

Project: Iron Bridge SPMEI Process Plant Construction - Dry Plant		FMG Document No: 662NSC2002-2000-IT-QA-0040		Document No: C292-QU-ITP-0037		Revision: 1		
Project No: C292		Contract No: 662NSC2002-0000-CO-CP-0002		Prepared By: Osei Boakye-Yiadom		Approved By: W. Bradshaw		
Scope: E&I Installation Area 2510 Air Classification A							Workpack / Area:	
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						CIVMEC	FMG	
1 Submission/ Approval of Documentation								
1.1	Quality Plan, Inspection & Test Plan submission to FMG for approval	662NSC2002-2000-SW-CN-0002_4 100-ST-QA-0002_1	662NSC2002-2000-SW-CN-0002_4 10.7 100-ST-QA-0002_1 14.2	ITP Approved	QC/PM	H/R	R	
1.2	Calibration & inspection of Test Equipment	10-QU-QC-WIN-0009_1	NATA Certified Calibration Certificate 10-QU-QC-WIN-0009_1 5	Calibration Register/Reports	QC/SS	H/R	R	
2 Materials								
2.1	Inspect all incoming materials for quantity, dimensions, surface treatment, damage or contamination and verify that they are correct in accordance with Bill of Materials (BOM), Delivery Docket and Material Certificates (verify material specification/grade, size and manufacturer).	662NSP2019-0000-IM-QA-0005_1	As per the Scope of work document 662NSC2002-2000-SW-CN-0002	Delivery Dockets, Letters of Conformity, Statements of compliance, Material Certificates, Data Sheets, Delivery Documentation, Packing List, Dilapidation survey report, Trackem	SS/QC/PE	H/R	S	Company Supplied and Contractor Supplied
2.2	Storage and protection	C292-QU-PLN-0001_0 Quality Management Plan	C292-QU-PLN-0001_0 12	Material control procedure LO-IV-PRO-0001 OSDR Procedure	SS	H	S	
2.3	Work pack compiling and approval	662NSC2002-2000-SW-CN-0002_4	100-SP-EL-0008 - Standard Engineering Specification Electrical Installation	Approved work pack	PE/SS	PE	S	
3 Installation of Cable containment								
3.1	Install Cable ladder, Cable cover, barrier strips, brackets & supports(where applicable), all joints fish plates & fixings to supports	Vendor Manual 100-SP-EL-0008 - Standard Engineering Specification Electrical Installation	AS/NZS 3000 AS/NZS 4680 100-SP-EL-0008.28	FMG 3D Model NEMA 20B Verified Workpack IFC Drawings	SS	S	S	1) Cable ladder and accessories shall be hot dipped galvanised steel 2) Cable ladder shall be mounted to maintain 300mm clearance between ladders stacked vertically and at least 150mm clearance under structural steel sections when crossing at right angles and 300mm when running parallel and below structural steel or surface
3.2	HV Cable ladder earthing	100-SP-EL-0002 Standard Engineering Specification for Electrical Earthing and Bonding	100-SP-EL-0002 5.5(a) AS/NZS 3000	DRG No 662NC0001-0010-DR-EL-0122 DRG No 662NC0001-0010-DR-EL-0116 DRG No 662NC0001-2000-DR-EL-0021 Workpack	SS	S	S	1) A bridging conductor of minimum size 35mm shall be installed across all HV Cable ladder joints 2) Cable ladders containing HV cables shall be connected to the substation or switchyard earth bar at the originating end, or to the substation earth bars at both ends if running between substations, with a minimum 120mm PVC insulated earth cable
3.3	Running earth installation	00-SP-EL-0002 Standard Engineering Specification for Electrical Earthing and Bonding	AS/NZS 3000	DRG No 662NC0001-2000-DR-EL-0021	SS	S	S	Refer to TQ202 Response
3.4	LV or ELV cable ladder earthing	100-SP-EL-0002 Standard Engineering Specification for Electrical Earthing and Bonding	100-SP-EL-0002 5.5(b)	DRG No 662NC0001-0010-DR-EL-0116 Workpack	SS	S	S	1) Cables ladders containing LV/ELV cables and installed directly on metal structures do not need to be earthed. Bridging conductors are not required for LV and ELV cable ladder provided that the cable ladder joints have been done in accordance with manufacturer specification 3) Bridging conductors are required across disjointed sections of cable ladder

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4 Installation of Earthing System								
4.1	HV Equipment earthing	100-SP-EL-0002 Standard Engineering Specification for Electrical Earthing and Bonding	100-SP-EL-0002 5.5(c)	DRG No 662NC0001-0010-DR-EL-0122 Dynamic Asset Database (DAD) 3D Model	SS/QC	S	S	1) HV equipment equipotential bonding shall be provided by using 70mm stranded Cu PVC earth conductor
4.2	Electric motors	100-SP-EL-0002 Standard Engineering Specification for Electrical Earthing and Bonding	100-SP-EL-0002 5.5(d) AS3000 Table 5.1	DRG No 662NC0001-0010-DR-EL-0122 Dynamic Asset Database (DAD) 3D Model Workpack	SS/QC	S	S	Refer to Table 5.1 of AS3000 for motor earth cable selection
4.3	Instrument Earthing	100-SP-EL-0002 Standard Engineering Specification for Electrical Earthing and Bonding	100-SP-EL-0002 5.4(0)	Vendor manual Workpack	SS	S	S	
4.4	Installation of earth grid/slakes	00-SP-EL-0002 Standard Engineering Specification for Electrical Earthing and Bonding	AS/NZS 3017- Section 3 AS/NZS3000 00-SP-EL-0002 - 5.4(g)	DRG No 662NC0001-0010-DR-EL-0122 DRG No 662NC0001-0010-DR-EL-0120 Workpack	SS	S	S	
4.5	Installation of earth grid tails to structure/Equipment	00-SP-EL-0002 Standard Engineering Specification for Electrical Earthing and Bonding	AS/NZS3000 00-SP-EL-0002 - 5.4	DRG No 662NC0001-0010-DR-EL-0116 DRG No 662NC0001-0010-DR-EL-0120 DRG No 662NC0001-2000-DR-EL-0021	SS	S	S	
4.6	Complete inspections and testing of the Earthing system	100-SP-EL-0010 Testing and Commissioning of Electrical Installation	Section 3 of AS3017 Section 9 of AS2067 Sections 1.9 and 8.3 of AS/NZS 3000 100-SP-EL-0010 8(f), 8.5	By completing all relevant ITRs Completions data base (CMS)	QC	R	S/R	
5 Installation of conduit/ saddles and support brackets								
5.1	Install conduits, clamps, brackets & supports	00-SP-EL-0008 - Standard Engineering Specification Electrical Installation	FMG 3D Model Dynamic Access Database (DAD) AS/NZS 3000	FMG 3D model Workpack	SS/QC	W	S	
6 Installation of Electrical Equipment								
6.1	Install Electrical equipment complete with support brackets. (including E, I & C LV MCC, Distribution Boards & Welding outlets)	00-SP-EL-0008 - Standard Engineering Specification Electrical Installation	FMG 3D Model Dynamic Access Database (DAD) AS/NZS 3000 AS 60529	DWG 662NSC0001-0010-DR-EL-0112_0 DWG 662NSC0001-0010-DR-EL-0113_2 DWG 662NSC0001-0010-DR-EL-0140 DWG 662NSC0001-0010-DR-EL-0141 DWG 662NSC0001-0010-DR-EL-0142	SS	S/R	S	
6.2	Complete inspections (and testing where required) on electrical equipment that has been installed.	100-SP-EL-0010 Testing and Commissioning of Electrical Installation	100-SP-EL-0010 section 8 Dynamic Access Database (DAD) AS/NZS 3017 AS/NZS 2067 AS/NZS 3000	By completing all relevant ITRs Completions data base (CMS)	QC	R	S/R	
7 Installation of Junction boxes, Decontactors, Isolators and Local Control Stations								
7.1	Install Junction boxes, Local Control Stations, Isolators and Decontactors complete with stands and support brackets.	00-SP-EL-0008 - Standard Engineering Specification Electrical Installation	FMG 3D Model Dynamic Access Database (DAD) AS/NZS 3000	DWG 662NSC0001-0010-DR-EL-0112_0 DWG 662NSC0001-0010-DR-EL-0113_2 DWG 662NSC0001-0010-DR-EL-0140 DWG 662NSC0001-0010-DR-EL-0141 DWG 662NSC0001-0010-DR-EL-0142	SS	S	S	
7.2	Complete inspections on Junction boxes, Local Control Stations and Decontactors that have been installed.	100-SP-EL-0010 Testing and Commissioning of Electrical Installation	Dynamic Access Database (DAD) AS/NZS 3017 AS/NZS 3000	By completing all relevant ITRs Completions data base (CMS)	QC	R	S/R	

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8 Installation of Control & Marshalling Panels								
8.1	Install Control panels & Marshalling Panels, complete with stands and support brackets.	00-SP-EL-0008 - Standard Engineering Specification Electrical Installation	3D Model Dynamic Access Database (DAD) AS 60529 AS/NZS 3000	3D Model Dynamic Asset Database (DAD)	SS	S/R	S	
8.2	Complete inspections on Control panels & Marshalling Panels	100-SP-EL-0010 Testing and Commissioning of Electrical Installation	Dynamic Access Database (DAD) AS/NZS 3017 AS/NZS 3000	By completing all relevant ITRs	QC	R	S/R	
9 Installation of Field Devices								
9.1	Install Field devices (Instruments), complete with stands and support brackets, Control panels & Marshalling Panels.	100-SP-EL-0008 - Standard Engineering Specification Electrical Installation	3D Model Dynamic Access Database (DAD) AS 4024.3610 AS/NZS 3000 100-SP-EL-0008 13.3	3D Model Dynamic Asset Database (DAD)	PE/SS	S/R	S	
9.2	Complete inspections/testing on Field devices	100-SP-EL-0010 Testing and Commissioning of Electrical Installation	Dynamic Access Database (DAD) AS/NZS 3017 AS/NZS 3000	By completing all relevant ITRs Completions data base (CMS)	QC	R	S/R	
10 Installation of HV/LV Cabling								
10.1	Install and terminate HV/ LV cabling	00-SP-EL-0008 - Standard Engineering Specification Electrical Installation Cable pull sheet Cable termination sheet	Dynamic Access Database (DAD) AS/NZS 3008.1.1 AS/NZS 3000 AS2067	Dynamic Asset Database (DAD) Termination Records.	SS	S/R	S	
10.2	HV cables final connection/terminations	00-SP-EL-0008 - Standard Engineering Specification Electrical Installation Cable pull sheet Cable termination sheet	Dynamic Access Database (DAD) AS/NZS 3008.1.1 AS/NZS 3000 AS2067	Dynamic Asset Database (DAD) Termination Records.	SS	S/R	H	FMG hold point required for HV cable final connection and to witness torquing of HV cables
10.3	Complete inspections and testing of LV cabling	100-SP-EL-0010 Testing and Commissioning of Electrical Installation	Dynamic Access Database (DAD) AS/NZS 3017 AS/NZS 3000	By completing all relevant ITRs Completions data base (CMS)	QC	S/R	S/R	
11 Installation of Control, Instrument and Fibre Optic Cables								
11.1	Install and terminate control and Instrument cabling	100-SP-IN-0019	Dynamic Access Database (DAD) AS 1049 AS/NZS 3000	Cable schedule Dynamic Asset Database (DAD) Instrument OEM	SS	S/R	S	Works to be conducted by Qualifield Instrument technician
11.2	Install and terminate Fibre Optic Cabling	100-SP-IN-0019	Dynamic Access Database (DAD) AS 1049 AS/NZS 3000	As per requirements set out in AS3080	SS	S/R	S	A 5m service loop shall be provided at the field communication panel end and a 10m loop at switchroom termination end
11.3	Complete inspections and testing of control, Instrument and Fibre Optic Cables	100-SP-EL-0010 Testing and Commissioning of Electrical Installation	Dynamic Access Database (DAD) AS/NZS 3000	By completing all relevant ITRs Completions data base (CMS)	QC	R	S/R	Ensure Optical Time Domain Reflectometer (OTDR) test is conducted as per the ITR requirement Ensure LSPM test is conducted

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12	Installation of Light & Small Power							
12.1	Install lights and General Power complete with poles and support brackets.	Typical installation drawings: 662NSC0001-0010-DR-EL-0126_1 662NSC0001-0010-DR-EL-0127_2 662NSC0001-0010-DR-EL-0128_1 662NSP0033-0000-DR-EL-0003_2 662NSP0033-0000-DR-EL-0004_2 662NSP0033-0000-DR-EL-0006_2 662NSP0033-0000-DR-EL-0007_2 662NSP0033-0000-DR-EL-0008_4 662NSP0033-0000-DR-EL-0009_2 662NSP0033-0000-DR-EL-0010_0 662NSP0033-0000-DR-EL-0027_0 662NSP0033-0000-DR-EL-0028_1 662NSP0033-0000-DR-EL-0030_0 662NSP0033-0000-DR-EL-0031_1 662NSP0033-0000-DR-EL-0032_0 662NSP0033-0000-DR-EL-0033_0 662NSP0033-0000-DR-EL-0034_0 662NSP0033-0000-DR-EL-0035_0 662NSP0033-0000-DR-EL-0036_0 662NSP0033-0000-DR-EL-0037_0 662NSP0033-0000-DR-EL-0038_0 662NSP0033-0000-DS-EL-0001_0 662NSP0033-0000-LI-EL-0001_1 drawing No 662NSP0033-0000-DR-EL-0003 to 662NSP0033-0000-DR-EL-0041	3D Model Dynamic Access Database Drawings FMG Specification 100-SP-EL-0009	Dynamic Asset Database (DAD) 3D Model Workpack	PE/SS	S/R	S	
12.2	Complete inspections and testing of light fittings, Power Outlets and their subsequent circuits.	100-SP-EL-0010 Testing and Commissioning of Electrical Installation	Dynamic Access Database Drawings AS/NZS 3017 AS/NZS 3000	By completing all relevant ITRs Completions data base (CMS)	QC	R	S/R	
13	Motors							
13.1	Complete termination of motors	Termination pack	AS/NZS 3017 AS/NZS 3000	Dynamic Asset Database (DAD) FMG issued typical schematic diagrams	SS/PE	S/R	S	
13.2	Complete inspections and testing of motors	100-SP-EL-0010 Testing and Commissioning of Electrical Installation	AS/NZS 3017 AS/NZS 3000	By completing all relevant ITRs Completions data base (CMS)	QC	R	S/R	
14	Transformer Installation, Inspection, and Testing							
14.1	Installation of transformer	Workpack Vendor Manual	AS/NZS 60076	IFC drawings FMG Specification 100-SP-EL-0001: Electrical Design Criteria	SS	S	S	
14.2	Inspection checklist: a) Transformer installed as per construction standards and applicable design drawings. b) Transformer matches system voltage c) Transformer bushings and tank in good condition (no oil leaks) d) HV cables properly terminated and connected on transformer HV bushings, if applicable. e) Neutral connected and earthed on transformer earth bar f) LV, and HV connections are as per design	Workpack Vendor Manual	AS/NZS 60076	IFC drawings	QC	S	S	
14.3	Transformer testing	Workpack Vendor Manual	AS/NZS 60076 00-SP-EL-0010 Testing and Commissioning of Electrical Installation	By completing all relevant ITRs Completions data base (CMS)	QC	S	S	

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15	Switchroom Inspection, and Testing							
15.1	Inspection checklist: a) There is no external damage and paint is correct colour and in good condition b) There is no internal damage and paint is correct colour and in good condition c) All access doors close securely and have overhangs as required d) All equipment is located as per drawings (or attach redlined drawing) e) All gland plates are installed f) All gland plates are of correct size g) All gland plates are of correct material h) Labelling is clear, securely attached and matches drawings i) Danger labels are attached j) Voltage warning labels are attached k) Busbars have been inspected to ensure torque marks are intact after transport l) All weather seals are in place and in good condition m) All devices appear to be fixed securely to their supports after transport n) All cubicles are clean, free from dust or debris o) Check and confirm Substation main earth	Switchroom vendor manual	00-SP-EL-0008 Standrard Engineering Specification Electrical Installation	Switchroom vendor manual/ FAT results	SS/PE	S	S	
15.2	Switchroom Testing	100-SP-EL-0010 Testing and Commissioning of Electrical Installation	Switchroom vendor manual/ FAT results Workpack	By completing all relevant ITRs Completions data base (CMS)	SS	S	S	
16	Specialised E&I Subcontractor							
16.1	Fibre optic cable installation, and testing	Vendor/ Subcontractor workpack	FMG Specification for Fibre Optic Cable	Completion of all relevant ITRs Completions data base (CMS)	SS	H	S	Ensure Optical Time Domain Reflectometer (OTDR) is included in the testing Ensure LSPM test is conducted
16.2	HV Cable testing	Vendor/ Subcontractor workpack	FMG Specification 100-SP-EL-0010 Section 8.3	Completion of all relevant ITRs Completions data base (CMS)	SS	H	S	
17	Final Inspection/ Finalise Documentation							
17.1	Carry out Final Inspection ensuring all punch list items have been closed out.	662NSC2002-2000-SW-CN-0002_4 100-SP-QA-0001_1	662NSC2002-2000-SW-CN-0002_4 Cl. 9.2 100-SP-QA-0001_1 Cl. 2.8	Punch List signed off Approved Construction Documentation	QC / PE	H / R	W / R	
17.2	Check and ensure all documents have been signed off by relevant parties	662NSC2002-2000-SW-CN-0002_4 662NSP2019-0000-IM-QA-0005_1	662NSC2002-2000-SW-CN-0002_4 662NSP2019-0000-IM-QA-0005_1	100-PL-PM-0004	QC / PE	H / R	R	
17.3	Confirm all verifying documents are correct and complete ready for compilation and review.	662NSC2002-2000-SW-CN-0002_4 100-SP-QA-0001_1	100-PL-PM-0004	Completion and Handover sign off	QC / PE	H / R	R	

SIGNATURE IDENTIFICATION REGISTER

NO	NAME	SIGNATURE	POSITION TITLE	ORGANISATION
1				
2				
3				
4				
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