AES Indiana
AES Indiana – Petersburg

Issue: R0

Issue Date: Feb 6, 2023

Exhibit F – Attachment 3

Supervisory Control and Data Acquisition Requirements

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1.0 DESCRIPTION

1.1 Summary

1.1.1 The work requirements and physical and networking architecture that makes up the site BESS SCADA systems are defined herein.

1.1.2 SCADA control system(s) shall include hardware, software, programming, documentation, factory and field testing, and training.

1.1.3 The BESS and Substation SCADA systems shall be integrated and specialized for supervisory control and monitoring of utility BESS site.

1.1.4 Design of the SCADA system shall be performed in cooperation between Contractor, Owner, and Transmission Owner to ensure an operational system that meets interconnection requirements. Contractor is responsible for ensuring that all network and substation SCADA systems integrate properly.

1.1.5 The site instrumentation and control equipment shall enable operations of the Project to be carried out in a safe, effective and reliable manner without invoking equipment or system operational limits.

1.1.6 The design of the site control equipment shall to the greatest extent employ recognized principles leading to:

1.1.6.1 A safe operating environment for personnel

1.1.6.2 Protection of the Project operating equipment from damage

1.1.6.3 High availability

1.1.6.4 Maintainability

1.1.6.5 Power production at the lowest possible cost

1.1.6.6 Minimization of operating and maintenance labor

1.1.6.7 Contractor should coordinate with the OWNER's security operations center for protection and intrusion detection requirements and malicious software including monitoring of firewalls/routers/operating systems

1.1.6.8 Utilizes least priviledge functionality

1.2 Quality Assurance

1.2.1 Referenced Standards in addition to those provided in Exhibit F – Scope of Work

1.2.1.1 National Electrical Manufacturers Association (NEMA):

1.2.1.1.1 ICS 1, Industrial Control and Systems General Requirements.

1.2.1.2 NERC-CIP-002 to 009 – BES Cyber System Identification

1.2.1.2.1 (NERC-CIP project classification is Medium)

1.2.1.3 NERC-CIP-013-2 - Cyber Security - Supply Chain Risk Management

1.2.1.4 IEC 62443 Industrial network and system security

1.2.1.5 The Institute of Electrical and Electronics Engineers, Inc. (IEEE):

1.2.1.5.1 C37.90.2, Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers.

1.2.1.5.2 C62.41.2, Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits.

1.2.2 Qualifications

1.2.2.1 Installation supervisor shall have had experience in overseeing installation and startup of at least three similar installations within the last five years.

1.2.2.2 Programmer(s) shall have had experience in SCADA system for at least two projects of similar size and complexity.

1.2.3 Testing

1.2.3.1 Provide a factory performance test after factory completion and prior to shipment.

1.2.3.2 Testing of the system software, network and hardware shall be performed at the Contractor's facility. System testing can be witnessed by the Owner and/or Owner's representative at the option of the Owner. Systems shall not be accepted until the specific software and hardware demonstration has been fully completed and all comments have been reconciled or incorporated. Contractor shall submit Factory Acceptance Testing plan for Owner's review and approval. System testing shall consist of at minimum:

1.2.3.2.1 Provide all accessories required to install and test.

1.2.3.2.2 Conduct testing with simulated I/O to verify each control loop operation.

1.2.3.2.3 Conduct a test where the system is operated continuously and checked for correct operation including loop controls, displays, and alarm responses.

1.2.3.2.4 Test all hard-wired inputs and outputs

1.2.3.2.5 Test the network by setting up network equipment (switch, router, firewall) and download the settings in each equipment to make sure the network is functioning as expected.

1.2.3.2.6 Verifying graphics are linked to the correct I/O

1.2.3.2.7 Verifying system program

1.2.3.2.8 Provide minimum of 15 days' notice prior to testing.

1.2.3.3 Commission and Acceptance Test in accordance with Exhibit F – Attachment 5: Project Acceptance Testing and Commissioning

1.3 Submittals

1.3.1 Submittals specific to the SCADA scope of work are provided below and shall be in compliance with the requirements of Exhibit F – Scope of Work and Attachment 10: Submittal Requirements.

1.3.2 Product technical data including:

1.3.2.1 Communication Schematics and Topology.

1.3.2.2 Wiring Diagrams.

1.3.2.3 Electrical requirements.

1.3.2.4 Installation instructions and Operation & Maintenance manual.

1.3.2.5 Results of all simulation procedures.

1.3.2.6 List of manufacturer's recommended spare parts.

1.3.2.7 All login and Passwords for device accessibility. (To be submitted via secure methods to OWNER)

1.3.2.8 A well-documented SCADA Points List. Contractor's I/O list shall include, as a minimum, the following information:

1.3.2.8.1 Register/bit/SCADA tag (applicable to tag based systems)

1.3.2.8.2 Description

1.3.2.8.3 Range (including any scalers and offsets to convert to a valid process range)

1.3.2.8.4 Engineering units

1.3.2.8.5 Set description (logic 1 description)

1.3.2.8.6 Zero description (logic 0 description)

1.3.2.8.7 Tag

1.3.2.9 Assigned IP addresses (to be confirmed with OWNER).

1.3.2.10 Factory Acceptance Test Report

1.3.2.11 Results of commissioning and acceptance testing.

1.3.2.12 Wiring and Interconnection diagrams.

1.3.2.12.1 Power Supplies.

1.3.2.12.2 I/O Points.

1.3.2.12.3 Communications.

1.3.3 Certifications:

1.3.3.1 Qualifications of installation supervisor.

1.3.3.2 Qualifications of programmer(s).

1.3.4 Software Licenses:

1.3.4.1 Documentation proving all software package licenses are assigned to Owner.

1.3.4.2 Bare metal configuration backups

1.3.4.3 Application backups

1.3.4.4 Secure transfer of passwords to owner

1.3.4.5 Secure transfer of IP Addresses to owner

1.3.5 Operation and Maintenance Data:

1.3.5.1 Submit maintenance procedures available to Owner.

1.3.5.1.1 Include the location and phone numbers of service centers.

1.3.5.1.2 Provide specific information including operation and maintenance requirements, programming assistance, troubleshooting guide, parts ordering, field service personnel requests, and service contracts.

2.0 DESIGN AND PRODUCT REQUIREMENTS

2.1 General Design Requirements

2.1.1 The project SCADA requirements shall be designed to meet the requirements as set forth in the GIA, including supporting NERC requirements for the Project, and shall also support MISO DIR requirements, as applicable, based on project COD

2.1.2 Contractor shall provide a fully integrated SCADA system to control and monitor all systems of the solar installation and supporting sub systems. This system shall include redundant communications links.

2.1.3 SCADA control systems shall include instrumentation, controls, fiber optic cable, interconnecting control wiring, panels, and/or conduits as required. Substation SCADA shall also include SCADA interface to meet GIA requirements.

2.1.4 The Local control systems shall allow for proper system maintenance, testing, and commissioning and include provisions for equipment isolation and essential tripping functions. Sufficient alarms and indications shall be provided to remotely verify the local system is configured for the intended operating role and functioning within design parameters.

2.1.5 The extent of remote manual controls, indications, automatic modulating controls, automated sequences and facility/personnel protection systems shall be such as necessary to enable all routine operations of the Project to be monitored remotely by Owner with minimal Owner interaction required. The SCADA system shall be equipped with an access port for the purpose of local/remote programming inclusive of remote operation of relays and breakers. Owner will provide all communication and network equipment to connect the plant SCADA systems to Owner's offsite control and monitoring facilities.

2.1.6 Contractors design shall be developed to provide overall communications system intended for voice, video, data, security and SCADA and produce all associated diagrams and one lines required.

2.1.7 Contractor RFP response shall include a narrative and preliminary diagram of the SCADA system and network(s) proposed. Design narrative shall include description of the incorporation of the required equipment listed herein; information on proposed controller(s), networking hardware, network segmentation, and integration with substation hardware; and description of the modes and operations anticipated by the SCADA system to meet GIA requirements at the POI.

2.1.8 All SCADA processors and human machine interface (HMI) units shall be located in the substation control house. The design shall incorporate the conduit systems and cable trays required. All SCADA points will be delivered to the SCADA rack in the modbus or DNP3 format.

2.1.9 The system shall be capable of operating in ambient conditions of 32 to 140°F temperatures and 5 to 95% relative humidity without the need for purging or air conditioning. Contractor is responsible for coordinating design of SCADA environmental requirements with Substation control house HVAC design appropriately. It is recommended that the ambient temperature be maintained to 120 deg F or lower to ensure long term reliability of the system components. The following environmental controls shall be considered and provided as appropriate:

2.1.9.1 Furnish circulation fans in solid state control system enclosures.

2.1.9.2 Over-temperature switches shall be utilized to provide special cooling if required to maintain operating temperatures within the manufacturer's specified range.

2.1.9.3 Air conditioning applications shall include means of preventing moisture condensation.

2.1.10 All devices shall be configured with static, pre-defined IP addresses.

2.1.11 All equipment shall be designed such that any interruption in electrical power supply shall not result in injury to personnel or damage to systems or equipment.

2.1.12 Contractor shall provide the following Owner workstation space and services within the substation control building to account for Owner provided equipment, at minimum the following shall be provided:

2.1.12.1 Workstation desk and chair. Desk surface shall be minimum of 5 ft wide x 2 ft deep

2.1.12.2 CAT 6 back compatible cable connection

2.1.12.3 Four (4) convenience outlets

2.1.12.4 One (1) Filing cabinet , minimum 18 inches wide x 60 inches tall x 24 inches deep

2.1.13 The software delivered by Contractor to Owner shall have minimum 3 year warranty and support contract. The support contract shall include updating of software patches for switches, routers, firewalls, Windows, VMware, PLC operating system, anti-virus, and control software on either platform, and any specialized software for solar facility operations, including Historian, runtime server. Owner shall have complete administrative and cyber security control of all computers and equipment, including operating systems and software, including root and Administrator level.

2.1.14 Third Party Network Agreement, to be provided by Contractor and approved by Owner shall be executed by the Contractor as part of this contract.

2.1.15 Owner shall supply, configure, and install the firewall and WAN interface equipment for the project. The Contractor shall provide a logical diagram or anticipated data flows with the firewall rules for review prior to installation. The Contractor shall provide to Owner the firewall rule set at least 4 weeks prior to installation. The Contractor will assist Owner by troubleshooting and finalizing the firewall rules. During this troubleshooting, Owner will report what ports or services are being blocked by the firewall. Remote access to the firewall will be available to Owner during this troubleshooting, provided by Contractor if Owner WAN connection is not available.

2.1.16 For installation, the Contractor will provision a minimum of 5RU space on the network rack and (4) 120 VAC power connections and (4) 48 VDC power connections (10A), that are fed by battery power within the Substation Control House. The AC power may be supplied by an inverter installed in the same rack that is powered by the Control House batteries. The Contractor is responsible for procuring and installing all Ethernet connections and cabling from the firewall to other equipment in the Substation Control House.

2.1.17 As part of physical security requirements, the Ethernet switches at inverters shall be in a cabinet that can accept a standard padlock. Unused ports on the Ethernet swtcihes should be disabled.

2.1.18 Contractor shall provide documentation on the appropriate process to maintain security and functionality of the IT systems at the facility. Documentation will include, but is not limited to, maintaining security and antivirus software, operating system patches and any firmware updates. Owner approval of final network configuration and equipment is required.

2.1.19 The Contractor shall purchase equipment of these models, or Owner approved equivalent, to support the network and SCADA. Final part numbers shall be coordinated with Owner. A summary is shown below:

2.1.19.1 Windows Server 2019, VMWare or latest supported by control software at time of procurement.

2.1.19.2 Configure operating system using ISA 62443 least privilege and least functionality concepts and/or CIS benchmark.

2.1.19.3 For use with VMWare and Windows Server: HP Proliant DL380, latest generation. Exact configuration to be determined in design reviews. The Proliant shall include at a minimum a redundant power supply, (2) CPUs, iLO Advanced Management Pack Tracking License, and TPM module.

2.1.19.4 Router (If design requires): Cisco CGR2010 with 24/48 VDC power supply options and IPSEC IOS support

2.1.19.5 Firewall (If design requires): 24/48 VDC power supply options and remote access licenses

2.1.19.6 Ethernet switches: IE-5000 for substation and IE-2000 for distributed switches. Each Switch should be purchased with redundant 48VDC power supply options. Design review shall define other requirements (for example, if layer-3 license is required).

2.1.20 Contractor shall propose all major equipment such as relays, RTUs, and revenue meter part numbers for Owner review and approval prior to procurement.

2.1.21 Contractor shall document SCADA programming, ensure SCADA programs is completely annotated and include factory testing of programming in scope of work.

2.1.22 Contractor shall terminate instrumentation wiring and test connectivity to instrumentation analog signals or RS-485 / Ethernet converter units (e.g. ADAM switches)

2.1.23 Contractor shall install and test protection system fiber optics, including coordination with ATXI during construction, testing, and commissioning.

2.1.24 Contractor shall test and commission all aspects of the SCADA system and fiber-optic network infrastructure.

2.1.25 Contractor shall develop metering scheme as required by MISO, AES Indiana and Owner's requirements. Load Balancing Authority (LBA) metering will need to be installed at the collector substation and meet the following requirements at a minimum:

2.1.25.1 Meters shall meet or exceed the latest versions of American National Standard Institute (ANSI) C12.1 (Code for Electricity Metering), C12.10 (Physical Aspects of Watthour Meters – Safety Standard), and C12.20 (Electricity Meters 0.2 and 0.5 accuracy class). Where differences exist between requirements of C12.1, C12.10, and C12.20, the requirements of C12.20 shall prevail.

2.1.25.2 Current transformers used for metering shall meet or exceed an accuracy class of fifteen hundredths of one percent (0.15%) and shall be of extended-range type. Equipment connected to the current transformer shall not affect the accuracy of the current transformer by exceeding the burden rating of the current transformer. Instrument transformers shall comply with the latest version of the applicable ANSI Standards including C57.13–IEEE Standard Requirements for Instrument Transformers, and C12.11–Instrument Transformers for Revenue Metering 10kV through 350kV BIL. The manufacturer shall include accuracy and burden class information on the nameplate of each device. Current transformers for Local Balancing Authority metering shall be dedicated for this meter.

2.1.25.3 Voltage or potential transformers used for metering shall meet or exceed an accuracy class of three tenths of one percent (0.3%). Equipment connected to the potential transformer shall not affect the accuracy of the potential transformer by exceeding the burden rating of the potential transformer. Instrument transformers shall comply with the latest version of the applicable ANSI Standards including C57.13–IEEE Standard Requirements for Instrument Transformers, C12.11–Instrument Transformers for Revenue Metering 10kV BIL through 350kV BIL, and C93.1–Power Line Carrier Coupling Capacitors and Coupling Capacitor Voltage Transformers (CCVT). The manufacturer shall include accuracy and burden class information on the nameplate of each device. Potential transformers for Local Balancing Authority metering shall be dedicated for this meter.

2.2 BESS Controllers (PPCs):

2.2.1 The following manufacturers are acceptable:

2.2.1.1 Schweitzer Engineering Laboratories: SEL3555/SEL3530.

2.2.1.2 Novatech: Orion LX.

2.2.1.3 Or Approved Equal.

2.2.2 A PPC shall be supplied that is able to dispatch commands to all inverters / battery packs and control the plant as an aggregate generator. The following minimum information shall be included in the system design

2.2.2.1 Real Power Dispatch - control

2.2.2.2 Active Power Dispatch - control

2.2.2.3 Shutdown/Turn-On commands - control

2.2.2.4 Number of enabled and online inverters - status

2.2.2.5 Number of enabled, oneline and unsaturated inverters - status.

2.2.2.6 MWh delivered to grid - metering

2.2.2.7 MWh received from grid - metering

2.2.2.8 MVARh delivered to grid - metering

2.2.2.9 MVARh received from grid - metering

2.2.3 The control system and all control modes should operate via a logical closed-loop PID controller with set-points dynamically adjustable by the OWNER.

2.2.4 Limits to each operational mode shall be configurable, including ramp rate limits

2.2.5 The PID control loop shall be tuned after initial energization to provide the quickest response with no overshoot.

2.2.6 Plant control shall be made available in the following modes:

2.2.6.1 Power Factor Control Mode.

2.2.6.2 Fixed Reactive Power Control Mode.

2.2.6.3 Voltage Regulation Mode with associated droop and deadband settings.

2.2.6.4 Voltage and Current data shall be obtained from OWNER supplied Voltage Transformer and Current Transformers.

2.2.7 The PPC must have the ability to switch the capacitor bank(s) as the inverters reach their maximum reactive power output.

2.2.8 A project specific PSSE/PSLF or WECC generic model (if applicable) is required to be submitted to Owner as part of the initial engineering deliverables. This model should be updated after commissioning of the plant has been completed and should include all parameters used in the tuning of the controller.

2.3 BESS SCADA System Components

2.3.1 HMI: Contractor shall coordinate with Owner for approval of final HMI screens to be provided. The following shall be provided at a minimum.

2.3.1.1 Substation POI oneline screen.

2.3.1.2 Device faceplate screens for equipment such as Inverters and Transformers.

2.3.1.3 Alarm and alarm history summary screens.

2.3.1.4 Work with OWNER for approval on defining the applicable HMI screens.

2.3.1.5 Work with OWNER to develop minimum security requirements for different access levels for example view only, operate, supervisor and administrator.

2.3.2 BESS SCADA SYSTEMS: Contractor shall provide communications and any necessary equipment to monitor and control inverter(s) via the supplied Power Plant Controller (PPC) and Servers. Contractor shall coordinate with Owner for final determination of datapoints, but at minimum the following inverter points shall be included:

2.3.2.1 Inverter status

2.3.2.2 Inverter overcurrent

2.3.2.3 Inverter power in

2.3.2.4 Inverter real power out

2.3.2.5 Inverter reactive power out

2.3.2.6 Inverter power factor

2.3.2.7 Inverter grid voltage

2.3.2.8 Inverter output current

2.3.2.9 Work with Owner for approval on the SCADA points from Inverter

2.3.3 TRANSFORMER ALARMS: Contractor shall provide communications and any necessary equipment to monitor MV analog and digital transformer alarms including

2.3.3.1 Liquid Level and Temperature.

2.3.3.2 Pressure Gauge.

2.3.3.3 Any additional alarms recommended by manufacturer

2.3.4 NETWORK COMMUNICATION:

2.3.4.1 A Single-Mode Managed Fiber Optic / Ethernet switch shall be included to allow communication back to the Power Plant Controller and any other servers in the substation control house. This switch must support RSTP to allow for a Fiber Loop through the Inverters in the feeder. Each Inverter Pad Switch must have a minimum of 4 x 10/100BaseT(X) RJ45 and 2 x 100BaseFX ports.

2.3.4.2 A failure or power down of a single inverter shall not interrupt communications to the remaining inverters in the same Fiber Loop

2.3.4.3 A fiber Patch Panel shall be included within the DAS enclosure. This Patch Panel must accommodate a minimum of 12 spliced fibers.

2.3.4.4 PPC will communicate with Utility SCADA over cell modem or other Owner approved alternative

2.3.5 ENCLOSURE:

2.3.5.1 All above mentioned equipment, with the exception of instrumentation devices that need to be exposed, shall be housed in a non-corrosive, NEMA 4X rated enclosure or higher.

2.3.5.2 Enclosure shall be UL 746C rated. All AC powered monitoring and control panels shall be UL508A listed.

2.3.5.3 All equipment should be securely mounted to a DIN rail.

2.4 Point of Interconnect SCADA System Components

2.4.1 FIBER DISTRIBUTION ETHERNET SWITCH

2.4.1.1 Each Electrical Feeder should have its own, independent Fiber switch that ties all the inverters in a loop configuration in the associated feeder. These switches must support RSTP to allow for a Fiber Loop through the Inverters. Redundant fiber loop is required.

2.4.1.2 All fiber distribution switches must be connected to a Main Ethernet switch. This Main Ethernet switch will be connected to the OWNER network.

2.4.1.3 For communication back to Owner's remote SCADA center, coordination with telephone service provider is required.

2.4.2 HISTORIAN SERVER

2.4.2.1 Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

2.4.2.2 Relays: Schweitzer Engineering Laboratories.

2.4.2.3 Emerson Ovation is the plant SCADA / DCS platform.

2.4.2.4 OWNER furnished historian server.

2.4.2.5 A historian server shall be installed to capture all system events, alarms and process data from the plant.

2.4.2.6 The historian server shall be able to record all data points on Owner defined intervals for 365 days locally by configuring appropriate deadband settings.

2.4.2.7 Local Data storage shall be configured using a RAID 1 configuration.

2.4.2.8 Local Data shall be made available to other systems through common industrial protocol such as Modbus, DNP3, etc. Vendor shall provide a points list of all available points to owner.

2.4.3 HMI AND SCADA SERVER:

2.4.3.1 An RTU, RTAC or SCADA Server must be provided that allows both local and remote control of the plant.

2.4.3.2 Remote Control of the system must be allowed through common industrial protocol such as Modbus, DNP3, etc. from other networked devices, as well as through a RDP session.

2.4.3.3 Access to the raw historian server data shall be available from this server.

2.4.3.4 A rack-mounted KVM shall be supplied with this server, which will be the main local HMI.

2.4.3.5 The HMI shall present graphics screens designed to easily access information and allow for control of the solar array. Alarm management should comply with ISA18.2 alarm management guidelines.

2.4.3.6 Develop security levels based on the user access levels.

2.4.4 MAIN CONTROLLER:

2.4.4.1 The main controller shall communicate with the PPC and provide statuses, alarms, analogs, and control for substation breakers, MODs, via protection relays using standard MODBUS, DNP3 or manufacturer specific protocol.

2.5 Example Data Point List

2.5.1 Contractor shall provide a proposed list of all data points to be available to Owner via the integrated site SCADA systems, in Excel format. The proposal list may simply provide the point description, units of measure and point type (analog vs. digital)

2.5.2 This list shall include point name, address, English description, span of the instrument measured/metered, units of measure, any offset or biases required, point type (analog or digital, float, single, double, etc.) per the communication protocol being utilized. This list shall be provided to owner at the end of the design phase, but no later than 2 months prior to equipment start up.

2.5.3 The following is an example of minimum expectation of data to be monitored by the control/data acquisition system and to be made available to Owner via a remote monitoring system:

2.5.3.1 Inverter/Re-combiner Box level production for real time AC and DC electrical characteristics including:

2.5.3.1.1 Active Power

2.5.3.1.2 Reactive Power

2.5.3.1.3 Frequency

2.5.3.1.4 Power factor

2.5.3.1.5 AC voltage

2.5.3.1.6 DC voltage

2.5.3.1.7 AC current

2.5.3.1.8 DC current

2.5.3.1.9 Kilowatt

2.5.3.1.10 Kilowatt-hour

2.5.3.2 Inverters, including capture of all diagnostic information including:

2.5.3.2.1 Temperatures

2.5.3.2.2 Alarms

2.5.3.2.3 Status indicators

2.5.3.2.4 Fault states

2.5.3.3 Transformers

2.5.3.3.1 Alarms

2.5.3.3.2 Status / Health Indicators

2.5.3.4 Trackers:

2.5.3.4.1 Status indicator (operating, locked, stow mode, alarms)

2.5.3.4.2 Angle/position output

2.5.3.5 Interconnection switchgear

2.5.3.5.1 Alarms

2.5.3.5.2 Status / Health Indicators

2.5.3.6 Facility switchgear

2.5.3.6.1 Alarms

2.5.3.6.2 Status / Health Indicators

2.5.3.7 SCADA metering

2.5.3.7.1 Day's power in kWh

2.5.3.7.2 Month's power in kWh

2.5.3.7.3 Year-to-date power in kWh

2.5.3.8 System health monitoring

2.5.3.9 System health monitoring

2.5.3.10 UPS system alarms and events, if available

2.5.3.11 Auxiliary equipment power feed to PDC voltage

2.5.3.12 PDC room temperature

2.5.3.13 Fire Alarm notifications

2.5.3.14 Battery Energy Storage System (See Attachment 2)

2.5.3.14.1 Power factor

2.5.3.14.2 AC voltage

2.5.3.14.3 DC voltage

2.5.3.14.4 AC current

2.5.3.14.5 DC current

2.5.3.14.6 Kilowatt

2.5.3.14.7 Kilovolt-amp

2.5.3.14.8 Kilovolt-amp reactive

2.5.3.14.9 Kilowatt-hour available

2.5.3.14.10 Battery state of charge

2.5.3.14.11 Depth of Discharge

2.5.3.14.12 Inverters, including capture of all diagnostic information including:

- Temperatures
- Alarms
- Status indicators
- Fault states

2.5.3.14.13 Historian function with up to 60 days of storage of all data points with a resolution of 1 second.

2.5.3.14.14 Sequence of Events (SOE) recorder for all protective functions with 1 mS resolution.

End