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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).....

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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. 05/2020

CLOSING AT 4.00 PM FRIDAY 21ST FEBRUARY 2020

**FOR CARRY OUT CLOSE INSPECTIONS, THERMAL
SCANNING AND PHYSICAL ASSESMENT OF THE
LINE HARDWARE, POLE/TOWER MEMBERS AND
CONDUCTOR CONSTRUCTION ACCESSORIES
USING DRONES ON PNG POWER Ltd IDENTIFIED
TRANSMISSION LINES IN PORT MORESBY.**



POM GRID TRANSMISSION LINES 544,545 & 534 THERMAL SCANNING AND INSPECTION ASSESSMENT SCOPE OF WORK

1 INTRODCUTION

PNG Power in its bid to maintain and operate its existing 66kv transmission lines in Port Moresby (POM) grid reliably with consistency, PNG Power considers it not only necessary but also critical that appropriate state-of-the-art equipment and or devices for better viewing and or scanning be utilized for survey and inspection for assessment of the physical integrity of the transmission lines. In this endeavor, reputable companies with certified professionals with track records of assuming and delivering similar jobs/projects in the recent past are called to submit their tenders to carry out close inspections, thermal scanning and physical assessments of the line hardware, pole/tower members and conductor construction accessories using ground pilot drone technology on identified transmission lines.

2. BACKGROUND

PNG Power Port Moresby (POM) Transmission Lines have recently had frequent trips (failures) due to their line components failures. The failures, from internal studies are attributed to line components wear and tear after being in service for a long period of time up to three or four decades. PNG Power internal Transmission Lines Maintenance team along with Reliability team have on a regular basis carry out physical inspection and assessment of the physical integrity of the line components but due to lack of appropriate inspection and assessment tools, proper and thorough inspections and/or assessments have been lacking. Most of the inspections and or assessments of the line components were only visual inspections from distant using normal cameras and sometimes binoculars but the views were from one or two sides (angles) only as most of the high voltage lines and their supporting structures (poles & towers) are located within rugged terrains of NCO and Central province making strategic viewing location quite inaccessible. Moreover, the views or the captured images are not that quite clear and blurry. This has resulted in partial inspection and assessment of the transmission lines and their components over the years culminating in inadequate maintenance and service works on some of the critical line components resulting in eventual transmission line failures.

Hence, with the current trend of development in technology, services of state-of-the-art devices capable not only for distance viewing but also for maneuvering freely around at all angles and zooming in for detailed capturing of the images with high clarity and resolutions are sought for improved transmission line physical integrity status inspections and assessments.

3. SCOPE OF WORK

The scope of work for transmission lines **544/545 (Kanudi/Moitaka) double circuit, 545-1 (Exxon Mobil/Baruni Damp)** and **534 (Rouna 2/Bomana)** and their tower members physical inspections and assessments through enhanced visual and thermal scanning (imaging) using ground piloted drones works includes but not limited to the following;

- 3.1** Line conductor physical inspection and assessment
- 3.2** Tower members physical inspection and assessment
- 3.3** Submission of inspection assessment report

Specific Tasks

3.1 Transmission Line Conductor Inspection and Assessment

- 3.1.1 Close inspection and assessment of transmission line (conductor) physical status integrity by viewing through improved and high resolution camera lenses. Use of latest three dimensional (3-D) distant object viewing drones are preferred to use for 3-D viewing and clear imaging
- 3.1.2 The inspection and assessment of inline joints where inline clamps and line splices have been used for the joint constructions shall be carefully inspected and assessed through 3-D viewing if possible to locate and or identify any weakness that may have developed.
- 3.1.3 Thermal scan (imaging) shall be conducted around the inline joint construction point/s to ensure their thermal condition at the point/s are not at extreme but within safe or normal (allowable) limits during peak loads periods. The joints shall be carefully inspected and assessed to ensure its construction members are intact to sustain and or support the weight and suspension of the line during high wind speeds and or during any extreme external force that may be exerted on the line during the life span of the transmission line conductor.
- 3.1.4 It is also of higher importance that any risk of line interferences by plant growths (trees, shrubs, or vegetations) at the proximity of the transmission lines shall be considered as unsafe (*posing potential risk to interfere with the line*) and be noted for reporting or be considered part of the inspection and assessment reporting.

3.2 Tower members physical status integrity inspection and assessment

- 3.2.1 Close inspection and assessment (possibly 3-D viewing) shall be conducted on each member of the tower namely; insulators, insulator pins, insulator discs, clamps, cross arms, nuts/bolts, shackles, earth wire connections and more importantly on the connection points (oints) which are considered the weak points.
- 3.2.2 Appropriate and high resolution scanning device (cameras) shall be used for all thermal scanning so as to ensure the best images and/or high grade status results of the tower members are obtained. Necessary consideration shall be given when inspecting and or assessing the individual insulator strings or discs and/or inside pins as most of the abnormalities (rust/corrosion) happen to develop within these regions. Every member of the tower (or construction components) shall be assessed, inspected and or checked well (thoroughly) through the high resolution 3-D cameras to locate even the slightest defects that may seem ignorable at the time but are known to develop into critical defects over time.

3.3 Inspection & Assessment Report

A comprehensible inspection and assessment report shall be compiled and submitted to the PNG Power Port Moresby Transmission and Reliability sections within *one (1) week* after the completion of the inspection and assessment of the all the above identified transmission lines for inspection.

4. IDENTIFIED TRANSMISSION LINES TO BE INSPECTED

- 4.1 The transmission lines are the main power lines operating at a nominal high voltage of 66,000 volts (66kv) running between the power (generating) stations and the distributing substations. They import and export huge amount of power between the power stations as well as interconnecting between the distributing substations to provide power in the PPL's POM grid which is a loop (or ring feed) system.
- 4.2 Lines 544 and 545 run as double circuit about 10km between Kanudi and Moitaka Power stations. The Exxon Mobile line 545-1 runs from PNG LNG power plant located about 10 km outside of Port Moresby and terminates unto line 545 at the Baruni Damp area.
- 4.3 Line 534 covers a total distance of about 19km from Rouna 2 (Sogeri) in the Central Province to Boroko Substation at Six Mile, Port Moresby.
- 4.4 The height of the location of the transmission lines and their components for inspection and assessment shall be between 15 to 55 meters from the ground level.
- 4.5 Most of the lines have their access roads to the line towers/poles or the line routes which are suitable for four-wheel drive vehicles only. Only few towers are inaccessible by vehicle but can be accessed through foot paths.
- 4.6 The contractor has to be fully responsible for movement (transport) of its operators/workers to and from site during the project implementation and PNG Power will not be liable for any issue arising from non-availability of transport or any other aids for movement.

5. SAFETY

- 5.1 Prior to accessing and working near close proximity of the live power lines (conductors), all necessary safety information shall be sought from a trained (a senior PNG Power officer) transmission lines officer/crew/engineer or a safety officer on the ground. Generally, all conductors (power lines) are assumed to be live and dangerous for direct contact or being near the line itself or its hardware members. A distance of about three (3) meters from the live conductor (power line) should be considered safe (though not 100%) for any object including drones to be at the proximity of the live conductor/s.
- 5.2 No external party, including contractors shall have access to the transmission line zones or the locations of the towers without the supervision and the assistance of a PNG Power representative. No person/s shall have direct access to any power line equipment and/or other physical objects deemed part of the power line infrastructures that may visibly or invisibly (not physically) in contact with a live power line or other electrical apparatuses considered live whilst working within the vicinity of the transmission line infrastructures or other power system infrastructures.
- 5.3 All external parties are kindly encouraged to seek prior advice and safety information from senior PNG Power representatives (engineers, team leaders and or foremen) or safety officer before having access to the site.
- 5.4 PNG Power will not be liable for any accident or injury (severe or light bruises or to whatever the extent or degree it may be or even fatal causing death) arising as a result of negligence of the above stated safety measures or other PPL existing safety measures or those measures which may not be stated but need to be adhered to in part or whole by total ignorance or by accident.
- 5.5 The contractor shall have full responsibility over the safety of its workers at the all-time through the duration of the contract. PNG Power shall by no means be responsible for any safety of the external contractor's workers apart from providing necessary safety instruction and information to be adhered to and fully observed by the contractor workers.

5.6 It shall be the sole responsibility of the contractor to seek clearance/s and/or advice from PNG Power representative/s as stated above regarding any safety issue that they are not clear of or doubt about.

5.7 Due to high risk involve in this area of work, PPL representative/s is/are required to be available on side to provide supervision and direction on the ground during the project implementation and in the event where the PPL officers are not available, the contractor is advised to defer the work to the next day or if not PPL office should be approached for assistance. In this unlucky situation where the PPL representative/s is unable, the contractor is advised not to go on and access the site or operate/fly drone around the proximity of the transmission lines and its towers/poles.

5.8 PNG Power assumes that the contractor and its drone operators are certified and or licensed with experienced in maneuvering and controlling the drone and expects that the drone operator/s (pilot/s) will not by any means have the drone directly come into contact with the live high voltage transmission lines. In the event of failure by the drone operator where drone/s by any means come/s into contact with transmission lines and disturb/s the power flow system resulting in partial or complete system blackout, the contractor shall take full liability or liabilities (if any) for whatever the damage (system loss, machine loss, revenue loss, time loss, life and property loss) that may be caused as result of the incident of drone/s having direct contact with the high voltage transmission lines.

6. THE CONTRACTOR

6.1 The successful contractor shall satisfactorily meet the relevant standards and guiding laws for operating unmanned aircrafts or for remotely operating aircraft systems under 25kg set by PNG Civil Aviation Safety Authority (PNG CASA).

6.2 The successful bidder/contractor shall be legally registered operator company satisfactorily meeting the PNG Company Acts and relevant laws for compliances purposes

6.3 The successful contractor shall have the CASA certificate for operating unmanned aircraft or the certificate for remotely operating aircraft systems under 25kg.

6.4 The successful contractor shall have the IRC tax compliance updated reports attached

6.5 The successful contractor shall have recent exposure and experience in successfully delivering or undertaking similar projects/works within time and allocated budget

6.6 The successful contractor shall have the initial capacity to mobilize manpower and resources on site in the event PNG Power delays paying the mobilization down payment.

7. PAYMENT METHOD

7.1 After the successful bidder is awarded the contract, a PNG Power Official Purchase (PO) or Contract Order (CO) will be issued to the contractor prior to actual starting of the work on site.

7.2 40% of the total contract value will be paid as mobilization payment to start up the work on site but this does not guarantee the successful contractor to delay or defer the work in the event this payment is delayed.

7.3 Last 60% of the payment shall be made upon the receipt of the comprehensive transmission line inspection and assessment report.

7.4 Due to huge number of payments to be processed for service providers to PPL, the successful contractor will not by any mean hold PPL liable for any delay in payment after the submission of signed COC (certificate of completion) with the invoice to the PPL finance department for payment.

8. ATTACHMENT

The bidders shall have their price schedules presented succinctly with all necessary and relevant cost components outlined as attachment. PNG Power will not consider ambiguous and inadequate price component descriptions.

9. CONTACT PERSON

Request for further information or clarity on this tender can be obtained from following officers;

- 9.1 Augustine Efi on aefi@pngpower.com.pg
- 9.2 Chris Luther on cluther@pngpower.com.pg
- 9.3 Simo Kaupa on skaupa@pngpower.com.pg

10 TENDER

The contractor shall submit his/her tender to the following address

The Chairman
Tenders Committee
PNG Power Ltd
P.O.Box 1105, BOROKO
National Capital District
Email: supplyhelpdesk@pngpower.com.pg

The submission of tender for this contract shall be within two weeks from the date of advertisement through online advertisement or on printed media and late submissions will not be accepted.

End!

Prepared



Billy Ambotane
(A/Manger Transmission South)

31.012.19

Endorsed



31/02/2019

David Mes

(A/Regional Manager South &NGI)

Approved



02/01/2020

Obed Batia
(A/EGM T&D)