

SEDGMAN



Goliath Gold Project

Power Supply Study Report



Treasury Metals

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1.0 Introduction

Treasury Metals Inc. (TML) are developing a gold processing plant, the Goliath Gold project, which is located adjacent to the village of Wabigoon, Ontario, approximately 20 km east of the city centre of Dryden or 330 km west of the city of Thunder Bay.

The Goliath gold plant is a 2700t/d gold processing facility which will operate 24hours a day. After an initial 3 years of operation, the mine will transition from an open cut to an underground mining operation. Additional power will be required for the future U/G mine infrastructure.

Sedgman Canada Ltd (SDM) has been engaged by TML to provide an updated preliminary power supply design for the Goliath Project.

This document provides the required information to Hydro One to form the technical basis for a request for power for the Goliath Gold Project.

2.0 Power Supply Details

2.1 General Details

The details of the project and of the proposed load for the project site are detailed below:

Name of Company:	Treasury Metals Incorporated
Office Address:	130 King Street West Suite 3680 Toronto, Ontario, M5X 1B1 Tel: 416 214-4654
Project Name:	Goliath Gold Project
Business Activity:	Mining / processing of gold
Initiation of electricity requirement:	2 nd Quarter 2018 (Tentative, to be confirmed)

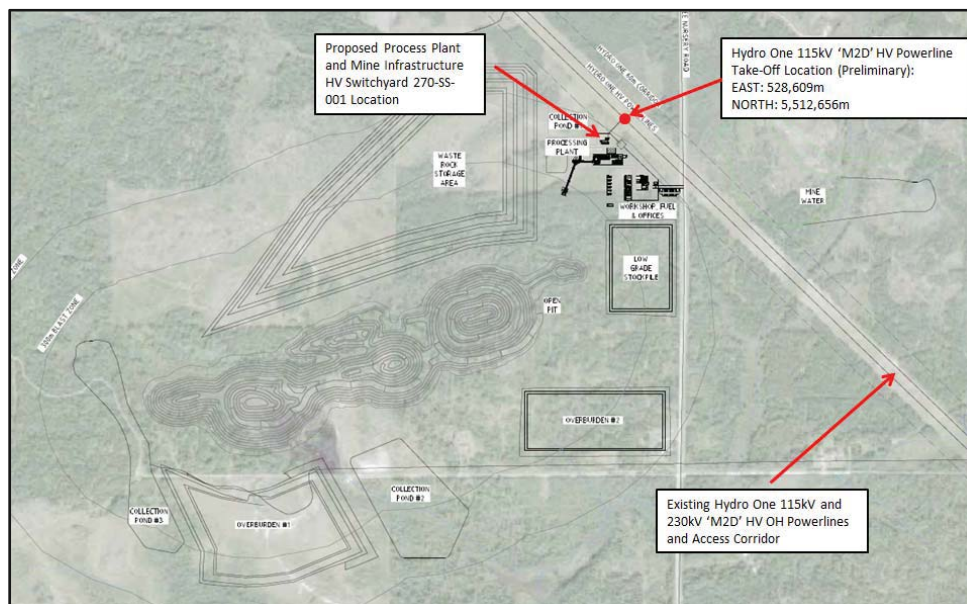
2.2 Incoming Power Supply

The plant shall be supplied from the Hydro One 115 kV power line circuit M2D via one 138 kV 600 A motorized disconnect switch 270-DS-001 in series with one 1200 A, SF6 circuit breaker 270-CB-001 shown in the 115 / 4.16 kV single line diagram in Appendix A.

An additional motorized disconnect switch 270-DS-002, SF6 circuit breaker 270-CB-002 and 5 / 7.5 MVA 115 kV / 4.16 kV transformer will be installed in year 3 for the future underground mine power supply.

The location for the proposed 115kV overhead powerline take-off point is shown in Figure 1 below.

Figure 1 - Preliminary Hydro One HV Powerline Take-Off Point and Plant HV Switchyard Location



2.3 Plant Distribution Services Transformers and Switchgear

- The 4.16 kV facilities include HV switchgear and two 600 kVAr shunt capacitor banks together with station services, protection and controls.
- Allowable voltage variation: not to exceed $\pm 10\%$ on steady state and $\pm 15\%$ during large drive start-up. Voltage drops in excess of this could affect the operation of the process plant.
- Allowable Frequency Variation: 60 Hz +2.5, -0.5

2.4 Emergency Power Supply

Three diesel generating units will be included to supply emergency power (Administration Building 150 kW, Concentrator 250 kW, and Mine 150 kW). The emergency power is not meant to be used for sustaining the operations of the plant and will not be connected to the grid for back feed generation. The purpose of the diesel generators is to provide power for the following consumers:

- Mine/Plant Administration building power
- Guard house
- 30% of area lighting
- Control room power
- Critical slurry tank agitators
- Critical plant services
- Fire-detection system and dry-pipe fire-fighting system (main fire loop has diesel pump)

3.0 Plant Demand

3.1 Load Requirements

- Maximum demand (Yrs 1-3) 6.8 MW
- Maximum Demand (Yrs 4-10) 9.9 MW
- Average Load (Yrs 1-3) 5.5 MW
- Average Load (Yrs 4-10) 8.1 MW
- Power factor 0.95 or better with power factor correction
- Period of production 24 hours per day, continuous
- Largest size motors 1 x 2.2 MW at 4.16 kV (SAG Mill)
- Largest motor starting current 1 x 583 A at 4.16 kV (approx) for 30 seconds
- Largest motor running current 1 x 364 A at 4.16 kV
- Largest motor method of starting Liquid Resistance Starter
- 4.16 kV system neutral grounding Resistance grounded
- 600 V Neutral Grounding Solidly grounded

A large proportion of the required electrical load will be due to the surface process plant, which is expected to run continuously for 24 hours per day. The load list summary is detailed in Table 1 below. These loads below are preliminary and will be refined during further design stages.

Table 1 Load List Summary

Plant Area	Demand Power
Area 100 Miscellaneous Facilities and Buildings (Incl. Mine Maintenance)	1,600 kW
Area 104 Tailings Dam	170 kW
Area 120 Feed Preparation	380 kW
Area 130 Milling	2,400 kW
Area 140 CIL	1,000 kW
Area 230 Water System and Area 250 Air System	650 kW
Area 115 Collection Ponds	180 kW
Contingency	400 kW
TOTAL PLANT DEMAND (Yrs 1-3)	~6,780 kW
Area 110 Underground Mining (Future)	3,200 kW
TOTAL PLANT DEMAND (Yrs 4-10)	~9,980 kW

A detailed preliminary project load list is included in Appendix B.

3.2 Load Characteristics

The plant electrical load is generally constant. The plant average load depends on the following:

- Plant throughput.
- Operating sections of the plant (crushing, milling, desorption, etc.).
- Scheduled Shutdowns.

Generally, the plant is designed for continuous operation throughout the year.

3.2 Maximum Demand

The plant substation shall meet the plant maximum demand without exceeding the voltage and frequency limitations.

Mill Starting Load

The process plant will include one SAG mill.

The SAG Mill will be driven by 1 x 2.2 MW wound rotor induction motor with a liquid resistance starter for soft starting. The maximum starting current would be about 1.4 – 1.6 times full load current (FLC).

The incoming power supply shall have the capacity to meet this step-load while the rest of the plant is in operation without exceeding the voltage and frequency limitations.

4.0 Method of Supply

The preferred option for the supply of power to the project has been identified as the Hydro One 115 kV, 'M2D' circuit. The scope of work would involve the following:

- Voltage level: 115 kV and 4.16 kV (metered at 4.16 kV).
- Quantity / Capacity of transformers: 2 x 5 / 7.5 MVA 115 kV / 4.16 kV main transformers (ONAN / ONAF) with delta configured primary and wye configured secondary which is grounded via a resistor.
- Installation of an overhead line take-off structure at the proposed T-off point for the process plant and mine infrastructure (By Hydro One).
- Construction of approximately 50-100 m (to be confirmed) of an overhead 115 kV line from the T-off point to the plant outdoor switchyard location (By Hydro One).
- Construction of a 115 / 4.16 kV, 1 x 5 / 7.5 MVA transformer / substation at the plant site.
- Construction of the second 115 / 4.16 kV, 1 x 5 / 7.5 MVA transformer at the plant site in year 3-4 of operation to supply the U/G mine power requirements.

Discussions with Hydro One may result in alternatives that better meet the requirements of both Hydro One and TML.

SDM shall liaise with Hydro One in the development of the conceptual design of the power supply to the site, including the HV power lines and the substation.

5.0 Schedule

The required schedule is about 60 weeks from commencement of the Project development phase. It is important that at the end of week 60, power is available to the site to enable commissioning of the facility.

6.0 Energy Tariff

Hydro One is requested to provide a bulk purchase energy tariff agreement, based on the following:

- The project will use on average about 5.5 MW of power for the initial 3-4 open cut mining period.
- The project average power requirement will increase to approximately 8.1 MW for the remaining 6-7 years of underground mining operation.

All capital costs associated with bringing the power supply to the site HV switchyard shall be provided by TML and it is proposed that these costs be recovered over a five year period as part of the energy supply cost, with the tariff structure based on a flat unit rate and charged on the units (MWHrs) consumed.

The tariff will be part of the Power Purchase Agreement to be signed by both parties (Hydro One and TML).

7.0 Implementation Plan

The responsibilities associated with the project implementation shall be shared with Hydro One.

7.1 Responsibilities of Hydro One

- Provide detailed design technical input to the project in consultation with the EPC Engineer.
- Provide the technical specifications of the major items of electrical equipment e.g. 115 / 4.16 kV transformers, 115 kV circuit breakers and isolators (disconnects), 115 kV CTs and PTs and assist TML in procuring these items directly or through the EPC Engineer.
- Provide construction standards for the 115 kV line and the 115 / 4.16 kV substation.
- Procure the 115 kV overhead line that will be required for the project.
- Construct the M2D take-off structure and 115 kV overhead line required for the project to the agreed battery limit at the site HV switchyard location.
- Provide supervision and quality control for the HV substation construction, through the EPC Engineer.
- Witness and supervise the commissioning of the line and substation.

7.2 Responsibilities of Treasury Metals Inc. / EPC Engineer

- Liaise with Hydro One in the development of the detailed design of the line and substation.
- Procure all major items of equipment such as 115 / 4.16 kV transformer, 115 kV circuit breaker and disconnect switch as well as 115 kV CTs and PTs, according to Hydro One's specifications and from manufacturers acceptable to Hydro One.
- Procure through a reputable contractor, acceptable to Hydro One, the remainder of the substation plant as well as the erection of the complete 115 / 4.16 kV substation. Treasury Metals Inc. will supply major items of equipment directly to the contractor.
- Pays for all works and services associated with the project (Hydro One infrastructure capital costs to be reimbursed as part of the signed tariff agreement).
- Overall success and timely completion of the project.

7.3 Ownership of the Power Facilities

- The ownership of the facility shall form part of the negotiated agreement between Treasury Metals Inc. and Hydro One.
- The issues of protection and tele-control will be determined by Hydro One.

Appendix A – 115/4.16 kV Single Line Diagram

Appendix B – Preliminary Load List (Broken down by plant area and starting method)

Table 2 - Goliath Gold Project Preliminary Load List

Equipment Tag	Equipment Description	Installed Power (kW)	Drive Type	Demand / Utilisation (%)
Area 100 Miscellaneous Facilities and Buildings				
FE MIA	MIA facilities	1,600.0	FDR	100%
SUB-TOTAL (kW)		1,600.0		
Area 104 Tailings Dam				
PP708	TSF Decant Return Pump	37.0	DOL	75%
PP709	TSF Decant Return Pump	37.0	DOL	0%
BG901	TSF Decant Return (Mine Water) Pond De-icing	7.5	DOL	80%
PP705	Under Drainage Pump	1.5	DOL	75%
PP706	Seepage Pump	1.5	DOL	75%
PP710	TSF EFFluent Pump	55.0	DOL	75%
PP711	TSF EFFluent Pump	55.0	DOL	0%
BG901	TSF Effluent Pump Return (Mine Water) Pond De-icing	7.5	DOL	80%
PP921	Raw Water Supply Pump (from mine water pond)	75.0	DOL	75%
PP922	Raw Water Supply Pump (from mine water pond)	75.0	DOL	0%
BG902	Raw Water (Mine Water) Pond De-icing	7.5	DOL	80%
	Lights & GPO's	15.0	FDR	85%
	WO's	0.0	FDR	85%
	Building	20.0	FDR	85%
SUB-TOTAL (kW)		395.0		
Area 120 Feed Preparation				
FE001	Apron Feeder	15.0	VSD	80%
CR001a	Primary Crusher	100.0	DOL	65%
CR001b	Primary Crusher Lube Pump	12.0	DOL	65%
CV001	Primary Crusher Discharge Conveyor	93.0	DOL	85%
FN001	Primary Crusher Dust Collector	11.0	DOL	80%
PP001	Primary Crusher Sump Pump	15.0	DOL	75%
CV002	Stockpile Feed Conveyor	30.0	DOL	85%
PK001	Rock Breaker	30.0	DOL	80%
MG001	Magnet	15.0	DOL	80%
CN001	Primary Crusher OH Crane	10.0	DOL	25%
AC001	Primary Crusher Air Compressor	19.0	DOL	80%
	Lights & GPO's	45.0	FDR	85%
	WO's	50.0	FDR	85%
	Building	75.0	FDR	85%
SUB-TOTAL (kW)		520.0		
Area 130 Milling				
FE201	Reclaim Feeder	15.0	VSD	80%
CV201	SAG Mill Feed Conveyor	56.0	DOL	85%
FE202	Lime Feeder	3.0	VSD	80%
FE203	Lime Silo Activator	0.9	DOL	80%
PP201	Transfer Area Sump Pump	15.0	DOL	75%
FN201	Fine Ore Bin Dust Collector	4.0	DOL	80%
FN202	Lime Bin Dust Collector	4.0	DOL	80%
ML201	SAG Mill	2,600.0	VSD	80%
PP202	SAG Mill Services (Lube, etc)	50.0	DOL	75%
PP203	Cyclone Feed Pump	187.0	VSD	75%
PP204	Cyclone Feed Pump	187.0	VSD	0%
PP205	Mill Feed End Sump Pump	22.0	DOL	75%
PP206	Mill Discharge Sump Pump	22.0	DOL	75%
CN201	Mill Area Crane	20.0	DOL	25%
CN202	Ball Hoist	4.0	DOL	25%
	Lights & GPO's	45.0	FDR	85%
	WO's	50.0	FDR	85%
	Building	45.0	FDR	85%
SUB-TOTAL (kW)		3,330.0		
Area 140 CIL				
SC301	Scalping Screen	5.5	DOL	70%

Equipment Tag	Equipment Description	Installed Power (kW)	Drive Type	Demand / Utilisation (%)
PK300	Intensive Cyanide Reactor	55.0	DOL	80%
CF301	Centrifugal Concentrator	45.0	DOL	80%
PP301	ICR Reaction Vessel Discharge Pump	5.5	DOL	75%
PP305	Leach Area Sump Pump	5.5	DOL	75%
PP302	ICR EW Cell Feed Pump	2.2	DOL	75%
PK301	EW Cell	5.5	DOL	80%
SC302	Trash Screen	4.4	DOL	70%
AG301	CIL Tank 1 Agitator	30.0	DOL	80%
SC303	CIL Tank 1 Intertank Screen	2.2	DOL	70%
PP303	CIL Tank 1 Loaded Carbon Advance Pump	3.7	DOL	75%
AG302	CIL Tank 2 Agitator	30.0	DOL	80%
SC304	CIL Tank 2 Intertank Screen	2.2	DOL	70%
PP306	CIL Tank 2 Loaded Carbon Advance Pump	3.7	DOL	75%
AG303	CIL Tank 3 Agitator	30.0	DOL	80%
SC305	CIL Tank 3 Intertank Screen	2.2	DOL	70%
PP307	CIL Tank 3 Loaded Carbon Advance Pump	3.7	DOL	75%
AG304	CIL Tank 4 Agitator	30.0	DOL	80%
SC306	CIL Tank 4 Intertank Screen	2.2	DOL	70%
PP308	CIL Tank 4 Loaded Carbon Advance Pump	3.7	DOL	75%
AG305	CIL Tank 5 Agitator	30.0	DOL	80%
SC307	CIL Tank 5 Intertank Screen	2.2	DOL	70%
PP309	CIL Tank 5 Loaded Carbon Advance Pump	3.7	DOL	75%
AG306	CIL Tank 6 Agitator	30.0	DOL	80%
SC308	CIL Tank 6 Intertank Screen	2.2	DOL	70%
PP310	CIL Tank 6 Loaded Carbon Advance Pump	3.7	DOL	75%
CN301	CIL Area Crane	11.0	DOL	25%
PP304	CIL Area Sump Pump	15.0	DOL	75%
PP305	CIL Area Sump Pump	15.0	DOL	75%
SC309	Carbon Recovery Screen	2.2	DOL	70%
SC310	Carbon Safety Screen	4.4	DOL	70%
SC401	Carbon Dewatering Screen	0.8	DOL	70%
PK401	Carbon Regen Kiln	10.0	DOL	80%
FE401	Carbon Kiln Screw Feeder	1.1	DOL	80%
FN401	Kiln Exhaust Scrubber	7.5	DOL	80%
PP401	Kiln Exhaust Scrubber Pump	5.5	DOL	75%
PP402	Carbon Conditioning Transfer Pump	7.5	DOL	75%
PP403	Carbon Regen Area Sump Pump	5.5	DOL	75%
SC402	Carbon Sizing Screen	2.2	DOL	70%
PK405	Elution Heater	5.5	DOL	80%
PP404	Acid Rinse Pump	5.5	DOL	75%
PP405	Stripping Solution Pump	3.7	DOL	75%
PP406	Lean Eluate Pump	11.0	DOL	75%
PP407	Acid Wash Column Area Sump Pump	5.5	DOL	75%
PP420	EW Pump	5.5	DOL	75%
PP421	EW Return Pump	5.5	DOL	75%
PP408	Pregnant Solution Pump	3.7	DOL	75%
PP409	Pregnant Solution Pump	3.7	DOL	75%
PP410	Pregnant Solution Area Sump Pump	5.5	DOL	75%
PK402	EW Cell	30.0	DOL	80%
FN402	EW Cell Fume Fan	1.1	DOL	80%
PP411	EW Cell Wet Scrubber Pump	0.8	DOL	75%
CN401	Gold Room Hoist	7.5	DOL	25%
PP412	Gold Room Sump Pump	5.5	DOL	75%
PP414	Sludge Filter Feed Pump	2.5	DOL	75%
PK406	Sludge Press	2.5	DOL	80%
PK403	Drying Oven	22.0	DOL	80%
PK404	Barring Furnace	10.0	DOL	80%
FN405	Furnace Dust Collector	7.5	DOL	80%
PP303	ICR EW Cell Feed Pump 1	2.2	DOL	75%
PP304	ICR EW Cell Feed Pump 2	2.2	DOL	75%
PK301	ICR EW Cell 1	5.5	DOL	80%
PK302	ICR EW Cell 2	5.5	DOL	80%
FN403	Goldroom Exhaust Fan 1	0.8	DOL	80%
FN403	Goldroom Exhaust Fan 2	0.8	DOL	80%

Equipment Tag	Equipment Description	Installed Power (kW)	Drive Type	Demand / Utilisation (%)
AG701	Detox Tank Agitator	75.0	DOL	80%
AG702	Detox Tank Agitator	75.0	DOL	80%
PP701	Sodium Metabisulphate Transfer Pump	1.5	DOL	75%
AG703	Sodium Metabisulphate Tank Agitator	2.2	DOL	80%
DP701	Sodium Metabisulphate Dosing Pump	1.5	DOL	85%
DP702	Sodium Metabisulphate Dosing Pump	1.5	DOL	85%
CN701	Sodium Metabisulphate Dosing Hoist	1.1	DOL	25%
FN701	Cyanide Detox Blower	45.0	DOL	80%
FN702	Cyanide Detox Blower	45.0	DOL	80%
PP702	Detox Area Sump Pump	5.5	DOL	75%
PP703	Tailings Pump	110.0	VSD	75%
PP704	Tailings Pump	110.0	VSD	0%
PP707	Tailings Area Sump Pump	18.5	DOL	75%
PP801	Hydrochloric Acid Pump	7.5	DOL	75%
PP802	Acid Area Sump Pump	5.5	DOL	75%
CN801	Reagents Hoist	5.5	DOL	25%
AG801	Cyanide Mixing Tank Agitator	2.2	DOL	80%
PP803	Cyanide Transfer Pump	3.7	DOL	75%
PP804	Cyanide Circulation Pump	1.5	DOL	75%
PP805	Cyanide Circulation Pump	1.5	DOL	75%
DP801A	Cyanide Dosing Pump	1.5	VSD	85%
DP801B	Cyanide Dosing Pump	1.5	VSD	0%
PP809	Cyanide Sump Pump	5.5	DOL	75%
AG802	Caustic Mixing Agitator	2.2	DOL	80%
DP802	Caustic Dosing Pump ICR	0.4	DOL	85%
DP803	Caustic Dosing Pump Stripping	0.4	DOL	85%
PP805	Acid Neutralisation Pump	0.4	DOL	75%
PP806	Caustic Transfer Pump	1.5	DOL	75%
AG803	Copper Sulphate Agitator	5.5	DOL	80%
CN802	Copper Sulphate Hoist	2.3	DOL	25%
PP810	Copper Sulphate Transfer Pump	1.5	DOL	75%
DP806a	Copper Sulphate Dosing Pump	1.5	DOL	85%
DP806b	Copper Sulphate Dosing Pump	1.5	DOL	0%
PP807	Diesel Circulation Pump	1.5	DOL	75%
PP808	Diesel Circulation Pump	1.5	DOL	75%
CN803	Hydrated Lime Sulphate Hoist	2.3	DOL	25%
AG804	Hydrated Lime Agitator	2.2	DOL	80%
PP811	Lime Transfer Pump	1.5	DOL	75%
PP812	Lime Ring Main Pump	5.5	DOL	75%
PP813	Lime Ring Main Pump	5.5	DOL	0%
PP814	Lime Area Sump Pump	5.5	DOL	75%
	Lights & GPO's	150.0	FDR	85%
	WO's	100.0	FDR	85%
	Building	90.0	FDR	85%
	SUB-TOTAL (kW)	1,500.0		
Area 230 Water System and Area 250 Air System				
PP901	Raw Water Distribution Pump	30.0	DOL	75%
PP902	Raw Water Distribution Pump	30.0	DOL	0%
PK901	Stripping Water Treatment Plant	30.0	DOL	80%
PP903	Collection Pond 1 Water Supply Pump 1	30.0	DOL	75%
PP904	Collection Pond 1 Water Supply Pump 2	30.0	DOL	0%
PK904	Collection Pond 1 De-icing	7.5	DOL	80%
PP930	Treated Effluent Discharge Pump 1	75.0	DOL	75%
PP931	Treated Effluent Discharge Pump 2	75.0	DOL	0%
PP905	Fire Water Pump	55.0	DOL	75%
PP906	Fire Water Jockey Pump	1.5	DOL	75%
PP907	Gland Water Pump	7.5	DOL	75%
PP908	Gland Water Pump	7.5	DOL	0%
PP920	Med Press Gland Water Pump	3.0	DOL	75%
PP921	Med Press Gland Water Pump	3.0	DOL	0%
PP922	High Press Gland Water Pump	4.0	DOL	75%
PP923	High Press Gland Water Pump	4.0	DOL	0%
AC901	Air Compressor	45.0	DOL	80%
AD901	Air Dryer	3.4	DOL	80%

Equipment Tag	Equipment Description	Installed Power (kW)	Drive Type	Demand / Utilisation (%)
AC902	Air Compressor	45.0	DOL	80%
AD902	Air Dryer	3.4	DOL	80%
FN901	CIL Blower	75.0	DOL	80%
FN902	CIL Blower	75.0	DOL	80%
FN903	CIL Blower	75.0	DOL	0%
PP910	Process Water Pump	75.0	DOL	75%
PP911	Process Water Pump	75.0	DOL	0%
PP912	Centrifugal Concentrator Water Pump	7.5	DOL	75%
PK902	Sewage Plant	30.0	DOL	80%
PP913	Sewage Pump	2.2	DOL	75%
PP914	Sewage Pump	2.2	DOL	75%
PP915	Sewage Pump	2.2	DOL	75%
PP916	Sewage Pump	2.2	DOL	75%
PK903	Potable Water Treatment Plant	30.0	DOL	80%
PP917	Potable Water Pump	30.0	DOL	75%
PP918	Potable Water Pump	30.0	DOL	0%
PP919	Cooling Water Pump	2.2	DOL	75%
CN901	Maintenance Crane	15.0	DOL	25%
	Lights & GPO's	45.0	FDR	85%
	WO's	50.0	FDR	85%
	Building	20.0	FDR	85%
	Exhaust fans/heating	75.0	FDR	85%
	SUB-TOTAL (kW)	1,208.0		
Area 115 Collection Ponds				
PP931	Collection Pond 2 Water Supply Pump 1	100.0	DOL	75%
PP932	Collection Pond 2 Water Supply Pump 2	100.0	DOL	0%
BG930	Collection Pond 2 De-icing	7.5	DOL	80%
PP933	Collection Pond 3 Water Supply Pump 1	100.0	DOL	75%
PP934	Collection Pond 3 Water Supply Pump 2	100.0	DOL	0%
BG931	Collection Pond 3 De-icing	7.5	DOL	80%
	Lights & GPO's	10.0	FDR	85%
	WO's	0.0	FDR	85%
	Building	20.0	FDR	85%
	SUB-TOTAL (kW)	223.0		
Contingency				
	Contingency (Allowance)	400.0	FDR	100%
	SUB-TOTAL (kW)	400.0		
Area 110 Underground Mining (Future)				
FE Mining	Allowance for underground mining (future)	4,000.0	FDR	80%
	SUB-TOTAL (kW)	4,000.0		
	TOTAL INSTALLED POWER (kW)	13,176.0		