



WINDIMURRA VANADIUM PTY LTD

WINDIMURRA VANADIUM PROJECT

STANDARD SPECIFICATION

PREFERRED EQUIPMENT LIST

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E N G I N E E R S

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1.0 PREFERRED EQUIPMENT LIST

General and Instrumentation

Listed below are the preferred makes, types and manufacturers of all general electrical plant and instrumentation equipment. In the interests of plant standardisation the Contractor shall adhere strictly to the nominated equipment unless written approval from the Superintendent's representative is given to use alternative equivalent equipment.

Refer to tables one and two following "Electrical Equipment" for short circuit coordination

2.0 ELECTRICAL EQUIPMENT

Equipment	Manufacture	Type/Model	Note
A			
Alarm Horn – Conveyor start warning			
Alarms – Siren	Clifford & Snell	"Yodalarm" Y08WR	
Alarms – Horn	R.V.B. Ltd	4100-008 W.P. L.R.	
Alarms – Flashing Light	Sirena	Type RA/A	
Arc Fault Detection Systems	NHP	ARC D-TECT – Camto Relay	
B			
Belt Drift Switches	Electric Control Products	Safe-T-Drift	
Blocked Chute Switches	Ramsey	Pro-Line Model 20-39	
Belt Rip Detector	Electric Control Products	Safe –T - Rip	
Belt Tracking Detector	Contrec	S18, 001	
C			
Cable Glands	Alco, CCG		
Cable Ladder & Accessories	Kounis type	NEMA 20B	
Cable Ladder Cover	Kounis type - Peaked	Snug fit suitable for screw fixing	
Cable Terminations – High Voltage	Raychem	Heat Shrink	
Circuit Breaker - Withdrawable	ABB	Rated to suit service	
Cable Ferrule Markers	Critchley	Multimark	
Cable Lugs – Power	Utilux	Metric Copper Crimp Lug	
Cable Lugs – Control	Utilux	Super Grip Pin Connectors	
Cable Clamps	Unistrut		
Cable Identification Markers	Critchley	Permark 316 Stainless Steel	
Cable Jointing Kits	Scotchcast or Raychem	To suit application	
Cable Repair Kits	Scotchcast or Raychem	To suit application	
Cable Tie	Panduit (min 4mm) or Similar	MLT Series	
Cable Tie	Critchley	Beta Tie 316 Stainless Steel	
Cable Ladder and Tray	Kounis	NEMA 20B Heavy Duty	
Conduit-Rigid Metallic	Clipsal	Class B Galvanized	
Conduit-Flexible Steel	Adaptaflex	SPC	
Contactor + Fuses for Drive Motor	See Table 1	Type 2 Co-ordination	
Contactor + Circuit Breaker for Drive Motor	See Table 1	Type 2 Co-ordination	
D			
Decontactors	Cutler-Hammer	Marechal DS Series	
Distribution Board	ABB		

Equipment	Manufacture	Type/Model	Note
Ducting PVC	NHP/IBOCO	Slotted	
Ducting PVC	Critchley	Beta Duct	
E			
Electric Motors	Toshiba, TECO, WEG		
Enclosures – Indoor/Outdoor	LUME, Rittal, Clipsal	Stainless Steel Aus Series	
Earth Stakes	Dulmison (Tyco) or similar	CTE 1530	
F			
Flashing Beacon	Mecthric		
Fan – Exhaust	Mistral	HD-12-70	
Fan – Exhaust	Expel Air	GX9	
Fuse Holder Low Voltage	GEC	Red Spot (RS)	
Fuse Cartridge Low Voltage	GEC	Type “T”	
Fuse Cartridge High Voltage	GEC	To suit Holder/Fixing	
G			
General Purpose Outlets	Clipsal	56 Series White	
General Purpose Outlet – Office	HPM	777 Series White	
H			
I			
Indicating Lights	Siemens	22mm dia 3SB1	
	NHP	S&S D7 Series	
	Schneider	Telemecanique Harmony 5	
Isolators CFS	Holec (Gilbert & Lodge)	Type QSA-H	
	NHP	Socomec SSF Series	
Isolators Load Break	Holec (Gilbert & Lodge)	Type QA-H	
	NHP	Socomec SLB Series	
Indicating Lamp	Cutler Hammer Heavy Duty	Type “T” (Transformer)	
J			
Junction Boxes	Rittal	AE series IP66 Stainless steel, PVC Type	
K			
Key Lock Fastener Panels/Enclosures	DIRAK	200 Series	
Key Latch Fastener MCC Doors	South Co (Adlam Enterprises)	93-10. –101-10	
L			
Local Control Stations 1 Button	Cutler-Hammer	TAIN11S	
Local Control Stations 2 Button	Cutler-Hammer	TAIN12S	

Equipment	Manufacture	Type/Model	Note
Lamps Sodium Vapour	Spectra	To suit application	
Lamps Sodium Vapour	Toshiba	To suit application	
Lamps Sodium Vapour	Sylvania	To suit application	
M			
Miniature Circuit Breakers, DIN Rail	ABB	10kA	
Miniature Circuit Breaker Dist. Boards	ABB		
Moulded Case Circuit Breakers, Welding Outlet Circuits	ABB		
Meters Ammeter	Crompton Industries		
Meters KWH	Email		
Meters Voltmeter	Crompton Industries		
Meters Elapsed Time	Crompton Industries		
MCC Incomer	ABB		
Motor Overload Thermal Overload	See Table 1		
Motor Overload Electronic Overload	See Table 1		
N			
O			
P			
Pendant Controllers	Cutler-Hammer	91520	
Pull-Wire Switch Emergency Stops	Downie	E0202R-C4P C/W Operator Indication	
Pull-Wire Switch Emergency Stops	Electric Controls	Pull-Safe	
Push Buttons, Potentiometers	Cutler-Hammer	30.5mm heavyduty E34	
PLC	Rockwell Automation	ControlLogix / MicroLogix	
Pushbuttons Start	Cutler Hammer Heavy Duty	Type "T"	
Pushbuttons Stop	Cutler Hammer Heavy Duty	Type "T"	
Pushbuttons Emergency	Cutler Hammer Heavy Duty	Type "T"	
Q			
R			
Residual Current (Earth Leakage) Device MCB's GPO Circuits	ABB	RCD 30 mA Sensitivity, 10 kA	
Residual Current (Earth Leakage) Devices, Welding Outlet Circuits	ABB	Sensitivity – 100 mA	
Residual Current (Earth Leakage) Devices, Lighting Circuits	ABB	Sensitivity – 30 mA	
Resistance Starter Resistor Banks	Electroswitch		
Rip Detector	Honeywell	LSK1A-8C	
Relays Control	Sprecher & Schuh	CS3	
Relays Control (Gas Firing)	Telemechanique	CA1	

Equipment	Manufacture	Type/Model	Note
Relays Signal	Releco	C3 Series	
Relays Earth Fault	GEC	MIDOS Series	
Relays Thermistor	Sprecher & Schuh	RT3-A1	
Relays Time Delay	Sprecher & Schuh	D Series	
Relays Time Delay	Omron	H3BA	
Relays Under Voltage	NHP	Advantage Plus Series	
Relays Under Voltage	Electromatic/Auslec	S System	
S			
Soft Starter	Emsby	Emotron MSF	
Sump Pump Control Relay	Endress and Hauser Nivotester Flygt	FTW 420 FPC80	
Selector Switches	Kraus & Naimer	Blue Line Series	
Saddle Half	Clipsal	180 Series	
Saddle Full	Clipsal	174 Series	
Switch Light (Indoor)	Clipsal	2000 Series	
Switch Selector	Cutler Hammer	Type "T"	
Switch Single Pole 10A	Clipsal	56 Series	
Switch Single Pole 10A 2 Way	Clipsal	56 Series	
Switch Three Pole 10A	Clipsal	56 Series	
Switch Three Pole 20A	Clipsal	56 Series	
Switch Three Pole 32A	Clipsal	56 Series	
Switch Three Pole 63A	Clipsal	56 Series	
Switch Daylight	Clipsal	56 Series	
Switch Cubicle Door	Square D	Class 9007	
Switch Level	Milltronics	To suit application	
Switch Level	Noyes	Bindicator Type 'H' Paddle Switch	
Switch Level Liquid	Flygt	Ball Float ENH-10	
Switch Pressure	Square "D"	Type G To suit medium	
Switch Proximity	IFM	to suit application	
Switch Limit	Square D	Class 9007	
Switch Tilt	Ramsey	Heavy Duty Model 20-39	
Switch Underspeed	IFM	DI0001	
Switch Temperature	Square D		
Switch Transfer Switch	ABB	ATA010/SACE Emax ACB	
Sleeving	Raychem	Heat Shrink	
T			
Telephone Distribution Frames	Krone	complete with surge compressors	
Thermal Overloads	S & S	To suit duty	
Terminals and Accessories	Klippon	WDU2.5	
Terminals and Accessories	NHP	WAGO Cage Clamp 870/280	
Test Link	Phoenix	URTK/S-BEN	
Terminal Blocks Power	Klippon	SAKG to suit	
Terminal Blocks Control	Klippon	SAK4/35 044366	

Equipment	Manufacture	Type/Model	Note
Terminal Blocks C.T.	Klippon	SAKT1-043792	
Terminals Earth	Klippon	EK4 066116	
Terminal Acc. (SAK 4/35 only) End Bracket	Klippon	EWK 013016	
Terminal Acc. (SAK 4/35 only) Partition	Klippon	TW 013012	
Terminal Acc. (SAK 4/35 only) Sleeve	Klippon	BS 030300	
Terminal Acc. (SAK 4/35 only) 2 Pole Link	Klippon	QL2 013060	
Terminal Acc. (SAK 4/35 only) 3 Pole Link	Klippon	QL3 013070	
Terminal Acc. (SAK 4/35 only) 4 Pole Link	Klippon	QL4 013080	
Terminal Acc. (SAK 4/35 only) Marking System	Klippon	DEKAFIX	
Transmitters Current	MANN (Specialised Industrial Systems)	ITX/ACX	
Transmitters Kilowatt	Crompton Parkinson	256-TW Series	
Transformers Meter C.T. 1-5A	Crompton Parkinson	Type 785-946	
Transformers Meter C.T. >5A	Crompton Parkinson	Type 781-943	
Transformers Protection C.T.	Crompton Parkinson	810 Series	
U			
Underspeed Relays	IFM		
Underspeed Sensing Heads	IFM		
Uninterruptible Power system	Emerson Network Power	Nxf	
V			
Variable Speed Control Units (VVVF)	ABB	ACS800 Series	
W			
Wire Markers	Grafoplast		
Welding Outlets	Clipsal	56 Series	
Wire Numbers	Grafoplast		
X,Y,Z			

TYPE "2" SHORT CIRCUIT COORDINATION WITH CIRCUIT BREAKERS

The following equipment shall be used to manufacture the motor control centre starter modules.

Table 1

Motor Details		MCCB		Contactor		Overload Release		
Rated power (kW)	Rated Current (A)	Type	Current Setting Magnetic release (A)	Type	Type	External CT	Min Current (A)	Max Current (A)
0.37	1.1	T2L160 MF 1.6	21	A9	UMC22	NA	0.24	63
0.55	1.5	T2L160 MF 1.6	21	A9	UMC22	NA	0.24	63
0.75	1.9	T2L160 MF 2	26	A16	UMC22	NA	0.24	63
1.1	2.8	T2L160 MF 3.2	42	A26	UMC22	NA	0.24	63
1.5	3.5	T2L160 MF 4	52	A26	UMC22	NA	0.24	63
2.2	5	T2L160 MF 5	65	A26	UMC22	NA	0.24	63
3	6.6	T2L160 MF 8.5	110	A26	UMC22	NA	0.24	63
4	8.6	T2L160 MF 11	145	A30	UMC22	NA	0.24	63
5.5	11.5	T2L160 MF 12.5	163	A50	UMC22	NA	0.24	63
7.5	15.2	T2L160 MA 20	210	A50	UMC22	NA	0.24	63
11	22	T2L160 MA 32	288	A50	UMC22	NA	0.24	63
15	28.5	T2L160 MA 52	392	A50	UMC22	NA	0.24	63
18.5	36	T2L160 MA 52	469	A50	UMC22	NA	0.24	63
22	42	T2L160 MA 52	547	A50	UMC22	NA	0.24	63
30	56	T2L160 MA 80	840	A63	UMC22	NA	0.24	63
37	68	T2L160 MA 80	960	A75	UMC22	4L185 R/4	46	185
45	83	T2L160 MA 100	1200	A95	UMC22	4L185 R/4	46	185
55	98	T4L250 PR221-I In160	1360	A110	UMC22	4L185 R/4	46	185
75	135	T4L250 PR221-I In250	1875	A145	UMC22	4L185 R/4	46	185
90	158	T4L250 PR221-I In250	2500	A185	UMC22	4L185 R/4	46	185



E N G I N E E R S

110	193	T4L320 PR221-I In320	2720	A210	UMC22	4L310 R/4	80	310
132	232	T5L400 PR221-I In400	3200	A260	UMC22	4L310 R/4	80	310
160	282	T5L400 PR221-I In400	4000	A300	UMC22	4L310 R/4	80	310
200	349	T5L630 PR221-I In630	5040	AF400	UMC22	5L500 R/4	125	500
250	430	T6L630 PR221-I In630	6300	AF460	UMC22	5L500 R/4	125	500

Hazardous Area Equipment:

Equipment	Manufacture	Type/Model	Note
A, B, C			
C			
Cable Glands	CCG	To suit application	
D			
E			
F			
G			
H			
Horn – Alarm	Mechtric	RVB 4150-030	
Horn – Conveyor Start Warning	Mechtric	RVB 4108-008	
I			
Isolating Switches	LK Rollcon LKM	H and LKA...H series	
J			
Junction Boxes	Wilco	WF JB series	
	NHP/Stahl	8000 Series	
Junctions Boxes Light & Power	Clipsal	124H series	
	NHP/Stahl	8000 Series	
Junction Boxes – Motor Control Circuits	NHP	Rose ALUM series	
	NHP/Stahl	8000 Series	
Junction Boxes – Welding Outlet	GEC	Vynckier AP041	
	NHP/Stahl	8000 Series	
K			
L			
Local Control Stations	Crouse-Hinds	DSE series	
	NHP/Stahl	8000 Series	
Local Isolators	Crouse-Hinds	ESA series	
	NHP/Stahl	8000 Series	
Lights, 2 x 40 W Fluorescent	Crouse-Hinds	eLLM 81040/40	
	NHP/Stahl	6000 Series	
M, N			
Motors	Toshiba	According to HA classification	
O, P, Q			
R			



ENGINEERS

Equipment	Manufacture	Type/Model	Note
S			
T			
U			
V, W			
X, Y, Z			

3.0 LIGHT FITTINGS

Equipment	Manufacture	Type/Model	Note
A			
B			
Bulkhead HPS 70 W	Eye	Maglite 44	
C, D			
E			
Emergency Exit Sign	Phillips	L451/10SE	
Emergency General Purpose Fluorescent (Inside substation, offices etc) 2 x 36 W	Pierlite	SSB series (1 tube maintained 1 tube switched)	
F			
Flood HPS 400 W	Pierlite	Contour	
Flood HPS 250 W	Pierlite	application dependant	
Flotation Floor HPS 150 W	GEC	Optispan OPN 150SONT	
G			
General Lighting HPS 70 W	Sylvania	B2223	
General Lighting	Philips	Metro Mining HPS 70W	
General Purpose Fluorescent 2 x 36 W (Inside substation, offices etc)	Pierlite	SSB series	
General Purpose Fluorescent 1 x 36 W (Inside substation, offices etc)	Pierlite	SSB series	
H			
Highbay HPS 400 W	Moonlighting	Multibay 1	
Highbay HPS Low Mounting 250 W	Moonlighting	Multibay 11	
I, J, K			
L			
Light Switches	Clipsal	56 Series	
M, N, O			
P			
Photoelectric Cell	National		
Q, R, S, T			
U, V			
W			
Weatherproof Fluorescent 2 X 36 W	Pierlite	NPSK/NLT	
Weatherproof Fluorescent 1 X 36 W	Pierlite	NPSK/NLT	
Weatherproof Emergency Fluorescent 2 x 36 W	Pierlite	NPSK/NLT	
X, Y, Z			

4.0 INSTRUMENTATION EQUIPMENT

EQUIPMENT	Manufacturer	Type/Model	Note
A			
Actuator – Quarter-turn Valve	Keystone	F79U/79E	
Actuator – Knife-gate Valve	Keystone	F738	
Actuator – Modulating Valve	Keystone	F79U/F79E	
Air/Water Purge Meter	Ambit Instruments	UFM Insite Series	
Air Flow – Primary Element	Yokogawa	Verabar / Accelabar	
Air Flow – Primary Element	Emerson Process	Rosemount 285 Annubar / DiamondII Annubar	
B			
C			
Cable Glands	Alco, CCG	according to application	
Cable Markers	Critchley	Unilabel	
Conduit – Flexible Steel	Adaptaflex	SPC	
Converter – I/P	Yamatake	KUX113	
Converter – I/P	ABB	TEIP11	
Converter – P/I	Yamatake	KUX60G/70G	
Conveyor – Belt Drift	Electric Control	Safe-T-Drift	
Conveyor – Belt Rip Detector	Electric Control	Safe-T-Rip	
Cyanide Analyser	Polymetron	8810	
Cyanide Analyser	Process Analytical	TAC 2000	
D			
Density – Source, Detector and Transmitter	Thermo Electron	AM426/02, AM771/20, AM770	
Density – Source, Detector and Transmitter	Specialised Industrial Systems	SS200	
E			
F			
Filter	SMC	AF Series	
Regulator	SMC	AR Series	
Lubricator	SMC	AL Series	
Mist Separator	SMC	AFM Series	
Filter – Regulator	SMC	AW Series	
F-R-L Combination Units	SMC	AC Series	
Auto Drains	SMC	AD Series	
Flow Tube – Magnetic (Slurry Service)	Yokogawa	ADMAG	
Flow Tube – Magnetic (Slurry Service)	Yamatake	MagneW (MGG200)	
Flow Tube – Magnetic (Slurry Service)	Emerson Process	8705	
Flow Tube – Magnetic (Clean Service, <5% solids)	Yamatake	2-wire PLUS	
Flow Tube – Magnetic (Water Service)	ABB	MagMaster	
	Yamatake	MagneW MTG18A	

EQUIPMENT	Manufacturer	Type/Model	Note
Flow Transmitter – Magnetic	Yokogawa	ADMAG AE	
Flow Transmitter – Magnetic	Yamatake	MagneW (MGG210)	
Flow Transmitter – Magnetic	Emerson Process	8732	
Flow Transmitter – Magnetic	Yamatake	2-wire PLUS (MG14C)	
Flow Meter – Ultrasonic	Controlotron	1010	
Flow Meter – Positive Displacement	Trimec	TP series	
Flow Meter – Positive Displacement	Macnaught	MP series	
Flow Meter - Reagents	Ambit Instruments	UFM SX / MX series	
Flow Switch – Vane Operated	Dwyer Instruments	Flotect V4 / V6 series	
Flow Switch – Transducer for Gland Water	IFM Electronic	SI1000 / 1006	
G			
H			
Gland Water Solenoid	Process Systems	Series B55	
I			
Indicator – Loop & Auxiliary powered	APCS	DPM series	
Indicator – Loop powered	Weidmuller (Mann)	LPD350 / LPD450	
Indicator – Auxiliary powered	Weidmuller (Mann)	DI350 / PM450	
Instrument Earth Box	Fishkars,	Polycarbonate, UV stabilised	
Instrument pipe fittings	Swagelock		
Isolating Valves	Whitey		
J			
Junction Boxes	Rittal	PVC type	
Junction Boxes – Small 3 Way	Clipsal	1239H or 1252H series	
K			
L			
Level Switch – Sump	Flygt	ENM10	
Level Switch – Tilt	Ramsey	20-39	
Level Switch – Tilt	Siemens	Tilt Switch	
Level Switch – Capacitive	Vega	Vegacap	
Level Switch – Tuning Fork	Vega	Vegavib / Vegaswing	
Level Switch – Tuning Fork	Endress + Hauser	Liquiphant	
Level Switch – Tuning Fork	Siemens	LVS	
Level Switch – Rotary Paddle	Siemens	LPS	
Level Switch – Rotary Paddle	Bindicator	LAR	
Level Sensor & Transmitter – Ultrasonic, 2-wire	Siemens	SITRANS LU	
Level Sensor & Transmitter – Ultrasonic, 2-wire	Endress + Hauser	FMU230 / 231 / 232	
Level Sensor & Transmitter – Ultrasonic, 2-wire	Vega	Vegason	
Level Sensor & Transmitter – Radar, 2-wire	Siemens	SITRANS LR200	
Level Sensor & Transmitter – Radar, 2-wire	Endress + Hauser	Micropilot	

EQUIPMENT	Manufacturer	Type/Model	Note
Level Sensor & Transmitter – Radar, 2-wire	Vega	Vegapuls	
Level Sensor & Transmitter – Ultrasonic	Siemens	Hydro-ranger / Multi-ranger / Enviro-ranger	
Level Sensor & Transmitter – Ultrasonic	Endress + Hauser	Prosonic	
Level Sensor & Transmitter – Ultrasonic	Vega	Vegason	
Level Sensor & Transmitter – Radar	Siemens	SITRANS LR300 / 400	
Level Sensor & Transmitter – Radar	Endress + Hauser	Micropilot	
Level Sensor & Transmitter – Radar	Vega	Vegapuls	
Level Sensor & Transmitter – Guided wire Radar	Endress + Hauser	Levelflex	
Level Sensor & Transmitter – Guided wire Radar	Vega	Vegaflex	
Level Sensor & Transmitter – Hydrostatic	Endress + Hauser	Waterpilot	
Level Sensor & Transmitter – Inventory Control	Emerson Process	SAAB Rex 3900	
Level Sensor & Transmitter – Inventory Control	Enraf	Servo & Radar	
Load Cell Mill Weight	Kelk Corp.	To Suit Application	
Load Cell Transmitter	Kelk Corp.	To Suit Application	
M			
Metal Detector	Viatech	EC-2	
Miniature Circuit Breakers, DIN Rail Mounted	ABB	10kA	
Miniature Circuit Breaker Boards DIN Rail Mounting	ABB	10kA	
N			
O			
P			
Slurry Particle Size Analyzer	Outotec	PSI-500	
Air Tube	Nylex ¼, ⅜, ½		
Pneumatic Isolation/Bypass Valve	SMC		
Pneumatic Rams	SMC		
Pneumatic Solenoid Valve	SMC		
Pressure Gauge	WIKA		
Pressure Switch	Square D	XMLE / XMLF	
Pressure Switch	Telemecanique	XMLE / XMLF	
Pressure Transmitter	Emerson Process	3051 series	
Pressure Transmitter	Trafag		
Pressure Transmitter	Yokogawa	EJA series	
Proximity Switch	Pepperl & Fuchs	NCN30 + U1 + Z2	
Proximity Switch	Telmecanique	XSA-V12373	
pH Transmitter	Emerson Process	5081	
pH Transmitter	Yokogawa	PH202 / PH402	

EQUIPMENT	Manufacturer	Type/Model	Note
pH Sensor	Emerson Process	396P / 398	
pH Sensor	Yokogawa	FU20 / SM series	
Q			
R			
RTD Converter	Moore Industries		
RTD Converter	APCS		
S			
Switch Limit Valves	Square D		
Switch Limit Valves	Keystone	Switch Box 26HZ46	
Switch Limit Valves	Pepperl and Fuchs	NCN30+U1+Z2	
T			
Temperature Gauge	WIKA		
Temperature Switch	Mercoid (Dwyer Instruments)	FM series	
Temperature Element RTD	Technitemp WA	PT100	
Temperature Element	Technitemp WA	Type K	
Transducer Vibration	Vibra Metrics	7000	
Transducer Vibration	Davidson	Crosbow / IMI	
Transmitter Temperature	Emerson Process	248 series	
Transmitter Temperature	Yokogawa	YTA series	
Transmitters Resistance/Current	Weidmuller (SIS)		
Transmitters Resistance/Current	Moore Industries		
Transmitters Voltage/Current	Weidmuller (SIS)		
Transmitters Voltage/Current	Moore Industries		
U			
V			
Valve Positioner	SMC	IP6100	
Valve Positioner	Tyco Flow	AVID Easy-Cal	
W			
Weightometer	Ramsey	Series 20	
Wire Markers	Grafoplast		
X, Y, Z			