Ex 13

Power Requirements

Underground Mine

Unit Equipment - Mine 1

	HP	Volts	Efficiency	Power Factor	FL Amps	Amps@7200V	Quantity	otal Amps
Miner	640	995	95%	75%	388.8	53.7	1	53.7
Roof Bolter	80	460	95%	75%	100.8	6.7	2	13.4
Feeder	200	480	95%	75%	251.9	16.8	1	16.8
Shuttle Car		480	95%	75%	128.6	8.6	3	25.7
Scoop Charger	50	480	95%	75%	63.0	4.2	1	4.2

Per Unit	113.9
3 Units	3
Unit Total	341.6

Outby Equipment - Mine 1

	HP	Volts	Efficiency	Power Factor	FL Amps	Amps@7200V	Quantity	otal Amps
Belt Drive	300	480	95%	75%	377.8	25.2	16	403.0

Outby Total	403.0
Underground Total	744.6
@ 55% Delivery	55%
Amperage Delivered	409.6
KVA Needed	5107

Unit Equipment - Mine 2

	HP	Volts	Efficiency	Power Factor	FL Amps	Amps@7200V	Quantity	otal Amps
Miner	640	995	95%	75%	388.8	53.7	1	53.7
Roof Bolter	80	460	95%	75%	100.8	6.7	2	13.4
Feeder	200	480	95%	75%	251.9	16.8	1	16.8
Shuttle Car		480	95%	75%	128.6	8.6	3	25.7
Scoop Charger	50	480	95%	75%	63.0	4.2	1	4.2

Per Unit	113.9
3 Units	3
Unit Total	341.6

Outby Equipment - Mine 2

	HP	Volts	Efficiency	Power Factor	FL Amps	Amps@7200V	Quantity	otal Amps
Belt Drive	300	480	95%	75%	377.8	25.2	16	403.0

Outby Total	403.0
Underground Total	744.6
@ 55% Delivery	55%
Amperage Delivered	409.6
KVA Needed	5107

Surface

Surface Facilities

	HP	Volts	Efficiency	Power Factor	FL Amps	Amps@7200V	Quantity	otal Amps
Shop	150	480	95%	75%	188.9	12.6	1	12.6
Bathhouse	100	480	95%	75%	125.9	8.4	2	16.8

Facilities Total	29.4
Facilities Total	29.4
@ 55% Delivery	55%
Amperage Delivered	16.2
KVA Needed	202

Belts

	HP	Volts	Efficiency	Power Factor	FL Amps	Amps@7200V	Quantity	otal Amps
Slope Belt	800	4160	95%	75%	116.3	67.2	1	67.2
Stacker Belt	100	480	95%	75%	125.9	8.4	1	8.4

Belt Total	75.6
Belt Total	75.6
@ 80% Delivery	80%
Amperage Delivered	60.5
KVA Needed	754

Fan 1

	HP	Volts	Efficiency	Power Factor	FL Amps	Amps@7200V	Quantity	otal Amps
Fan	500	4160	95%	75%	72.7	42.0	1	42.0
Escape Hoist	100	480	95%	75%	125.9	8.4	1	8.4

Fan Total	50.4
Fan 1 Total	50.4
@ 80% Delivery	80%
Amperage Delivered	40.3
KVA Needed	503

Fan 2

	HP	Volts	Efficiency	Power Factor	FL Amps	Amps@7200V	Quantity	otal Amps
Fan	500	4160	95%	75%	72.7	42.0	1	42.0
Escape Hoist	100	480	95%	75%	125.9	8.4	1	8.4

Fan Total	50.4
Fan 2 Total	50.4
@ 80% Delivery	80%
Amperage Delivered	40.3
KVA Needed	503

Formulas Used:

$$Amperes = \frac{hp \times 746}{1.73 \times V \times \%Eff \times PF} \qquad KVA = \frac{V \times I \times 1.73}{1000}$$

Item Description	No. Drives	Projected Horse Power	Voltage	Projected Amperage	Phase Ø	FVNR	FVR	Soft Start	Breaker Size	Variable Speed Drive	OL Trip Ind. Lt.	Primary Control Location Operators Room	Primary Control Location Local Station	Bypass Contactor	Motor Num	
Magnetite drum separator #1 (coarse coal circuit)	1	5	460	7.6	3	1			20			X			25	
Magnetite drum separator #2 (coarse coal circuit)	1	5	460	7.6	3	1			20			X			26	
Magnetite drum separator #3 (coarse coal circuit)	1	5	460	7.6	3	1			20			X			27	
Magnetite drum separator #4 (small coal circuit)	1	5	460	7.6	3	1			20			X			28	
Magnetite drum separator #5 (small coal circuit)	1	5	460	7.6	3	1			20			X			29	
Magnetite drum separator #6 (small coal circuit)	1	5	460	7.6	3	1			20			X			30	
5' x 12' fine coal dewatering screen #1	2	5	460	8.6	3	1			20		X	X			31A 31B	
5' x 12' fine coal dewatering screen #2	2	5	460	8.6	3	1			20		X	X			32A 32B	
5' x 12' fine coal dewatering screen #3	2	5	460	8.6	3	1			20		X	X			33A 33B	
5' x 12' fine refuse dewatering screen #1	2	5	460	10.3	3	1			30		X	X			34A 34B	
5' x 12' fine refuse dewatering screen #2	2	5	460	10.3	3	1			30		X	X			35A 35B	
Coarse coal dryer HSG1300 unit #1	1	75	460/480	96	3	4			200			X			36	
Coarse coal dryer HSG1300 unit #1 oil pump	1	½	460/480	1.1	3	0			15			X			37	
Coarse coal dryer HSG1300 unit #1 eccentric drive	1	7 ½	460/480	11	3	1			30			X			38	
Coarse coal dryer HSG1300 unit #2	1	75	460/480	96	3	4			200			X			39	
Coarse coal dryer HSG1300 unit #2 oil pump	1	½	460/480	1.1	3	0			15			X			40	
Coarse coal dryer HSG1300 unit #2 eccentric drive	1	7 ½	460/480	11	3	1			30			X			41	
Fine coal dryer EBW 42 unit #1	1	100	460/480	124	3	5			200			X			42	
Fine coal dryer EBW 42 unit #1 oil pump	1	¼	460/480	.75	3	0			15			X			43	
Fine coal dryer EBW 42 unit #2	1	100	460/480	124	3	5			200			X			44	
Fine coal dryer EBW 42 unit #2 oil pump	1	¼	460/480	.75	3	0			15			X			45	
*Sump #1 – Pump #1	1	300	2300									X			46	

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Item Description	No. Drives	Projected Horse Power	Voltage	Projected Amperage	Phase 3Ø	FVNR	FVR	Soft Start	Breaker Size	Variable Speed Drive	Primary Control Location Operators Room	Primary Control Location Local Station	Bypass Contactor		
*Sump #1 – Pump #2	1	300	2300								X			47	
**Sump #2 – Pump #1	1	150	460/480	180	3	5			400		X			48	
**Sump #2 – Pump #2	1	150	460/480	180	3	5			400		X			49	
Sump #3 – Pump #1	1	100	480	124	3	5			300		X			50	
Sump #4 – Pump #1	1	100	460	124	3	5			300		X			51	
Sump #5 – Pump #1	1	350	2300								X			52	
Sump #6 – Pump #1	1	250	460/480	312	3			X	800		X		X	53	
Sump #6A – Pump #1	1	250	460	312	3			X	800		X		X	54	
Sump #8 – Pump #1	1	100	460	124	3	5			300		X			55	
**Clarified water pumps	2	300	2300								X			56A 56B	
Thickener tank underflow pump	1	100	460	124	3	5			300		X			57	
Thickener tank rake drive	2	3	460	4.8	3	1			20		X			58A 58B	
Thickener tank rake elevator	1	1	460	2.1	3		0		20			X		59	
Magnetite bin auger – unit #1	1	5	460/480	7.6	3	1			20		X			60	
Magnetite bin auger – unit #2	1	5	460/480	7.6	3	1			20		X			61	
Lake pump	1	100	460/480	124	3	5			300		X			62	
Air compressor	1	20	460/480	27	3	2			50		X			63	
Sump pump	1	20	460/480	27	3	2			50			X		64	
Chemical mixing tank	1	5	460/480	7.6	3	1			20			X		65	
Potable water supply line booster pump	1	7 ½	480	11	3	1			30		X			66	
Raw water supply line – plant clean up pump	1	10	480	14	3	1			30		X			67	
Gland water pump	1	50	480	58	3	3			150					68	
Plant air compressor	1	25	480	34	3	2			50					69	
Dryer service hoist	4	5	480	8	3				30					70A 70B 70C 70D	
Plant material hoist	2	10	480	15	3				40					71A 71B	
Plant power vents	2	5	480	7.6	3	1			20					72A 72B	
Welders	5		480	200	3				60					73A 73B 73C 73D 73E	
Refuse bin gate	1	5	480	7.6	3	1			20					74	
Op. Room heat/cool	1		480	20	3				40					75	
MCC heat/cool	3		480	45	3				100					76A 76B 76C	
Plant lighting	1		480		3				100					77	
Outside conv. Lighting	1		480		3				70					78	
Plant service recps.	1		480		3				100					79	
Water booster pump (chem.)	1	25	480	34	3	2			60					80	

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SPARE
(STARTER LIST) & (BREAKER LIST)

Item Description	No. Drives	Projected Horse Power	Voltage	Projected Amperage	Phase Ø	Nema Size FVNR	Nema Size FVR	Soft Start	Breaker Size	Variable Speed Drive	Primary Control Location Operators Room	Local Station	Bypass Contactor	Motor Number
Miscellaneous														
	2	10	480	15	3	1			30					
	2	25	480	35	3	2			60					
	1	50	480	65	3	3			150					
	1	100	480	124	3	4			250					
	3		480		3				30					
	3		480		3				60					
	1		480		3				100					

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*Motor and starter control now within Arclar Company inventory

PLANT LIGHTING

1 – 45 KVA Transformer 480/208-120 3ø
1 – Power Panel 208/120 3ø 32 CKT with 200 amp main breaker

Branch breakers 20 – 20 amp 2-pole
10 – 20 amp 1-pole

OUTSIDE CONVEYOR LIGHTING

1 – 30 KVA Transformer 480/208-120 3ø
1 – Power Panel 208/120 3ø 24 CKT with 125 amp main breaker

Branch breakers 14 – 20 amp 2-pole
4 – 20 amp 1-pole

PLANT SERVICE RECEPTACLES

1 – 45 KVA Transformer 480/208-120 3ø
1 – Power Panel 208/120 3ø 42 CKT with 200 amp main breaker

Branch breakers 30 – 20 amp 1-pole
6 – 30 amp 2-pole

WILLOW LAKE MINE
COAL PREPARATION PLANT
PRELIMINARY ELECTRICAL REQUIREMENTS

Item Description	No. Drives	Projected Horse Power	Voltage	Projected Amperage	Phase Ø	FVNR	FVR	Soft Start	Breaker Size	Variable Speed Drive	Primary Control Location Operators Room	Primary Control Location Local Station	Bypass Contactor	Motor Number
Raw coal tunnel exhaust fan	1	40	460/480	52	3				100			X		1
Raw coal tunnel sump pump	2	5	460/480	7.6	3	1			20			X		2A 2B
**Raw coal tunnel feed belt #1 @	1	20	460/480	27	3				50	X	X			3
**Raw coal tunnel feed belt #2 @	1	20	460/480	27	3				50	X	X			4
Raw coal screen/rotary breaker feed conveyor belt	1	125	460/480	156	3	5			400		X			5
Self-cleaning belt magnet	1	5	460/480		3				60		X			6
Raw coal scalper screen	2	30	460/480	40	3	3			70		X			7A 7B
Rotary breaker	1	60	460/480	77	3	4			200		X			8
**Rotary breaker rock reject conveyor belt	1	15	460/480	21	3	2			40		X			9
Plant raw coal feed conveyor belt	1	150	460/480	180	3	5			400		X			10
Plant solid coal refuse conveyor belt	1	50	460/480	65	3	4			200		X			11
Plant clean coal conveyor belt	1	50	460/480	65	3	4			200		X			12
Clean coal radial stacker	1	125	460/480	156	3	5			300		X			13
Clean coal radial stacker tram	1	5	460/480	7.6	3		1		20			X		14
Clean coal radial stacker hoist	1	15	460/480	21	3		2		40			X		15
10' x 20' raw coal desliming screen #1	1	50	480	65	3	3			150		X			16
10' x 20' raw coal desliming screen #2	1	50	480	65	3	3			150		X			17
6' x 20' coarse coal drain and rinse screen #1	1	30	480	40	3	3			70		X			18
6' x 20' coarse coal drain and rinse screen #2	1	30	480	40	3	3			70		X			19
10' x 20' coarse refuse drain and rinse screen	1	50	480	65	3	3			150		X			20
6' x 20' small coal drain and rinse screen #1	1	30	480	40	3	3			70		X			21
6' x 20' small coal drain and rinse screen #2	1	30	480	40	3	3			70		X			22
8' x 16' small refuse drain and rinse screen	1	30	480	40	3	3			70		X			23
Heavy media vessel	1	20	480	27	3	3	2		50		X			24

(A) Also Provide Long Lead Filter & Line Reactor

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