

52ST.305



TENDER FORM

The Chairman – Tender Opening Committee
PNG Power Ltd
P. O. Box 1105
BOROKO 111 NCD
Papua New Guinea
Phone: (675) 324 3381
Fax: (675) 3250791
Email: supplyhelpdesk@pngpower.com.pg

We (*all name of company).....
.....
.....
.....

hereby tender for the undermentioned goods and services subject to the conditions of tendering and at the prices quoted in the scheduled therein

TENDER No. 51/2019

CLOSING AT 4.00 PM FRIDAY 13TH SEPTEMBER 2019

FOR INTEGRATION OF ULAGUNAN, KEREVAT AND WARONGOI SUBSTATIONS TO THE GAZELLE GRID SCADA UTILISING RADIO MODEMS AND CITECT SCADA 2015 SOFTWARES IN EAST NEW BRITAIN PROVINCE.



System Operations – Transmission & Distribution

Term of Reference for SCADA Extension Project for Gazelle Grid

1. Authors

Name	Role	Department
Jason Towo	System Planning Engineer – POM/GAZELLE	System Operations – PNG Power

2. Document History

Date	Version	Document Revision Description	Document Author
09.07.19	1	Scope of Work_ Gazelle Interim SCADA Extension Project	Jason Towo

3. Approvals

Approval Date	Approved Version	Approver Role	Approver	Signature
05/08/19	1	Project Manager	Jason Towo	
07/08/19	1	Director System Operations	Simo Kaupa	
9/8/19	1	EGM – Transmission & Distribution	Douglas Mageo	
9/8/19	1	Acting Managing Director	Carolyn Blacklock	

4. Contents

1. Authors.....	1
2. Document History.....	1
3. Approvals.....	1
5. Background.....	3
6. Objective	3
7. Scope of Works.....	3
11.10 Establish communication pathway from remote sites to control room	3
11.11 SCADA System Design.....	4
11.12 Human Machine Interface (HMI) to be installed at control room	4
11.13 Installations and wiring of field devices	4
11.14 Test and Commissioning.....	5
11.15 Training & Handover to Gazelle System Control.....	5
8. Deliverables	5
9. Requirements and Qualifications	5
10. Approach and Methodology.....	6
11. Standards and Quality Assurance	6
11.16 PNG Power Requirements	6
11.17 HSE Requirement	6
12. Risks and Assumptions	6
13. Other Responsibilities	6
14. Location of Work and Travel	7
15. Procurement.....	7
11.18 Supply of Materials and Freightng	7
11.19 Contractor Payment	7
16. Commencement and Duration of Project	7
17. Insurance/Warranties	7

5. Background

The initial project to establish a SCADA System was basically to have some form of remote control and monitoring functions of the remote substations from an ideal control centre within the Gazelle Power Grid System. The initial proposal was to utilise a Miri AD2006+ Master Terminal Unit located at the control room at the Kokopo Office and Miri AD2006+ Remote Terminal Units (RTU) in Rabaul, Kokopo, Keravat Ulagunan and Warongoi substations. However, because of poor radio communication pathway from Ulagunan, Keravat and Warongoi to the control room, only Kokopo and Rabaul substations were successfully commissioned in 2017.

Hence, the extension of the project to integrate Ulagunan Substation, Keravat Substation, Warongoi Substation and Warongoi Hydro Units to the Gazelle Grid SCADA System will now look into utilising another communication mode with a cost effective approach.

6. Objective

The purpose of establishing a SCADA system in Gazelle Grid was due to the following factors;

1. Rapid increase in demand of electricity necessitating network upgrades and expansion resulting in the network becoming more complex to control and monitor.
2. Demand for reliable and uninterrupted power supply by PPL customers and consumers
3. The growing economic constraints have exerted pressure on the optimization of the cost of electricity generation, transmission and distribution.
4. Field technicians are continually placed under pressure during system disturbances, outages and restoration cycles of power supply.
5. Reduction of downtime and restoration time.

7. Scope of Works

The following outlines the tasks that will be done by PNG Power and the Contractor for the Gazelle SCADA Extension Project.

“PNG Power” will refer to the PNG Power Project Team and the “Contractor” will refer to the contractor that will be engaged for the project.

11.10 Establish communication pathway from remote sites to control room

PNG Power shall;

- Conduct initial site survey to the sites concerned.
- Provide co-ordinates, distance between the sites
- Provide radio bandwidth as used for the existing SCADA
- Be onsite to witness line of sight test

The contractor shall;

- Conduct a communication pathway site survey between Ulagunan, Keravat and Warongoi and Kokopo PNG Power office to confirm radio wave line of sight.

- Do an onsite test and confirm specification of an applicable radio modem to utilize.
- Provide test results to PNG Power
- Install and configure radio modems at each site to ensure efficient radio communication link between the sites.
- Mapping of radio modems to individual addresses

11.11 SCADA System Design

PNG Power shall;

- Conduct a proper site inspection to inspect the existing SCADA
- Create Citect SCADA and Mirimap back up file for the existing SCADA
- Document specifications of software and hardware equipment utilized in the existing SCADA
- Provide layout drawings and wiring schematics of the existing system

The contractor shall;

- Conduct a site inspection to assess the existing Gazelle SCADA System.
- Provide a design of the proposed system integrating with the existing system
- Provide all specifications of hardware or software's intended to utilize
- Provide proposed drawings/schematics

11.12 Human Machine Interface (HMI) to be installed at control room

PNG Power shall;

- Provide functional description of the operation of the HMI
- Provide list of equipment to be integrated to the proposed SCADA
- Assign tags for the field equipment
- Provide list of SCADA Indications and Alarms to be integrated

The contractor shall;

- Obtain back up file of existing Citect SCADA System
- Build/Create dynamic graphics utilizing the back-up file.
- Assign addresses and tags to field equipment using Citect SCADA 2015 Version 7.5 software.
- Install HMI at the control room
- Mapping of logical interfaces to physical interfaces

11.13 Installations and wiring of field devices

PNG Power shall;

- Ensure all terminations/wirings meet relevant standards
- Allocate cable numbering to use
- Ensure Engineer and Technician is onsite with contractor

The contractor shall;

- Be responsible to install field equipment's/control panels/junction boxes
- Be responsible to install radio modems for the sites

- Be responsible to lay cables and terminate all electrical, controls and instrumentation field devices.
- Provide as-built schematics of all wiring from field to control room

11.14 Test and Commissioning

PNG Power shall;

- Conduct necessary test and provide results
- Inspect all installations done by contractor
- Obtain as-built drawings and have it stamped for filling

The contractor shall;

- Provide Engineer and Technician to be onsite during test and commissioning
- Provide test results for communication links and electrical terminations
- Liaise with PNG Power team during test and commissioning
- Provide final as-built drawings/schematics to PNG Power team

11.15 Training & Handover to Gazelle System Control

PNG Power shall;

- Conduct operational training to System Controller at Gazelle
- Provide Standard Operating Procedures (SOP) to System Controllers
- Close out and sign off project

8. Deliverables

PNG Power as the project owner shall closely monitor the progress of the project and advise contractor accordingly based on the following milestones;

1. Initial System Design/drawings to be developed and deliver to PNG Power immediately after the site inspection
2. Effective radio communication link from the remote sites and control room to be established and approved by PNG Power
3. A Human Machine Interface (HMI) to be built using Citect SCADA 2015 Ver 7.5 and mapping of remote sites to be configured using Mirimap AD2006+ and deliver to PNG Power for approval
4. Hardwire field installations and wiring to be executed after approval of design from PNG Power
5. Test and Commissioning of the overall SCADA System to be conducted to prove functionality of the system

9. Requirements and Qualifications

The contractor shall meet the following requirements;

1. Be a PNG registered company registered with Investments Promotion Authority (IPA) and Internal Revenue Commission (IRC).
2. Must be a vetted company with PNG Power

3. Have previous work history with PNG Power and other industries
4. Must have recently commissioned similar type project
5. Have a minimum cash flow income of K500,000 a year

10. Approach and Methodology

Contractor must present to PNG Power its specific approach and methodology in accomplishing the project prior to starting of project so that PNG Power will review and ensure all work is carried out in according to its plans and targets.

PNG Power will be actively present on site to assess work carried out by the contractor whereby the contract shall provide weekly reports on progress of the project.

11. Standards and Quality Assurance

11.16 PNG Power Requirements

PNG Power will ensure the contractor is equipped with certified personals, necessary tools and equipment to carry out the task in accordance to the following standards.

1. AS/NZ 3000 Wiring Rules
2. PNG Power Trade Circular – 4th Edition 2016
3. IEC 61850-3 - 7: Communication networks and systems in substations – Part 3,5-7.1-7.4: General Requirements

11.17 HSE Requirement

PNG Power will strictly monitor the following safety practices during the duration of the project.

1. Equipped with FULL PERSONAL PROTECTIVE EQUIPMENT (PPE) within and during working time
2. Good HOUSEKEEPING practice
3. ZERO alcohol consumption within the work site and during work
4. Sufficient REST by personal involved

12.Risks and Assumptions

Following are assumed factors and identified risks that could affect the delivery of the project.

1. Weather conditions
2. Geographical locations of each site with respect to the main Scada room
3. Line of sight of each site with respect to the main Scada room
4. Lack of proper planning
5. Incompatibility of devices/instruments

13. Other Responsibilities

Apart from the outlined scope of work above, the contractor shall be responsible to provide;

1. Necessary consumable and accessories required
2. Airfares, accommodation, meals and hire car for its personal
3. A weekly report of project progress
4. Tools and equipment required

All other requirements excluded here shall be provided by PNG Power.

14. Location of Work and Travel

The project is located in East New Britain province and will require transportation from Kokopo, Rabaul and Gazelle District.

15. Procurement

11.18 Supply of Materials and Freight

It is the responsibility of PNG Power to procure all materials required for the project and meet all freight charges to the site which is Kokopo.

This is excluding any materials or equipment required by the contractor during the duration of the project.

11.19 Contractor Payment

Payment to contractor for its services will be done as below;

1. Contract Award & Mobilization to site – 40% of total cost
2. 50% Project Completion – 40% of total cost
3. Commissioning – 20% of total cost

16. Commencement and Duration of Project

The total expected duration of the project is four (4) months depending of the lead times of materials and equipment delivery from suppliers.

1. Preparation of design/drawing and material list – One (1) month
2. Approvals and Issuing of Purchase Order (PO) to suppliers – One (1) month
3. Delivery and Shipment – One (1) month
4. Installation and Commissioning – One (1) month

Expected commencement of project will depend on the availability of materials at site.

17. Insurance/Warranties

It is the responsibility of the contractor to cover all insurance of its staffs that will be engaged in the project. PNG Power will not be responsible to cover any insurance cost for the contractor's labor/casual or staff in the event of an accident or injury.