

Potash and Agri Development Corporation of Manitoba Ltd.

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September 2, 2021

Jennifer Winsor P. Eng.
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Manitoba Conservation and Climate
Environmental Approvals
1007 Century Street
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R3H 0W4

RE: PADCOM Potash Solution Mining Project – Environment Act Proposal (EAP) Application

Dear Ms. Winsor:

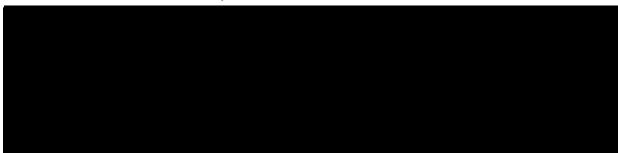
Please find enclosed our Environment Act Proposal (EAP) application along with a cheque for \$7500 payable to Minister of Finance.

Also please find enclosed two hard copies and an USB drive of the Report/plans supporting the EAP.

As outlined in the EAP proposal, the project will consist of a small selective potash solution processing project located in the abandoned Hamlet of Harrowby, Manitoba, approximately 16 km west of Russell within the Municipality of Russell-Binscarth.

If you have any questions regarding the proposed project, please contact me at your earliest convenience.

Yours sincerely,



Daymon Guillas
President

T: 204-773-7500

E: dguillas@manitobapotash.ca

**Potash and Agri Development Corporation of Manitoba
(PADCOM)**

**Potash Solution Mining Project
Removing the Potash Only By Selective Solution Mining**

Environment Act Proposal

By:

Harvey Haugen

Daymon Guillas

September 1st, 2021

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EXECUTIVE SUMMARY

A proposal is presented for Potash and Agri Development Corporation of Manitoba (PADCOM) to construct a small selective potash solution processing plant at Harrowby, Manitoba. The project will begin at a 100,000 tonne per year rate for 90 days to confirm the design, then progress to 250,000 tonne per year rate over a two-year development. At the end of the development period the mine will produce the first (near zero) carbon potash in the world.

The Beechy Potash Technology has a huge positive environmental impact, providing a possible path for future potash production in Canada (and the world) to produce near zero carbon emission potash. Canada produces about 21,000,000 tonnes of potash per year. 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. If carbon is valued at \$170 a tonne, that is a contribution to the industry, in carbon value alone, of \$0.85 billion. At the same time application of the technology reduces capital and operating cost making large scale expansion of the industry possible with dramatic reductions in water consumption, with no salt piles or tailings ponds.

The dimensions and negative impacts of the proposed mine is minimal. Based on the Purpose of the Environment Act 1(1) (b) provides for the environmental assessment of projects which are likely to have significant effects on the environment.

1. The entire operation is in a single building, on a 1-hectare site. This is similar to an industrial manufacturing shop, far less than a normal farmsite, not a typical potash solution mine;
2. Three wells are used, all three are on the site, each handles a non toxic salt/potash brine. There are no overland brine pipelines.
3. No chemicals are used in the processing of potash.
4. 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.
5. Emissions from the PADCOM solution plant are from three sources. They include hot gas from boilers, dryer discharge air, and air from dust collectors. Stack sampling on the system operating at the Beechy Potash Products Corp. facility shows emissions of 2.8 mg/cubic m for a total discharge of 10 grams per hour which is less than 10% of the regulated emission.
6. The only "chemicals" used, include oil (local 35 api crude) for dust control on the product, and amine (octadecyl amine) for anticaking;
7. Carbon emissions are low for the industry. No toxic emissions.
8. The PADCOM operations team has the expertise to understand potash mining, potential hazards, and are well capable to manage the operation in a safe manner with a minimum of adverse environmental impact.
9. This plan provides large environmental benefits now and into the future with a minimal environmental footprint.

10. Socioeconomic benefits are very positive for the local communities and local First Nation communities residing in the Treaty 2 Territory.

LIST OF ABBREVIATIONS

Amine	Octadecyl Amine
C	Celsius
cm	Centimetres
Fm	Formation
GPM	Gallons per minute
HDPE	High density polyethylene plastic pipe
Hr	Hour
KCl	Potassium Chloride
K ₂ O	Potassium Oxide
km	Kilometres
lb	Pound (weight)
MB	Manitoba
MPC	Manitoba Potash Corporation
Mbr	Member
m	Metres
M ³ /minute	Cubic metres per minute
MOP	Muriate of potash
NH ₃	Ammonia
PADCOM	Potash and Agri Development Corporation of Manitoba
TDS	Total dissolved solids
Tonne	Metric ton
t/m ³	Tonnes per cubic metre
TPA:	Tonnes per annum
USGPM	US gallons per minute

1. GENERAL PROJECT INFORMATION

1.1 Project Overview

This document provides a plan for a 250 000 tonnes per year potash mine to be built by PADCOM at the Hamlet of Harrowby, Manitoba. The project is the construction of a small-scale potash solution mine near Russell Manitoba. A 90-day production test is a first step in the development of a full-scale potash mine; 250 000 tonnes per year.

The initial 90-day production test estimates approximately 17 000 tonnes will be extracted in solution to 70 000 tonnes, with modification and optimization growing production to 100 000 per year . The plant will then be scaled up over 2 years to produce 250 000 tonnes per year into a small-scale potash solution mine. The mine site will be located at Harrowby, Manitoba (16 kms from Russell, Manitoba). Russell is 350 kms from the City of Winnipeg, by road.

This project is being developed for the purpose of supplying high quality potash for use in a variety of markets such as agricultural fertilizer. The product will be transported by truck and then eventually rail to markets in Canada, United States and internationally. The anticipated life of the mine is estimated at 100+ years.

Extraction will involve drilling two 7 inch (17.8 cm) cased wells and two horizontal wells at 827.1 meters which will intersect the potash zone and to confirm the production which will dictate the design for Phase 2 expansion .

Project descriptions will be provided in this report describing in detail the extraction process. This will include all permanent buildings, facilities and infrastructure that are part of the potash processing facility and extraction.

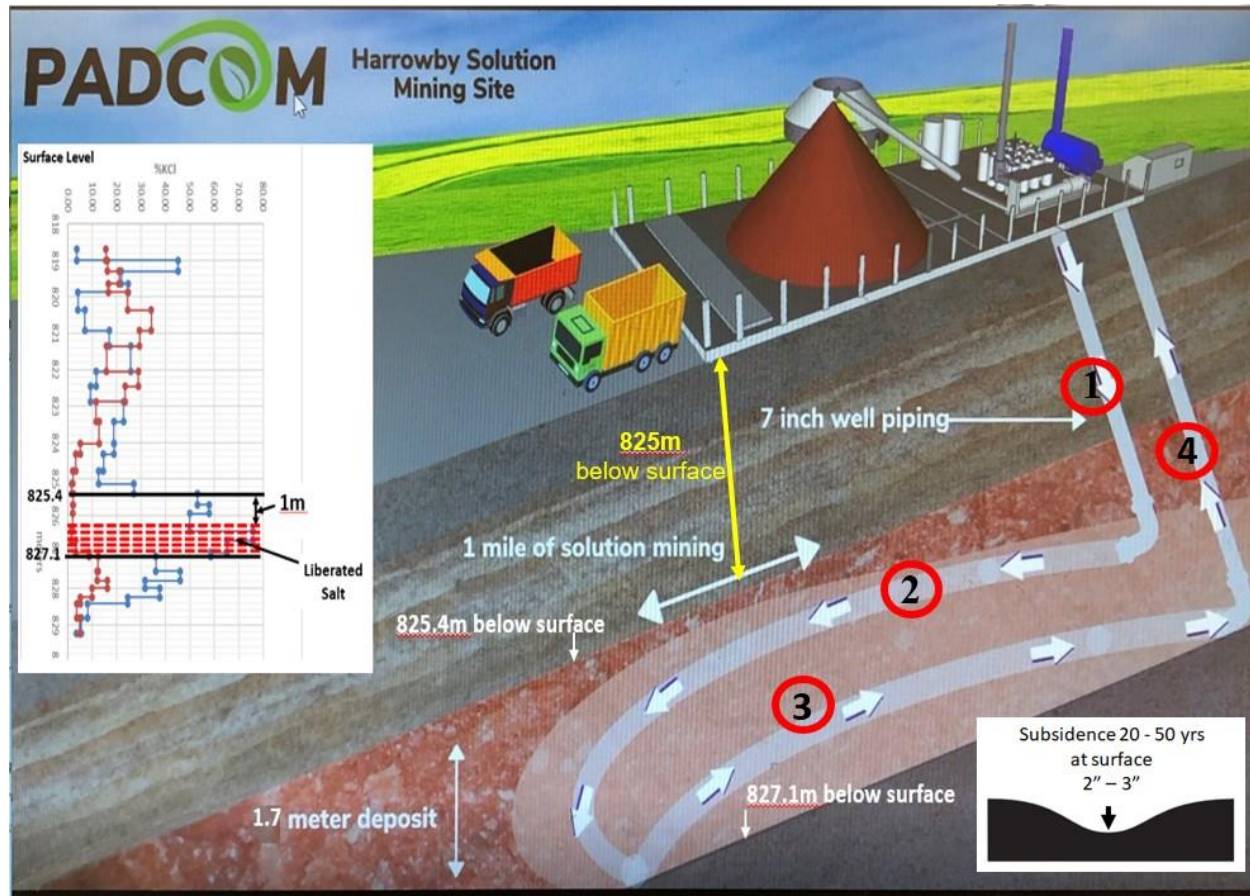
Key components of the Project are:

- Processing Plant will the following associated components;
 - Intake well of potash brine;
 - Centrifuge;
 - Product dryer;
 - Downhole injection brine well;
- Ancillary structures, including permanent office with staff kitchen and washrooms.

The above-listed components are collectively referred to as the Processing Plant.

There will be 7-8 semi truckloads per day for trucking out of the potash processing plant versus 40 trucks a day from the Bunge canola plant.

A conceptual map of the Processing Facility is shown in Figure 1. Details are provided in Section 2 – Project Descriptions.



Foot print similar to a farm operation or oil well site.

Figure 1: Conceptual Site Map of the PADCOM Processing Site

The potash resource in Manitoba has historically been studied by a number of companies since the 1960s. A major proposal was completed by Canamax Resources (Manitoba Potash Corp) in 1987, with the plan for a conventional room and pillar underground mine. Subsequently, BHP did additional studies and produced a high-level development plan for a similar room and pillar mine in 2009. None of these projects were able to move forward. The potash resource has been identified through these various studies over the years and a total of 51 drill holes have been drilled to intersect the potash zone.

In 2015, the Manitoba Government hired the consulting firm MICON International to divest the Manitoba Potash Corporation including its leases and assets in a public and transparent bidding process. Over 300 parties were invited to bid and eventually three parties choosing to participate in the MPC divestiture process. PADCOM was selected as the successful party in 2016.

PADCOM had Agapito Associates Inc. assess the potash resource during its bid for the successful acquisition of MPC in 2015. The study showed a resource estimate of 231-521 million tonnes available in the North and South Block (originally the potash sites were divided into 2 prospective sites – North and South) that are part of the area of interest initially under MPC which were awarded to PADCOM.

In 2018 PADCOM and Beechy Potash Products partnered to develop a small selective underground potash solution project (100 000 tonnes/year initially) (compared to the Rocanville, Saskatchewan mine which extracts approximately 7 million tonnes/year) at Harrowby, Manitoba. The project will emit nearly zero emissions and will also partner with Gambler First Nation. Project ownership is between PADCOM, Gambler First Nation and Beechy Potash Products Corporation.

Mr. Harvey Haugen, President of Beechy Potash Products, will direct planning for the plant at a local level. Mr. Haugen owns the technology patent that PADCOM is using for the proposed potash solutioning at Harrowby, Manitoba and is a knowledgeable and respected authority on this process in the world.

PADCOM is primarily interested in the North Block. Seismic lines have been run on the North Block in previous studies which identified the edge of the potash deposit to the east in the North Block. PADCOM's re-evaluation of historic drill assays and downhole gamma logs from this area, and using the Beechy process, with an assumption of mining 60% of the high-grade potash, it is estimated 42,100,000 tonnes of production is available. This work has identified that the zone of interest is at a depth between 825.4 meters and 827.1 m, which is best suited for the Beechy technology.

In the North Block, the potash only extends into Manitoba approximately 5 km from the Manitoba-Saskatchewan border. The high-grade potash zone (the target zone) comes from the Esterhazy Member of the Devonian Prairie Evaporite, which exists in the subsurface throughout the area. This high-grade zone, over 70% K₂O ideal for selective potash solutioning method.

PADCOM's area of interest is within Townships 19, 20 into 21, Range 29, W1 (west of the prime meridian (WPM)).

1.2 Proponent Contact Information

Table 1: Proponent Contact Information

Name of Proponent	Potash and Agri Development Corporation of Manitoba Ltd. (PADCOM).
Address of Proponent	Russell, Manitoba, Box 460 Russell, R0J1W0
Principal Contact Person(s) for the Environment Act Proposal (EAP)	Daymon Guillas President / Project Leader Box 460 Russell, Manitoba R0J 1W0 Phone: 204-773-6228 Email: dguillas@manitobapotash.ca
	Harvey Haugen President of Beechy Potash Products, Technology Owner; Shareholder and Executive of PADCOM Box 130 Beechy, Saskatchewan S0L 0C0 Phone: 306-859-7680 Email: harhau@sasktel.net
	Chief Dave LeDoux, Gambler First Nation Partner Box 250 Binscarth, Manitoba R0J 0G0 Email: office@gamblerfn.ca

1.3 Company Profile

PADCOM is a private company registered in Manitoba and Canada located in the Municipal of Russell-Binscarth. The mineral deposits covered by these mineral rights/claims/leases contain potash (K₂O potassium oxide) and are contained in the subsurface geological unit called the Prairie Evaporite Formation (Fm). The purity of the potash in this geological unit can be as high as 59-75% K₂O puts this unit within international standards for high purity potash.

PADCOM aims to be the first potash producer in Manitoba and will aim to provide benefits to the local community. They propose to develop this Manitoba-based Project using local resources and services to deliver the product by truck (and later rail) to a pre-established market.

As well, it plans to reduce its output of GHG (greenhouse gas) emissions. 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) CO₂ for each tonne of potash they produce. As well, they use 900-5000 gallons (4092 – 22,730 litres) of water per tonne of potash produced.

The PADCOM project predicts an emission of. **21 oz (596 g) of CO₂ per 1 tonne of produced potash** and **132 gallons (600 litres) of water for the production of one tonne of potash.**

- Corporation ID: 897355-5
- Business Number: 829478197
- Incorporation Date: 2014-11-06

1.4 Project Location and Land Tenure

The proposed potash processing plant will be located on section 28 township 20 range 29 W1 (Figure 2). The plant site will be located on the Main Street extending down the back lane in the abandoned Hamlet of Harrowby (Figures 3 and 4).



Figure 2: Location of PADCOM's potash processing plant (red circle).

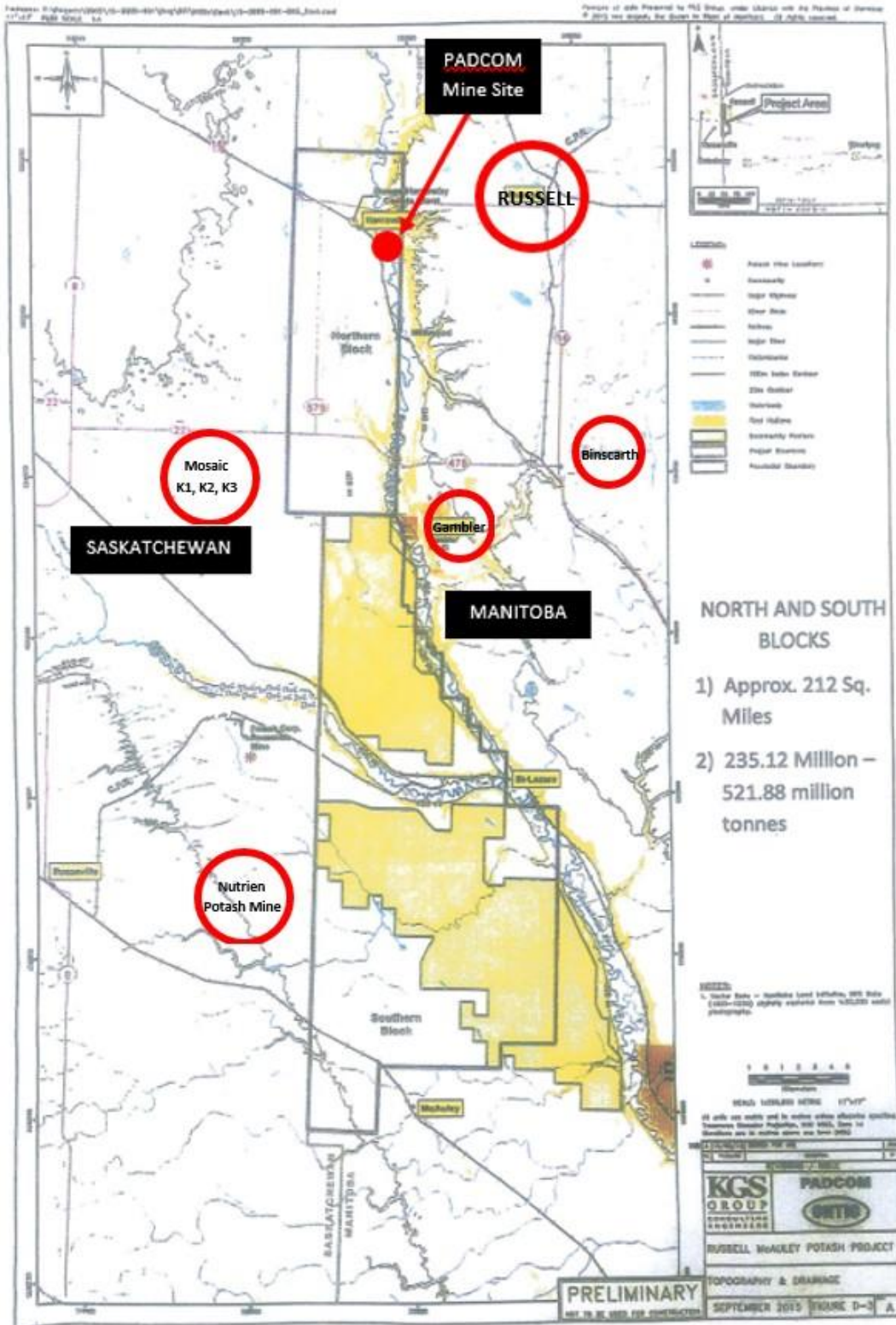


Figure 3: PADCOM's potash processing plant location in Harrowby, near the Town of Russell, and other major mines and significant towns.

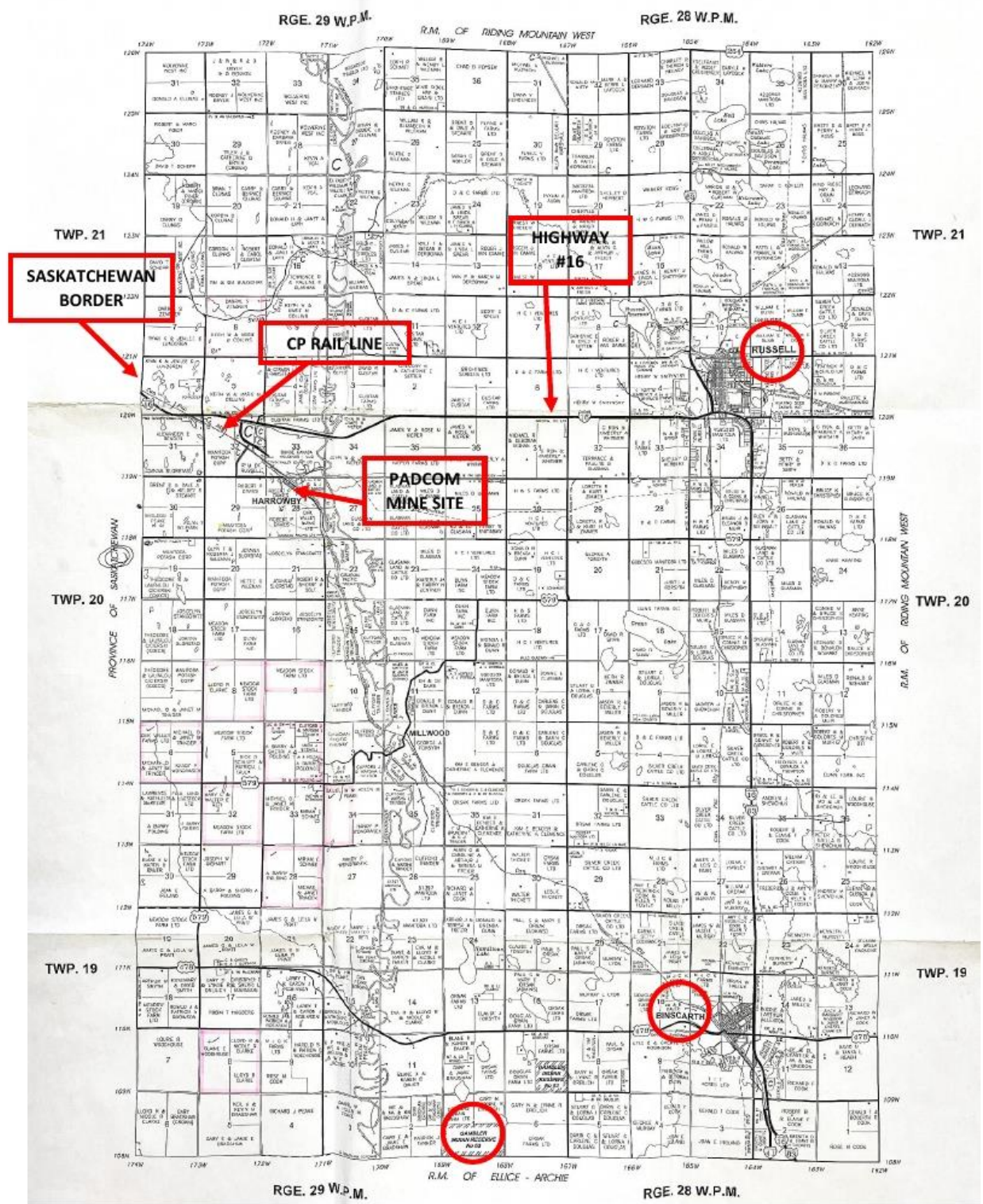


Figure 4: Close up of the plant site and significant towns.

The mine will be developed along the east edge of section 28, south of the railroad. The site will be about 16 km by road from Russell, Manitoba. The mine will be 1½ km south of the Yellowhead Highway # 16 on the paved Bunge Canola Processing Plant access road, then to a gravel road.

There is an active rail siding at the original Harrowby CP Rail siding across the road from the proposed PADCOM plant.

The Mine site is within the Municipality of Russell-Binscarth on private land in the hamlet of Harrowby as illustrated in Figures 5 and 6.



Figure 5: Aerially View of the Location of the PADCOM Processing Site

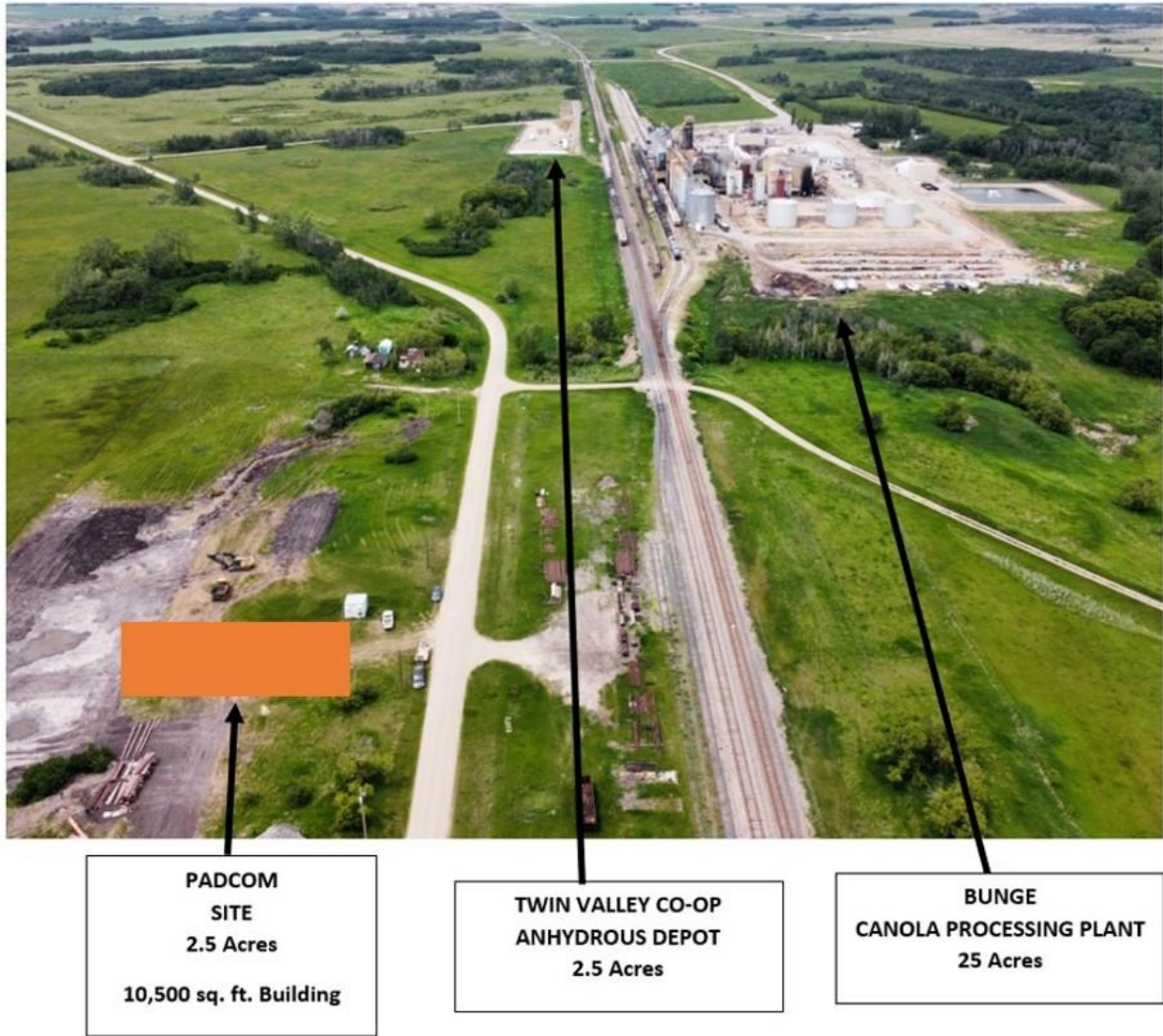


Figure 6: Close up view of the PADCOM Processing Plant location (outlined as an orange rectangle). The Bunge canola plant and the Twin Valley anhydrous plants are indicated also.

PADCOM has purchased title to all privately-owned lands with the Project site. Also PADCOM will, with the approval, construct a permanent structure for the Processing Facility. Figure 7 outlines the detailed site map of the proposed plant site.

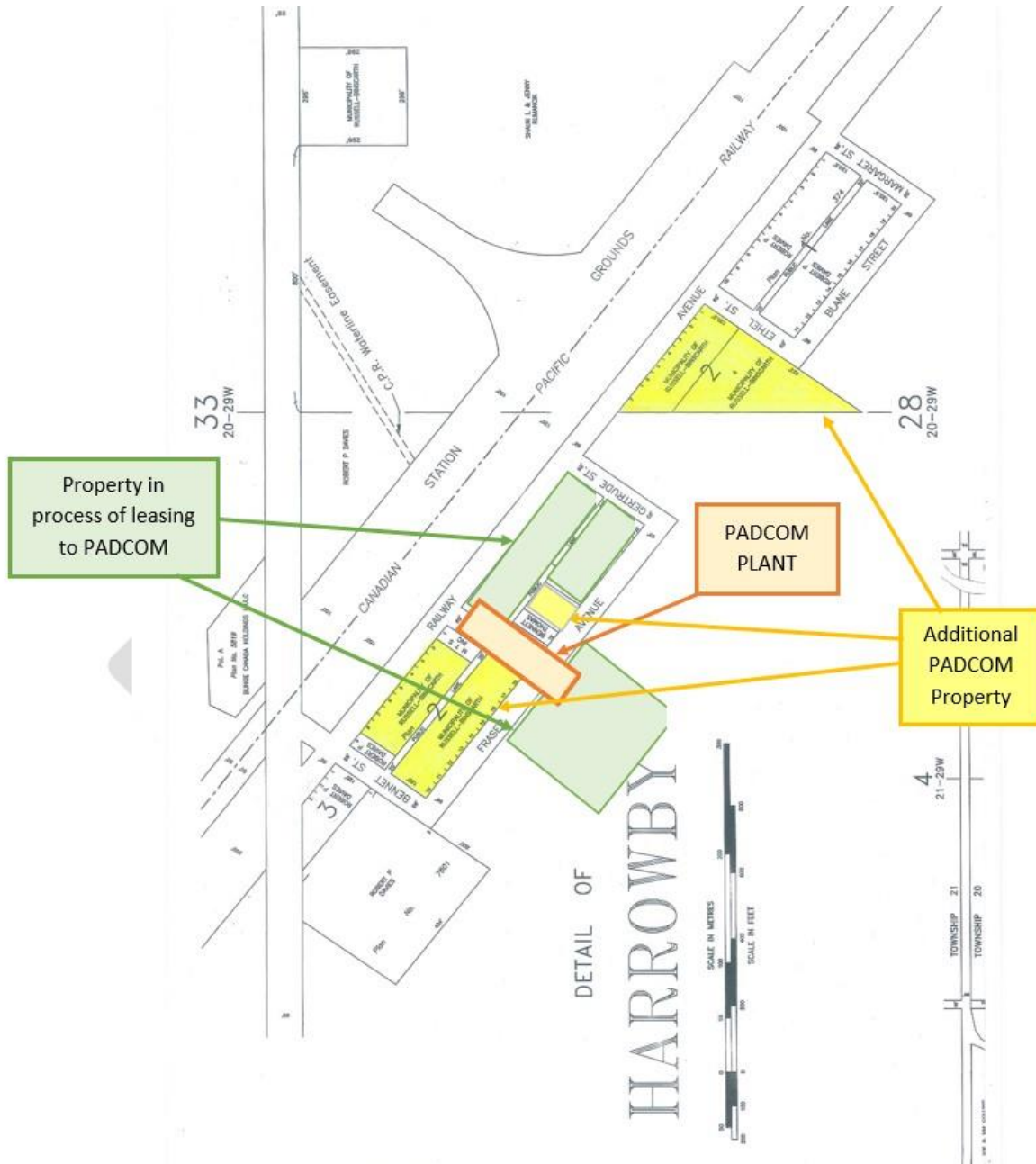


Figure 7: Detailed site map of the proposed processing plant (outlined as an orange rectangle).

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 project will proceed using a diesel generator until installation can be completed by Manitoba Hydro.

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.

The selected Project site is also close to other existing infrastructure such as roads and available electrical power line options to support Project operations, thus minimizing the need for additional construction or traffic. The Project site is zoned for industrial use as AO (Agriculture Operation) which also permits exploration (see Appendix 1). This compliments nearby agricultural activities.

All these factors make the chosen location within the Hamlet of Harrowby ideal for the Project

1.5 Project Planning Phases

PADCOM is planning to initiate construction activities during year Q4 2021 and begin processing potash following the issuance of regulatory permits and approvals. Approvals will be required for the drilling of 3 drill holes that will provide access to the potash zone of interest.

Project phases include to following:

PADCOM has designed a small solution mine in a 3-stage development process.

1. Construction of the 70,000 tonne per year plant within 8 months upon approval
 - a. Complete construction of the plant building;
 - b. Drill two 18 cm (7 inch) cased wells to 827.1 m which become two horizontal wells at 827.1 meters and spread out horizontally 1.6 km;
 - c. Complete equipment installation and connection to the wells;
 - d. Operate on single phase power source.
2. Commence production within 8 months. Sell the product to a single customer loaded on trucks.
3. Expand production to 100,000 tonne per year as soon as possible with minor modifications and optimization.
4. Add capacity to 250,000 tonnes per year over a two-year period.
 - a. Bring in 3 phase power supply
 - b. Complete process design and select heat pump system
 - c. Order additional crystallizers
 - d. Install new equipment
 - e. Look at possible rail loading facility
 - f. Commission at 250,000 tonnes per year.

1.6 Project Schedule

Figure 8 outlines the proposed timeline for the project.

	2021						2022						2023														
	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	
PADCOM																											
Potash Project																											
Phase 1																											
70,000 - 100,00 tpa																											
Environmental Approval																											
Building Construction																											
Well Drilling																											
Equipment Installation and Well Connection																											
Pilot Run and Operation																											
Phase 1 Complete																											
Phase 2 - 250,000 tpa																											
Full Capacity Expansion																											
Powerline Installation																											
Extended Process Design																											
Order New Equipment																											
New Equipment Insallation and Connection																											
Ramp up and Operation																											
Phase 2 Complete																											

Figure 8: PADCOM Project Schedule.

2. PROJECT DESCRIPTION

2.1 Potash Resource

The potash resource in Manitoba has historically been studied by a number of companies since the 1960s. A major proposal was completed by Canamax Resources (Manitoba Potash Corp) in 1987, with the plan for a conventional room and pillar underground mine. None of these projects were able to move production of potash in Manitoba forward. The potash resource has been identified through these various studies over the years and a total of 51 drill holes have been drilled to intersect the potash zone (Figure 9).

A study by AMEC for BHP Billiton on Manitoba's potash resources in July 2009 reported on North Rim's evaluations of the deposit in the North Block. The mineable mineral resource of the Esterhazy Member (Prairie Evaporite) on the Russell Project (North Block), was estimated at 111,000,000 tonnes, providing a 20-year life for a 2,000,000-product tonne per year. This evaluation was based on using the room and pillar style of underground mining of the deposit.

In 2015, the Manitoba Government hired the consulting firm MICON International to divest the Manitoba Potash Corporation including its leases and assets in a public and transparent bidding process. Over 300 parties were invited to bid and eventually three parties choosing to participate in the MPC divestiture process. PADCOM was selected as the successful party in 2016.

As part of its due diligence, PADCOM had Agapito Associates Inc. assess the potash resource during its bid for the successful acquisition of MPC in 2015. The study showed a resource estimate of 231-521 million tonnes available in the North and South Block that are part of the area of interest initially under MPC. (PADCOM Submission of Phase II Expression of Interest Russell McAuley Potash Mine, Russell, Manitoba, September 2015, pp. 39-43).

For this project, the area of interest includes the extension of the deposit into Townships 19, 20, 21, Range 29WPM1. This area was part of BHP's original area of study from 2009. PADCOM's interest is primarily in the North Block. Seismic lines have been run on the North Block identifying the edge of the potash deposit on the east side as well as a number of disturbances including Devonian Winnipegosis Formation mounds along the west of central part of the North Block.

The interval of interest for production is the potash zone within the Esterhazy Member with the Prairie Evaporite Formation. The formation is Devonian in age (Figures 10 and 11).

The potash only extends into Manitoba approximately 5 km. The target will be the high-grade Esterhazy Member of the Devonian Prairie Evaporite Formation throughout the area. Specifically, there is a high-grade zone, over 70% potash (in this example from 826.5 to 827). This is ideal for selective solution mining.

The high-grade vein that PADCOM will be targeting for the 90-day production test and growing to 250,000 tonne per year is between 825.4 meters and 827.1 meters below surface (13-22-20-29 Harrowby) (13-22-20-29 Harrowby).

To confirm the high-quality grades of the potash zone, PADCOM was allowed permission to re-examine cores from the historical holes in the North Block at the core lab in Winnipeg. The Geological Survey staff was instrumental in allowing PADCOM permission to re-sample and re-analyze the historical drill core to verify the ore resource.

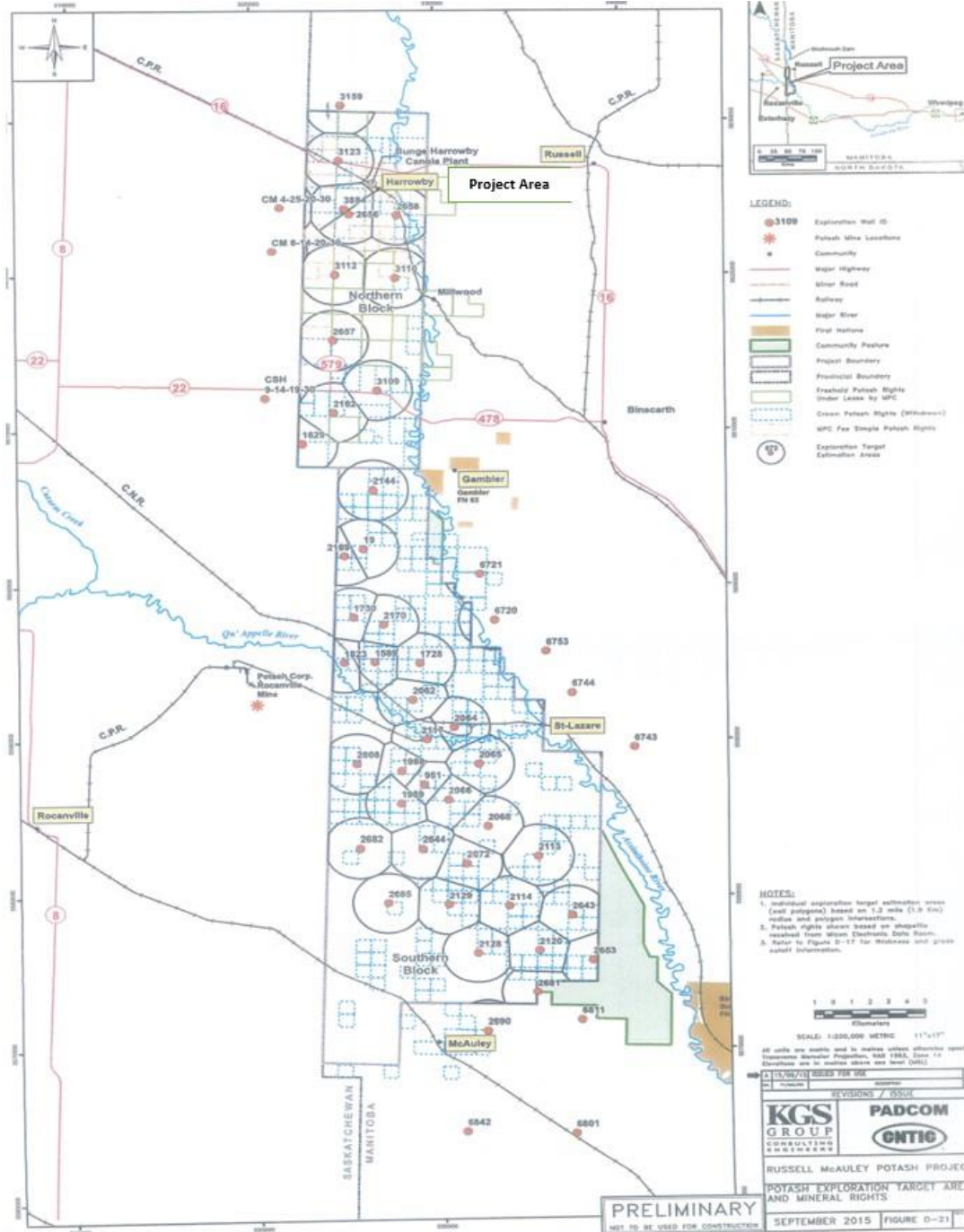


Figure 9: Historical drill holes in the North and South Blocks for the Manitoba Potash Project (as red dots). Circular bubbles around each dot indicate estimated areas for potash extraction for a resource calculation. For this proposal, the area of interest lies in and around the Hamlet of Harrowby.

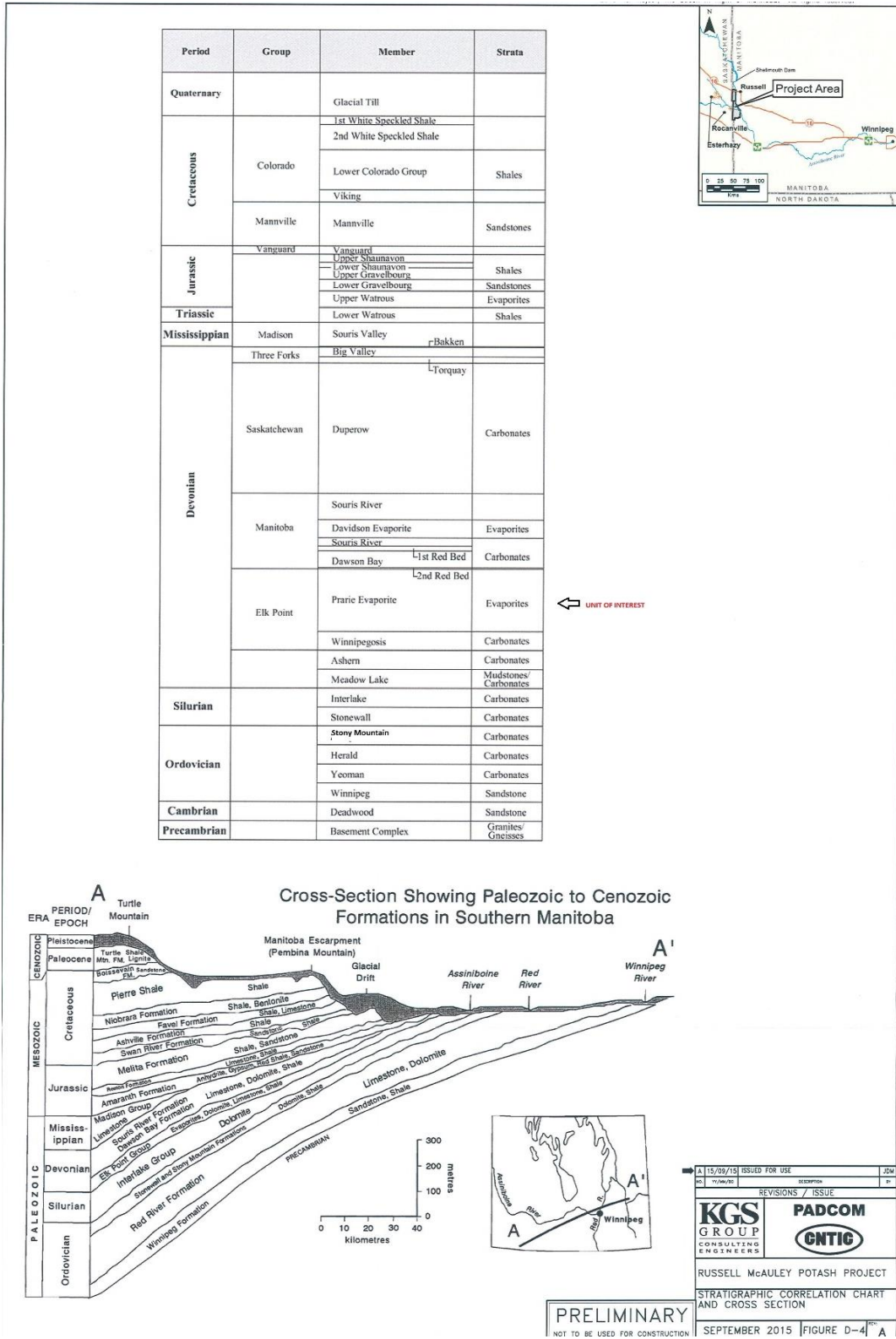
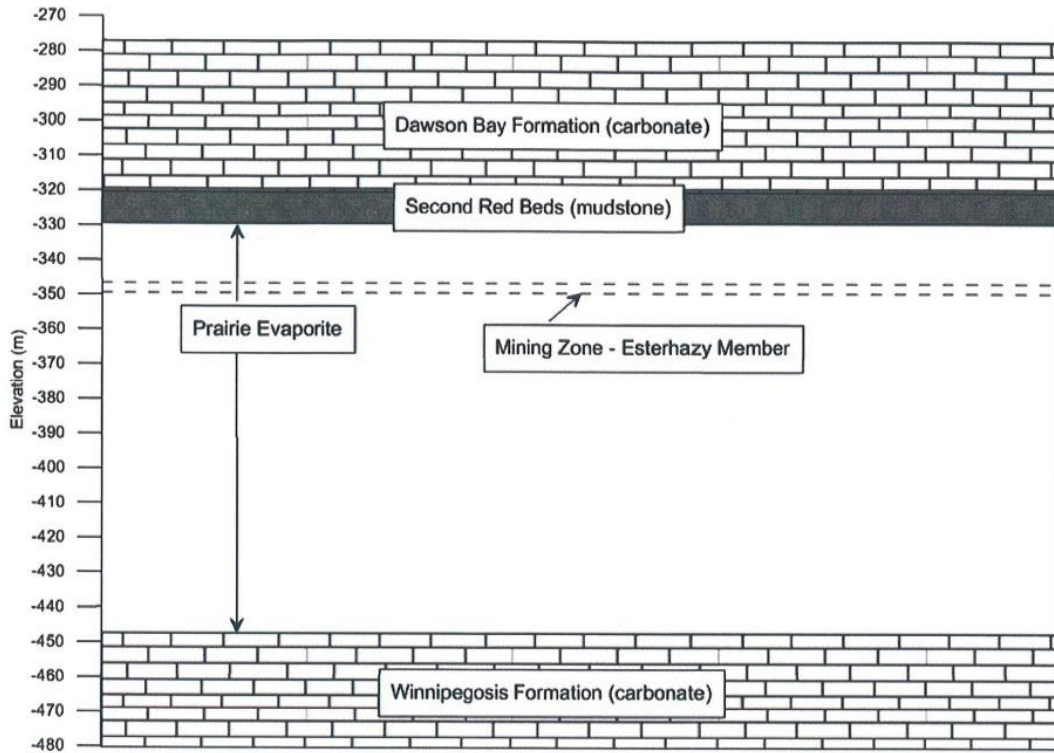


Figure 10: Subsurface stratigraphic column for Southwestern Manitoba – similar to the PADCOM Plant Site.



Notes: Stratigraphy and elevations taken at borehole 03-29-020-29W1.

A - Summary of Hydrostratigraphy

Figure 11: Close up of the unit of interest, the Prairie Evaporite, and the member with high grade potash – the Esterhazy Member.

2.2 Potash Production Process

Investigations on the potential of this project, based on using the Beechy Solution Mining Technology, evaluated previous 2 D seismic interpretations, historic geochemical drill core assays and downhole gamma logs. Winnipegosis Formation reef mounds were not factored into being an issue for this study and assuming the ability to mine 60% of the high-grade potash, this provided an estimated 42,100,000 tonnes for production (The Harrowby (Russell) Potash Mineral Resource).

2.2.1 The Beechy Solution Potash Mining Technology

The Beechy potash process addresses the high capital and operating costs of new potash mines, while achieving a significantly reduced environmental footprint. The process eliminates the necessity of waste salt storage on surface, reduces energy consumption, and reduces water consumption. Briefly the technology includes:

1. A Polythermic potash mining process
2. A patented and pending solution mining system using a series of curved interconnected holes.

3. A simple crystallization plant using contact cooled crystallizers.
4. A novel crystallizer using surface-cooled, wiped surface crystallizers.
5. A simplified plant layout in a pre-engineered building.
6. Product Centrifuge
7. Product dryer
8. Brine Heater
9. A simplified plant layout in a pre-engineered building.

Laboratory Testing and Modelling

Solution Mining started in Germany in 1861. Large scale solution mining dissolving both salt and potash with hot water, bringing both to the surface has been done since 1961 (A Review of Potash Mining Techniques and Description of Solution Mining Removing the Potash only (Selective Solution Mining)).

The Beechy Solution Mining Technology has been developed over the last 10 years and included extensive lab testing and modelling. Figure 12 demonstrates the dissolution of the potash out of a sample of ore by the hot brine, in simulated mine conditions and the final product. Note the potash being dissolved out of the sample with the salt crystals is not dissolved and liberated. Cooling the brine produces pure potash crystal.



Figure 1.
Actual Potash Ore
Potash and salt are together.



Figure 2.
Selective Solution Mining
In this illustration the potash has been extracted by dissolution and the salt remains.



Figure 3.
Potash 62% K₂O/99.5% KCl
The white pile is the dissolved potash that has been crystalized.
This quantity of potash came from the actual potash ore.



Figure 4.
Illustration of how potash will be stored and size of buildings required.

Figure 12: Photographs of potash products and the steps needed to produce the final product.

2.3 Potash Product

The product produced from the project will be white soluble 95% - 99.9% muriate of potash (MOP with alternative names as Potassium Chloride, (KCl). The process inherently produces 99.9% potash unless we deliberately add salt back to the product. This is supported by the chemistry but has also been established by a number of laboratory tests.

Granular is not considered in the phase one of the project but may be considered in the full capacity expansion in the later stage that compaction (Table 2).

Table 2: PADCOM Potash Specifications

POTASH MOP PARTICLE SIZE DISTRIBUTION	Tyler Mesh	Standard, mm	Typical (predicted)	
	20	0.85	2.5%	
	28	0.6	32.1%	
	35	0.425	69.1%	
	48	0.3	90.5%	
	60	0.25	96.7%	
	80	0.18	99.1%	
	100	0.15	99.6%	
Size Guild Range (SGN) 52				
POTASH PHYSICAL PROPERTIES		Unit	Range	
	Bulk Density	Kg/m ³	1150 - 1250	
	Angle of Repose	Degrees	30 - 32	
POTASH CHEMICAL ANALYSIS	Component	Symbol	Typical %	Guarantee %
	Potassium Oxide Equivalent	K ₂ O	62.2	60.0
	Potassium Chloride	CKI	98.5	95.0
	Potassium	K ⁺	51.6	
	Sodium	Na ⁺	0.59	
	Magnesium	Mg ²⁺	0.03	
	Calcium	Ca ²⁺	Nil	
	Sulfate	SO ₄ ²⁻	Nil	
	Anticaking Agent			Added
	Water Insolubles		0.01	
	Moisture	H ₂ O	0.01	

2.4 Product Transportation

Product will be trucked to market. Transportation by rail will be considered later. At production of 100,000 tonnes per year, approximately 274 tonnes a day is produced. A typical semi-truckload holds approximately 42 tonnes, which will see 7-8 truckloads leave the plant daily. The Bunge canola plant next door has 35-40 truckloads leave their plant daily.

The plan is to use a trucking contractor, with car loading supplied by the contractor. A scale, loading hopper and loading equipment will be located in one end of the storage building. The hopper will be filled with a front-end loader. Trucks will be loaded outside the building in a sheltered structure to contain potential fugitive dust and to protect loading operations from the weather.

2.5 Process Waste

There are no by-products except for brine which will be re-injected downhole.

2.6 Ancillary Facilities

The plant site will cover about 1 hectare (2 acres) of land in the abandoned Hamlet of Harrowby. The location will primarily be on Main Street.

The entire process plant complex will be installed in a single building, with the plant in the southwest, and product storage and truck loading in the northeast.

The foundation uses drilled piles to bedrock. A stub wall extending 1.5 meters above the concrete floor will retain product stored in the building as well as possible splash inside the plant. The floor will be sloped into a sump in the plant area, designed to retain spills inside the plant.

A small office building will be located on the lot northwest of the Bell MTS building (Figure 13).

An area to the northwest of the plant will be used for two production wells and an injection well. The area will also be temporarily used for propane tanks and a generator, until permanent power and gas lines are installed.

Due to the use of alternate technology, the plant site will resemble more of an industrial shop site rather than what you would expect of a potash processing plant. Note there will be no salt tailings pile.

The following figures outline the plant layout on the property site (Figures 7 and 14).



Figure 13: Project Office Building

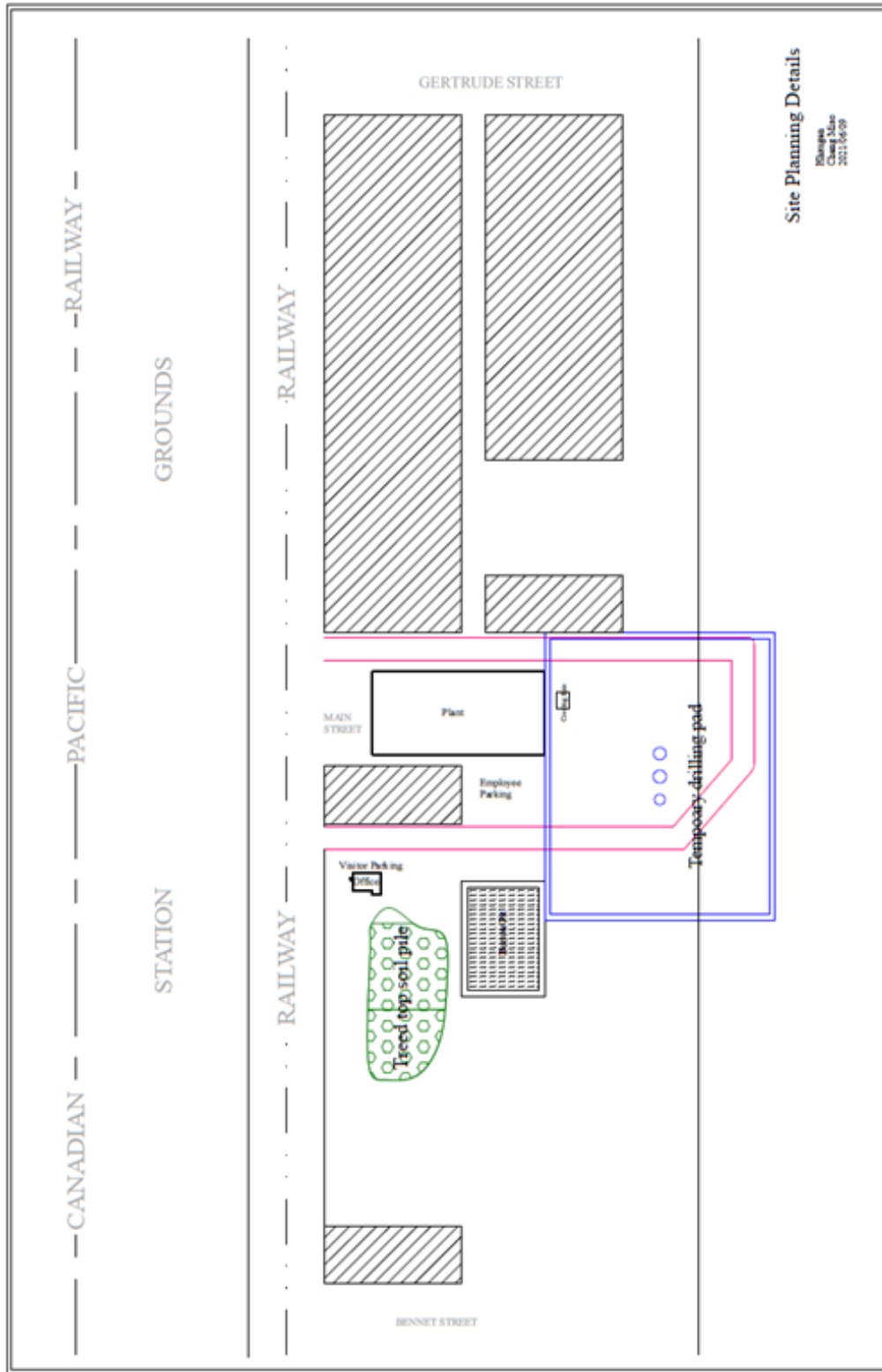


Figure 14: PADCOM Plant Site Plan

2.7 Processing Plant

The processing plant consists of a crystallization circuit, a centrifuge for dewatering the product and a product dryer (Figure 15). Hot saturated brine from the mine (typically 80 degrees Celsius) is brought to the plant from a production well directly beside the plant.

The brine is cooled in the crystallizers with temperatures between 15 to 30 degrees C, depending on the seasonal cooling capacity. The potash crystallizes as the brine is cooled. The crystal portion is pumped to the centrifuge to remove the brine, with the dewatered crystal being transferred to the dryer.

The cooled brine is reheated, partly by heat recovery from the crystallizers and stack scrubber. A low-pressure boiler and heat exchangers provide additional heat.

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 (Figure 16 shows a flow chart of the process).

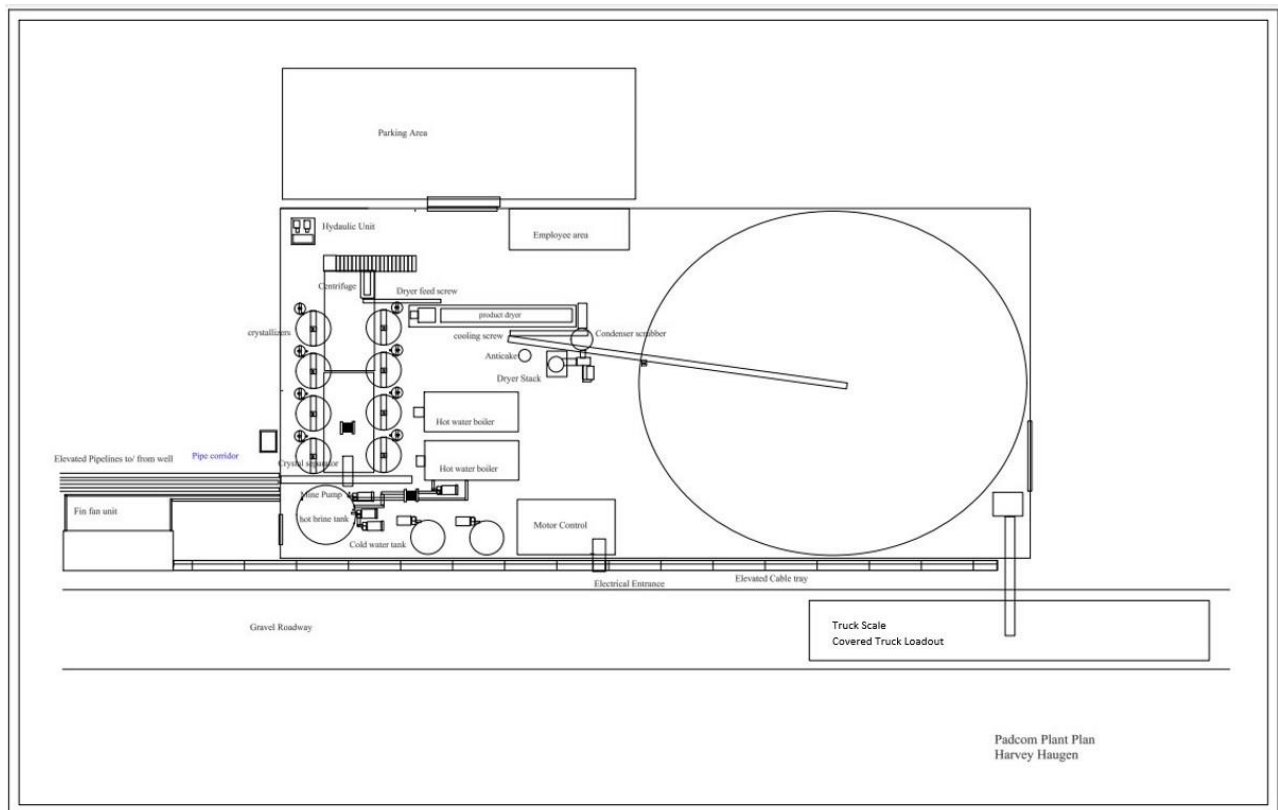


Figure 15: PADCOM Plant Layout

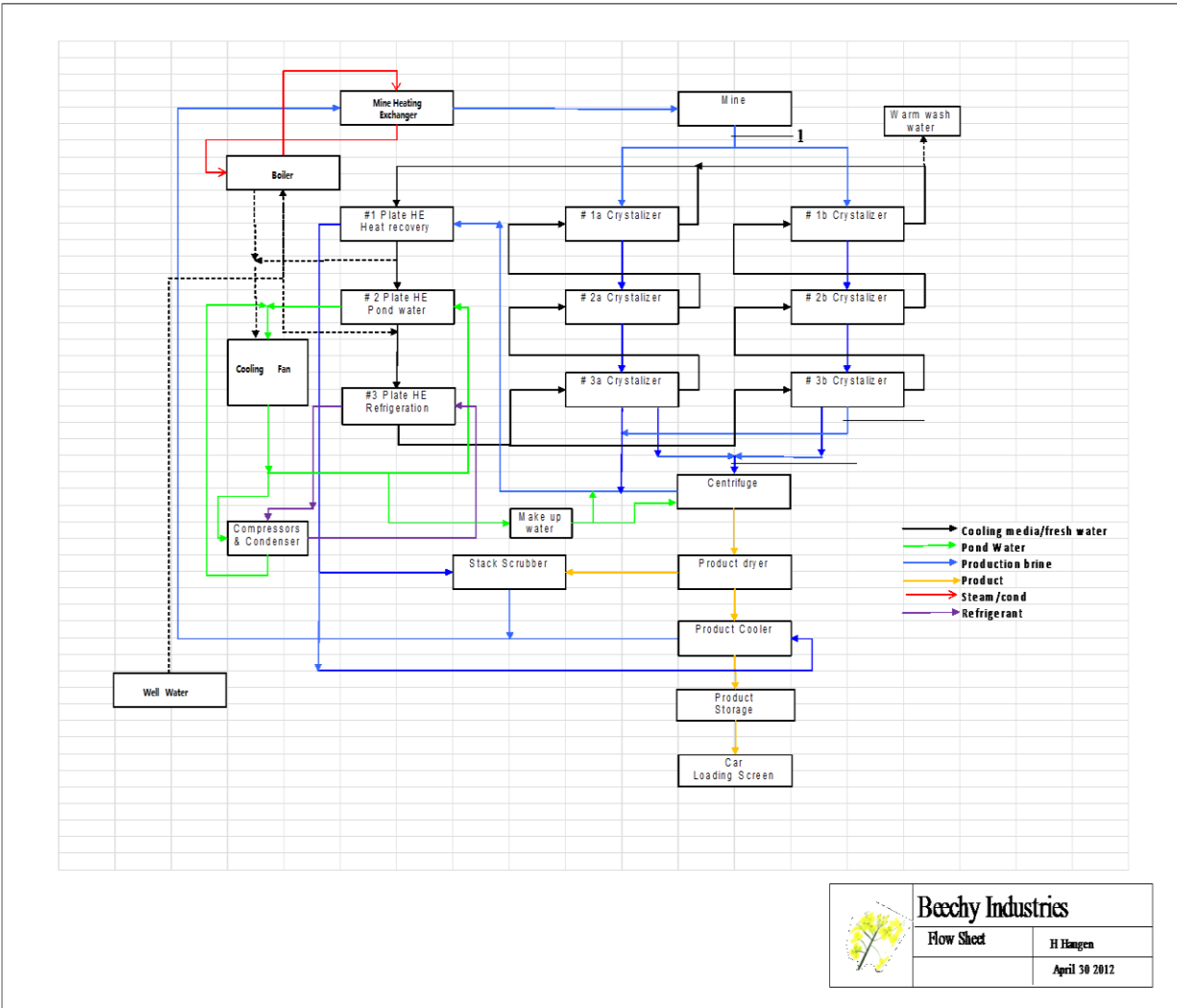


Figure 16: Plant Process Flow Chart

2.7.1 Processing Plant Mass Balance

A mass balance shows all quantities of feed materials to the plant, all product and byproduct or waste streams out of the plant. It might also show more or less details of the liquid and solid flows and the energy used within the process. The mass balance used for the processing plant was calculated using a computer program. The program allows evaluation of the process based on different temperature and flow scenarios. The mass balance is fully predictable from phase chemistry (Table 3).

Table 3: Project Mass Balance Table

Beechy Potash Solution Process Outputs		
Mass Balance		
Tonnes of product per year	250,000	Tonnes/year
Days per year	350.00	Days
Hours per day	22.00	Hours
Hour per year	7,700.00	Hours
Available Hours	8760.00	Hours
Utilization Rate	87.90%	Percent
Potash Produced per hour	32.41	Tonnes/hour
Mother liquor feed	407	Tonnes/hour
Water addition	16.6	Tonnes/hour
	0.27	Cubic m/minute
Total flow to wells	423	Tonnes/hour
	5.7	Cubic m/minute
	1535	US gallons per minute
Temperature to wells	85	degrees C
Production Rate	7.61	Tonnes/100 Tonnes Brine
KCl dissolved Rate	36.8	Tonnes/hour
NaCl dissolved Rate	4.72	Tonnes/hour
Halite dissolved Rate	12.73	Percent of halite
Ore specifications:		
Grade	50.00	Percent
K ₂ O	31.59	Percent
MgCL ₂	0.00	Percent
Tonnes required	73.73	Tonnes/hour
Salt remaining	32.15	Tonnes/hour
Ore removed	56.37	Weight percent

2.7.2 Crystallizers

The plant uses Beechy patented wiped surface crystallizers. The crystallizers are unique allowing the cooling to occur in the presence of suspended crystal. This will grow large uniform crystals that may be saleable as granular potash. The direct single step crystal mechanism may also provide a stable crystal, not subject to caking, with minimal dust produced on handling (Figure 17).

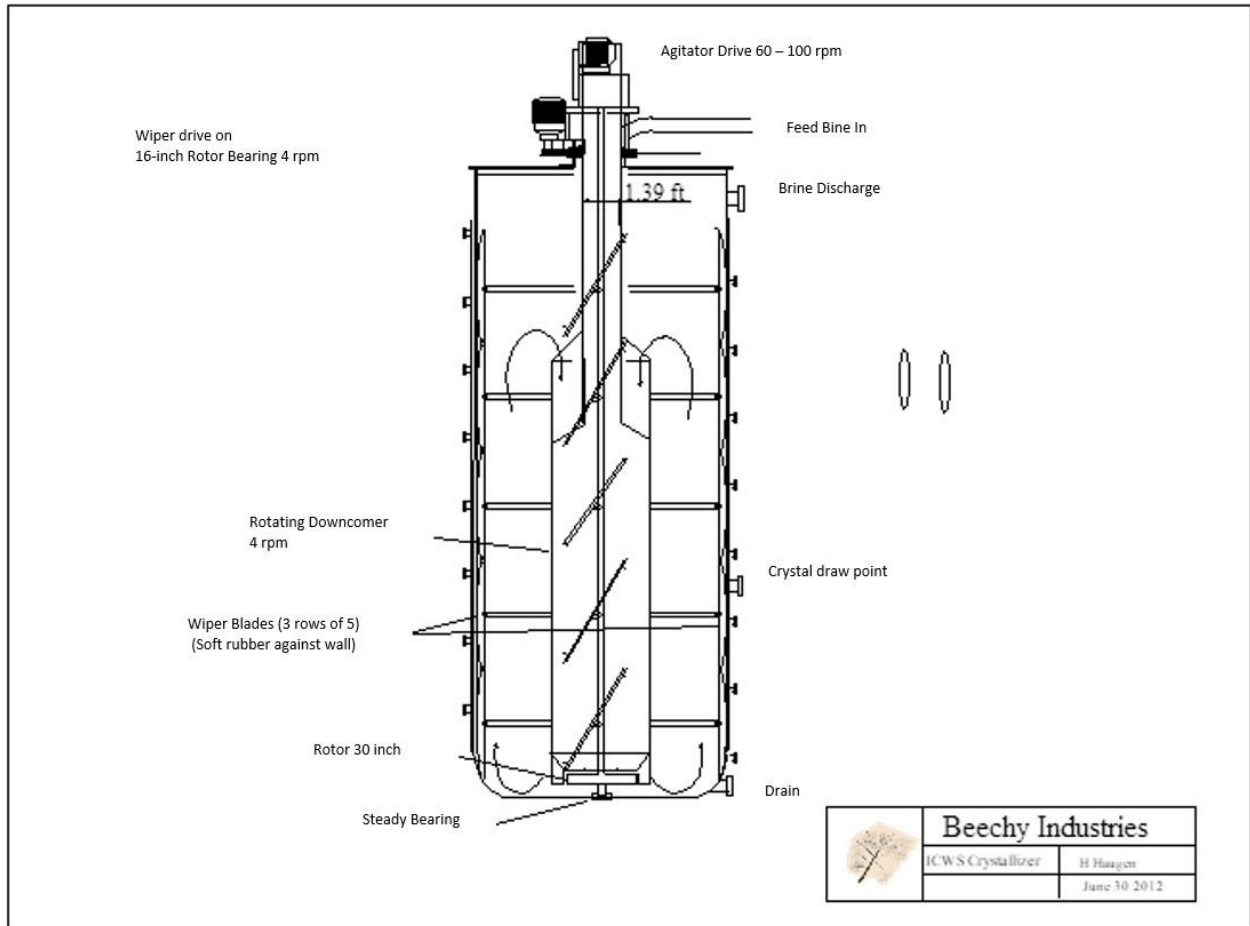


Figure 17: PADCOM's Crystallizers

2.7.3 Cooling Fan

Cooling for the crystallizers will be provided by a large fin fan unit driven by a 50-kw motor (see Figure 18). A low strength glycol fluid will be used to prevent freezing.



Figure 18: PADCOM's Cooling Fans

2.7.4 Dryer

PADCOM will use a 3' x 20' hot air stainless steel dryer to dry the potash generated from the crystallizers (Figures 19 and 20). The dryer has a burner to generate 3 million BTU heat to blow into the drum.



Figure 19: An example of what a dryer will look like.

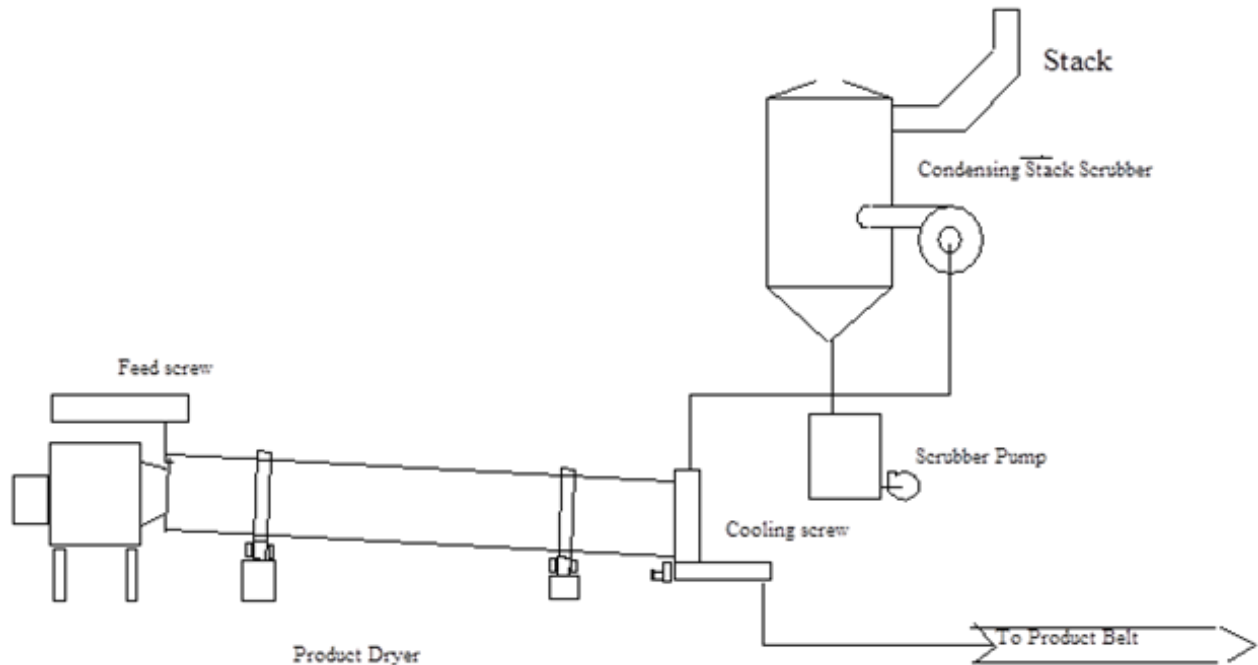


Figure 20: PADCOM's Product Dryer and Drying Process

2.7.5 Centrifuge

A 500mm drum pusher centrifuge with 40Hp will be used in the 1st phase development period. The centrifuge aimed to obtain 97% solid crystals prior the drying process (Figure 21). A larger or additional centrifuges will be used in the 2nd phase to reach the full capacity.

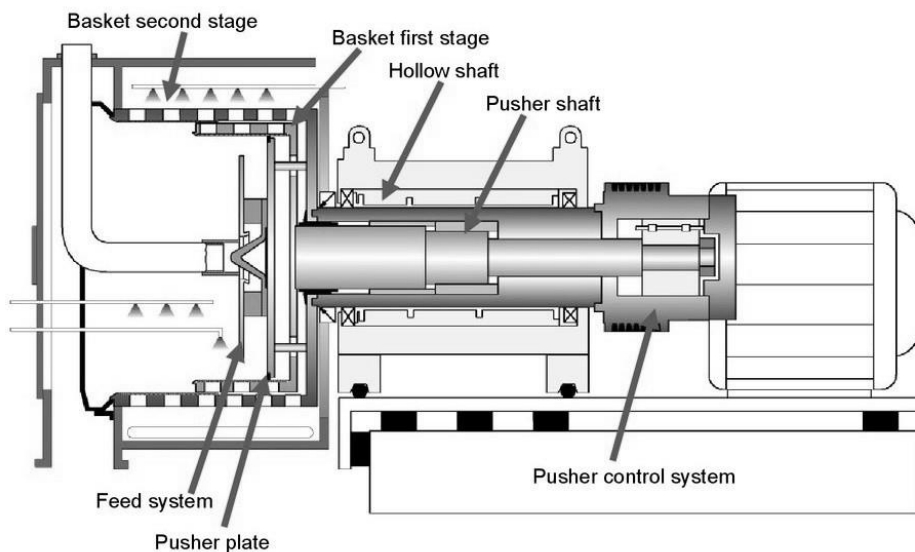


Figure 21: Pusher Centrifuge System

2.7.6 Process Water Pond (and Borrow Pit)

The process water pond will be sized to handle runoff from the immediate area of the plant site (about 1 hectare). The pond will be excavated to bedrock, about 3 m. On an extreme 4-inch rain, total pond area is about 2000 square feet at 10 feet ((609.6 square metres at 3.05 metres), with slope about 4000 ft². **(1219 m²)**

The pond will be pumped down to minimum levels to allow freeboard for surface runoff from the immediate site in the case of a heavy rainfall event. An extreme event will be handled by allowing the incoming flow to the pond to bypass the pond in a controlled manner, since at that stage, those volumes would be almost pure water.

2.7.7 Brine Injection Well

A small brine injection well will be located as close to the plant as possible. The well will see only intermittent service to control magnesium levels in the mine feed brine.

A multistage centrifugal pump may be used depending on the injection formation. 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. This unit lies above the target unit.

The alternative unit is the Devonian Winnipegosis Formation, which is just below the target zone (see Figure 10 for the location of these formations in the stratigraphic column).

2.7.8 Product Storage

Product will be stored in one end of the plant building on a flat concrete floor, placed in a conical pile with an elevated belt conveyor. As the potash product tends to cake in storage, the product as it comes from the dryer is treated with anti-cake amine prior to being transferred to storage.

2.7.9 Load-out and Transfer to Trucks

Product will be trucked to destination or to an appropriate rail siding for car loading. The plan is to use a trucking contractor, with car loading supplied by the contractor. A scale, loading hopper and loading equipment will be located in one end of the storage building. The hopper will be filled with a front-end loader. Trucks will be loaded outside the building in a sheltered structure to contain potential fugitive dust and to protect loading operations from the weather.

2.8 Processing Site

The processing site will use Beechy's novel solution mining techniques. The system uses a pair of reversible production wells (brine from the ore zone to surface). Hot unsaturated brine is injected in one well, then through a 1600-meters curved section where the bulk of the dissolution occurs, then returns on the second curved section. As more production is needed new curved wells are drilled,

allowing the brine to flow from the last drilled well, in sequence to the first drilled well (see Figure 22).

Caverns form along the curve, with salt deposited inside the curves.

Brine pressure in the mine is less than actual formation pressure. Hydro fracturing (fracking) is not used in the development or operation of the mining system.

PADCOM Resource

Project: Russel
 Site: PADCOM Russel Hz (14-28) 101_12-21-19-29
 Well: 101_12-21-19-29W1
 Wellbore: Hz
 Plan: Plan#2

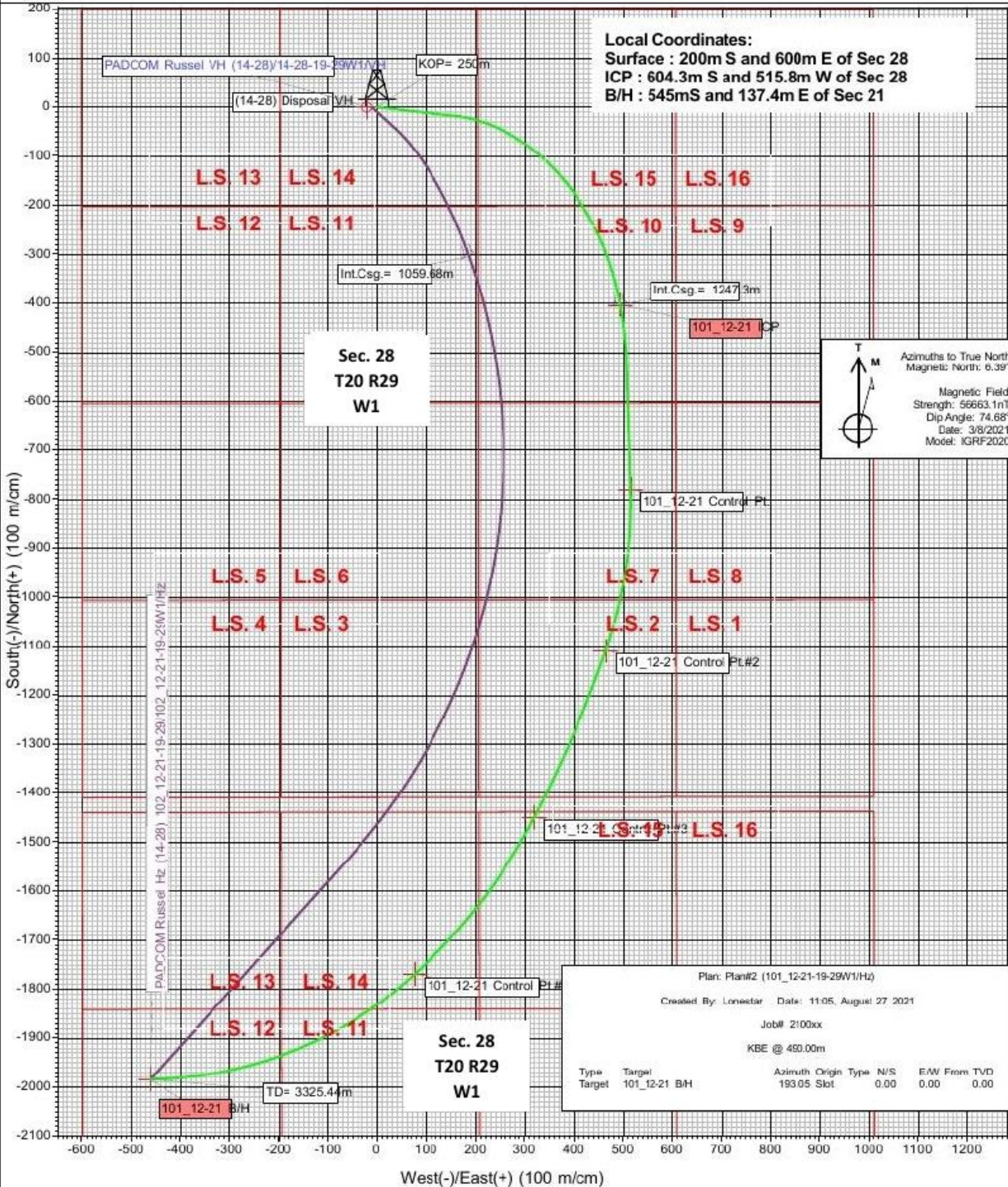


Figure 22: PADCOM's Potash Dissolution Subsurface Plant Plan

2.8.1 Mine Heating

The concentration of high flow to a small area will provide the heat necessary to raise the temperature of the ore around the caverns (this is not possible in conventional potash solution mines). Heat required for heating the ore is in the order of 0.5 to 1 gigajoule per hour per 1600 m leg. Heat loss to the deposit is like heat loss from a buried pipeline. It is best thought of as flow through a pipe with a near infinite thickness of a poor insulation blanket (Figure 23).

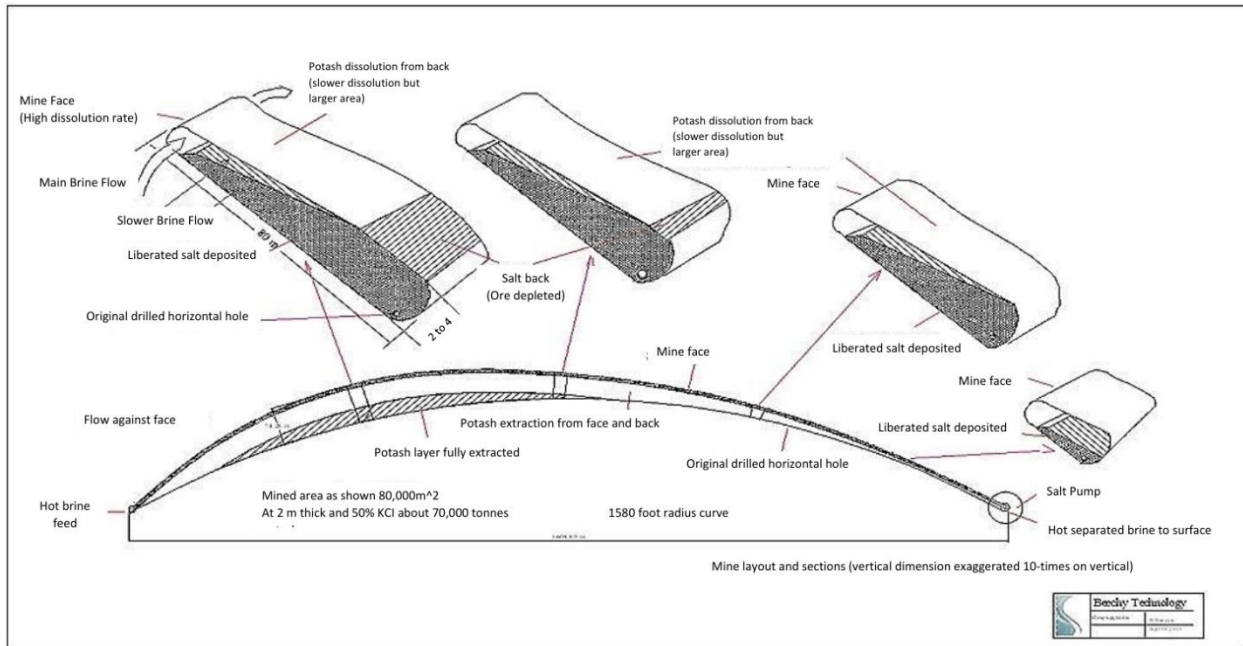


Figure 23: Subsurface Cavern Development Illustration

2.8.2 Subsidence

The potash dissolution plan represents a long “wall mining” technique. The plastic ore body gradually closes in on the mined-out cavern. With over half of the original ore (the salt portion) left in place the cavern, the effect of closure is insignificant, as compared to conventional shaft mining or current potash solution mining methods.

High resolution imagery has been done on the mine area to be used as a future reference to detect and measure subsidence. The Green Aero technology uses a drone to photographically image and measure elevation and contours that can be rerun to monitor subsidence over years.

The final subsidence can be calculated for ore mined from a potash bed. A subsidence prediction was made for 100,000 tonne per year mine after 20 years of operation on a 2.5-meter potash bed 50% potash, using the Beechy method.

A calculation was made for the PADCOM Mine (Table 4)

Table 4: Subsidence calculations for the site

Tonnes per year	100,000
Extraction	80%
Ore Grade	50% KCl
Ore density	2 t/m ³
Horizontal run	1600 m
Mined width	800 m
Mined height	2 m
Potash density	1.86 t/m ³
Volume of ore removed	2,000,000 tonnes
	1,075,000 m ³
	0.84 m

It is recognized in the industry that subsidence occurs at 45 degrees outward from the cavern edge. In this case the mined cavern surface is 1,300,000 m² (0.5 square miles). The surface on which subsidence occurs is in the order of 8,000,000 m² (3 square miles). The ultimate final subsidence will then be 0.1625 of the extracted 0.84 meters or 0.1365 meters (5" of subsidence over 3 sq. miles) (Figure 24).

The subsidence is progressive beginning soon after the ore is extracted, then slowing but continuing to the calculated value, years (maybe 100 years) after the mining is done. It is also important to understand that the mining is also progressive, in the current design, as per this calculation, from two separate curved holes.

The Beechy method produces minimal subsidence risks, primarily since we only take out potash. The extraction is progressive further minimizing the effect.

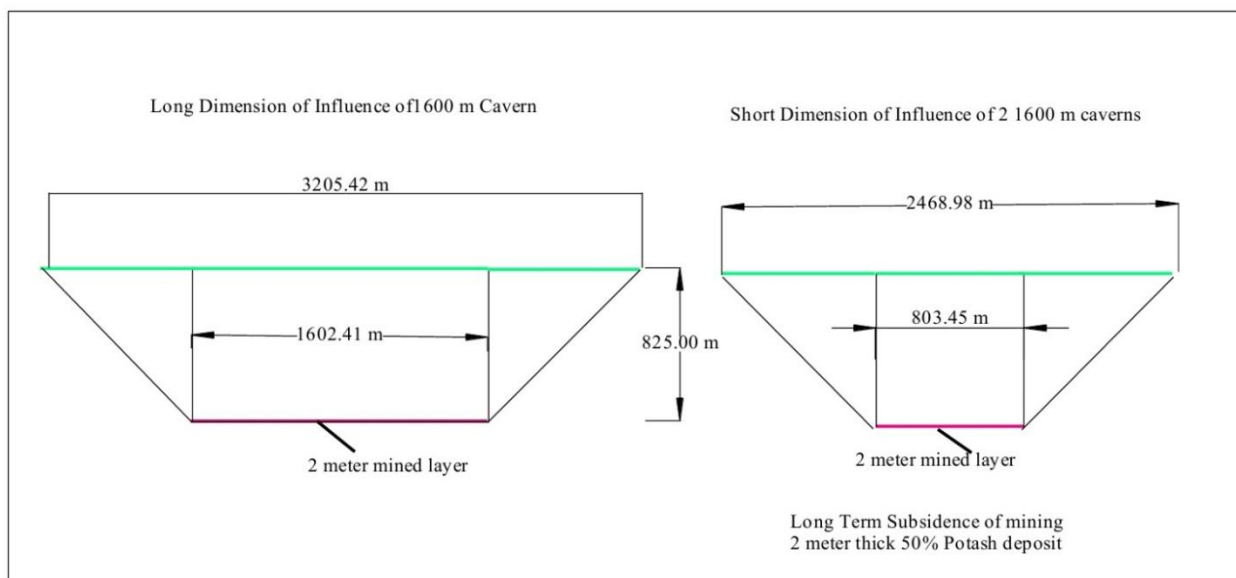


Figure 24: Long term subsidence on solution mining 2 m thick (50% potash grade) ore zone.

2.8.3 Water Requirements

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.

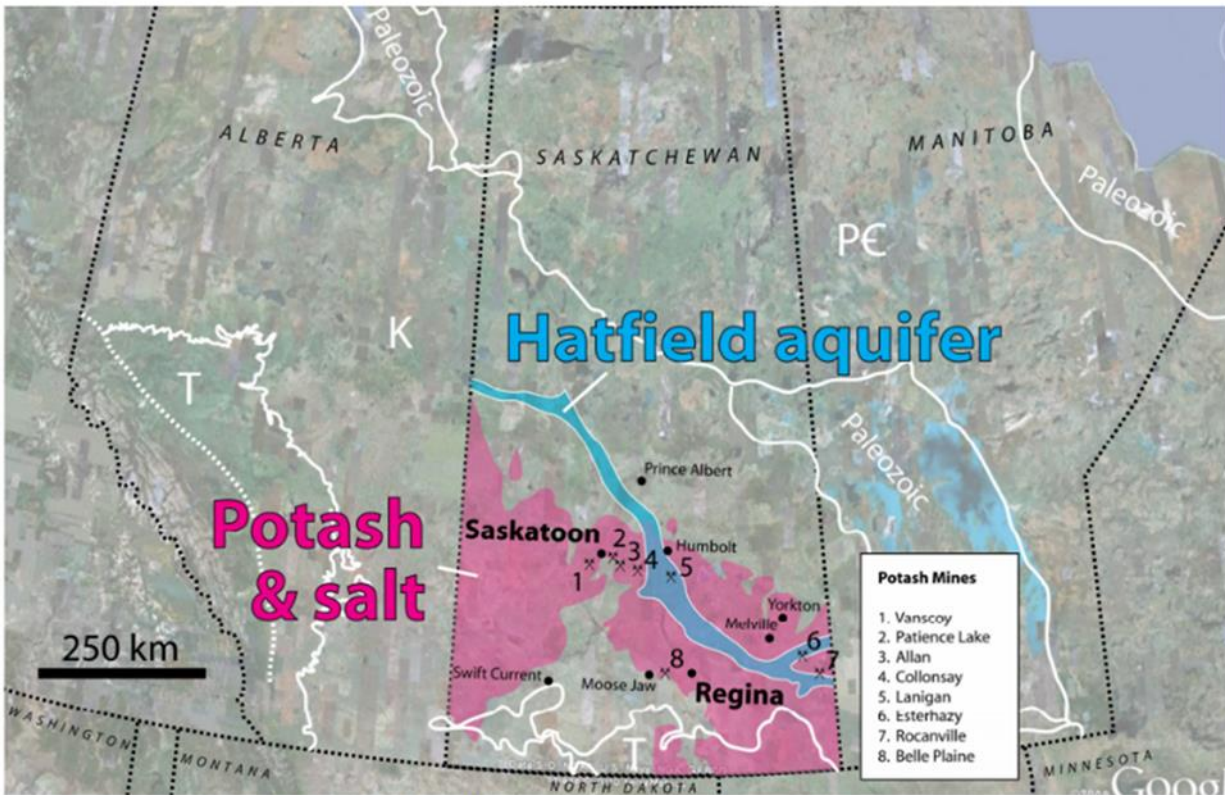
2.9 Process Inputs

This solution mining system has a minimum of inputs, consisting of utilities, water, power and gas, plus anti-cake – dedusting chemicals for the final product. Octadecyl amine is added to potash to prevent caking 0.11 kg per tonne. Dedusting oil 2 litres per tonne. We plan on using clean 35 API local crude oil.

2.9.1 Water Supply

The mass balance for the mine shows water consumption of 6 cubic meters of water per hour (25 IGPM) at 100,000 tpa production rate. For planning purposes, since this is a relatively small amount of water, we should design for double that amount. The source of water for the plant will be from wells west of the mine site.

The Hatfield valley aquifer originates in the Shellbrook area in Saskatchewan (Figure 25). This preglacial valley (Empress Group) extends across Saskatchewan and is known to produce large quantities of water. It is known to cross the Manitoba border north of the Yellowhead highway. A well drilled by Hayter Drilling just 1 km west of the border, due west of the plant site, for Saskatchewan Research encountered 23 meters of coarse gravel in the Empress Group from 38.1 to 61 meters as well as 7.6 meters of Sutherland gravel from 24.3 to 30 meters. This well should supply 200 gpm (757 lpm). We know that the preglacial surface rises dramatically near the border but predict that the aquifer will be encountered on the Manitoba side of the border. We have a driller available to do exploratory drilling to identify and drill the well.



The Hatfield buried valley aquifer, potash resources, and potash mines in Saskatchewan. T = Tertiary bedrock (sandstone and shale), K = Cretaceous bedrock (mostly marine shale), Paleozoic = Paleozoic bedrock (mostly carbonate), PC = Precambrian Shield.

Figure 25: The Hatfield Valley Aquifer in blue in Saskatchewan. Potash and salt are represented in pink.

The water to the site will be pumped through a 100 mm HDPE pipeline. Pipe will be buried on the road allowance. Single phase power will supply the pumphouse.

The effect on the environment in installation of water facilities is negligible. Well sites are small, and pipelines will be buried along RM road allowances. The minimal water consumed will not impact other users, since either aquifer is large, with no known users in the area.

Small amounts of water will be removed from shallow groundwater on the site to lower the water table. This will also retrieve any possible contamination in that water. Drains will be installed around the plant and terminate in the borrow pit / contaminated water pond.

Potable water for wash water will be produced by chlorinating low tds well water. Drinking water will be supplied by bottled water.

2.9.2 Natural Gas/Propane

The mine will require 21 gigajoules per hour. 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. We will require an onsite propane storage capacity of 30,000 liters. Storage and handling will be as required by the National Fire Code of Canada 2010.

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. A larger power line will be required. Within that choice might be the possibility of a small gas line for building heat and product drying.

2.9.3 Power Supply

A three-phase power line will be required. The closest point of origin will be at Russell, Manitoba. Arrangements are in process for installation with Manitoba Hydro constructing the line to the plant.

Initially we will connect to existing single-phase power. We will draw the maximum allowable from that source. Additional power for the 90-day trial will be provided by a diesel generator. This diesel generator will be 500 hp which is the equivalent of a semi highway tractor trailer.

2.9.4 Anti-cake and Dedusting

Anti-cake: The final product is treated with 0.25 lb (0.163 kg) /tonne Akzonobel Armeen HT (octadecyl amine) to prevent the product from caking. The product is manufactured from beef tallow by adding a NH₃ group to the 18-carbon chain aliphatic molecule.

Dedusting: About 2 litres of 30 weight oil is added to each tonne of product to prevent dust.

Current plans are to source light crude from Gambler First Nation for this application. This will allow minimum storage on site. For the test, a 25 cubic meter insulated tank trailer will be used for storage. A double walled storage tank will be installed later.

2.9.5 Gas and Diesel Fuel

Diesel fuel is required for site vehicles including loaders for the product, mobile crane, forklift etc. Initially it will be used for part of the power required and will be stored in approved double wall vaults.

Diesel consumption will be approximately 80 litres per hour and an onsite storage of approximately 4000 litres will be required. The onsite storage and handling will be as required in PART 1 of The Dangerous Goods Handling and Transportation Act, Storage and Handling of Petroleum Products and Allied Products Regulation (The Dangerous Goods Handling and Transportation Act, Storage and Handling of Petroleum Products and Allied Products Regulation, pgs 4 – 9).

2.10 By-Products

There are no by-products except for brine, which is discussed below.

2.11 Brine Disposal

Some brine disposal capacity will be provided. The well will be drilled into the Winnipegosis Formation. This formation is used across the border at potash mines at Esterhazy, Saskatchewan with injection rates of up to 15,000 usgpm (56,781.12 litres). It is also used at the potash mine in Rocanville, Saskatchewan for similar volumes. PADCOM's mine will inject up to approximately 100-200 usgpm (378.54 – 757.08 litres).

The well will be used for:

1. In the event, early in mine development, that we need to dispose of some salt to get the underground caverns flowing properly.
2. If we encounter unexpected levels of magnesium in the ore. We will need to bleed off part of the brine to keep magnesium concentrations under control.

It also provides for the unlikely accumulation of excess water, possibly during plant shut down periods.

2.12 Ancillary Projects

This plan as presented does not include trucking of product to final destination, or trans loading of product to rail. A tentative plan is to sell all product to an off taker. They would be responsible for trucking product from the site.

The rail siding at Harrowby is available and could be set up with a simple covered car loading facility. CP Rail provides a daily switch to the Bunge Plant located next door, making this a good option.

2.13 Alternative

The alternative to the Beechy technology is conventional solution mine or typical underground mine. Either option would have very high CO₂ emissions, salt tailings and ponds, very large footprints as well as far greater capital costs. More important this is the only option ever proposed for a potash mine with this low capital cost and low to near zero carbon.

3. SCOPE OF THE ASSESSMENT

To assess the potential environmental impact of the proposed project, spatial and temporal boundaries were defined and outlined:

3.1 Temporal Boundaries

These boundaries are defined as follows:

3.1.1. Construction Phase

This will include primarily the construction of the infrastructure required for the project operations including the processing plant. This will also include the drilling of 2 subsurface drill holes to access the potash zone.

- Q4 2021-Q1 2022

3.1.2. Operations Phase

Includes commissioning of the processing plant; potash production and loading of potash on truck or railcars to transport to market.

- Q1 2023-Q3 2023

3.1.3. Decommissioning Phase

After the expected life of the project (100 years), the processing plant will be dismantled, and previously disturbed areas leveled and rehabilitated. The future use of the site will be determined on the sale of the property and it will be determined if there is potential to repurpose the site for others to use. Otherwise, all other project components will be decommissioned such as power line and road access.

3.2 Spatial Boundaries

Spatial boundaries for this project are described below (Figure 26).

- **Project Site:** Includes the footprint of the actual project site, which will encompass the land which the project components are located and the immediate surrounding area that will be directly affected by it (1 km radius). Within this radius there are:
 - No residences;
 - Bunge Canola Crushing Plant;
 - Twin Valley Co-op Anhydrous Ammonia Receiving and Shipping Plant;
 - CPR main line plus 3 spur lines;
 - Municipal roads;
 - Pasture lands
 - Crop land
 - Abandoned Hamlet of Harrowby.

- **Local Project Area:** This is comprised of an area of 2 km in radius around the project site. This area takes into account the majority of direct and indirect effects of the project on environmental components (such as wildlife habitat loss related to vegetation clearing and noise). It includes all the above, additional pasture and crop lands.
- **Regional Project Area:** Is comprised on an area 10 km in radius beyond the project site which takes into account the maximum spatial extent of potential effects of the project.

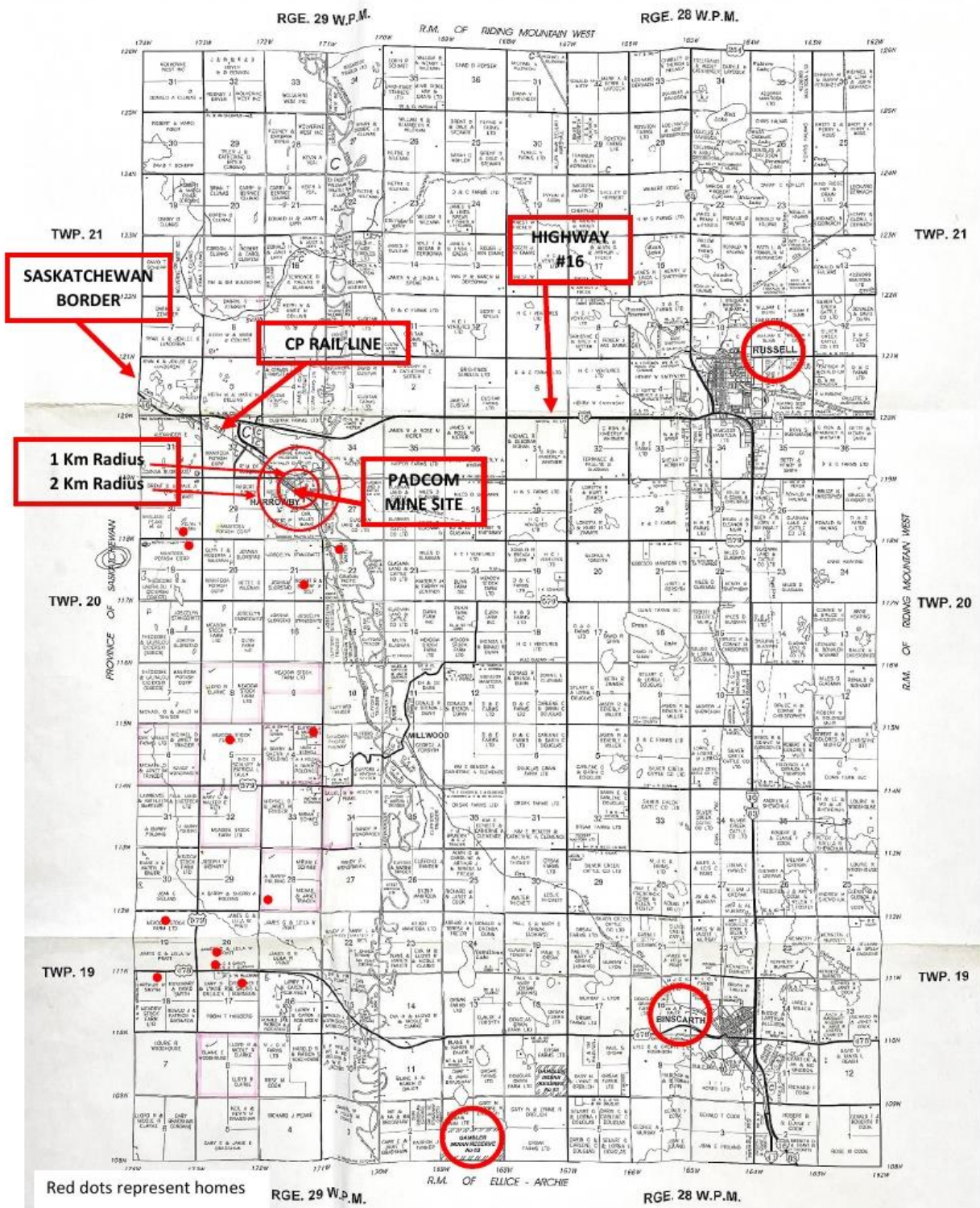


Figure 26: Spatial Boundaries around the PADCOM proposed Plant Site

3.3 Biophysical and Socioeconomic Components

In accordance with the Manitoba Sustainable Development ‘Information Bulletin – Environment Act Proposal Report Guidelines’ (Manitoba Sustainable Development 2018), the scope of the environmental assess includes potential project effects on the:

- Biophysical Environment
 - Including wildlife, fisheries, surface water, groundwater and forestry resources.
- Impacts on the socioeconomic environment
 - Including human health and safety
 - Potential impacts on Indigenous communities such as resource use and cultural or traditional activities

Section 6 describe the specific environmental components included within the assessment.

4. DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1 Physical Environment

4.1.1 Soils and Topography

Soil type is predominantly Jaymar series Class 3M with strips of Marsden Class 5W and Class 5 MT (see Figure 27). The Jaymar series consists of well drained, Orthic Black Chernozem soils developed on stratified materials composed of a thin mantle (40 to 70 cm) of moderately to strongly calcareous, loamy (L, CL), lacustrine sediments over a thin 30 to 60 cm, contact zone of sandy skeletal (S, GrS) materials, overlying moderately to strongly calcareous, loamy (L, CL, SiCL), glacial till of shale, limestone and granitic rock origin. The soils occur on very gently to gently sloping topography, runoff is moderate, and permeability is moderate to rapid in the upper loamy and sandy skeletal strata and moderately slow in the underlying till. These soils are often stony due to the modification of the till.



Figure 27: Soils and Topography. The location of the plant site is outlined in green in the upper photo; the lower photo outlines the agricultural capability for the area.

4.1.2 Surficial Geology

The area around the plant site is classified as Glaciolacustrine. This soil is formed from silts eroded by glaciers. Clay from the site is highly plastic. This is a good clay for roads and building base when dried out, especially when mixed with lower gravel and sand layers (Figures 28 and 29).



Figure 28: Glaciolacustrine Surface



Figure 29: Clay from the site

4.1.3 Surface Water and Surface Drainage

Surface water includes scattered shallow sloughs. There are intermittent drainage channels that may flow during spring runoff. The land slopes to the east, flowing to the Assiniboine River. (Figure 30).

The Assiniboine River is 1570 meters from the plant and with the flow path it is much longer. Water flow from the site is to the northwest to a stream bed and a culvert under the road and railroad. Flow then goes to the NNE a kilometer before flowing generally eastward joining the river by the highway bridge (total path about 2 km from the tracks, nearly 2.5 km from the site).

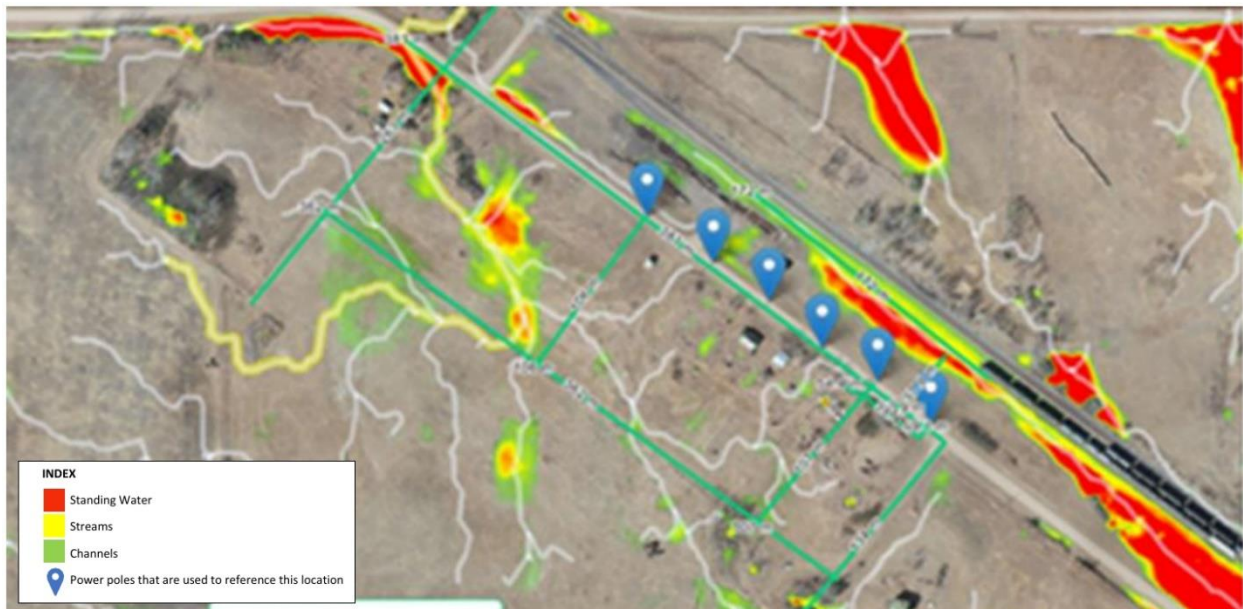


Figure 30: Surface Drainage Map. Plant site outlined in green. Blue dots are power line poles.

4.1.4 Hydrogeology

The area around the mine site is underlain by glacial clay, silt, sand, and some coarse gravel. A 3-meter layer of stratified clays and silts overlays bedrock. A mixed sand silt and gravel layer contains a surficial aquifer with water level to within 1 meter of surface (Figure 31).

A test hole shows the seepage out of the sand layers up to about a meter of surface. This hole was open for 24 hours and accumulated to approximately less than 1/3 meter of water over that time.

There are 3 large diameter wells on the lot adjacent to the site. A pump test showed a recovery time, of approximately 24 hours, hence the need for 3 wells for one household.



Figure 31: Site Foundation Study

Six test holes were drilled on the site approximately 45 meters. Holes 1 to 3 along the alley on a northwest line, holes 6, 5 and 4 along the rear fence line on the same northwest direction (Table 5).

Table 5: Water well test hole data.

Well No.	Location	Elevation	Water Elevation	Variance
Testing Hole No#1	NE	1,525.39	1,521.09	-
Testing Hole No#2	N	1,523.72	1,520.72	- 0.38
Testing Hole No#3	NW	1,521.53	1,520.03	- 1.06
Testing Hole No#4	SW	1,522.59	1,519.89	- 1.21
Testing Hole No#5	S	1,522.43	1,520.39	- 0.71
Testing Hole No#6	SE	1,522.97	1,521.05	- 0.04

Result shows the water table sloping to the west with the southeast holes, #1 and #6 at 1521 and hole #3 and #4 at about 1520, about a meter lower.

Water conductivity was measured in each hole. The wells east of by the house east of the site had a conductivity of 800. Wells # 1 was 1100, #2, 1250, #3, 1350. The back line, #6 at 1200, #5, 1200, and 4, 3500. Clearly there is flow from the southeast to the west with water being retained around hole number 4, with probable surface evaporation occurring in that area, between #3 and #4 leading to high TDS.

4.1.5 Land Use

This land is classified as AO-Agriculture operations under the Tri-Roads Planning Act which permits exploration (Appendix 1). 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 actual site is an abandoned townsite. Just to the southeast is an abandoned house and associated rudimentary structures.

A Bell MTS building is located on a lot within the site area.

The nearest occupied farm site is located 1.6 km to the southeast. The heavy industrial Bunge Canola processing plant is about 500 m to the northwest

The land around the site is used primarily for pasture and hay crops and are reported as class III and IV (Figure 32).

Land capability class definitions area as follows: Class I contains soils having few limitations for cultivation; Class II contains soils having some limitations for cultivation; Class III contains soils having severe limitations for cultivation; Class IV contains soils having very severe limitations for cultivation.



Figure 32: Land Use Map (Lines designate Marsden (MRN Class 3mt) and Jaymar (Jay Class 5w) soil. 80% of the soil is Jaymar.

4.1.6 Climate

The climate is a temperate continental climate. Manitoba is far from the moderating effects of any large body of water. The climate at Russell is classified as a Dfb under the Koppen Classification system (warm summer continental) (Figures 33, 34, 35).



Figure 33: Historical Average Temperatures in the region.

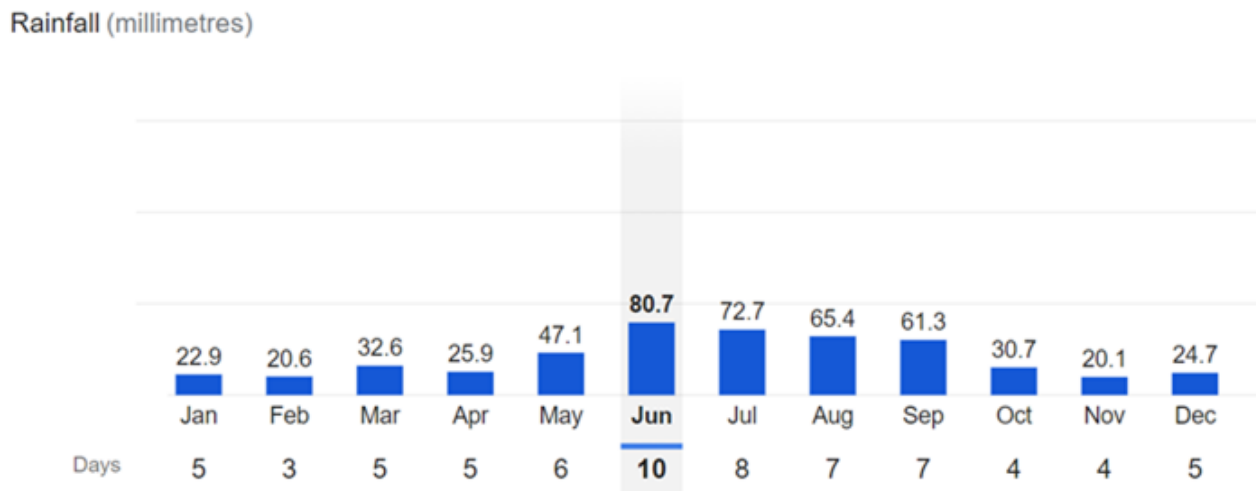


Figure 34: Historical Rainfall in the region.

Snowfall (millimetres)

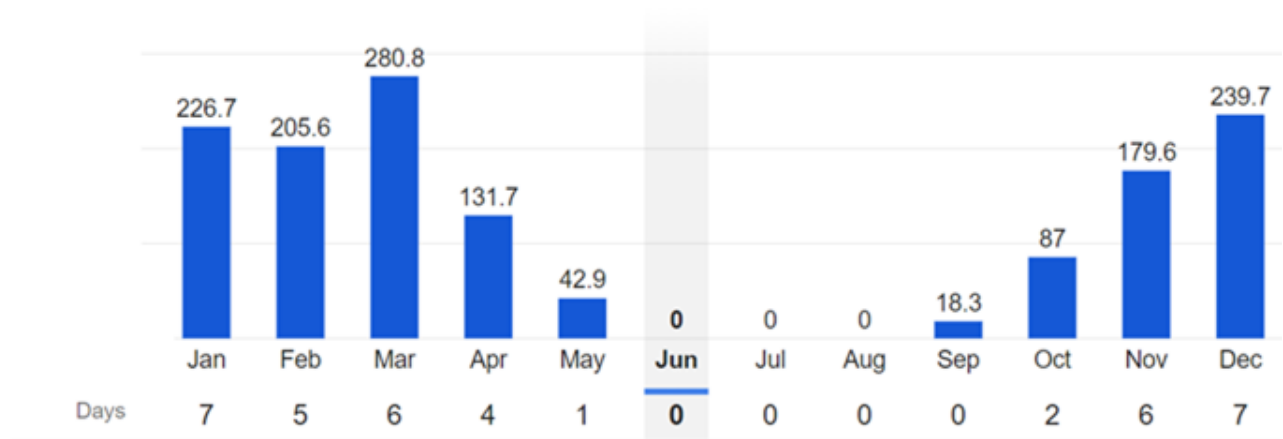


Figure 35: Historical Snowfall in the region.

4.2 Biological Environment

4.2.1 Vegetation

On Site: Vegetation consists of seeded grass and a few trees.

Locally: The area is mainly uncultivated pastureland with small amount of grains or tame hay. The natural grassland has groves of aspen and willow trees near sloughs.

4.2.2 Wildlife

On Site: There is no evidence that this area is home to wildlife, but it is assumed that wildlife passes through and grazes in the area.

Locally: The mixed grasslands supports a variety of birds and animals, typical of southern Manitoba.

4.2.3 Fisheries

On Site: There are no lakes, ponds or bodies of water on site.

Locally: There are no fish in the immediate area due to the lack of any permanent water bodies, through the area is bordered to the east by the Assiniboine River.

4.3 Indigenous Peoples

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.

PADCOM has involved the communities of Gambler First Nation, Birdtail Sioux First Nation and Waywayseecappo First Nation since 2015 with Gambler First Nation and Birdtail Sioux First Nation entering into Memorandum of Understandings with PADCOM in 2015. This encompasses the closest First Nation communities under Treaty 2.

4.4 Socioeconomic Environment

The proposed Project is located entirely within the RM of Russell-Binscarth. . Considering the proximity of the City of Winnipeg and Brandon and other surrounding rural municipalities, there are expected to be sufficient worker skills, trades and services available to support Project construction and operation within a reasonable commuting distance. The actual Project site, in the Hamlet of Harrowby, has no inhabitants. Only two abandoned houses remain on the site, assessed as beyond repair. The land holdings consist of a few traditional farms to the south. PADCOM owns and leases the surface land that we propose to develop on (see Figure 26).

The following tables outline the distances to nearby communities and services (Tables 6, 7, and 8).

Table 6: Nearby communities to Harrowby.

COMMUNITY	DISTANCE FROM HARROWBY
GAMBLER FIRST NATION	23 KM
BINSCARTH	23 KM
RUSSELL	16 KM
MILLWOOD	8 KM
SILVERTON	25 KM
ANGUSVILLE	36 KM
WAYWAYSEECAPPO FIRST NATION	52 KM
ROSSBURN	56 KM
INGLIS	32 KM
FOXWARREN	50 KM
BIRTLE	66 KM
BIRDTAIL SIOUX FIRST NATION	91 KM

Table 7: Nearby Communities and their Populations

MUNICIPALITY/COMMUNITY	POPULATION
GAMBLER FIRST NATION	94
RUSSELL/BINSCARTH	2442
RIDING MOUNTAIN WEST	1390
PRAIRIE VIEW	2167
BIRDTAIL SIOUX FIRST NATION	458
WAYWAYSEECAPPO FIRST NATION	1604

Table 8: Nearby Communities and their Services

SERVICES	LOCATION
AIRPORT	RUSSELL
FIRE DEPARTMENT	BINSCARTH, RUSSELL, GAMBLER
HOSPITAL	RUSSELL
AMBULANCE SERVICE	RUSSELL
RCMP	RUSSELL
HEALTH CLINIC	RUSSELL
OPTOMETRIST	RUSSELL
DENTAL SERVICES	RUSSELL
MENTAL HEALTH SERVICES	RUSSELL
CHIROPRACTORS	RUSSELL
PHARMACY	RUSSELL
SCHOOLS	RUSSELL, BINSCARTH
DAYCARES	RUSSELL, BINSCARTH, GAMBLER
EMPLOYMENT SERVICES	RUSSELL

4.4 Community Relations

The president of PADCOM, Daymon Guillas has been in business in Russell area for 38 years. Over this time, Mr. Guillas has been a member of the Russell & District Chamber of Commerce (38 years), past president, Russell & District Chamber of Commerce, Co-Chair of the Russell Main Street Revitalization Program, and has expanded his business from 22 employees to the current staff level of 338. Mr. Guillas has good relations with the Federal, Provincial, local Governments, local communities, and with the local First Nation communities.

Gambler First Nation is a well-respected First Nation community in this region. They opened their business office on Main St. Russell, approximately 4 years ago. Gambler First Nation is building a very successful Urban Reserve in Brandon, Manitoba and are involved with many other business interests. Chief LeDoux's interests are employment, business opportunities and long-term income

for the members of Gambler First Nation. Also, this First Nation will be a part owner (20% plus 1% of the net profits from the social royalties) of the PADCOM Project.

PADCOM had two other preferred sites at Harrowby but declined them both because of potential impact on the long-term neighbours to these properties.

- PADCOM purchased 2.5 acres approx. 200 yards from the current site. Beside this property is an abandoned house. The owner of the abandoned house lives in Saudi Arabia. Mr. Guillas contacted him to see how he felt about the PADCOM potash facility being close to their abandoned family home. He stated that this 2.5 acre property was where his mother had her garden and where he and his siblings played and it was upsetting to him to have these memories disturbed.
- Mr. Guillas then asked how he felt about our secondary location at the proposed Harrowby site and he stated that he was good with that and has offered to lease other lands to PADCOM to make sure the project has room for expansion.
- Another preferred site was 3.2 km south of the current proposed site. It was an excellent site, as it was very large and flat along the municipal road and right beside the rail line with lots of room for project expansion and spur lines if ever required in the future.
- This location was right across the road from the existing home site, so we quickly rejected this idea as it would put additional vehicle traffic and activity across from their home.

5. COMMUNITY ENGAGEMENT

The following table outlines the efforts that PADCOM has gone to engage the community on the project (Table 9).

Table 9: Communication to various parties regarding engagement regarding the PADCOM project.

Memorandum of Understanding	GAMBLER FIRST NATION & PADCOM	August 25, 2015
Memorandum of Understanding	BIRDTAIL SIOUX FIRST NATION	August 26, 2015
Letter to ADM John Fox	Mun. Russell-Binscarth	March 9, 2015
Letter to MICON Vice-President	Mun. Russell-Binscarth	March 9, 2015
Letter to Minister of Innovation, Energy & Mines	Town of Russell	November 25, 2013
Letter to Minister Chomiak	R.M. of Russell	December 12, 2013
Letter to Minister Chomiak	Western Manitoba Rural Development Authority	December 12, 2013
Letter to Deputy Minister Beauchemin	Western Manitoba Rural Development Authority	December 12, 2013
Tri-Roads Planning Public Hearing	PADCOM	January 2021
Meetings with Gambler First Nation	PADCOM	2015 - 2021
Meetings with Birdtail Sioux First Nation	PADCOM	2015- 2020
Meetings with Town of Russell and the Rural Municipality of Russell	PADCOM	2012 - 2021

Currently, PADCOM employs 6 full and part time employees: two are Metis and one is an under-represented Canadian. Secondly, 2 additional full time staff members are being hired who are from Gambler First Nation. It has been agreed to with Chief Ledoux of Gambler that community members have an opportunity to work in the company and PADCOM plans to honour that agreement.

5.1 Social Community Royalties

PADCOM is committing 11% of its net profit to social royalties or the region. Profit sharing will be as follows:

- 5% of the net profit to be shared with Local First Nation communities and the Manitoba Metis Federation.
- 1% of the net profit to support a 20-student middle school with very high teacher to student ratio.
- 1% of the net profit to support a university program in this region.
- 4% of the net profit for a socio-economic development fund to expand daycare spaces, personal care home beds and to support small business and new technology startups.

6. ENVIRONMENTAL ASSESSMENT AND MITIGATION MEASURES

6.1 Water

6.1.1 Wastewater Disposal

Wastewater and sewage will be held in a 10,000-litre holding tank, then trucked to the Municipality of Russell-Binscarth lagoon.

The risk is considered to be negligible.

6.1.2 Sump Water and Surface Runoff

Some potash will track out of the building on vehicles on to road surfaces. Inevitably there is some fugitive dust from an operating plant.

In the absence of a tailings pond, a system is needed for storage of potentially contaminated surface runoff from the immediate plant area. A containment area will include the roof area of the plant building plus an allowance of 4 to 10 meters around the building. All of this water will be collected in a perimeter trench feeding the process water pond.

Any contamination will be diluted with the fresh runoff water as the pond water is used on a continuous basis for makeup to the mine.

Manitoba has Nutrient Management Regulations under the Water Protection Act which PADCOM will follow. The regulations control application of plant nutrients that might contaminate freshwater lakes and streams. Potash is a plant nutrient. There is no deliberate application of potash associated with this operation though small amounts of potash enter the environment entrained in air from building ventilation and product drying. A containment plan is in place to minimize the amount of the discharge

The impact on surface water is considered to be negligible.

6.1.3 Process Water Pond Leakage

The construction of the pond will provide fill for the plant site (Figure 36). The pond will be excavated to bedrock and will deliberately not be lined. This will allow local groundwater to seep into the pond, to collect any local contamination, with the normal water level in the pond designed to be at least 1 meter below static hydrostatic level. Drainage tile will be installed around the plant to the pond. A pump will be installed in a riser from that line to return water to the process.

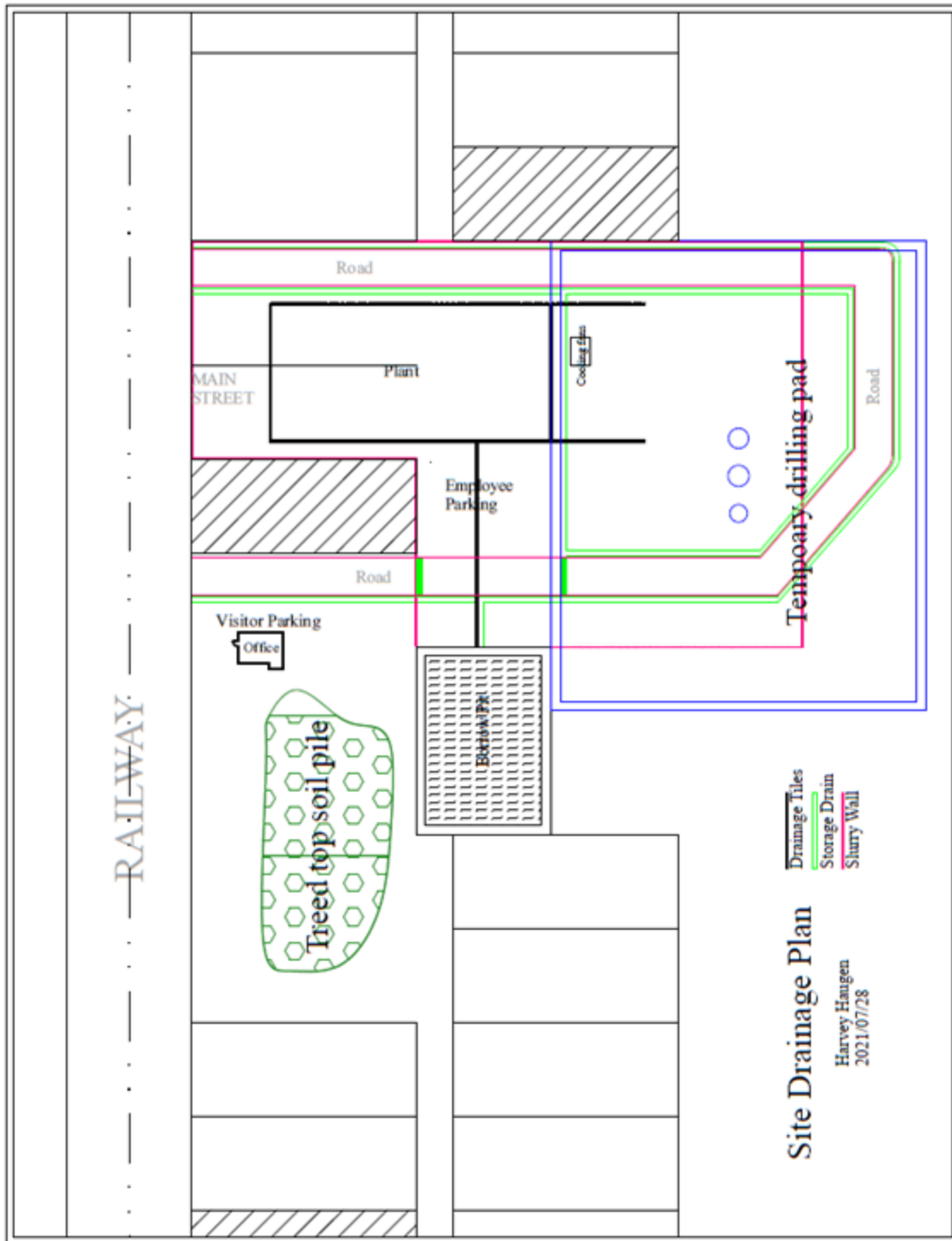


Figure 36: Site Drainage Site Plan

A slurry wall will be installed around the property to isolate any possible shallow groundwater contamination on the site from the surrounding area. The wall will be installed by adding drilling mud to a chain trencher. The trench will be about 150 mm wide. The clay and sand from the trench

will be mixed with drill mud additives to create an impermeable wall. Ground water inside the wall will be drained to the process pond to maintain negative pressure within the wall at all times.

The impact is considered to be very low.

6.1.4 Brine Disposal

The brine disposal is proposed to be drilled into the Winnipegosis Formation as is done at the potash mines in Esterhazy and Rocanville, Saskatchewan.

The impact is considered to be negligible.

6.1.5 Spills and Leaks

The volume of the sump will be calculated to contain the largest spill possible in the plant, with elevated thresholds to ensure no brine spills out of the plant doors on shut down or process disturbance. All water from the roof of the plant, plus all water from the plant site roads that may contain salt contamination will be contained and reused in the process. The ground around the building will be graded to a peripheral trench draining into the water storage pond.

The brine disposal well will be located next to the plant within the containment area.

The impact is considered to be very low.

6.1.6 Air Emissions

Air emissions are regulated under the Clean Air Act. Stack emissions will be tested according to accepted procedures of the Act (Table 10).

The innovative nature of the technology reduces the greenhouse gas to about 0.0006 to 0.12 tCO₂ per product tonne. This compares to the conventional solution mines at 0.15 to 0.97 t CO₂ per product tonne.

The impact is considered to be negligible.

Table 10: Air emissions controls under the Clean Air Act.

	3 Months in Gas	Annual In Power
Production Qty (T)	30,634	119,133
CO₂ Emission due Gas Consumption		
Nature Gas Consumption (Gj)	73,130	-
MB CO ₂ Emission Factor (T/Gj) ¹	0.0506	0.0506
CO ₂ Emission due Gas Consumption (T)	3,704	-
CO₂ Emission due Power Consumption		
Power Consumption (GWh)	2.20	87.54
MB CO ₂ Emission Factor (T/GWh) ²	0.8800	0.8800
CO ₂ Emission due Power Consumption (T)	1.93	77
Total CO₂ Emission per year (T)	3,706	77
CO₂ Emission per tonne of potash (T)	0.1210	0.0006

Notes:

1. CO₂ Gas emission factor followed the Manitoba rate (1886 g/m³) in 2020 National Inventory Report (NIR Annex 6) published by Environment and Climate Change Canada.
2. CO₂ Power emission factor (0.88 T/GWh) followed the 2019 rate published by Manitoba Hydro.

6.1.7 Dryer Discharge Gases

The main potential for contamination of the environment is the discharge from the rotary dryer. There is a lot of experience in the industry on control of stack gas particulates. The current consensus is to use a pulse jet baghouse.

For the first stage we will be using a small rotary dryer. This dryer uses a large heat exchanger for removal of particulates also condensed the water vapor from the discharge. Remarkable particulate control was achieved. The results were explained by the fact that the condensing water forms a fog of micron sized droplets with massive surface area, in the presence of the particulate. The challenge in “scrubbing” particulate from an air stream is to form very fine droplets of high surface area, which is just what we accomplished.

The stack was sampled from 2014 - 2019. Results showed 0.0028 grams per cubic meter particulate. This compares to the then standard in Saskatchewan of 0.57 grams per cubic meter. BHP used 1.5 gram per cubic meter in their study but predicted 10.4 grams per sec on 69 cubic meters per sec air flow (0.144 grams per cubic meter).

There will be a minimal moisture plume in cold weather from the dryer (saturated but cool) as well as from the boiler stacks (hot but low moisture).

We are currently working on a novel contact heated dryer. Product is heated preferentially with electricity so the moisture coming off the product is high temperature steam, that can be reused. The elimination of hot air heating would improve drying efficiency and produce a minimal discharge to atmosphere. This is an important development going to near zero carbon.

Dryer stack will be sampled and monitored in accordance with standards set out in the Clean Air Act.

The impact is considered to be very low.

6.1.8 Fugitive dust

There is a minimum of handling of dry product in the plant. The only fugitive dust would come from product handling in the storage building. The building has a large, enclosed volume for the amount of product handled and stored allowing dust to settle within the building. All products will be treated prior to storage with dust control oil. This will also control dust in truck loading. In addition, the truck loadout area will be a covered structure to contain fugitive dust.

The impact is considered to be very low.

6.1.9 Noise

The sound pressure level of a quiet residential neighborhood is 45 dBA during daytime hours and 35 dBA at night and 100' from a busy highway is 70 dBA and normal conversation 3' feet away is 60 dBA (Figure 37).

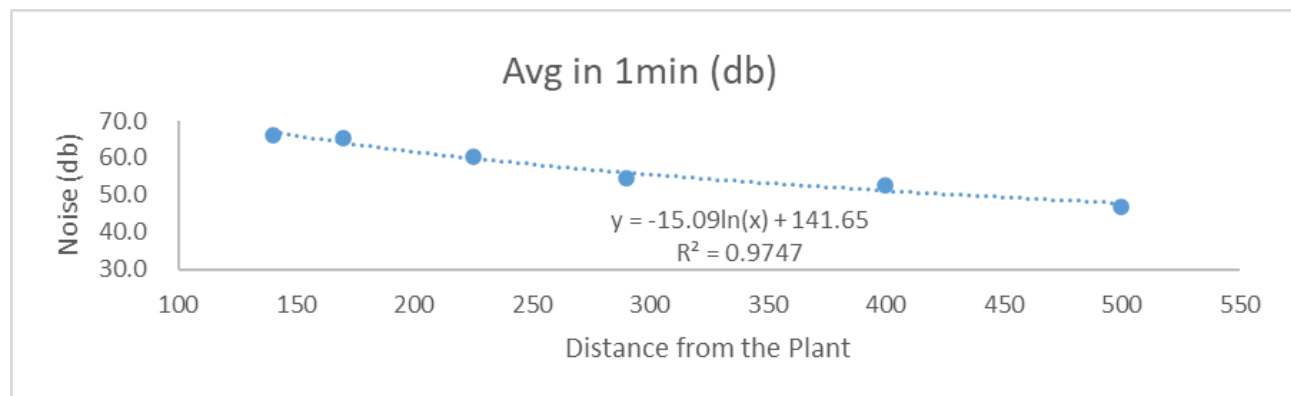


Figure 37: Noise levels

Ambient sound level from the heavy industrial neighbor is about 42 dBA. The only significant sound will be from the dryer fan and a dust collector fan. Both are low speed fans. Overall sound level is expected to be in the range of 60 dBA.

The impact is considered to be negligible.

6.2 Wildlife and Plant Species

We do not anticipate any issues in this one-hectare area and extended area as it is extensively previously disturbed, with the surrounding land being pasture with extensive cattle grazing.

The risk to wildlife will be associated with increased road traffic.

The impact is considered to be very low.

6.3 Mine Construction Activity

Well drilling and pipelines will meet the defined requirements of normal oil and gas drilling by Agriculture and Resources Development. Topsoil on the sites will be stripped prior to any drilling or excavation. Soil will be stored and replaced after the site is no longer used.

The impact is considered to be negligible.

6.4 Plant Construction

The construction workforce will be small. The plan is to use a single building on pilings to bedrock. The earthwork will use excavation from the water pond for fill material. A layer of gravel, crushed rock and clay will be compacted over the area for roads and parking areas.

The plant foundations will be poured. A contractor will install the building on the foundation with their own crews. The concrete floors will be poured.

All equipment will be prefabricated, as complete as possible, with pumps, piping, walkways, handrails all installed. Modules will be shipped to the site or assembled on site for final assembly and installation.

The electrical controls will be fabricated complete with instrumentation, controls and programmable logic controller (PLC). The only electrical work to be done on site will be installation of field wiring.

Most of the construction work will be supplied by trades available from the Russell area, travelling to the site on a daily basis. Lower skilled work will be done by staff hired by PADCOM for continued operation of the plant.

The impact is considered to be negligible.

6.5 Plant Construction

The processing wells will be installed by oil field contractors. Well site environmental procedures will be those required in the oilfield. Pipelines to the plant will be installed by oilfield contractors according to procedures required for oil and wastewater lines in the oilfield.

The impact is considered to be negligible.

6.6 Site services and roads

The site is serviced by excellent existing roads. A road use agreement will be made with the Municipality of Russell-Binscarth to compensate them for increased maintenance costs. See fig 29

The impact is considered to be negligible.

6.7 Socioeconomic

The socioeconomic effects of the plant are positive, with significant income potential to the Municipality of Russell-Binscarth in potential tax revenue. It also provides income potential to a small number of local employees, local contract services and some small potential for local suppliers. The small scale of the business and the proximity of the large economic unit connected to the Rocanville and Esterhazy mines means the measurable impact will be small.

The impacts to the community are considered very positive. There is no influx of a large quantity of workers that would disrupt housing, municipal services, traffic or quality of life.

This region needs good paying jobs, Gambler First Nation needs income for community infrastructure and the Municipality of Russell-Binscarth needs new income in order to maintain property and school taxes.

PADCOM's social royalties is considered very positive for the entire region. Sharing of the profit and creating opportunities within the region is the correct business model when using a public resource.

The impact is considered to be positive.

6.8 Human Impact

The small total workforce provides a minimum disruption to the community of Russell.

The siting of the plant has been selected as to cause a minimum impact on the surrounding area and communities. The small amount of land used and location of the plant on an abandoned village site is well received.

One senior person will lead the site safety and training program.

The impact is considered to be negligible.

6.9 Effects on Indigenous and Treaty Rights

The project is not expected to adversely affect the exercise of indigenous or treaty rights because the project is on private land, the majority of the mineral rights are owned by the Crown, with some being privately held. The environmental impact of the project on vegetation, water, wildlife, and birds is considered to be negligible.

PADCOM has consulted with and involved Gambler First Nation and Birdtail Sioux First Nation since 2015 and from the outset suggested profit sharing with them (both under Treaty 2).

The relationship between PADCOM and Gambler First Nation has grown whereby Gambler First Nation will now be a 20% shareholder of the project, receive 1% of the net profit, will rent equipment to the project, workforce and may own the future transmission line to the project site, which PADCOM would lease from Gambler First Nation.

6.10 Heritage

Discussions were held by phone call, and subsequently by emails in July 2021 between PADCOM and Historic Resources Branch in which PADCOM asked for a heritage screening. On August 10th, 2021 a letter was received from the Branch stating that they 'had no immediate concerns with the proposed site' (Appendix 2).

The plant site initially uses only 1 hectare of land of the former village of Harrowby. Location of well sites and pipelines can readily be relocated if specific sites are found within the mine area. Note that the three remaining abandoned houses, located near our site, but not on our proposed site location, will be left untouched and in place.

The impact is considered to be negligible.

6.11 Subsidence

The subsidence is calculated to be 13 cm over 8 square km. The impact is considered to be negligible.

6.12 Infrastructure and Services

The project will have a minor impact on the regional fire, ambulance and hospital services.

Fire department services are available at Gambler First Nation, Binscarth, and Russell. Ambulance and Hospital services are located in Russell.

The impact is considered to be negligible.

6.13 Community Services

The impact on the community water and wastewater facility is considered negligible. There is no water being used from the local municipalities. On site wastewater will be captured in a 10,000-litre holding tank and trucked to the Municipality of Russell-Binscarth lagoon. We anticipate 10,000 – 20,000 litres per week, being hauled by a licensed hauler to the Municipality of Russell-Binscarth lagoon (Letter dated July 22, 2021 to PADCOM from Municipality of Russell-Binscarth) (Appendix 3).

The impact is considered to be negligible.

6.14 The Community Impacts and Benefits

The impacts to the community are considered very positive. There is no influx of a large quantity of workers that would disrupt housing, municipal services, traffic, or quality of life.

Some of the positive spin-offs include:

- Creation of 17-35 fulltime positions drawing on the local communities, including Gambler First Nations;

- At present 6-8 full and part time jobs have been created which produce further spin offs for the community;
- Job creation from spin offs is 1.25:1, so an additional 20-40 additional community jobs may be created;
- Social royalties are uncommon for new project developments in Canada, let alone in Manitoba – The local Municipality currently budgets \$0 towards socio-economic development. PADCOM will be spending \$2.6-5 million per year on socio-economic development when producing 250,000 tonnes per year of product;
- The present royalty tax in Manitoba, for a 250,000 tonnes per year production, is \$4.7-9.5 million per year;
- Manitoba Hydro receives \$400,000 **per month** for supplying power to the plant when at full production.

6.15 Traffic

PADCOM's potash will be transported by truck and possibly rail cars later. There is currently 35 – 40 semi-tractor trailers leaving the neighboring Bunge Canola plant per day and we anticipate the truck traffic to PADCOM to be far less (7-8 trucks per day) when our production hits 100,000 tonne per year.

With there being only two occupied homes south of the plant utilizing the same road, local traffic is very minimal.

The Municipality of Russell-Binscarth requires PADCOM to pay for the maintenance of the municipal road due to the additional heavy traffic. PADCOM will apply dust control if required.

The impact is considered to be negligible.

6.16 Workplace Health and Safety

PADCOM is committed to create and maintain a safe and healthy work environment in accordance with industry standard and in compliance with legislative requirement under *The Workplace Safety and Health Act and Regulations, Manitoba Workplace Safety and Health and Operation of Mines Regulation*. PADCOM strives to eliminate any foreseeable hazards that may result in accidents, worker injury/illness, damage in property and environment through the following efforts and plans and their plan is available (Appendix 4).

- Set up safe work rules, practices, and procedures with management, supervisors, and workers to create a safe and healthy workplace environment and culture.
- Recognize, evaluate, control, and prevent a list of hazards may present in the project and the operation afterwards.
- Inspect and investigate for potential risk, misconduct, and improvement, and keep related records for internal control, auditing, and education.
- Maintain good training and communication for workplace safety and health.

- Provide qualified personal protective equipment (PPE) and ensure the proper training, use, care, and maintenance to safeguard the health of people in the work.
- Develop preventative maintenance programs to ensure equipment and tools are in good use to reduce the risk of injuries, damage, and loss of property.
- Prepare the emergency response plan to mitigate the risk of injuries and damages in cases of an accident exist.

7. DECOMMISSIONING

7.1 Mine Area

All wells will be cemented off after the useful life of the well. Topsoil will be replaced, and the soil put into original condition.

7.2 Plant Site

The plant site is designed to be temporary but could well be converted into a permanent operating plant. If the site were to be abandoned, the plant building will be removed or repurposed for other uses. The location of the site would make it an attractive manufacturing plant building, or alternately a barn or storage building for agriculture. The site will be easily transferred to other use since site contamination will be minimal. The pond area could be filled in or left for local water supply or even for aquaculture.

8. SUMMARY

A new selective solution mine is planned for location in the abandoned village of Harrowby. The mine is unique in the following ways:

- a. It will use the Beechy process for selective solution mining, removing only the potash from a selected high grade potash seam
- b. Using wiped surface contact crystallizers for improved crystal sizing and reduce dust
- c. There will be no salt pile waste left on surface
- d. Water consumption is only 25 US gallon per minute, the lowest in the industry based on tonnage
- e. The site is located on one (1) hectare of land. No pipelines on site.
- f. The entire site will be drained down to bedrock to prevent contamination.
- g. Low dust emissions with a unique scrubber system
- h. Low to zero carbon emissions as the project develops
- i. Potential for significant potash recovery from what is considered a “marginal potash resource” on the edge of a major deposit

This project has the potential to change the environmental impact of all potash production in Canada as outlined below:

- a. Reduced greenhouse gas production
- b. Reduced water consumption
- c. Reduced construction greenhouse gases.

This project has a positive effect on lowering the cost of fertilizer necessary for food production in the world, while providing significant employment for Manitobans.

The impact on the environment is highly positive with minimal to negligible impacts. The socioeconomic impact is very positive.

APPENDICES

Appendix 1: Tri-Roads Certificate of Approval



Tri-Roads
forward
Planning for progress and prosperity

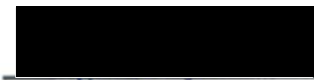
CERTIFICATE OF APPROVAL

CONDITIONAL USE

Issued By:	Tri-Roads Planning District Board
Applicant:	PADCOM
In Respect of:	TRCU #01/21
In Accordance of:	Tri-Roads Zoning By-Law #18/02/18
Date of Order:	January 28 th , 2021

The application listed above has been approved with the following conditions:

1. That all required provincial and federal license, permits and insurance is obtained and copies provided to Tri-Roads Planning District within a reasonable period of time.
2. That PADCOM enters into an agreement with The Municipality of Russell Binscarth for road maintenance prior to any development of the lots.
3. Valid for a period of 18 months from the date of this order.
4. Applicant is responsible to review any notations on certificate of title.



Adrienne Falloon
Planning Officer
Tri-Roads Planning District

Approved by Resolution #9/21

COPY

Appendix 2: Heritage Branch Letter of Approval



Memorandum

DATE: 2021-08-10

TO: Daymon Gillas
President
Potash and Agri Development
Corporation of Manitoba Ltd.
dgillas@manitobapotash.ca

FROM: Christina Nesbitt
Impact Assessment Archaeologist
Historic Resources Branch
Main Floor – 213 Notre Dame Avenue
Winnipeg, Manitoba
R3B 1N3

PHONE NO: (204) 945-8145
FAX: (204) 948-2384
E-MAIL: Christina.Nesbitt@gov.mb.ca

SUBJECT: Heritage Screening: Potash processing facility at the abandoned town of Harrowby Manitoba
AAS File No. AAS-21-17283

No concerns at this time.

Further to your request for the above noted heritage screening, the Historic Resources Branch has examined the location in conjunction with Branch records for areas of potential concern. Because the proposed developmental footprint appears to be within a previously disturbed cultivated field, the potential to impact heritage resources is believed to be low and, therefore, the Historic Resources Branch has no immediate concerns with the proposed development.

If at any time, however, heritage resources are encountered in association with these lands during testing and development, the Historic Resources Branch may require that an acceptable heritage resource management strategy be implemented by the developer to mitigate the effects of development on the heritage resources.

If you have any questions or comments, please feel free to contact the Branch as above.

Historic Resources Branch
Archaeological Assessment Services Unit

Appendix 3: Letter from Rural Municipality of Russell-Binscarth for Approval of Plant Site Wastewater Disposal into the Municipal Lagoon



July 22, 2021

MAYOR:
Cheryl Kingdon-Chartier

PADCOM
Box 578
Russell, Manitoba
R0J 1W0

RE: Waste Water Disposal / Harrowby Site

This is to confirm that PADCOM is authorized to dump Waste Water (septic or holding tank) from its Harrowby site into the Russell Lagoon.

PADCOM will require the setup of the account with the Municipal Office in order to complete the authorization.

COUNCILLORS:
Estha Baseley
René Cadieux
Ray Elliott
Marg Fraser
Danny Galatiuk
Barry Wishart

Should you have any questions please advise.

Regards


James Fielder
Chief Administrative Officer

**CHIEF ADMINISTRATIVE
OFFICER:**
James Fielder

**ASSISTANT CHIEF
ADMINISTRATIVE OFFICER:**
Nicole Burdeniuk

P.O. Box 10
Russell, Manitoba
R0J 1W0

Bus: 204-773-2253
Fax: 204-773-3370

Email: info@rmb.gov.com

Appendix 4: PADCOM Workplace Health and Safety Plan (June 2021)

PADCOM Potash

Workplace Safety and Health Plan

June 28, 2021

Cheng Miao
Harvey Haugen

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1. INTRODUCTION

PADCOM is developing an annual production of 28,000, 100,000 or 250,000 tonnes potash mine located in Harrowby Manitoba section 28 township 20 range 29 W1. Unlike the traditional potash mine at Rocanville in the nearby province of Saskatchewan, PADCOM is using an innovational Polythermic potash mining process.

The purpose of this report is to establish a structural framework and practical guidance for PADCOM to build a safe and healthy work environment in the Harrowby project as well as the operation after the project. The report contains the rules, policies, action plans, management systems and an emergency response plan for any emergency situation. The report is based on the requirement and guideline from *The workplace Safety and Health Act and Regulations (The Act and the Regulation M.R.207/2006)*, *Manitoba Workplace Safety and Health and Operation of Mines Regulation (The regulation M.R. 212/2011)*, *Code of Practice and Guidelines* and *Equivalent Publication, Code or Standards* published by Manitoba government.

2. SAFE AND HEALTHY WORKING ENVIRONMENT

2.1 Commitment

PADCOM is committed to protect its people and property and will strive to eliminate any foreseeable hazards which may result in accidents, personal injury/illness, or property damage. The company recognizes the right of its employees to work in a safe and healthy work environment and will build and continue to improve the environment for everyone's best interest.

PADCOM is committed to develop safe work practices and procedures with employees. PADCOM recognizes that all employees will be equally responsible for minimizing accidents within facilities and site locations. Accidental loss can be controlled through good management in combination with active employee involvement. Safety is the direct responsibility of all managers, supervisors, and employees.

All management activities will comply with company safety requirements in planning, operation and maintenance of facilities and equipment. All employees will perform in accordance with established procedures and safe work practices.

2.2 Duties of Stakeholders

To follow the commitment for creating a safety environment, PADCOM further assigned the duties of the stakeholder defined by *The Regulation 212/2011*.

Duties of Employer

PADCOM as the employer shall:

- Make proper training of employees to ensure they are competent to perform the work that is assigned;
- Ensure management's awareness for safety and maintain safety programs;
- Create Workplace Safety and Health (WSH) Committees and Representatives;
- Establish safety policies to provide a safe workplace for employees;
- Provide personal protective equipment (PPE) and access to first aid kits;
- Document unsafe and abnormal conditions and implement measures to correct the unsafe conditions;
- Report and protect employee from unsafe conditions;
- Ensure management inspects the unsafe conditions and take corrective actions;
- Ensure compliance with regulations;
- Keep good practices and set a good example.

Duties of Supervisors

Management in PADCOM is assigned supervision roles for safety. They shall:

- Promote safety awareness;
- Establish and enforce safe rules and work procedures;
- Instruct employees about safety;
- Correct unsafe conditions and unsafe practices;
- Inspect workplace hazards;
- Investigate all accidents;
- Ensure proper maintenance of equipment;
- Comply with regulations;
- Keep good practices and set a good example.

Duties of Employees

Employees are expected to contribute to maintaining a safe environment, they shall:

- Contribute in setting safety rules and policies;
- Follow safe rules and work procedures;
- Report unsafe conditions;
- Correct unsafe conditions;
- Report unsafe acts;
- Report any injuries;
- Comply with rules and regulations;
- Keep good practices and set a good example.

Workplace Safety and Health (WSH) Committees and Representatives

The regulation 212/2011 defined the responsibilities for WSH committees and Representatives in a mine operation. In PADCOM, WSH committees and representatives shall:

- Develop a new safety standards and procedures for new processes;
- Cease operation when unsafe processes/procedures/dangerous hazard & risks have been addressed;
- Meet monthly to address safety issues, document and distribute minutes in a timely manner to all committee members;
- Appoint internal safety inspectors or coordinate with external safety inspectors;
- Report incidents and required information to mine inspectors or other bodies if need be.

3. RULES, POLICIES AND PRACTICES

Derived from the safety and health acts and regulations, PADCOM developed its rules, policies, and related procedures to create a safe and healthy atmosphere in the company as well as the Harrowby project. The rules, policies and procedures will be updated on a continuous basis in accordance with the update of the regulations and the requirements in the workplace.

3.1 Company Rules

Company rules define the general safety and health principles that EVERYONE must follow to ensure a safe workplace. The rules are created based on experience and knowledge as well as the guidelines from safety regulations:

1. Employees shall be at the workplace, ready to work at the regular starting time;
2. PPE will be provided to all employees. PPE such as hard hats and safety boots are to be worn on the job site all the time. Other PPE should be used as required;
3. All work shall be carried out in accordance with appropriate safe work practices and the supervisor's direction;
4. Accidents, injuries or "near misses" events shall be reported to supervisors regardless of the nature of the events;
5. First aid treatment is to be obtained promptly for any injuries;
6. Smoking is permitted only in designated areas;
7. Tools and equipment must be maintained in good condition, with all guards and safety devices in place to be used;
8. Fighting, horseplay, practical jokes, oral abuses, harassment or otherwise interfering with other employees is strictly prohibited;

9. Consuming or being in possession of alcohol, cannabis or illegal drugs on company premises or on any job site is strictly prohibited;
10. Work areas including individual working quarters shall be kept in a clean and orderly fashion;
11. Operating vehicles and mobile equipment must be in compliance with safe operation code of practices and highway regulations.

3.2 Policies and Practices

The policies and practices define the programs and disciplinary actions that management and employees must do or must not do to be safe in the workplace. A number of policies and practices are presented in the following sections and will be updated as required to implement any changes.

3.2.1 Hazard Recognition, Evaluation and Control

Workplace hazard can be visible and hidden and can be any practice, behavior or act, physical conditions that leads to illness/injury, damage to health/property/environment, and loss of production. Management must set good practices to recognize, evaluate and control hazards in the workplace:

- Identify and recognize hazards in P.E.M.E.P (People, Equipment, Materials, Environment, Processes) five categorizes in each task of each operation processes;
- Assess the level of risk for each hazard and prioritize the hazard;
- Determine the method of control (at source, along the path and at the people);
- Implement control strategies to eliminate/reduce the risks;
- Inform all employees and WHS committees/representatives;
- Monitor and follow up to ensure effectiveness of the control;
- Document and improve the practice and procedures.

A hazard identification, assessment and control will be conducted in below stages:

- In project planning stage that tasks and procedures are designed;
- In project and operation stage that before tasks are executed;
- In project and operation stage that the tasks are carrying on;
- In project and operation stage that safety inspections are executed;
- In project and operation stage that every incident or “near misses” occurred.

The hazard risks identified in this plan covers the potential hazard that may present in developing and operating the project. It will be a continuous procedure while the project in progress.

People	Equipment	Material	Environment	Process
Covid19 infection	Defective tools and equipment	Hot brine/steam /tanks/piping	Noise in construction and operation	Unexpected issues not covered in the design/plan
Accidents in increased travels		Spills and leaks	Dust produced in storage & plant	
Undertrained employees		Heavy objects in lifting and moving	Field operation in cold temperature in Winter	

Table 1: Hazards identified through P.E.M.E.P.

Hazard assessment and controls:

No#	Name	Priority	PEMEP	Descriptions	Prevention/Mitigation Plan
1	Covid-19 infection	1	People	Covid 19 and its variance infection due to increased human interaction activities.	PADCOM strictly following the public health orders and guidance; Every employee must be vaccinated promptly and timely to reduce the risk of infections in the workplace; Visitors will be registered at the entrance office with a Covid screening question form.
2	Accidents in increased travels	2	People	Potential travel accidents due to the increased travels on the road, and increased volume of vehicles in the site area.	All employees travelling to the work must have a valid license and follow traffic regulations; Speed limit will be restricted in the site area;
3	Defective tools and equipment	3	Equipment	Defective tools and equipment may cause incidents such as malfunction, fire and personal injury.	Tools and equipment shall be well-maintained according to Preventative Maintenance Program; Employee must follow safe work practices while using tools and equipment; Employee will be trained in the emergency response plan.

4	Undertrained Employees	4	People	Potential incidents could happen due to undertrained/non-experienced employees due to the new processing and mining method.	Operation employees will gain experience in participating in the process to build the project; Operation employees will be well-trained and operating according to safety policies and procedures; PPE are supplied to employees and will be required to be worn in the operation;
5	Unexpected issues not covered in design/plan	5	Process	Incidents could happen due to unexpected issues not considered in the design/plan.	As unplanned incidents arise, they will be documented, and procedures will be implemented into our WSP pertaining to the new incidents.
6	Dust produced in storage and plant	6	Environment	Dust generated from the process may contaminate environment and also cause health issues for employees.	Dedusting process in the process design will minimize the fugitive dust escape outside of the plant; Ventilation for the working area will minimize the dust in the workplace; PPE such as masks will be worn in handling the product in the storage area.
7	Hot brine /steam /tanks /piping	7	Material	Hot temperatures occurring in brine heating, injection, crystallization and drying process may have potential risks to cause personal injuries.	Insulation will be placed on the equipment to prevent the touch of hot surfaces to minimize the risk; PPE must be worn to operate in the related processes.
8	Spill and leaks	8	Material	Spills may occur during the process allowing brine, chemicals or other liquids to contaminate the workplace and environment.	Contamination was considered in the engineering design including ditches, pit and pumps for the working site to prevent the brine spill; Chemicals and other liquid such as octadecyl amine used for anti-cake process and diesel used for generators will be stored safely in containers;

9	Heavy objects in lifting and moving	9	Material	Incidents could happen while moving/lifting heavy object in building the plant and facilities.	Plant and other site facilities were built with experienced employees; Operator on powered mobile equipment will follow related code and standards, and PADCOM'S safe work practice.
10	Field operation in cold temperatures	10	Environment	Field operation such as well maintenance in cold temperatures may cause personal injuries	Employee will follow Safe Work Practices to operate in cold temperatures to prevent incidents.
11	Noise in construction and operation	11	Environment	Noise from construction and operation may cause damage to operation personnel and people around the site	The continuous noise from process equipment is calculated below 85dBA under noise control part 12 of <i>The Regulation 217/2006</i> . Barriers will be placed near major equipment contributing noise such as diesel generators to reduce to the lowest possible; Necessary mitigation will be placed as noise will be monitored in the project and operation;

Table 2: Hazards assessment for list of risks identified

Note: The priority was based on the weighted estimation of Severity and Probability of the incident.

3.22 Safe Work Practice (SWP)

PADCOM'S SWPs outlined the safety guidelines for employees to complete a list of certain tasks that may have potential risks of working hazards. SWPs provide a certain "to do" and "not to do" guideline rather than how to do procedures. The practices were based on the past experience and in compliance with WSH and other related legislations. The practices shall be updated on a continuous basis as required, in order to create a safe working environment and protect PADCOM'S employees.

A number of principles as well as policies are set for SWPs:

- SWP are developed and reviewed by management, supervisors and employees;
- Any release, publication and removal of SWP shall be approved by General Manager of the plant and WHS committee and representatives;
- All employees must be trained with SWP;
- All employees must understand and apply SWP in the working sites and facilities;
- Supervisors (including management) and employees must ensure SWP to be followed at all times in the workplace

- SWP must be updated in a timely manner accordingly to the requirement from the workplace and the development of applicable legislative regulations;
- All SWP shall be reviewed by GM and WHS committee and representatives annually;
- These policies of SWP shall be reviewed by GM & WHS committee and representatives every three years.

A list of SWPs:

No.	Name	SWPs	Protective Guidance	Supervisor's Responsibility	Worker's Responsibility
1	Use of First Aid	<ul style="list-style-type: none"> • All employees must know the location of the First Aid Equipment and the contact of First Aid attendant; • All employees must be trained with ERP; • The First Aid attendant must be trained and certified; • First aid kits must be maintained in good condition; Incident and injury and treatment reports must be recorded and well maintained; 	<ul style="list-style-type: none"> • MB WHS Regulation 217/2006 • Canadian Centre for Occupational Health and Safety (CCOHS) OHS Answers-First Aid • Emergency Response Plan (ERP) 	<ul style="list-style-type: none"> • Provide and maintain First Aid kit in good condition and stored in a visible and accessible location; • Ensure First Aid attendant is trained and certified; • Ensure employees are trained with emergency response for first aid; An injury and treatment record to be maintained; 	<ul style="list-style-type: none"> • Understand the procedures for summoning first aid; • Report all injuries to supervisors;
2	Use of PPE	<ul style="list-style-type: none"> • All employees, guests and visitors must wear basic PPE including CSA standards Hard Hats, Work Boots, Safety Glasses and other special PPE required for the job sites; • All PPE provided to employees will meet MB WHS regulations, CCHOHS regulations & CSA or equivalent standards; • All PPE will be maintained in good condition in accordance with the 	<ul style="list-style-type: none"> • MB WHS Regulation 217/2006 • MB WHS Legislation Equivalent Publication • MB WHS Code or Standards • CCOHS OHS Answers-PPE 	<ul style="list-style-type: none"> • Qualified PPE to be provided to employees; • Ensure employees trained how to use, care and maintain PPE, and use the required PPE at the workplace; • Inspect and maintain the PPE in good condition overtime; 	<ul style="list-style-type: none"> • Wear or use in accordance with manufacturer's specification; Take reasonable steps to prevent damage to PPE; • Inform supervisor for any defective or failure to provide the

		<p>manufacturer's instructions and requirement;</p> <ul style="list-style-type: none"> • All PPE will be inspected at the time of issue and before use in the workplace; • Any PPE that is questionable in reliability, damaged, or in need of service or repair must be removed from service immediately and will not be returned until repaired and inspected by a qualified and competent person. 			<p>protection that PPE was intended to provide.</p>
3	<p>Use, maintain and storage of general materials, equipment, machines and tools</p>	<ul style="list-style-type: none"> • Users must be trained how to use and maintain the materials, equipment, machines and tools according to the manufacturer's specifications, standards and applicable regulations; • Only qualified personnel can operate the equipment and tools with specific requirement; • Housekeeping including clean up, waste disposal, removal of unused materials must be done during the shift in daily operation; • Inspection and documentation must be made for housekeeping programs; • Storage in the building or structure as well as on racks and frames must not exceed its designed specifications for safe loading conditions; • Storage cannot be beneath an outdoor overhead electrical line; • Post or guardrail must be connected to the floor to 	<ul style="list-style-type: none"> • MB WHS Regulation 217/2006 • CCOHS OHS Answers- Workplace Housekeeping • MB Building Code 	<ul style="list-style-type: none"> • Ensure employees are trained to use, maintain and safely store the materials, equipment, machines and tools; • Inspect and ensure safe workplace through daily housekeep at the workplace; • Inspect and ensure materials, equipment, machines and tools are stored safely; • Keeps training and daily housekeeping records; 	<ul style="list-style-type: none"> • Complete the required training for use, maintain and store the materials, equipment, machinery and tools; • Perform housekeeping programs on a daily basis; • Reports any potential hazards in use and storage process;

		prevent the possible collision to storage rack columns from mobile equipment;			
4	Use of powered mobile equipment	<ul style="list-style-type: none"> • Only competent operators with sufficient knowledge, experience and training are required or permitted to operate powered mobile equipment. A certain number of training hours and supervised operation shall be determined to meet the competency; • Operators must follow the safety procedures of different type of equipment that is required by the manufacturer's instruction or related regulations; • The operator's manual must be kept and stored with the equipment so as to be readily available to the operator. 	<ul style="list-style-type: none"> • MB WHS Regulation 217/2006 • MB WHS Code or Standards 	<ul style="list-style-type: none"> • Ensure safety procedures are developed for different types of equipment in compliance with related regulations; • Ensure employees are trained on each type of equipment, and keep records of training; • Ensure equipment is inspected and well maintained, and maintain the record and review with operators. 	<ul style="list-style-type: none"> • Comply with safe work practice of each type of equipment; • Complete the required training of each type of equipment; • Meet the competency requirement; • Wear any necessary PPE in operating the equipment.
5	Prevention of Slips, Trips and Falls	<ul style="list-style-type: none"> • Keep good housekeeping daily to clean spills and wet floor immediately, remove obstacles from walkways, and ensure workplace is clean and tidy; • Always wear proper footwear in case of working in wet area to increase comfort and prevent fatigue; • Use guardrail system and qualified fall protection system while working in high place; 	<ul style="list-style-type: none"> • MB WHS Regulation 217/2006 • CCOHS OHS Answers- Prevention of Slips, Trips and Falls 	<ul style="list-style-type: none"> • Inspect and ensure safe workplace through daily housekeeping at the workplace; • Inspect and ensure proper PPE and footwear are used in the condition with potential slips, trips and falls; • Ensure employees are well trained to use guardrail system and fall 	<ul style="list-style-type: none"> • Perform housekeeping programs on a daily basis; • Reports any potential hazard that could lead to slips, trips and falls; • Take training of how to use guardrail system and fall protection system.

				protection system; • Inspect and ensure guardrail system and fall protection system are in good condition;	
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Table 3: List of Safe Work Practices for PADCOM'S project and operation.

3.23 Safe Job Procedures (SJPs)

SJPs are the detailed working procedures for employees to safely perform a specific task or tasks in a process. It gives details of steps on how to do safely. SJP will be worked between supervisors (managers), employees and possibly the 3rd party experts required in a specific task (such as maintaining a crystallizer tank).

List of procedures are to be developed.

4. EMERGENCY RESPONSE PLAN (ERP)

The purpose of the ERP is to create a decisive framework and action plan so that PADCOM can effectively respond to any emergency. ERP addresses emergency scenarios, potential hazards to the public, environment and company property while outlining the systems, resources and personnel actions required for an effective response. ERP also provides access to critical information necessary to respond to any emergency scenarios.

4.1 Emergency Scenarios

From the hazard identification process illustrated in section 3.21, we prepared the response plan for the potential emergencies due to incidents in below scenarios:

- People injured at the workplace;
- A fire or explosion due to operation error, malfunction of equipment or unexpected issues from the process;
- A leak or spill.

According to Russell Emergency Measure Public Information, the Asessippi Parkland Region is "low risk" for many of the natural disasters. "The most likely emergency event caused by natural disasters are the one from severe weather - tornado, blizzard, flood and ice storms, and/or a loss of electrical service." Therefore, in this plan, we also prepared a procedure in response for severe weather conditions.

4.11 Procedure for First Aid to the Injured

In the event of **first aid** or a **medical emergency**, the following procedure should be followed:

1. Approach with care and evaluate the scene and the injured person/people
 - Do not enter the scene to put yourself in danger;
 - Form an initial assessment of the scene and do the evaluation:
 - i. Number of the people injured or need aid;
 - ii. Nature of the injury /illness;
 - iii. Severity of the situation
 - Severer cases are cases that present life-threatening symptoms such as unresponsive, serious bleeding, unable to breath etc;
 - Minor cases are minor injuries that do not pose danger to life such as cuts, pain, pinches, scrapes etc.
 - iv. Identify nearby personnel and call for the first aid attendant and supervisors.
 - Do not move the injured person unless there is a life-threatening situation that necessary action must be done;
2. Examine the details and determine the plan for aid
 - In the event of severer cases
 - i. Call 911 to for the emergency and medical assistance;
 - ii. Communicate with 911 operator and follow the instruction, do not end the call until instructed to do so;
 - iii. Prepare the supporting information such as location, nature of emergency, description of scene, estimated condition of patient for the emergency team, contact info of yourself and supervisor etc;
 - iv. Clear the pathway for emergency assistance personnel and vehicles;
 - In the event of minor cases
 - i. Contact first aid attendant and supervisors;
 - ii. First aid attendant shall perform head to toe checking and make decisions based on their best professional judgement;
 - iii. First aid attendant shall prepare and use the first aid kit for treatment.
3. Use of first aid
 - Only trained personnel and first aid attendant can minister the first aid;
 - First aid kit must be retrieved from a convenient location;
4. Use of medical transportation
 - Ambulance to be called in the event of severer cases following the instruction from 911 operators or the professional judgement of the first aid attendant;

- Do not use personal vehicles in transportation in severer cases unless it is absolutely necessary from a professional judgement or from the instructions from 911 emergency services;
 - There must be appointed personnel accompany the injured person from the site to the emergency facilities.
5. Report and Documentations
- In any event of injuries, an incident report must be completed. The incident report includes the nature of the incident and the treatment record in the incident;
 - An incident investigation must be done following the incident. Corrective plans must be drafted in the report and implemented with the approval of supervisors;
 - Both incident report and investigation report must be reviewed and signed off by the management and WHS committee and representatives;
 - The incidents and corrective plans must be communicated thoroughly to the employees.

4.12 Procedure for Initial Firefighting and Evacuation

In an emergency event such as **fire**, follow below emergency procedures:

1. Approach with care and assess the severity of the fire;
 - Do not enter the scene to put yourself in danger;
 - Estimate the severity through:
 - i. The level of the smoke in the space;
 - ii. The flame/temperature/heat in the area;
 - Shout out/Alert all nearby personnel for the fire.
2. Determine the Strategy
 - In a severe event that fire is impossible to control:
 - i. EVACUATE the building IMMEDIATELY;
 - ii. Call 911 for emergency assistance.
 - iii. Prepare the supporting information such as location, nature of the fire, estimated severity, contact info of yourself and supervisor etc;
 - In the case the fire is safe to control:
 - i. Stop all the work and turn off all equipment;
 - ii. Locate the close by fire extinguishers and use according to instructions/training/ drill.
 - iii. Protect yourself first, then others.
 - iv. Contain the blaze with fire extinguishers;

- v. Shut off/separate the flammable materials such as gases, fluids etc;
3. Evacuate the building
 - Press the fire alarm and alert everybody in the building;
 - Get out through the nearest exits;
 - Shut doors behind you but do not lock;
 - Stay far away from the building;
 - Do a personnel count at the muster point;
 4. In a case where a rescue must be operated:
 - Keep upwind in the event of hazardous goods, spills, leaks or fire;
 - Administer first aid to maintain life;
 - Keep non-operative personnel away.
 5. Report and Documentations
 - An incident report must be filed. The incident report includes the nature of the fire and the treatment record if there is any injury occurred;
 - An investigation must be done following the incident. Corrective plans must be drafted in the report and implemented with the approval of supervisors;
 - Both incident report and investigation report must be reviewed and signed off by the management and WHS committee and representatives;
 - The incidents and corrective plans must be communicated thoroughly to the employees.

While fighting the initial fire according to ERP, a few items must be kept in mind:

- Be calm!
- Follow the practice in the training or drill;
- Don't feel compelled to control the hazard;
- Keep out of low areas;
- Observe and detect:
 - Hazards;
 - Warning placards;
 - Downed wires;
 - Hissing sounds of gases;
 - Leaking fluids;
 - Flames, smoke, steam etc.

In an **extreme case of an explosion** caused by fire through leaking gas, faulty heating equipment, flammable vapors, and laboratory experiments, follow below procedures:

1. Get down to the floor and take immediate shelter
 - Hide under tables, desks or other objects that offer protection against flying glass or debris;
 - Protect your face and head with your arms
2. EVACUATE the building IMMEDIATELY after the explosion (follow step 3 stated above);
3. Call 911 and provide available information;
4. DO NOT return to the building until the “all clear” signal is given by the supervisor, Fire Emergency Officer or designate.

4.13 Procedure for Spill Control

PADCOM’S production process does not involve chemicals nor chemical reactions that release toxic gases or vapors posing threat to human life or environment. The liquid that poses risk of spill in the plant and at the site are the brine of Potassium Chloride (KCl) and Sodium Chloride (NaCl), and the diesel stored for diesel generator. The risk of spill shall be minimized by regular visual inspections, prevention maintenance, and spill response training for all processing personnel.

Potential KCl and NaCl brine spills could be a result of the following:

- A leakage from processing system failure;
- Damaged pumping system.

In the event of a **KCl and NaCl brine spill** in the plant or at the site:

1. Approach with care and estimate the severity of the spill
 - Do not enter the area to put yourself in danger;
 - Estimate a safety access through:
 - i. The heat/steam/temperature in the area;
 - ii. The flow rate of the leakage;
 - iii. The flooded area on the floor/ground.
 - Shout out/alert to the nearby personnel of the spill;
 - Report to the spill response coordinator or supervisor.
2. Control the spill with safety precaution
 - Shut down the equipment and turn off the valves to stop the flow of the brine;
 - Start the pumping system or backup pumping system to divert the excess brine to the trench drain to the containment pit;
 - Clean up and containment.
3. Reports and Documentations

- Spill must be recorded in the incident report;
- Supervisor must ensure the responsible regulator is notified for the spill;
- An investigation must be done for the spill. Corrective plans must be drafted in the report and implemented with the approval of supervisors;
- Both incident report and investigation report must be reviewed and signed off by the management and WHS committee and representatives;
- The incidents and corrective plans must be communicated thoroughly to the employees.

Potential diesel fuel spills could be a result of the following:

- Accidental damage to barrels or cylinders;
- Transportation vehicles involved in accidents;
- Damaged pumping system.

In the event of a **diesel fuel spill** in the plant or at the site:

1. Approach with care and estimate the severity of the spill
 - Identify the source of the leak or spill;
 - Estimate the severity of the spill
 - i. Flow rate of the leakage;
 - ii. Risk of fire from nearby hazard.
 - Shout out/alert to the nearby personnel of the spill;
 - Report to the spill response coordinator or supervisor.
2. Contain the spill;
 - Turn off valves to stop the flow;
 - Unitize patching kits to seal the leaks;
 - Place plastic sheeting below the leakage area to prevent seepage into the ground;
 - Transfer the fuel from leaking barrel/storage tank to another barrel/storage tank if the leak cannot be sealed.
3. Reports and Documentations
 - Spill must be recorded in the incident report;
 - Supervisor must ensure the responsible regulator is notified of the spill;
 - An investigation must be done for the spill. Corrective plans must be drafted in the report and implemented with the approval of supervisors;
 - Both incident report and investigation report must be reviewed and signed off by the management and WHS committee and representatives;

- The incidents and corrective plans must be communicated thoroughly to the employees.

4.14 Procedure for Severe Weather

In the event of severe weather in the area:

1. Be prepared according to the weather report before impacted;
 - Examine the windows, doors, outside equipment to ensure it is safe and secured against strong wind, rain, blizzard etc;
 - Prepare the pumping system and generators in case of strong rain fall and loss of power;
 - Prepare basic supplies in case of temporary lock down;
 - Alert all personnel of the severe weather conditions;
 - Follow local emergency alert and instructions for operation, lockdown, and evacuation.
2. Safety procedure in severe weather
 - Stay inside of the building in a secured area;
 - Aid people who are injured;
 - Stay away from exterior windows;
 - Do not drive nor stay in a vehicle outside;
 - Monitor and operate pumping system to control the water level in contaminate pit and fresh water in trenches to prevent flood;
3. Investigate and clean up after the weather
 - Inspect all the equipment outside and investigate for damages after the weather;
 - Repair and maintain damaged equipment;
 - Clear and clean the impacted area by the weather such as broken trees by the wind, snow/ice on the road etc.
 - Seek medical care if needed.

8.1 4.2 Emergency Response Contact List

Name	Contact Info.	Location
Russell Fire Station	Urgent: 9-1-1 Non-Urgent: 204-773-2526 Email: rslfire@mts.net	Lawrence St W, Russell, MB R0J 1W0
Binscarth Fire Station	Urgent: 9-1-1 Non-Urgent: 204-532-2191 Email: rslfire@mts.net	Russell, St. Binscarth, MB R0J 0G0
RCMP Russell Detachment	Urgent: 9-1-1/204-773-2105 Contact: 204-773-3051 Fax: 204-773-3309	377 Main St S Russell MB R0J 1W0
Russell Ambulance	Urgent: 9-1-1 Non-Urgent: 204-774-7522	

Russell Health Centre	Urgent: 9-1-1 Contact: 204-773-2125	426 Alexandria Ave. South Russell, MB R0J 1W0
Russell Personal Care Home	Urgent: 9-1-1 Contact: 204-773-3117	113 Arsini St. E Russell, MB R0J 1W0
Russell Public Health Unit	Contact: 204-773-2761 / 204-773-2140	426 Alexandria Ave. South Russell, MB R0J 1W0
Russell Clinic Dr. Wickus Pieterse Dr. Ammar Almalky Dr. James Honiball Dr. Rola Sadeddin Nurse Practitioner – Cynthia Burton	Contact: 204-773-2146 Fax: 204-773-2718	117 Westbourne St W, Russell, MB R0J1W0
Reavie's Pharmacy Ltd.	Contact 204-773-2244	243 Main St N, Russell, MB R0J 1W0
STARS Air Medic Service	Regina: 306-564-7900 Winnipeg: 204-786-4647	Regina: 2640 Airport Road, Regina, Saskatchewan S4W 1A3 Winnipeg: 155 West Hangar Road, Winnipeg, Manitoba R3J 3Z1
RM of Russell-Binscarth	Contact: 204-773-2253 Email: info@mrbgov.com	362 Main St N, Russell, MB R0J 1W0
Russell Municipal Emergency Coordinator Wes Anderson	Contact: 204-773-2253 Email: wanderson@mrbgov.cm	362 Main St N, Russell, MB R0J 1W0
Russell Infrastructure	Contact: 613-443-1747 Email: infrastructure@russell.ca	362 Main St N, Russell, MB R0J 1W0
MB Labour & Regulatory Service - WHS	Report serious WHS Incident or unsafe work Contact: 204-957-SAFE (7233); Toll-free: 1-855-957-SAFE (7233) Email: wshcompl@gov.mb.ca	Winnipeg: 200-401 York Avenue Winnipeg, MB R3C 0P8 Brandon: 328 – 340 Ninth Street Brandon, MB R7A 6C2
Provincial 24hr Environmental Emergency Response line	Contact: 204-944-4888 Toll Free: 1-855-944-4888	Winnipeg: 1007 Century Street Winnipeg Manitoba R3H 0W4
MB Spill 24hr report line	Contact: 204-944-4888 Toll Free: 1-855-944-4888	1007 Century Street Winnipeg, MB R3H 0W4
MB Petroleum Storage Program	Contact: 204-470-8315 Fax: 204-945-5229 Email: petstor@gov.mb.ca	1007 Century Street Winnipeg, MB R3H 0W4

Provincial Solid Waste Management	Engineer Cory Graham: 204-250-7645 Email: cory.graham@gov.mb.ca Email:Solidwaste@gov.mb.ca	1007 Century Street Winnipeg, MB R3H 0W4
MB Conservation and Climate	Contact: 204-945-6784 Toll Free: 1-800-214-6497 Email: cc@gov.mb.ca	1007 Century Street Winnipeg, MB R3H 0W4
Bunge Harrowby	Contact: 204-773-3422	1 Main Street, Russell, MB R0J 1W0

Table 4: ERP contact List

5. FORMS

A list of draft forms is developed in this plan to assist the development of WHS reporting and documentation system. The forms shall be reviewed and approved in the first WHS review meeting by general manager and WHS committee and representatives. The forms are the tools that help PADCOM to improve its safety working environment on a continuous basis. The forms and its contents will be printed, posted and trained with every personnel in the company to improve safety awareness.

Form 2: Safe Work Practice

PADCOM Safe Work Practice Form	
Name	
General Practice	1. 2. 3. 4.
Protective Guidance	
Supervisor's Responsibility	
Employees' Responsibility	
Reviewed by: General Manager: _____ Date: _____ WHS Committee: _____ Date: _____ Comments:	

Form 3: Safe Job Procedures

Safe Job Procedures Form		
Job Name:		
Job Description:		
Equipment Required:	Material Required:	PPE Required:
1. 2. 3.	1. 2. 3.	1. 2. 3.
Job Procedures: 1. 2. 3. 4. 5.		
Reviewed by: General Manager: _____ Date: _____ WHS Committee: _____ Date: _____ Comments:		

Form 4: Equipment Preventative Maintenance Checklist

Equipment Preventive Maintenance Checklist	
Name:	Maintenance Schedule:
Equipment#:	Maintenance Date:
SN#:	Maintained By:
General: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	
Interior: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	
Exterior: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	
Comments for Defects:	
Repair and Replacement:	

Form 5: Incident Report

Incident Report Form			
Date of Incident:		Incident Reported By:	
Time of Incident:		Supervisor in Charge:	
Location of Incident:			
Name of Injured Worker:			
Incident Type: <input type="checkbox"/> Injury/Illness <input type="checkbox"/> Near Miss <input type="checkbox"/> Damage <input type="checkbox"/> Spill <input type="checkbox"/> Other			
If injury/illness, was it a: <input type="checkbox"/> Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Serious <input type="checkbox"/> Severe <input type="checkbox"/> Critical <input type="checkbox"/> Maximal			
Person(s) involved including witnesses:			
Name	Company	Contact	Address
Description of Incident (such as tasks being performed, location of person, equipment being used, other work activities etc).			
Estimated Nature of Incident:			
Injury Treatment Records:			

Form 6: Incident Investigation Report

Incident Investigation Report Form	
No. of Incident:	Incident Investigated By:
Date and Time of Incident:	Date and Time of Investigation:
Location of Incident:	
Name of Injured Worker:	
Description of Incident:	
The Investigated Nature of Incident:	
Proposed Corrective Plan:	
Reviewed By:	
General Manager: _____ Date: _____	
WHS Committee: _____ Date: _____	
Comments:	