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# ENERGY POLICY PROGRAM

## VISIT REPORT OF TPS GUDDU



March 2014

# USAID/PAKISTAN: ENERGY POLICY PROGRAM (EPP)

Visit Report of TPS Guddu

**Contract No:** AID-EPP-I-00-03-00004 **Order No:** AID-39I-TO-12-00002

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## **DISCLAIMER**

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## Background:

Most of the equipment and material required for uprate of Units 5, 7 and 8 of 600 MW Combined Cycle Power Plant was received at TPS Guddu. The units are under shutdown and up-rate work has been started on Mar 13, 2014 and will take three months to restore 75MW. EPP expert visited site to monitor the ongoing works.

### Details of Purchase Order & Service Order placed by Guddu with General Electric

<b>Purchase Order April 10, 2012</b>	<b>Service Order Feb 20, 2012</b>
<b>Name of Company</b> M/S. GE Energy Part Inc. 4200 Wildwood Parkway, Atlanta Georgia, GA 30339 U.S.A	<b>Name of Company</b> M/s General Electric International Inc. 4200 Wildwood PKWY, Atlanta Georgia, GA 30339 U.S.A
<b>Subject:</b> PURCHASE ORDER FOR SUPPLY OF SPARES / EQUIPMENT FOR RELIABILITY ASSUARANCE, TFIRE UPRATE / ADVANCED SEALS UPGRADE, MARK VIe CONTROL SYSTEM, EX2100 EXCITATION SYSTEMS, DCS SYSTEM UPGRADE INCLUDING ONE NEW GENERATOR STATOR REWINDING KIT WITH NEW COPPER FOR TWO FRAME 91E GAS TURBINES NO. GT-07 & GT-08 AND STEAM TURBINE ST-05	<b>Subject:</b> INSTALLATION, TESTING AND COMMISSIONING OF THE EQUIPMENTS /PARTS PROCURED FOR THE UPRATE/UPGRADE TO ACHIEVE GUARANTEED PARAMETERS,
<b>Reference:</b> i) LO1 No. CPGCL/CEO/MMM/PM-III/FARA/01/19488-93 Dated 30-09-2011 and M/S GEII Proposal No. 1-1OPLS6 ROCK-I Februarys17, 2012. ,	<b>Reference:</b> i) LOI No. CPGCL/CEO/MMM/PM-III/FARA/01/19488-93 Dated 30-09-2011 ii)M/S GEII proposal of February 7,2010.

<p><b>Contractor's Deliverables:</b></p> <p>1. Attain minimum of the following Up rate outcome from the subjected CCP Sub Block-I;</p> <ul style="list-style-type: none"> <li>i. Increase in firing temperature from 1985 F~ to 2055 F,</li> <li>ii. Increase in output MW +10% minimum rated capacity</li> <li>iii. Decrease in Heat Rate by - 3.5% minimum</li> </ul> <p>As per indicative scope of supply subject to the general conditions laid down here under.</p> <p><b>2. Scope of Supply:</b> consists of a long list of parts for rehabilitation / refurbishment parts</p>	<p><b>Contractor's Deliverables:</b></p> <p>1. PERFORMANCE INDICATORS</p> <ul style="list-style-type: none"> <li>i. Increase in firing temperature to 2055 C</li> <li>ii. Increase in output MW+ 10% o/o</li> <li>iii. Decrease in heat rate -3.5%,</li> <li>iv. Improve Efficiency 2 %</li> </ul> <p><b>Scope of Work:</b></p> <p>Installation Commissioning Testing of the procured Parts vide PO No.09/CPGC/CEO/MMM/PM-III/Up rate/FARA/6s49-58 dated 10th April 2012 for the Up rate/ Upgrade to achieve guaranteed parameters as stated under Para-I above,</p>
<p><b>Total cost of P.O.</b></p> <p>Total Amount: US \$14.566.000.00 (US Dollars Fourteen Million and Five Hundred Sixty Six Thousand Only.</p>	<p><b>Total cost of S.O.</b></p> <p>Total Amount US \$1,826,000</p>
<p><b>5. SOURCE OF FINANCE:</b></p> <p>FARA (Fixed Amount Reimbursement Agreement No.391-CUD-FARA-005-00)</p>	

**Present Status:**

**CCP Guddu Unit # 7&8 and ST-5**

Unit #	Shut Down	Completion expected
Unit # 7	13-03-2014	15-05-2014
Unit # 8	13-03-2014	15-05-2014
St # 5	13-03-2014	15-05-2014

## Testing Results prior to Shutdown of Units

Unit #	Firing temperature F <sup>o</sup>	Output MW	Decrease in HR
Deliverable	Increase in firing temperature from 1985 F'~ to 2055 F,	Increase in output MW +10% minimum rated capacity	Decrease in Heat Rate by - 3.5% minimum
GT # 7	Protocol awaited	Protocol awaited	Protocol awaited
GT # 8	Test not conducted	Test not conducted	Test not conducted
ST # 5	Test not conducted	Test not conducted	Test not conducted

Note: Test on Unit # 8 was not performed as load on this unit could not go beyond 40 MW because of a problem in its Accessory Gear.

### Work Force deployed

GE has outsourced the installation of parts supplied to a local contractor M/S Albario Engineering (Pvt) Ltd with Head Office at 60-The Mall Shah Din Building Lahore. About 90 technicians are deployed. GE has three persons for supervision on site. One expert Mr. Pall from GE America arrived on site last night March 18, 2014.

### Uprate equipment receipts and inspections

Receipt of equipment dispatched by GE through and by Air is shown in the list annexed at 'A'.

During discussion with Plant Manager and Engineers of CPGCL they were of the opinion that no hold up will occur and they were hopeful to have all the material at site.

### Progress of Work

Progress reports of General Electric (GE) are in Annexure-I and site photos are in the Annexure-II



## Power Generation Services

### DAILY PROGRESS REPORT – March 16, 2014

Unit Serial Numbers: GT7 282546, GT8 282547, ST5 197996

**Site: Guddu 600MW, Pakistan**

**Work scope: 2x9Es Uprate/Major + 1x209SCDF ST Major**

<b>Site Project Manager:</b> Anslan Ahmad	<b>AEPL Site Lead:</b> Abid/Aleem
<b>GT7 TA:</b> Mahmood Ul Hassan	<b>GT7 Supervisor:</b> Sarwar
<b>GT8 TA:</b> Waseem Hameed	<b>GT8 Supervisor:</b> Sahail
<b>ST5 TA:</b> Paul Conway	<b>ST5 Supervisor:</b> Zubair
<b>Generator TA:</b> Imran Arshad	<b>I&amp;C TA:</b> Hassan Shamim

#### 1) Safety / Issues/ Concerns:

No unsafe entry to working area – use of PPEs is mandatory for every entrant to working area.

#### 2) Summary of Progress:

##### Completed Work

##### GT7

- Conducted daily EHS tool box talk.
- Unbolted and dismantled AFT half of Turbine compartment roof.
- Unbolted and dismantled LHS turbine compartment door.
- Unbolted and dismantled fuel gas supply manifold.
- Unbolted and dismantled cooling sealing air piping manifolds.
- Unbolted and dismantled remaining combustion can doors.
- Unbolted and dismantled remaining combustion liners.
- Unbolted and dismantled 88TK Fan piping manifold.
- Unbolted and dismantled remaining flow sleeves.
- Checked and recorded accessory coupling float.
- Unbolted and dismantled accessory coupling.
- Unbolted turbine to clutch load coupling.
- Unbolted and dismantled casing jacking post plates.
- Disconnected IGV actuator arm assembly.
- Removed exhaust diffuser vertical and horizontal insulation pads.
- Unbolted Inlet plenum AFT Wall.
- Prepared Scaffolding racks for parts storage.
- Site housekeeping at the end of the shift.
- All tools issuance signed off.
- Observed covering of opened pipes and flanges (FME)
- Good display of use of safety equipment.

##### GT8

- Conducted daily EHS tool box talk.
- Recorded TP set back clearances.
- Unbolted and dismantled all transition pieces.
- Unbolted and dismantled turbine compartment Structural doors.
- Unbolted and dismantled Upper RHS & LHS Bleed air manifolds.
- Unbolted and dismantled Cooling sealing air piping manifolds.
- Unbolted and dismantled AFT turbine compartment roof.
- Unbolted and dismantled Load compartment roof.
- Prepared Scaffolding platform for exhaust plenum dismantling.
- Unbolted and dismantled load Coupling guards.
- Unbolted 88TK Fan motor.

- Unbolted and dismantled casing jacking post plates.
- Site housekeeping at the end of the shift.
- All tools issuance signed off.
- Observed covering of opened pipes and flanges (FME)
- Good display of use of safety equipment.

##### ST5

- Conducted daily EHS tool box talk.
- Unbolted and dismantled HP acoustic enclosure LHS.
- Unbolted and dismantled HP acoustic enclosure RHS.
- Unbolted and dismantled HP Front Standard acoustic enclosure.
- Unbolted and removed Crossover pipe, LHS
- Unbolted and removed Crossover pipe, RHS
- Unbolted and dismantled turning gear.
- Unbolted and dismantled Bearing 3 coupling guard
- Unbolted and removed coupling bolts cover plates Front side
- Unbolted and removed coupling bolts cover plates Rear side
- Unbolted and dismantled Bearing 3 housing UH
- Removed HP Insulation UH
- Unbolted and dismantled both LP Rapture disks
- Unbolted and dismantled all LP inspection windows
- Measured and Recorded rotor thrust.
- Removed floor plates for instrument removal
- Completed removal of all instruments
- Started preparing bolt heaters
- Prepared Scaffolding for racks
- Shifted all tool kits to site
- Site housekeeping at the end of the shift
- All tools issuance signed off
- Cooldown mode complete and turbine off turning gear

#### 3) Scope/ Issues/Delays:

- CPGCL required continuing shifting all removed parts as usual
- Site Office facilities including phone line, clean toilets need to be provided
- TA Accommodation issues at K3 need to be resolved on urgent basis – letter already sent. At a minimum 12 rooms are requested to be arranged on priority.
- CPGCL required to maintain supply of material such as cribbing, cutting/heating gasses etc
- Sand blasting and NDT plan need to be discussed beforehand



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Generator TA: Imran Arshad	I&C TA: Hassan Shamim

<b>1) Safety / Issues/ Concerns:</b>
No unsafe entry to working area – use of PPEs is mandatory for every entrant to working area
<b>2) Summary of Progress:</b>
<b>Completed Work</b>
<p><b>GT7:</b></p> <ul style="list-style-type: none"> <li>Conducted daily EHS tool box talk</li> <li>Unbolted and dismantled inlet plenum AFT wall.</li> <li>Installed casing jacks under all casings and jacked all casings as per specs.</li> <li>Measured and recorded 6 point compressor rotor position checks – as found</li> <li>Unbolted &amp; uncoupled Gen to Clutch coupling.</li> <li>Unbolted and dismantled UH SSS clutch housing.</li> <li>Dismantled SSS clutch FWD &amp; AFT oil deflectors.</li> <li>Unbolted combustion wrapper casing vertical bolts AFT side.</li> <li>Unbolted combustion wrapper casing horizontal bolts RHS.</li> <li>Unbolted and dismantled Exhaust plenum UH</li> <li>Prepared Scaffolding platform for casing unbolting on RHS.</li> <li>Site housekeeping at the end of the shift.</li> <li>All tools issuance signed off</li> <li>Observed covering of opened pipes and flanges (FME)</li> <li>Good display of use of safety equipment</li> </ul> <p><b>ST5:</b></p> <ul style="list-style-type: none"> <li>Conducted daily EHS tool box talk.</li> <li>Unbolted and dismantled inlet plenum AFT wall.</li> <li>Installed casing jacks and casing lifted as per specs.</li> <li>Measured and recorded 6 point compressor position check</li> <li>Unbolted and dismantled 88TK Fan motors RHS &amp; LHS.</li> <li>Unbolted exhaust plenum duct.</li> <li>Unbolted and dismantled accessory coupling guard.</li> <li>Unbolted inlet bell mouth vertical bolts.</li> <li>Site housekeeping at the end of the shift.</li> <li>All tools issuance signed off</li> <li>Observed covering of opened pipes and flanges (FME)</li> <li>Good display of use of safety equipment</li> </ul> <p><b>ST5:</b></p> <ul style="list-style-type: none"> <li>Conducted daily EHS tool box talk</li> <li>Checked and recorded LP coupling runout.</li> <li>Started main steam valve unbolting</li> <li>Completed removal of HP main steam valve insulation/cladding</li> </ul>



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<ul style="list-style-type: none"> <li>Completed removal of HP shell insulation/cladding</li> <li>Completed LP to generator coupling bolts unlocking</li> <li>Completed as found checks for rotor float</li> <li>Completed LP rotor axial position checks</li> <li>Removed HP shell to front standard keys</li> <li>Unbolted front standard – ready for lifting</li> <li>Measured LP hood contact checks with feeler</li> <li>Removed front and rear LP hood to inner casing jib keys</li> <li>Completed LP hood jib keys measurements</li> <li>Installed rigging arrangements on LP hood for rigging</li> <li>Dismantled LP hood inner cover plates – front and rear</li> <li>Unbolted and dismantled LP hood. Rigged to storage area.</li> <li>Unbolted main steam flange on HP casing.</li> <li>Prepared gas heaters for bolts heating.</li> <li>Prepared gas cutting set.</li> <li>Prepared Scaffolding platform for HP casing.</li> <li>Started bolt heating</li> <li>Completed packing of all removed insulation stuff</li> <li>Site housekeeping at the end of the shift</li> <li>All tools issuance signed off</li> </ul>
<b>3) Scope/ Issues/Delays:</b>
<ul style="list-style-type: none"> <li>Additional office is required since existing office is not spacious enough.</li> <li>Site Office facilities including lean useable toilets need to be made ready</li> <li>TA Accommodation issues at K3 need to be resolved on urgent basis. Work in progress. At a minimum 12 rooms are requested to be arranged on priority.</li> </ul>
<b>4) Recommendations:</b>
<ul style="list-style-type: none"> <li>Remaining consignments need to be expedited ASAP.</li> <li>Sand blasting and NDT plan need to be discussed beforehand</li> <li>It is recommended that CPGCL should make spares ready to cater for replacement needs on as and where required basis, where as-found condition of parts is not appropriate for re installation such as inlet bell mouth expansion joint, cooling fans expansion joints and etc</li> <li>CPGCL required continuing shifting all removed parts as usual</li> <li>CPGCL required to maintain supply of material such as cribbing, cutting/heating gasses etc</li> </ul>







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