

ADDENDUM 7 - Attachment 1

SCADA Integration

1.0 NCC SCADA Integration

The purpose of the NCC SCADA integration scope for Afolau is to:

- Maximize the benefits brought about by EPC's existing investment in nationwide SCADA
- Provide the End User with a uniform and consistent national system that both monitors all their generation assets and allows for remote control of same
- Minimize the duplication of monitoring/control system equipment and configuration
- Allow sites to run unmanned to the greatest safe and practical extent

It is particularly important that the monitoring and control of all of EPC sites is integrated to allow for a holistic generation, distribution and load management approach to be actioned both automatically (under EPC's grid stability system) and by remote operator intervention from SCADA.

2.0 Scope Overview

The NCC SCADA integration of the new gasification site at Afolau, via direct optical fibre cable (OFC) link into the existing EPC national SCADA Wide Area Network (WAN). The SCADA WAN interconnects to the EPC National Control Centre (NCC) site, located at Fuluasou. The OFC shall be supplied and installed by Others and shall interconnect to the existing EPC fibre at the Falelauniu main road junction.

SCADA integration is to be achieved by the supply of a Remote Telemetry Unit (RTU) panel. This panel shall log site data and issue plant controls as required. Whilst the panel shall include a communication interface, it can operate in "stand-alone" mode, logging data without communications and operating on its own internal DC battery system for up to four hours without external power.

The EPC corporate IT, VoIP telephone and CCTV systems shall use the same network and channels to access Afolau via dedicated VLANs and may be used to assist in the commissioning of remote control and monitoring functionality.

NCC SCADA integration is to be achieved by the physical LAN connection of the local automation devices proposed elsewhere under this tender (i.e. PLC equipment and any other new intelligent field devices).

The purpose of local logging and power back up is to ensure that valuable historic operations and grid stability data are not lost to EPC in the event of a communications breakdown or power outage; data can be stored for months, ready to update NCC SCADA system with the "missing" data upon resumption of communications.

Full independent local control at the site shall be handled by a local system, consisting of Programmable Logic Controllers (PLCs).

NCC SCADA shall be configured to be able to issue all controls in parallel with the local PLC system, but only when a local panel is selected to be in "REMOTE" mode. This selection shall be achieved via a "REMOTE/LOCAL" software switch configured within both PLC and NCC SCADA systems. This "soft" switch shall take the form of a graphical representation of a button that can be clicked or touched to cause it to change state. All operator control functions shall be password protected.

The plant shall run under automatic control. However, plant start, stop and active power setpoint controls shall also be achievable via the PLC or NCC SCADA, dependent on the REMOTE/LOCAL software switch selection as follows:

1. The local PLC shall control the site 24/7 with the panel in "REMOTE", allowing the NCC SCADA operators to override PLC control if required
2. When operators visit site, they may switch the panel to "LOCAL" to allow local/pushbutton overrides of the PLC control
3. When the operator leaves site, they will switch the panel to "REMOTE" to allow NCC/MCC SCADA overrides of the PLC control to continue

3.0 Integration Scope

The design, build, test, supply, installation and commissioning of the expansion to the existing EPC NCC SCADA system required by the Afolau Gasification Project; more particularly as follows:

- System design and documentation
- Build, test, supply and installation of RTU panel of similar specification to current EPC RTU panels
- Design of OFC communications networks between Afolau and Fuluasou NCC SCADA (tie in at Falelauniu overhead junction)
- Installation of fibre termination boxes, closures and patch cabling
- Termination of fibre cabling (trunk fibre supplied and installed by others)
- Supply, installation and termination of all cabling required by the RTU panel
- Configuration of national SCADA system servers and networks for EPC operations to include the Afolau Gasification Project
- Factory integration testing using a current backup copy of the existing NCC SCADA system and spare RTU (EPC to free-issue on loan for testing purposes)
- Commissioning of signals provided to / from the Afolau RTU, along with associated plant operational controls
- Configuration of communications network equipment in line with existing EPC standards.
- Provision of two fully configured network ports, one for VoIP telephony and one for CCTV connection; these shall be configured to current EPC standards; one VoIP handset is included for the Afolau site

3.1 SCADA & Network Modifications

Modifications shall be made to the existing NCC SCADA database in the form of database copies for review and approval prior to finalization. The final integration of these changes shall be performed during the FAT and the proven configuration finalized during the FAT exported into the live NCC system prior to commissioning.

Additions to the current system configuration are required to be made to allow EPC operators access to the new site information and control. EPC shall be provided with identical operator interfaces and functionality to existing sites. Matching NCC screen displays shall be added and overview screens shall be modified and updated to reflect the new sites input to the national grid.

3.2 Test & Commission Works

Test and commissioning works shall proceed along the following lines:

- FAT at suppliers works using recent NCC SCADA database and spare RTU (EPC to free-issue on loan for testing purposes)
- Post site installation, Afolau visit to check all new installation and interface works relevant to SCADA
- Confirmation of healthy communications to NCC
- Signal-by-signal check of all Afolau parameters monitored by NCC SCADA
- Signal-by-signal check of all Afolau parameters controlled by NCC SCADA
- Confirmation of NCC generator control sequence interface
- Extended / overnight run test period with Afolau under full auto control with Remote NCC operator override

4.0 Hardware Supply Scope

The contractor shall supply an RTU in a stainless-steel enclosure with all required network and power supply equipment, terminal blocks etc. to meet this specification. The RTU shall be rated to operate in non-air conditioned environment and shall communicate with the NCC SCADA via DNP3 protocol as per all other EPC RTUs.

In addition to SCADA ports, the RTU switch shall include provision for a single network port for each subnet as follows: VoIP, Corporate IT and CCTV.

5.0 NCC SCADA Interface Interoperability

During the project design phase and prior to FAT, Contractor shall provide to EPC the following documents and engineering design information:

- PLC drawings, network configuration, process description documents, formulas and calculations as required. In particular, an automatic control philosophy document explaining how the PLC control modes function and what, if any, functionality is required from the SCADA interface other than the presentation of set point data and monitoring of same.
- PLC all Intelligent Field Device (including protection relays, revenue meters and governors) input/output lists in a readily understandable and verbose format including schedules of ratings, scaling detail, engineering units, tag names, DNP3/Modbus addresses and point types, along with a description of what each point represents/does an any interrelation to automatic control
- Alarm priority list and grouping (in particular, “ready to start” signals and critical alarm lists
- Network security detail, including all device IP addresses policy requirements for configuration, installation and maintenance of high level network equipment (e.g. firewalls, AV software)
- All required technical support, documentation and manuals for interfaced third party items

All the above information should be supplied in standard electronic format (i.e. MS Word or pdf) and should be fully searchable using standard search tools, documents containing cut-and-paste images of tables and text shall not be acceptable.

Network equipment to be interfaced to under this project should be addressed as per the current EPC IP standards as follows:

SCADA devices:	10.50.xxx.xxx/16 DG10.50.255.254
Corporate network:	10.40.xxx.xxx/16 DG10.50.255.254
CCTV ports:	10.30.xxx.xxx/16 DG10.30.255.254
VoIP devices:	10.20.xxx.xxx/16 DG10.20.255.254

However, all equipment supplied for integration should be capable of being reconfigured to alternative IP schemes as required.

Other than VoIP handsets, all IP addresses of equipment connected to NCC SCADA are, and shall be, static.