore removed per well is 1600m x 800m x 0.84 m or 1,075,200 cubic meters. At an ore density of 2.0 t/m^3 from table 4, 2,150,400 tonnes of ore would be removed from one well. Table 4 gives a value of 2,000,000 tonnes which after rounding confirms this calculation. At 50% potash in the ore, less than one well per year would be required for a production of 250,000 tonnes potash per year. This appears to be a very optimistic recovery estimate.

Table 3 of the EAP gives the flow of water to wells at 5.7 cubic meters per minute for 250,000 tonnes of potash production per year at a temperature of 85C. Assuming the water in the aquifer is at an average of 10 C, using a specific heat capacity of water of 4.0 kJ/kg/K (at 40 C) [14] and the density of water of 1.0 t/m^3, the energy required to raise the temperature of the water from the aquifer to supply the wells to 85C per year is 898,776 GJ. At 74.1 kg CO2 per GJ,[14] diesel heating would generate 66.6 kt of CO2. The large energy and potential GHG emissions for heating of aquifer water has been omitted from the PADCOM EAP.

The brine in the processing plant is likely cooled to 0 C[9] to crystallize the KCl. The specific heat capacity of saturated brine is about 3.3 kJ/kg/K[16]. To cool 2.5 million cubic meters of brine per year from 85 C to 0 C for a brine density of 1.2 tonnes per cubic meter for about 200 days would require 461,095 GJ of energy. Two hundred days is used considering that cooling would not be required in winter. To heat the brine back up to 85 C for to keep the remaining salt in solution for disposal would require about 841,500 GJ energy for 365 days of heating. The total energy for cooling and reheating the brine at the processing plant would be 1,302,595 GJ. The emissions from diesel generation for the energy required would be 96.5 kt CO2. The emissions from cooling and reheating the brine would be far greater than the emissions calculated for the processing plant for propane heating. It appears, therefore, the propane heating emissions of 35.7 kt CO2 apply only to the drying of the potash.

The EAP does not specify where the heat will be supplied to the aquifer water for the extractions wells. There will be heat energy required to replace heat loss in the water pipes depending on where the water is heated.

Heat will also be required to prevent KCl from precipitating as the brine cools in the pipeline returning brine from the recovery wells to the processing plant. The heat loss for a buried jacketed 6 inch HPDE pipe would be 39 W/m.[17] The heat required to replace the cooling loss per kilometer of pipeline per year would be about 1230 GJ. If diesel fuel were used for this energy the CO2 released at 74.1 kg CO2 per GJ would be 91 tonnes. As the project advances more than 10 km of pipeline would be required releasing 910 tonnes which is relatively small compared to the potential GHG for heating and cooling brine and aquifer water.

The largest amount of energy would be required for heating the aquifer water with the potential releases of 66.6 kt of CO2 per year and cooling and reheating the brine at 96.5 kt of CO2 per year. The third largest emission would be from propane fuelled drying of the potash at 35.7 kt for a total of 200 kt per year. More than 10 kt CO2 emissions requires reporting to Statistics Canada and Environment and Climate Change Canada (ECCC)[18] Manitoba considers emission of more than 50 kt per year to be a large final emitter.[20] The largest final emitter in Manitoba in 2018 was the Koch fertilizer plant in Brandon at 771 kt CO2. According to 2018 data the PADCOM plant would rank as the fourth largest final emitter in the province.[20] This potential large GHG emission cannot be ignored.

The Impact Assessment Agency of Canada (IAAC) guidelines require a proponent to estimate any greenhouse gases (GHG) emissions associated with the project. The proponent must submit the EAP to the IAAC together with estimates of total GHG emissions.[21]

Section 2.9.2 of the PADCOM EAP states;

"*A decision has to be made for the next expansion, to use some gas or to convert entirely to electricity as an energy source (moving the mine to essentially zero carbon). This will require the installation of large heat pumps to cool the crystallizers and reheat the brine, to heat the building and potentially to dry the product.*"

This statement verifies that the energy to heat the aquifer water to 85 C for the injection wells has not been considered. This is in keeping with the strategy employed in the PADCOM EAP to consider only the processing plant and ignore all the potential adverse effects from the injection and withdrawal wells and hot water and brine pipelines over the very large 212 sq mile area outside the processing plant at Harrowby.

In conformance with the SAAC requirements to provide a credible plan that describes how the project will achieve net- zero emissions by 2050, the licence conditions for the project should include a stipulation for a deadline to transition from propane to electrical heat pumps for drying the potash. Diesel generators should not be allowed for the large amount of energy required to heat the aquifer water, heat and cool brine and provide power for other plant needs. PADCOM should be required to build windmills to provide the large amount of power required for this mining operation in order to meet GHG targets for net zero emissions by 2020.

The intermittency of wind could be handled by increasing the indoor stockpiles of potash. The large elevation change along the banks of the Assiniboine River Valley could be used to pump and store water uphill and generate power using turbines in downhill return pipes at times of low wind. This is an ideal project to use renewable energy from wind so as not to diminish the available hydro power that could be used for transition away from fossil fuels. GHG emission mitigation strategies for this project should be implemented in conformance to Canadian Net Zero Emissions Accountability Act and the SAAC guidelines.

7. Injection wells

One injection wells is documented in the processing plant area that would be used to control magnesium levels in the brine mine feed. The reason for control of magnesium levels is not given. This is another example of missing information in the EAP. It appears that magnesium, prior to treatment in the processing plant, must be removed from the ore as an undesirable component of the potash fertilizer.

The geological formation for brine disposal injection is not specified. The Cretaceous age Swan River Formation (or Manville) or the Devonian Winnipegosis Formation are given as possibilities. The research on the suitability of these formations to accept the large quantities of brine disposal should be done before the project is approved. The quantity of brine that must be disposed per year and locations of the brine disposal wells must be specified. The PADCOM EAP states in section 2.11 the PADCOM mine will inject 378.54 – 757.08 litres of brine per minute for a disposal well. According to section 2.7 of the EAP, 2.5 million cubic meters of brine would require disposal for 250,000 tonnes of potash production per year. Using a 500 litre of brine per minute disposal rate about10 disposal wells would be required. The formation can absorb only a certain amount of brine at a given site. More disposal wells would be required over time.

The number and location of such brine disposal wells must be given. A Theis solution should be carried out using the properties of the aquifer used for brine disposal to determine the pressure build up and feasibility of injection over the long term.[19] The pressure from brine injection should not exceed the fracture pressure for the aquifer caprock.

Safe brine injection rates must be established for the formations to prevent over pressurization. Any abandoned or active exploration or oil wells that penetrate to the brine injection formation wells, that could

act as upward conduits to potable aquifers for injected brine, must be identified and avoided. Considering that there are two active oil fields nearby the project area, the Manson and Birdtail, there will likely be numerous abandoned deep wells. These wells are typically sealed with cement only at the hydrocarbon pay depth. The open annuli around well casings and the interior of corroded casings are known to provide a route for pressure or buoyancy driven contaminants.[22]

As required in the CEC hearings for the Canamax original potash mine proposal of 1989, the ground around brine disposal and withdrawal wells should be frozen to prevent leakage to potable aquifers near the surface.

8. Leak Detection

At the Bethune solution potash mine in Saskatchewan, more than 100 km of brine water pipeline between wells and the processing plant are monitored for leak detection using fiber optics technology.[23] Such leak detection measures should be a licensing condition for the PADCOM Potash Mine.

Gradual leaks that would not be detected by a leak detection system could be more environmentally damaging in the long term than a large detected leak. Accurate real time volume measurements of the amount of brine entering the pipeline system and the amount leaving, together with an automated mass balance check that shuts down the pipelines when a volume discrepancy is recorded must be installed.

Groundwater and brine transport modelling for different leakage scenarios including a large spill and gradual ongoing undetected smaller leaks should be done to quantify the risk and detriment from leakage.

9. Toxins in the Potash

In the processing plant, crude oil at 2 litres per tonne of potash is to be used as a dust suppressant. Crude oil is known to contain carcinogens such as benzene and PAH's and other toxic organic compounds. A representative value for benzene content in crude oil is 0.52 weight%. [24] Thus 0.11 kg crude oil per tonne could result in 57.2 grams of benzene per tonne of potash or 57.2 parts per billion. The allowable concentration of benzene in water is 5 micrograms per litre or 5 parts per billion.[25] Clearly a non toxic substitute must be used for a dust suppressant.

Octadecyl amine is added to potash to prevent caking 0.11 kg per tonne of potash. According to the European Chemicals Agency octadecyl amine

" *may be fatal if swallowed and enters airways, is very toxic to aquatic life, is very toxic to aquatic life with long lasting effects, causes serious eye damage, may cause damage to organs through prolonged or repeated exposure and causes skin irritation.*" [26]

The extreme toxicity of octadecyl amine to aquatic organisms would violate the Fisheries Act under federal jurisdiction. The risk to the fisheries must be reported to the IAAC. Use of a non toxic anti-caking agent must be a licence condition for this project. Octadecyl amine should not be allowed.

Toxic heavy metals and selenium are often found in subsurface mineral deposits. Elevated levels of chromium and lead have been found in potash fertilizer in Bangladesh.[27] The conditions in the Bangladesh study may not be applicable to the PADCOM mine however the evidence from Bangladesh establishes that heavy metals can occur in potash. Ore samples from the PADCOM potash deposit must be analyzed for heavy metal, fluoride, radium and selenium content.

Hydrogen sulphide (H2S) contamination of potash ore has been reported in Saskatchewan.[27] The H2S develops as a result of the mining process. Organic material introduced from aquifer water that can be used as a food source by sulphate reducing bacteria that release H2S. The levels of H2S in the recovery brine should be monitored. One mitigation scheme that should be investigated is the removal of organic content from the aquifer water.

10. Exposure to Airborne Particulate

A potash stockpile in the processing plant could generate harmful levels of PM10 ad PM2.5 particulate. Ventilation design to minimize particulate exposure to workers and PM2.5 and PM10 and particulate level monitors should be specified in the EAP.

11. PADCOM Pipeline Crossings of Critical Infrastructure and Water Courses

The PADCOM EAP has omitted the critical infrastructure that the brine and hot water pipelines for the injection and recovery wells and the brine disposal wells. As shown in figure 3 of the EAP the project potash mining area covers 212 square mines where much critical infrastructure exists but has not been identified. The EAP deliberately omits the requirement for buried pipelines to convey hot water and brine over the entire mining area and does not show the eventual route of the required pipelines.

The map in figure 2 from the Birtle Transmission Line planning study illustrates some of the rail, road and transmission line infrastructure that would be affected by the PADCOM project.[28] A reproduction of figure 9 in the PADCOM EAP shown in figure 3 shows the extent of the potash resource with respect to infrastructure, and potential eventual brine pipeline crossings of rail, road and river crossings.

The Canada Energy Regulator Act states,

"*273 (1) It is prohibited for any person to construct a facility across, on, along or under an international or interprovincial power line or engage in an activity that causes a ground disturbance within the prescribed area unless the construction or activity is authorized by the orders or regulations made under section 275 and done in accordance with them*."

Permission must be obtained from MB Hydro for PADCOM pipelines to cross the Birtle Transmission Line.

An application specifying the engineering drawings and plans for the pipeline crossing of the rail lines must be submitted to CN and CP and approval obtained. Manitoba Infrastructure and relevant local municipalities must be notified of all eventual road crossings by the PADCOM pipelines and permission obtained.

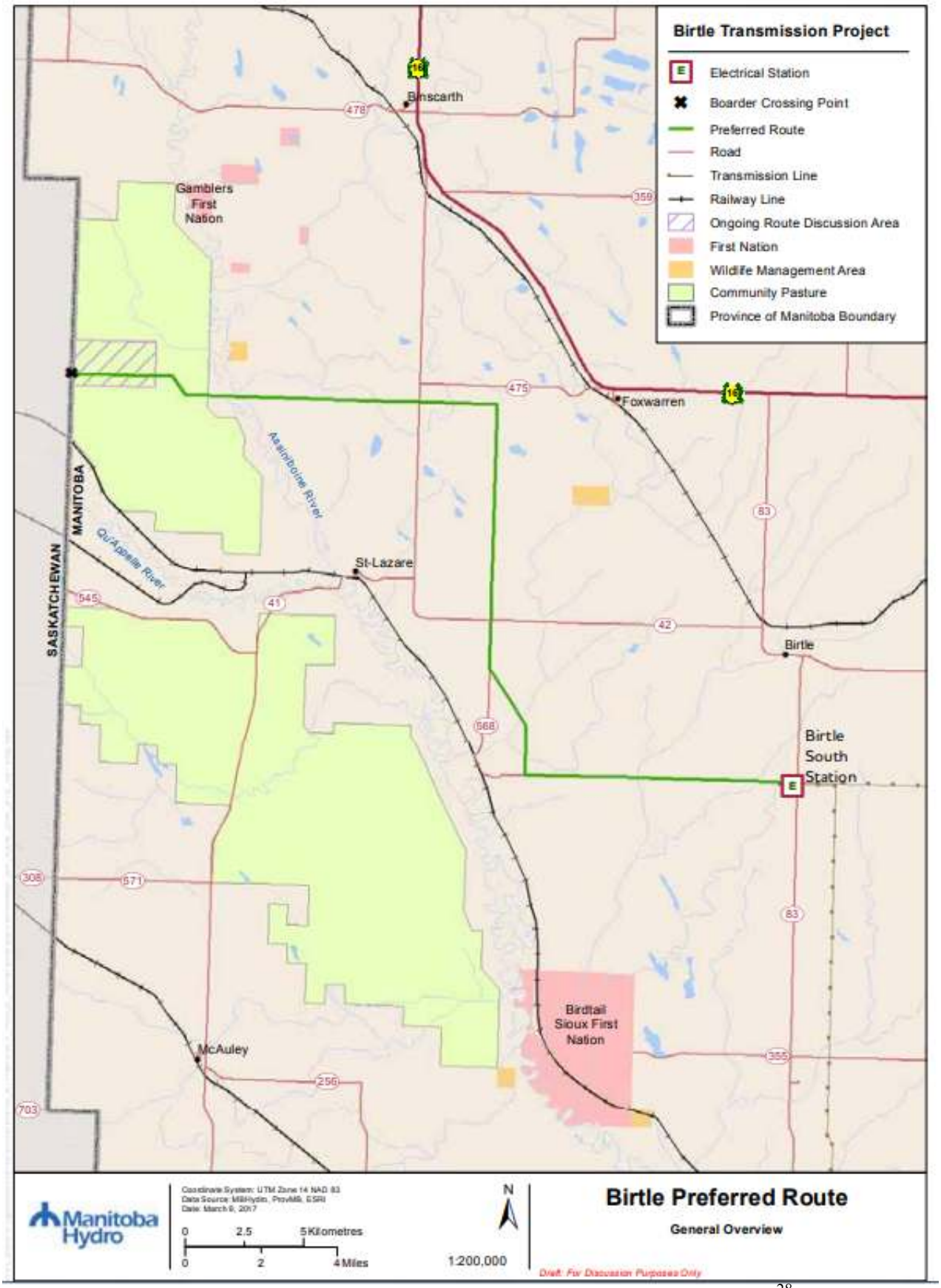

Figure 2. Some of the critical infrastructure in the PADCOM potash mining area [28]

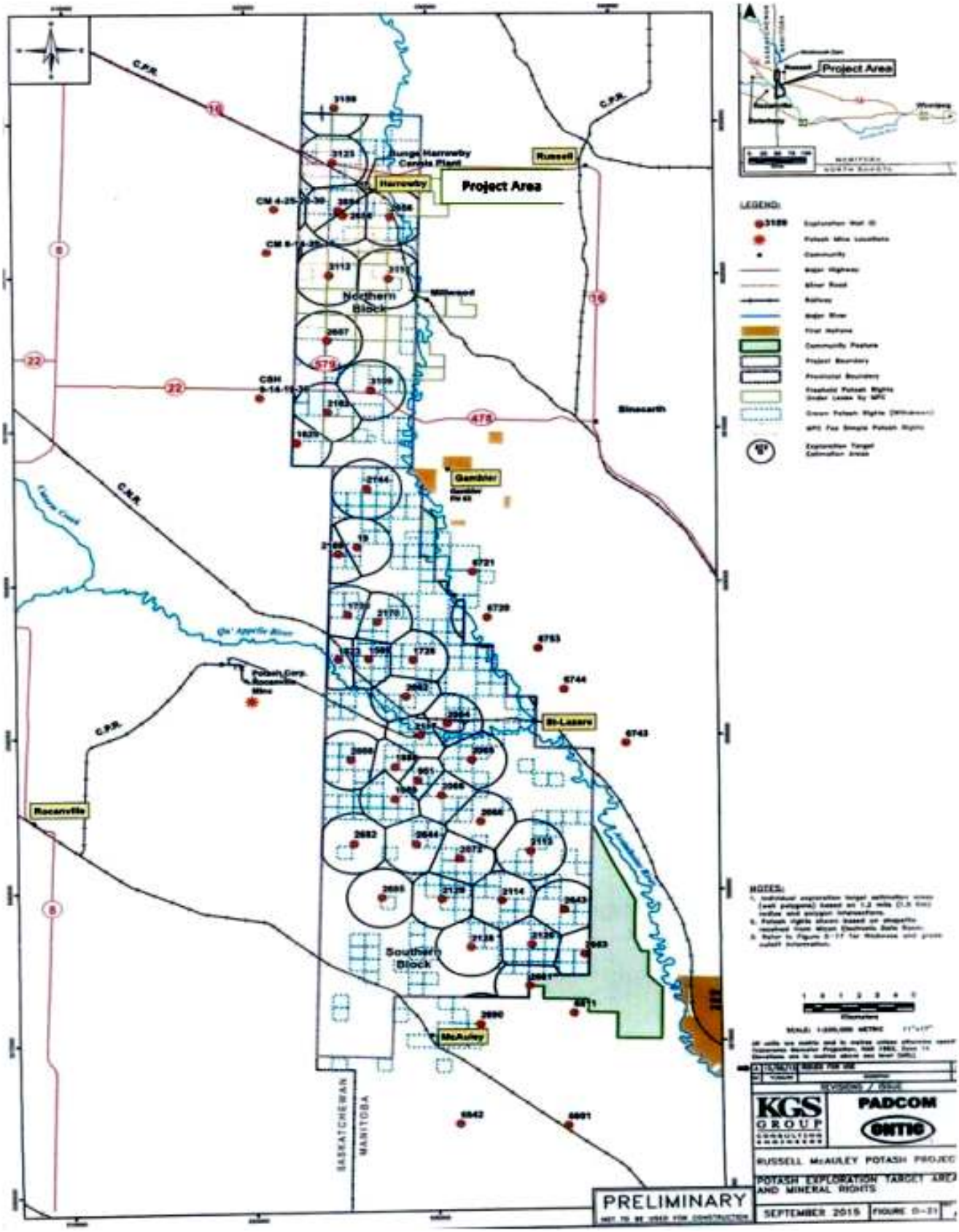

Figure 3. Historical drill holes shown by red dots illustrating the extent of the PADCOM potash resource. Infrastructure and road, rail and river crossings of eventual brine pipelines are shown.

Many rivers and streams must be eventually crossed by the brine pipelines including the Qu'Appelle River. A brine spill in any of these rivers and streams would adversely affect fish and Fish habitat. All fish bearing water courses that must be eventually crossed by PADCOM brine pipelines must be identified and the Fisheries and Oceans Canada (DFO) and the IAAC notified of these crossings. Mitigation measures to minimize the risk of brine spills and detriment to fish habitat in consultation with the DFO and the Fish and Fish Habitat Protection Program under the Fisheries Act and Species at Risk Act must be implemented.[28]

There are 12 units of The Upper Assiniboine Wildlife Management Area stretching from north of St. Lazare, south to Miniota and southeast to the Oak Lake area. According to the Manitoba Use of Wildlife Lands Regulation, M.R. 77/99;[30]

"*No person shall engage in (c) quarry mineral exploration or (d) any other activity that significantly and adversely affects habitat*."

The project infringement on these wildlife management areas must be determined and avoided.

There appears to be a deliberate strategy of omission by the proponent to avoid DFO, CN, CP, MB Hydro, Manitoba Infrastructure and municipal oversight and approval for pipeline crossings. This avoidance of regulatory, government oversight and required approvals by affected industries must not be allowed. The Manitoba Approval and Licensing Branch must ensure all the proper federal regulatory authorities, including the DFO, the IAAC, SAAC, CN, CP and MB Hydro have been informed about this project and supplied with additional information required to assess the risk to the environment and infrastructure and to specify necessary mitigation measures for this project.

12. First Nation Consultation

Section 4.3 of the PADCOM EAP states;

"*PADCOM's small pod solution mine is not expected to impact the exercise of Indigenous or Treaty Rights. The project site is private land and only for the purpose of the project, there is a negligible impact on vegetation and wildlife populations and there will be no impact on fish or fish habitat*."

Spills from the brine and hot water pipelines over the very large 212 square mile mine area could affect fish and fish habitat and wet lands used by migratory birds and moose. Land based spills could result in soil salinity that could adversely affect all local wildlife. PADCOM has entered in agreements with Gambler and Birdtail Sioux First Nations however it appears no grass roots community based consultation under the auspices of the Crown was undertaken with the First Nations as required according to Section 35 of the Constitution Act**.** Traditional land of First Nations and Métis could be adversely affected by this project.

An agreement has been made with PADCOM to share 5% of the net profit to be shared with Local First Nation communities and the Manitoba Métis Federation. The Birtle Transmission Project Métis Land Use and Occupancy Study identified Métis traditional harvesting areas such as the Spy-Hill Ellice Community Pasture north west of St. Lazare that are in the PADCOM project area.[32] There is no mention of consultation with the Métis concerning their traditional harvesting areas within the 212 square miles of the PADCOM project area such as the Spy-Hill community pasture. Many Métis landowners in the PADCOM project area are identified in the Birtle Transmission Line Report with whom there is no record of communication or consultation. A community based Crown led Section 35 consultation should be conducted before this project

proceeds. The Section 35 consultation should communicate with all Métis landowners in the area. Such landowners would be directly affected by injection and withdrawal wells and pipelines on their lands.

The Métis people in the area should be consulted at the community level concerning traditional harvesting areas such as the Spy-Hill Ellice Community Pasture. First Nations in the area should be consulted at the community level about the traditional lands in that could be affected by the PADCOM project.

13. Broad Based General Public Consultation in Nearby Communities

The only public consultation mentioned in the PADCOM EAP was this statement;

"*PADCOM has a certificate of approval from the Tri-Roads Planning district to proceed with this project, which was obtained through a public hearing where participants were invited, and the public notified through local advertising*."

The Tri-Roads Planning District does not contain the Southern Block PADCOM development area or important rural towns such as St. Lazare and Miniota. Well publicized community meetings must be held to cover the entire north and south block areas in St. Lazare, Miniota, Brandon and other nearby towns. The community meetings must provide comprehensive information on the project and explain how the risk of brine contamination of groundwater, local drinking water supplies and agricultural land, would be mitigated. Brandon must be involved because the city's drinking water is sourced from the Assiniboine River which could be affected by a brine spill.

14. Recommendations

Recommendations based on the information and evidence provided here are;

- The Manitoba Licensing and Approval Process should not proceed until the proponent consults with the IAAC and the SAAC on a plan for the PADCOM project to achieve net- zero emissions by 2050.[1,2]
- Windmills should be used for the large energy consumption for this project as part of the net zero emissions plan.
- Aquifer water storage atop the Assiniboine Valley should be implemented to provide energy to the Project at times of slack wind.
- Plans for mitigation of potential adverse effects within federal jurisdiction including prevention of fish habitat, agricultural land and groundwater detriment from brine spills should be formulated in consultation with experts from the IAAC and DFO.
- Real time detection, volume balance measurements with automatic brine pipeline shut down should be installed.
- Non toxic anti-caking and dust suppressants should be required as a mandatory licensing condition to replace crude oil and octadecyl amine.
- Laboratory testing for heavy metal, selenium and radium concentrations in the potash ore must be done.
- Toxic species in the potash ore must be removed.
- Air monitors should be installed in the processing plant where the potash stockpile is located, to measure PM2.5 and PM10 particulate levels.
- Ventilation should be provided in the processing plant to keep the PM2.5 and PM10 levels below allowed limits.

- Organic content in the aquifer water supplied to the hot water injection wells must be removed to prevent souring of the potash ore body.
- Brine disposal injection wells must not be drilled within an injection pressure envelope of any abandoned or active wells that penetrate to the injection depth.
- The ground around the potash wells should be frozen to prevent brine leakage to potable aquifers.
- The project should not proceed without scientific evidence that the water withdrawal for the project does not exceed the sustainable limit for the Hatfield Valley Aquifer and other interconnected ground water resources.
- A comprehensive interprovincial water modeling study for the Hatfield Valley Aquifer and interconnected groundwater resources must be done that incorporates all groundwater users of the aquifer system in both Manitoba and Saskatchewan.
- The Assiniboine West Watershed District of southwest Manitoba[10] under the Manitoba Watershed Districts Act[12] and the Saskatchewan Water Security Agency[11] must be consulted to review this project and determine the sustainability of the large draw of water from the Hatfield Valley aquifer and all other interconnected groundwater resources.
- Manitoba Hydro must be notified and permission obtained for the eventual PADCOM pipeline crossings of the Birtle transmission line
- CN and CP rail must be notified and permission obtained for the eventual PADCOM crossings of the railway lines.
- The provincial and municipal road crossing of the PADCOM pipelines must be identified and permission obtained from Manitoba Infrastructure and the relevant Municipalities.
- The road, rail and hydro line permissions must be obtained before the licensing approvals process is allowed to proceed as the project viability depends on these crossings and on any restrictions imposed regarding the crossings.
- Restrictions and conditions imposed on the road rail and hydro line crossing must be included in the EAP and measures to fulfill these conditions must be documented.
- All fish bearing water courses that must be eventually crossed by PADCOM brine pipelines must be identified and the DFO and the IAAC notified of these crossings.
- The project infringement on the twelve units of the Upper Assiniboine Wildlife Management Area must be determined and avoided.
- Mitigation measures to minimize the risk of brine spills and detriment to fish habitat in consultation with the DOF and Fish Habitat Protection Program must be implemented.
- Regional groundwater modelling must be done to evaluate the sustainability of the aquifer system and the effect of all the accumulated withdrawals on water resources in the area and on the water levels in the Assiniboine River pertaining to the Navigable Water Act.
- Brine transport modelling for different leakage scenarios including a large spill and gradual ongoing undetected smaller leaks should be done to quantify the risk and detriment from leakage.
- The Manitoba Approval and Licensing Branch must ensure the all proper federal regulatory authorities, including the DFO, the IAAC, SAAC, CN, CP and MB Hydro have been informed about this project and supplied with additional information required to assess the risk to the environment and infrastructure and to specify necessary mitigation measures for this project.
- The city of Brandon, the town of St. Lazare and other nearby towns and communities must be consulted regarding the potential harm to their drinking water supply from brine spills.
- In addition to the agreements made with First Nations and Métis in the area, formal broad-based community based Section 35 consultation must be undertaken by the Crown with all the First Nations people in the project area and with the Métis in the communities of St. Lazare and nearby.

- Section 35 consultations must be completed before the Manitoba licensing approval process can proceed.
- Broad based public communications and meetings regarding the project must be held in the surrounding communities including St. Lazare, Miniota and Brandon.
- Considering the extensive missing information in the PADCOM EAP, the large area affected by the project and that CEC hearings were held for the original Canamax potash mine at Harrowby, CEC Hearings should be held for the current PADCOM potash mine project.
- In the event that the minster decides CEC hearings will not be held the Minister must give written reasons for the decision.
- As specified under the Environment Act the Minister and/or the Direct of Environmental Approvals should require additional project information in the form of a full environmental impact statement from the proponent. The public and the provincial Technical Advisory committee, the CEC if convened, the IAAC, the SAAC and the DFO must be allowed to comment on new information provided to fill the missing information gaps.

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Public registry 6126.00 - Potash and Agri Development Corporation of Manitoba Ltd. (PADCOM)

The following are reasons for my objection to the proposed horizontal selective solution mining and milling project.

According to Manitoba Classes of Development Regulation potash mine and mills fall under a Class 3 Development. In 1988, public hearings by the Clean Environment Commission were provided for the development of a potash mine at Russell, Manitoba by Canamax Resources.[1]

- I request written reason as to why this proposed project is being handled differently and not assessed under Class 3 developments?

A10 km radius is identified for potential effects from the project (3.2 Spatial Boundaries). This radius extends outside of Manitoba and would then dictate agreement from the province of Saskatchewan as per section 13.1 of the Manitoba Environment Act. Although the Hatfield Aquifer is mainly in Saskatchewan it extends into Manitoba and will be used by the proponent; a Water Rights License should be required from the Saskatchewan Water Security Agency.

The land slopes to the east, flowing to the Assiniboine River. (4.1.3)
Leaks/spills/contamination from the mill site and mining will flow to the Assiniboine River which flows into the Red River and Lake Winnipeg. The Impact Assessment Agency of Canada(IAAC) and Fisheries should be notified by PADCOM as required under IAAC guidelines and regulations to assess impacts from project operations on the Assiniboine River system. The city of Brandon and many towns use the River as a drinking water source. It is unclear if those obtaining drinking water from the River have been consulted.

- Provide a fish and fish habitat assessment.
- Provide a study for impacts from a brine release to the environment, groundwater and water bodies.
- Provide plans for mitigation of these impacts.
- What emergency measures will be provided to those obtaining drinking water from the Assiniboine River in the event of contamination from a brine spill? For those on private wells?
- Provide ground and surface water monitoring.

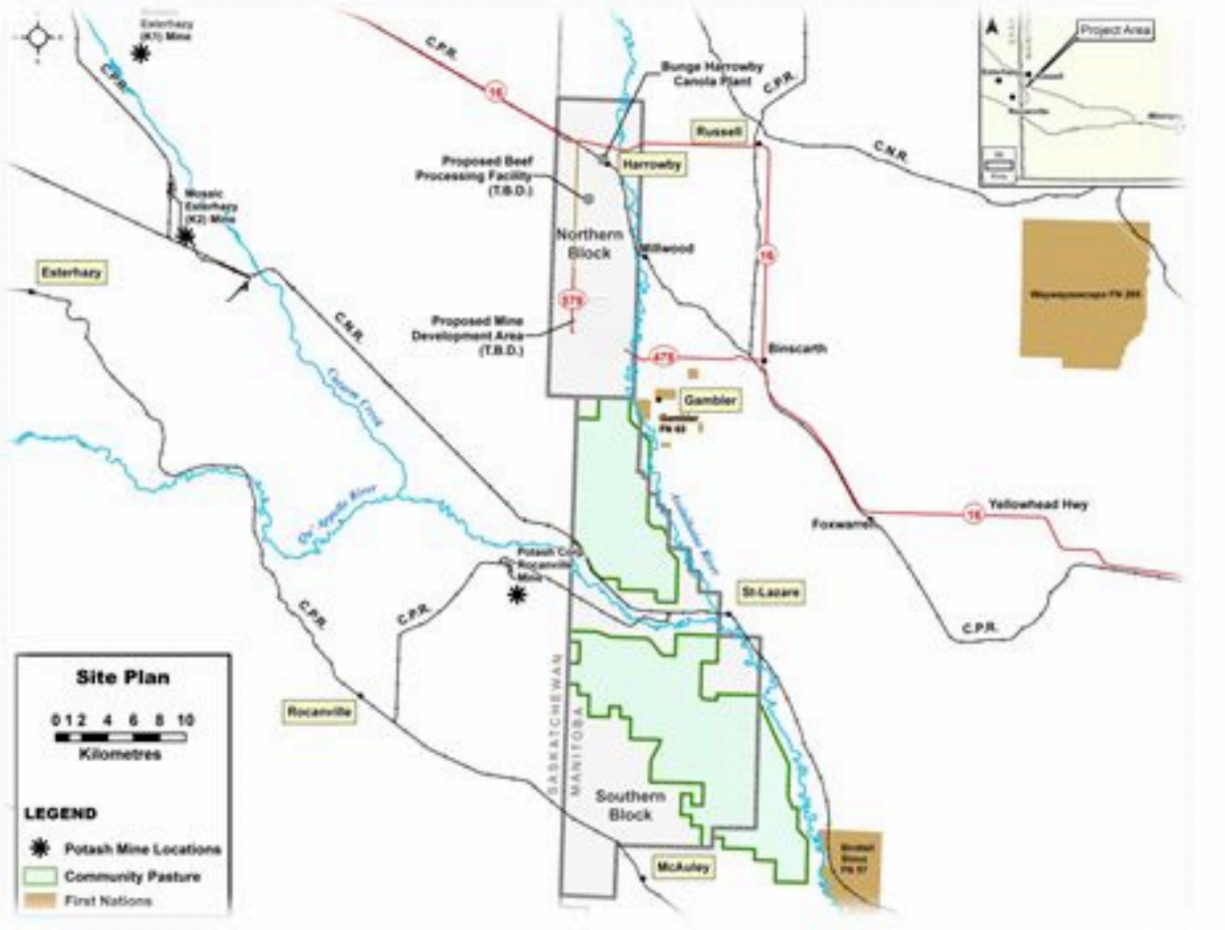
The project indicates “no overland brine pipelines” but the North Block area alone covers 3 townships; 19,20, 21, Range 29WPM1. A South Block is discussed, referenced, and shown in figures 3 and 9 however it is not made clear that it will never be developed.
If not by pipeline, how does the brine make its way to the plant for the entire duration of the 100+ year project?

- How are corrosion and abrasion conditions from solution mining handled?

[1] https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.673.2433&rep=rep1&type=pdf

- How are leaks/spills monitored? Leak detection, monitoring, cathodic protection, must be installed on the system.
- Provide a study on potential brine leaks to the underlying aquifer systems and water bodies including the Assiniboine River.

Figure 1. From PADCOM website; @ 2021 Manitoba Potash; *https://manitobapotash.ca* showing north and south mine blocks, community pastures, proposed beef processing facility and first nations.



There is no evidence that this area is home to wildlife, but it is assumed that wildlife passes through and grazes in the area. (4.2.2 Wildlife). Figure 1 shows the Ellice-Archie and Spy Hill community pastures. These two areas were designated as important bird and biodiversity areas by Nature Manitoba, Bird Studies Canada and Nature Saskatchewan in 2019 and is the first

important bird and biodiversity area in Manitoba to include another province, Saskatchewan.[2] Two globally threatened birds migrate and breed in the area. The Manitoba side is also home to 10 uncommon or rare Manitoba plant species, including Indian Rice Grass and Waxleaf Beardtongue. Although the North Block is just north of the Important bird area, the area contains these grasslands, wetlands, aspen forests, and the Assiniboine River system, surely there is an ecosystem present. The PADCOM proposal makes assumptions on "Biological Environment 4.2" wildlife, vegetation and fish; it lacks a detailed and thoughtful ecosystem study. It is insufficient for a 100+year potash mine/processing plant Environment Act Proposal. The area is beautiful and deserves a proper and comprehensive analysis.

- Provide a comprehensive assessment of ecosystems, wildlife in the entire project area including fish and fish habitat assessment.
- Provide a noise and light pollution study and impacts to wildlife, livestock and residents from all project operations including a cumulative impact study from neighbouring industry.

The project will go beyond 2050 requiring the project to meet Canada GHG emission reduction targets under Bill C-12 Canadian Net Zero Emissions Accountability Act and the Strategic Assessment of Climate Change(SACC). PADCOM must contact the IAAC regarding GHG emissions of the project and to determine federal jurisdiction.

- The project must comply to Bill C-12 and SACC.

Canada is one of the world's top emitters for GHG emissions from fertilizers.
Canada can only reduce fertilizer emissions 30% below 2020 levels by 2030 by sustainable farming practices that do not rely on synthetic fertilizers. Increasing Canada's potash footprint, regardless of technique used, is not sustainable development, is not a resilient project, and the movement towards getting off fossil fuels/chemical fertilizers to regenerative farming puts this project at odds and financial risk. As it is, the Manitoba Chamber of Commerce, now entrusted with the Manitoba Mineral Development Fund, announced funding of the PADCOM project of $300,000 towards "phase 1 (test production) in the fall of 2020."[3] It is not in the best interest of Manitobans, Canadians and the planet to continue to subsidize fossil fuel development.

- How does an additional potash mine and mill enable Canada to reduce fertilizer emissions?

A decision has to be made for the next expansion, to use some gas or to convert entirely to electricity as an energy source (moving the mine to essentially zero carbon). (2.9.2 Natural gas/ propane)
The project requires installation of a new gas pipeline to supply the volume required. Canada should not be installing gas pipelines, Canada should be eliminating fossil fuel reliance. As a new project that bases itself on reducing GHG emissions it is concerning that the project has not

[2] https://www.cbc.ca/news/canada/manitoba/manitoba-saskatchewan-important-bird-area-1.5035100

[3] https://mbchamber.mb.ca/wp-content/uploads/2021/02/Approved-Projects_Website.pdf

considered producing its own energy rather than relying on fossil fuels, Hydro or combination thereof.

The proposal does not assess GHG emissions for the planned 250,000 tonnes per year of potash production. It states propane, diesel, gas, and hydro as energy choices to power the project but puts the decision off to the expansion phase. This does not provide for detailed GHG calculations. GHG calculations for diesel and transport of the product are missing from the proposal. Low to zero carbon emissions are supposed to occur at the end of the two year development period however there is no guarantee and no detailed and credible plan on how this will be achieved in accordance with SACC.

- Provide GHG calculations for all energy choices stated in the proposal for the planned 250,000 tonnes production per year.
- Provide GHG calculations for heating the freshwater, cooling the brine for crystallization, drying the potash, and reheating the brine for injection.
- Provide GHG calculations for equipment used to load the product and for truck and rail transport.
- Provide an economic feasibility report for supplying the plant with a new larger gas line required for the plant.
- Provide GHG emissions for all probable new connections in providing the new gas line from other industry and agriculture.

The initial 90-day production test estimates approximately 17 000 tonnes will be extracted in solution to 70 000 tonnes (Project Overview)
The project will begin at a 100,000 tonne per year rate for 90 days to confirm the design, (Executive Summary)
Add capacity to 250,000 tonnes per year over a two-year period. (1.5 Project planning phases)
Statements for time frames contradict other time frames in the proposal. The test and information and data contained in the Proposal seems to be for extraction volumes below the planned project capacity of 250,000 tonnes per year. After the test period the process design will be completed, a heat pump system will be selected, additional crystallizers, and new equipment will be installed. The proposal does not match the final project, emission calculations do not match the final project etc; the proposal is not developed to a level appropriate of a credible, comprehensive environmental assessment that will protect the environment and thus human health. An Environment Act License must not be granted to an experiment.

The product will be transported by truck and then eventually rail to markets in Canada, United States and internationally. (1.1)
As the selected location is adjacent to the rail line, PADCOM will be able to directly load the product from the Processing Facility to railcar in the future. As for now, trucking will be the primary mode of product transport. (1.4)
Sell the product to a single customer loaded on trucks. (1.5)

The proposal indicates looking at possible direct loading from the processing facility to railcar in the project planning phase(1.5) for 250,000 tonnes per year production and operations phase(3.1.2) The facility design does not provide for this probability; rail load out, car storage/ rail yard, spur line(s). The proposal should provide this information for rail assessment, to assess if feasible, what impacts will occur to neighbouring industries, residents and wildlife, increased rail traffic, noise and vibration.
The proposal compares truck traffic amounts from neighbouring Bunge Canola Plant, describes "semi truckload" use and calculates "7-8 truckloads" daily at the 100,000 tonnes production level that will occur for 90 days(executive summary).
The proposal files transportation of the product under "ancillary projects" (2.12) however transport is a necessary component of the project(3.1.2) and critical to its success, produces effects(road dust, infrastructure wear and tear, fugitive salt dust and potential contamination of vegetation, soil, and water systems, GHG) and should be assessed under this proposal, not dismissed from the project to a "trucking contractor".(2.7.9)
Loading and transport of the product is avoiding environmental assessment. The entire project needs to be assessed for all impacts and cumulative impacts now.

- Provide GHG emissions from loading of product and transport via truck and rail.
- Provide a site plan for planned rail load out and rail yard.
- Provide a traffic study and mitigation plans on 250,000 tonne planned production capacity.
- Provide a traffic study and mitigation plans on impacts to wildlife, livestock and residents.
- Provide mitigation of fugitive salt dust in transportation.

The only "chemicals" used, include oil (local 35 api crude) for dust control on the product, and amine (octadecyl amine) for anticaking(executive summary)
The proposal does not contain material safety data sheet on all "chemicals" used. Amine[4] is soluble in benzene[5] which is found in crude oil. Both are toxic to aquatic life.
Applying amine and crude oil, a fossil fuel, to the potash will inevitably introduce it to the food chain, groundwater and water ways through agricultural operations, drainage practices, rain and snowfall. This is unacceptable and not the proper direction that Canada and Manitoba should be taking.

- Provide study on how chemicals and combining the chemicals will impact the environment.
- Source and use non toxic dust control and anti-caking agents.

The Beechy Solution Mining Technology has been developed over the last 10 years and included extensive lab testing and modelling.(Laboratory Testing and Modelling)

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[4] https://pubchem.ncbi.nlm.nih.gov/compound/Octadecylamine

[5] https://pubchem.ncbi.nlm.nih.gov/compound/benzene

The technique has not progressed outside of the lab although the founder of Beechy has approached many in the Saskatchewan potash industry.[6] [7] Horizontal selective solution mining for potash is unproven. Why has the experienced Saskatchewan potash industry not team up with Beechy or trial the technique?

Two small scale selective solution potash mines in Saskatchewan have been exempted from EIS, having been ruled "not a project". These two projects have a significantly larger footprint and emissions compared to the proposed PADCOM selective solution mine with PADCOM's mine being less than 10% of the environmental footprint.(Executive summary)
No reference material is provided to support the statement of an environmental assessment exemption. It is unclear if the two small scale mines mentioned use the novel horizontal selective solution mining process. Regardless, under Manitoba Legislation potash mines and processing facilities are considered Class 3 developments and this project is avoiding conveyance of public hearings.

- I request written reason(s) as to why the Clean Environment Commission has not been convened.

Under *"2.13 Alternative"* the proposal is written in such a way that if the Beechy technology fails to live up to *"laboratory testing and modelling"* the only alternative is *"conventional solution mine or typical underground mine"*.

- Is the project licensing solely for the Beechy technology?

Manitoba Conservation and Climate needs to clarify this section and ensure only the Beechy technology is under review for licensing.

Presently the unit of interest is the Cretaceous age Swan River Formation (or Manville) which has been used and has a proven record for low pressure injection of waste salt brines. The alternative unit is the Devonian Winnipegosis Formation, (2.7.7 Brine Injection Well)
The brine disposal is proposed to be drilled into the Winnipegosis Formation as is done at the potash mines in Esterhazy and Rocanville, Saskatchewan. (6.1.4 Brine Disposal)

- After continued use as a dumping zone for injecting materials, has the ability for these formations to accept further material been analyzed and calculated? Please provide.
- Determine if the formation can handle additional volumes of injected material from this 100+ year project.
- What is the safe pressurization for these formations?

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[6] https://stockhouse.com/companies/bullboard/v.gsp/gensource-potash-corporation?postid=34057326

[7] https://simsa.ca/news/simsas-junior-potash-2-0-event-features-legendary-persons/

A small brine injection well will be located as close to the plant as possible. (2.7.7)
two production wells and an injection well. (2.6)
The proposal only indicates the use of 1 injection well.

- How does this 1 well service a project estimated at 100+ years?
- How many production wells are drilled for the entire project?
- How many injection wells are drilled for the entire project?

132 gallons (600 litres) of water for the production of one tonne of potash (1.3 Company Profile)
For 250,000 tonnes of potash water consumption would be 33,000,000 gallons. This amount of water is permanently removed from the aquifer system. The proposal lacks critical studies on sustainable water draw from the Hatfield Valley Aquifer and if additional use from the PADCOM potash mine and processing plant would compromise present users on both sides of the provincial border. The proposal provides a map of the Hatfield Valley Aquifer but only for the province of Saskatchewan.

- Is there sufficient knowledge of the aquifer systems in Manitoba?
- What is the sustainable yield of the aquifer from all users and can it handle the addition of this potash mine that has a 100+ year life?

It is unclear if indigenous consultations have occurred for all community members. It is unclear what public consultations have taken place and the outcome(s). The “advertisement” on the public registry fails to open.

As in the proposal for the CanWhite Sands project (Manitoba Public Registry 6057 & 6119) this Environment Act Proposal is for a project that uses a new mining technique, is still at an experimental stage, has no established safe outcome, and the Environment Act Proposals are limited to a small portion of the project yet request licensing for the entire project.

The PADCOM Potash Mine #6126.00 proposal only considers the “local project area” and not the true footprint of the 100+ year mine at 250,000 tonnes per year capacity. It lacks pertinent information and thus cannot be credibly assessed.

To ensure protection of the environment and human health, it must not receive an Environment Act License.

From: Hanna Drielick
To: Winsor, Jennifer (CC)
Subject: File 6126.00
Date: November 12, 2021 4:33:19 PM

Dear Jennifer,
I am sending you an email to comment on the potash solution mine as I feel that the development of this mine will effect me in a positive way. I sincerely believe that this will create good jobs in our area and I hope to be able to apply for one of these jobs.

Thanks,
Hanna Drielick

November 2, 2021

Topic: Potash and AGRI Development Corp. of Manitoba LTD. (PADCOM) – Potash Solution Mine

To whom this may concern;

I am writing this letter in support to the Potash Solution Mine located on section 28-20-29 WPM in the Hamlet of Harrowby in the RM of Russell/Binscarth.

As a supportive individual to the local Russell/Binscarth/Ellice-Archie community, I strongly support the Potash Solution Mining Project. This opportunity has been thought-out thoroughly with highly qualified designers, and with the benefits of this development, it has potential of stable careers for many families from the surrounding communities considering the job losses affected by the COVID-19 pandemic. I have had the opportunity to sit in on the proposed plan on a couple of occasions located in both Russell and Gambler First Nation, I would highly recommend reviewing the presentation. With my understanding, it will be a great asset for the local farmers on fertilizer to better support plant growth, increase crop yield and disease resistance, and enhance water preservation. The proposed project will have a less invasive removal as it is being mined through Solution drilling, . With Bunge being a neighbouring company, there is a set trucking system as well as a railway, the disturbance of the environment is set with a known atmosphere for many years before now.

In conclusion, the Potash Solution Mining Project will only further the development and infrastructure to the surrounding communities.

Thrilled resident of Gambler First Nation,

Dana Tanner

[redacted]

To: Whom it may concern.

I am writing this letter in regards to the PADCOM article. I, as a Manitoban, feel it would be great to have a potash mine in Manitoba, as the closest one is in Saskatchewan. It would create some jobs for local people and be able to create a revenue for Manitoba.

I have also been to a couple of the meetings that were held in Russell, Manitoba and on Gambler First Nation, in regards to how the drilling for the potash would be done. I would like to say that I feel this would be a more efficient and environmentally friendly way of mining potash.

Sincerely,

[redacted]

Tara Tanner

2 November 2021

Environmental Approvals Branch
Manitoba Conservation and Climate4
1007 2021Century Street
Winnipeg, MB
R3H 0W4

RE: Potash and Agri Development Corporation of Manitoba Ltd. (PADCOM)-
Potash Solution Mine-File: 6126.00

Greetings:

Thank you for allowing me to voice my views on this project. I am very excited to have such a viable, valuable, and beneficial project coming to the Russell/Binscarth/Gambler area.

It is evident to me that the brine solution will not impact the environment in a negative way as there is already salt in the ground and no chemicals will be used to draw the potash out. There will be no large holes or tailings left upon the land.

I believe our area will be affected in a positive way creating jobs and stimulating the economy.

Sincerely,

[redacted]

Tuesday November 2nd, 2021

To whom this may concern,

Boozhoo,

I, Councilor Kellie LeDoux of Gambler First Nation, would like to send in my support to the PADCOM mining solution company, recognizing it to be a great business venture and employment opportunity for our surrounding area of Russell/Binscarth/Gambler.

I believe this is going to allow our communities to flourish in ways of:

- Owning our own natural resources which can be utilized by the many local farmers in the area and other fertilizer companies.
- Having Manitoba available to a mineral resource that is more commonly available outside our province.
- Long term employment for many generations to come.

Good luck to PADCOM and the future it will bring to many of our neighbors and community members.

Miigwech

[redacted]

Councilor

Kellie LeDoux

Tuesday November 2nd, 2021

RE: Potash and Agri Development Corporation of Manitoba Ltd. (PADCOM)- Potash Solution Mine File: 6126.00

Attention: Jennifer Winsor, Senior Environmental Engineer

Good afternoon,

I am writing in response to the article for the Notice of Environmental Act Proposal for PADCOM. I am in full support for this corporation and have been waiting eagerly for some time to see this operation begin.

I am a community member of Gambler First Nation and have been in attendance for both the Russell town meetings on the topic, as well as presentations that Daymon has provided for our community of Gambler.

I think this would be beneficial for the large surrounding areas of Russell, Binscarth and Gambler for several reasons:

- From my understanding is it is a simple operation that causes little to no environmental hazard as it doesn't contain fracking or the use of chemicals during the process.
- It is set up at a prime location close to the many surrounding farms for use and railway systems for easier, more accommodating transportation routes.
- The grounds where the operation is occurring is a gold mine for underlaying potash veins which can house operations for many years to come which means employment opportunities for generations to come.
- Above ground mining is one of the safest ways to mine; there is no way of a mine collapsing.
- The "give-back" program the company is striving for will aid surrounding communities in means of financial aides, educational programs/resources and most importantly job opportunities.

I look forward to seeing this great opportunity come to fruition for our Russell/Binscarth/Gambler municipalities, as well as, the Province of Manitoba, as potash mining is something more known to be done by our neighboring provinces.

Thank you for your time.

Sincerely,

[redacted]

Mackenzie Olynyk

MANITOBA ECO-NETWORK

3rd Floor 303 Portage Ave., Winnipeg MB R3B 2B4
Tel: 204-947-6511 www.mbeconetwork.org

November 23, 2021

Honourable Sarah Guillemard
Minister of Climate and Conservation
mincc@leg.gov.mb.ca

Jennifer Winsor, P. Eng.
Environmental Approvals Branch
Manitoba Conservation and Climate
Jennifer.Winsor@gov.mb.ca

Dear Minister Guillemard and Jennifer Winsor,

Re: MbEN Comments – PADCOM Potash Mine, File No. 6126.00

The Manitoba Eco-Network (MbEN) appreciates this opportunity to comment on the Potash and Agri Development Corporation of Manitoba Ltd. (PADCOM) Potash Solution Mine EAP. Since 1988, MbEN has promoted positive environmental action by supporting people and groups in our community. MbEN's programming focuses on policy advocacy, engagement in consultation processes and developing capacity building tools that benefit the environmental non-profit sector and our member groups.

Given the size and scope of the project, the novel and unused mining technology proposed and the lack of detailed information provided to date, MbEN requests you consider PADCOM's proposed Potash Mine and Processing Plant as a Class 3 Development and require a Clean Environment Commission (CEC) public hearing with participant funding. The CEC should initiate a public outreach program to get input on the terms of reference for the hearing and participant funding program. While Manitoba does not have an established potash industry, the last attempt to establish a potash mining project, in 1988 by Canamax Resources Inc., went through the Clean Environment Commission's public hearing process. This proposed project should receive the same level of public review.

Designation as a Class 3 Development

The proposed development should be designated as a Class 3 development under the *Classes of Development Regulation* since "Potash mines and milling facilities" are captured under s. 4 of the Regulation. This means the development must proceed with the assessment and licensing process set out under s. 12 of *The Environment Act* ("the Act").

The project should be assessed at its highest proposed operating potential (i.e. 250,000 tonnes per year) and should not be considered for licensing in stages under s. 13 of the Act. The lack of information in the EAP about the applicable legislative provisions and reference to the initial 70,000 ton test phase as "Phase 1" seems to indicate the potential for the proposed project to be licensed in stages under s. 13 of the Act. MbEN strongly suggests this approach is not utilized and the project instead be assessed under s. 12 of the Act.

This sentiment is supported by the Manitoba Law Reform Commission (MLRC Report 130 (2015), p 103), which identified that "[o]ne of the most heavily criticised aspects of Manitoba's environmental assessment and licensing process is the legislative mechanism that allows a development to be licensed in stages". This is because a staged approach is inconsistent with the principles of sustainability and prevents comprehensive consideration of a proposed development's aggregate effects. Repeal of s. 13 was recommended by the MLRC in 2015.

Information requirements not met according to Manitoba EAP Report Guidelines

There are significant gaps in the information provided by PADCOM in its EAP according to the requirements set out in the Government of Manitoba's EAP Report Guidelines. For example, the description of the proposed development is missing the following information:

Need or rationale for the development, purpose, and alternatives; may include one or more of the following depending on the development and specifically, reference to previous studies and activities relating to feasibility, exploration, or project siting and prior authorization received from other government agencies.

The novel mining process, described as selective solution mining technology has been proposed in other jurisdictions in Canada. There is no discussion on the feasibility and/or success of this technology, nor any reference and reporting of those activities and studies from other jurisdictions.

Owner of land upon which the development is intended to be constructed, and of mineral rights beneath the land, if different from surface owner.

The full footprint of the project (i.e., 100 years at 250,000 tonnes potash extracted per year) has not been identified according to the mineral rights held, nor have the mineral rights been adequately geographically identified.

Description of proposed development and schedule for stages of the development, including proposed dates for planning, design, construction, commissioning, operation, and decommissioning and/or termination of operation (if known), identifying major components and activities of the development as applicable (e.g. access road, airstrip, processing facility, waste disposal area, etc.).

The project schedule provided in the EAP and description of activities does not identify the full footprint of the project at 250,000 tonnes per year. It is our assumption that there will be a network of gathering pipelines leading to the processing facility to collect potash from the horizontal wells, to force hot water to collect the potash, and inject spent brine into the Winnipeg Formation. There is also no accurate depiction of energy used, at what places and magnitude, and type, over the life of the project. A more accurate depiction of energy use will provide the true magnitude of greenhouse gas emissions of the project.

Funding, including the name and address of any government agency or program (federal, provincial or otherwise) from which a grant or loan of capital funds have been requested (where applicable).

Potash is an important nutrient for our global agricultural systems and we are supportive of the economic benefits that may be achieved in the region, however there is no mention of how this project is financed, nor any indication as to how much governments may or have invested into the project to date in the form of grants, loans or subsidies (direct or indirect).

Other federal, provincial or municipal approvals, licences, permits, authorizations, etc. known to be required for the proposed development, and the status of the project's application or approval.

There are a whole host of approvals, licenses, permits, authorizations, etc. from various agencies that have not been identified. Without the full project footprint of 250,000 tonnes per year at 100 years plus, it is impossible to provide comment at this point in time.

Results of any public consultations undertaken or to be undertaken in conjunction with project planning.

Public consultation has not occurred for this proposal. Considering that the EAP has been submitted and the Environmental Approval process is in place, having public consultations led by the proponent would be meaningless. As mentioned, we suggest that the CEC conduct a public outreach program as part of their investigation into this project through the hearing process.

Without knowing the full extent of the project, i.e. footprint and location of extracting 250,000 tonnes per year over the lifespan of the project, we decline to offer further comments at this point in time in regard to environmental and human effects of the proposed development, mitigation measures to those effects as well as assessing whether follow-up plans, monitoring and reporting are adequate.

MbEN appreciates your consideration of our comments about the environmental assessment and licensing of PADCOM's proposed Potash Solution Mine and welcomes future opportunities to engage with the Department in the assessment of projects in Manitoba to ensure the highest level of environmental protection measures are required. Under *The Environment Act*, the Department of Conservation and Climate is tasked with protecting the quality of the environment and environmental health of present and future generations and providing the opportunity for all citizens to exercise influence over the quality of their living environment. We are confident you will adhere to these principles and ensure an informed decision about the proposed development can be made.

Sincerely,

Heather Fast, B.A., J.D., LL.M.
Policy Advocacy Director

Glen Koroluk
Executive Director