

LAKE ALBERT TILENGA PROJECT



SUPPLIER WORKSHOP

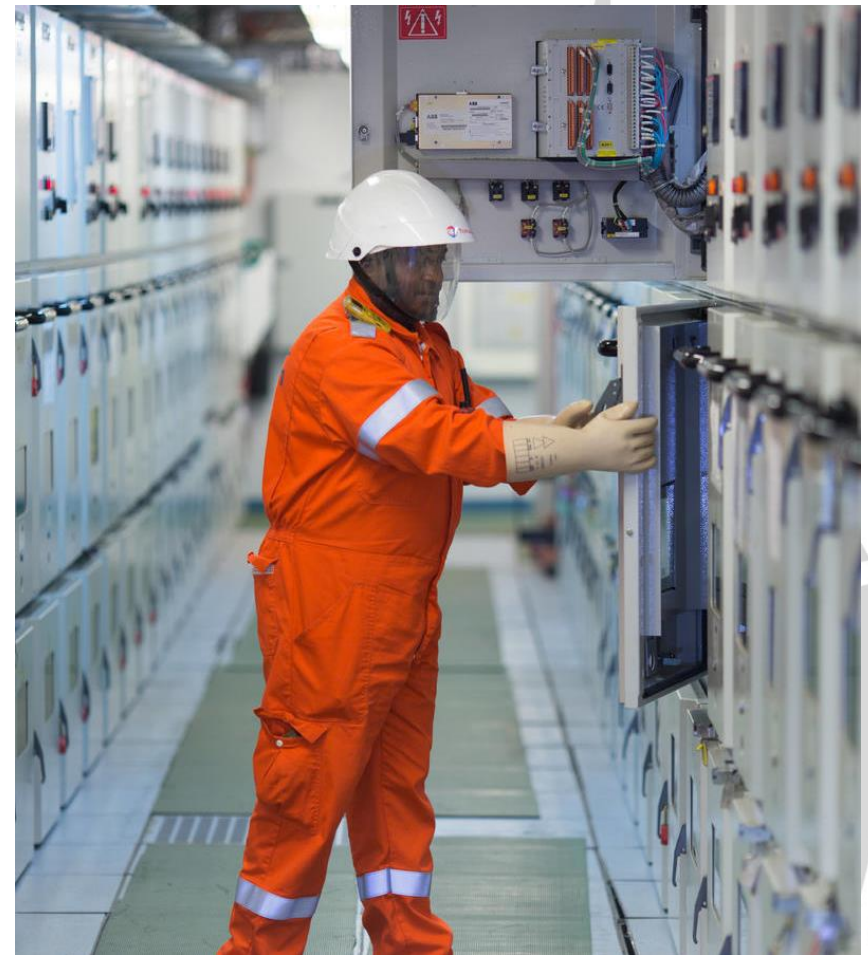
FIELD OPERATIONS SUPPORT CONTRACTS



CONTENT



- Introduction to Field Operations Contract Requirements
- Overview of Mechanical Support Contracts
- Overview of Electrical and Instrumentation Support Contracts
- Overview of Inspection Support Contracts
- Overview of Support Services Contracts
- Overview of Production Operations Support Contracts
- Overview of Site Operations Support Contracts
- Schedule
- Conclusion
- Contacts





- Overall objective of this session is to give the market an understanding of the support services required by the Field Operations department.
- Field Operations is the organisation of TotalEnergies that shall operate, maintain and inspect the processing plant and facilities after First Oil
- Drilling, HSE, Telecoms and Logistics are not under the direct control of Field Operations

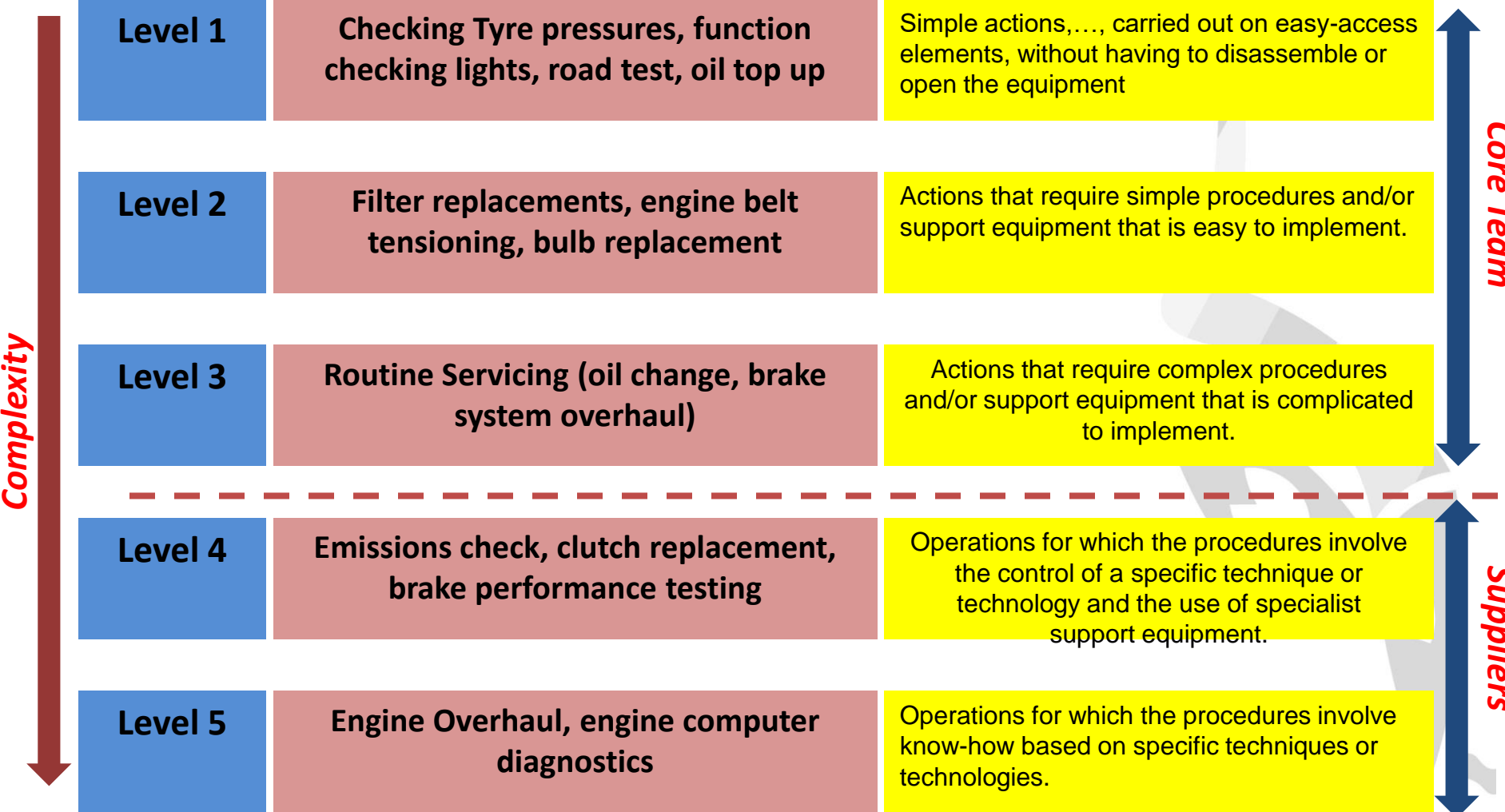
Important to understand



- The Engineering Procurement and Construction contractor has already purchased and supplied the complete packages and equipment for the plant.
- We are now implementing the specific support services required to assist TotalEnergies teams to operate and maintain the specific equipment of the plant.
- Typically, we require specialist services beyond the skills and competencies of the core team at site*
 - *Level 4 and Level 5 maintenance as per EN 13306:2017 - Maintenance terminology
- Generally, we shall look for service providers who
 - Have proven experience in the service provision
 - Have a trained and competent workforce
 - **Have links with the Original Equipment Supplier or recognised industry specialist**
- Additionally, some Expressions of Interest have already been launched for some contracts, as well as unique engagement workshops for these other services. They will not be covered in this presentation.
- Contract shall be awarded for between 3 and 5 years depending on their value.

Note: LPG facilities are excluded from this scope.

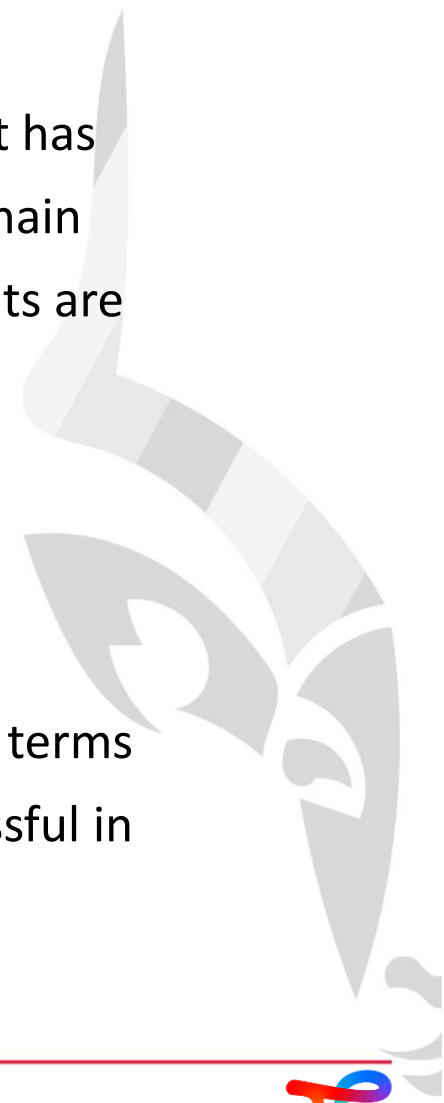
Lets take a “real world” example



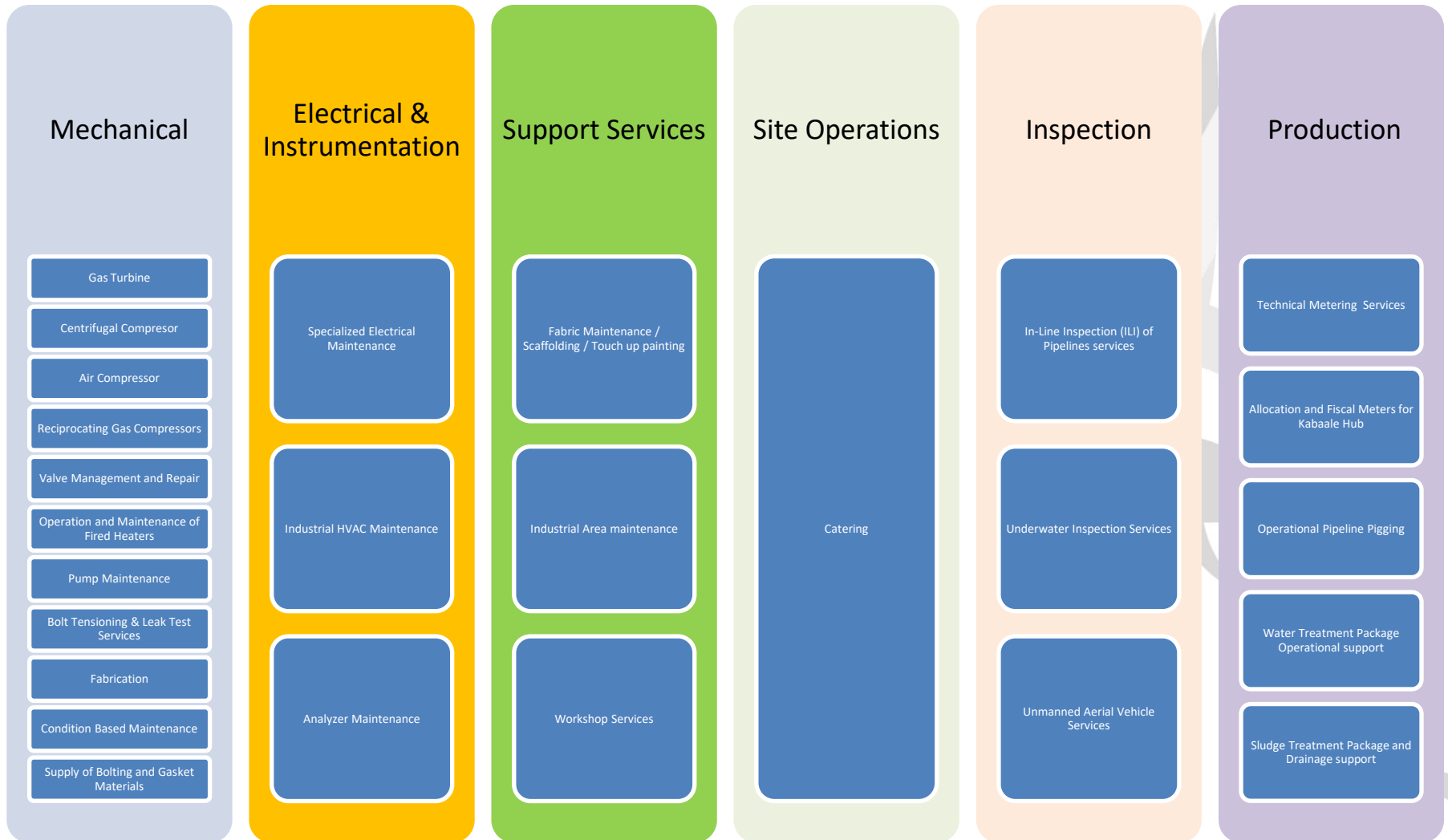
Why the workshop now?



- Over the next 2 to 3 years, Call for Tenders (CFT) shall be launched for the service we require.
- We want to differentiate the scope of service between what has been expected so far in the “project phase” by the supply chain and to better explain what the Field Operations requirements are for the 25 years of operations
- We want to give the opportunity for the market to develop proactively in order to be in the best place to meet the requirements
- It’s a chance for suppliers to understand what we require in terms of services that will enable them to be potentially be successful in a tender



Overview



Note: Table covers only the main contracts

April 8th, 2024

7





Maintenance & Inspection

MECHANICAL





- Gas Turbine Generators
- Centrifugal Gas Compressor
- Air Compressor
- Reciprocating Gas Compressors
- Valve Management and Repair
- Operation and Maintenance of Fired Heaters
- Pump Maintenance
- Bolt Tensioning & Leak Test Services
- Fabrication
- Condition Based Maintenance
- Supply of Bolting and Gasket Materials

Gas Turbine Maintenance



- Service Overview
 - Contract management
 - Technical support - 24/7 Hotline
 - Planned Maintenance
 - Resident Engineer (Field Service Representative)
 - Mechanical / Control system - from Tilenga start-up to 6 months and + 6 months as an option
 - Spare parts and Special Tools management / supply / repair
 - Engineering services
- Key Skills
 - Proven competency and experience in equipment and technology
 - OEM trained or certified technicians
- Equipment
 - 4 power generation package Baker Hugues Frame 5
- Manpower estimation
 - 1 Resident engineer position
 - 1 specialized team of 4 technicians for major maintenances (50 mandays/year)



Centrifugal Gas Compressor



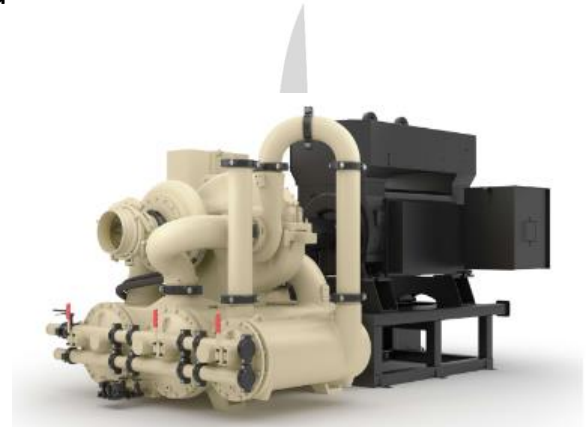
- Service Overview
 - Contract management
 - Technical support - 24/7 Hotline -
 - Planned Maintenance
 - Spare parts and Special Tools management / supply / repair
 - Overhaul of bundles at OEM or ISP workshop
 - Technical assistance (Dry Gas seals replacement, repairs, etc.)
 - Engineering services
- Key Skills
 - Proven competency and experience in equipment and
 - OEM trained or certified technicians
- Equipment
 - 2 packages of two compressors
- Manpower estimation
 - 1 resident Engineer



Air Compressor Maintenance



- Service Overview
 - Planned and Corrective Maintenance of Air compressor and Air Dryer package
 - Provision of skilled and trained technicians with technical knowledge of the equipment
 - Ability to supply of OEM spare parts
 - Technical support for troubleshooting
- Key Skills
 - Proven competency and experience in equipment and technology
 - OEM trained or certified technicians
- Equipment
 - 3 x Air Compressor, Manufacturer: Ingersoll Rand, Model: NX5000XL (1,4MW)
 - 2 x Air Dryer, Manufacturer: COES SRL, Model: HL 500/U/DX
- Manpower estimation
 - 25 mandays per year



Reciprocating Gas Compressor



- Service Overview
 - Contract management
 - Technical support - 24/7 Hotline - Engineering services
 - Planned Maintenance – Level 4 and Level 5
 - Spare parts and Special Tools management / supply / repair
 - Training of core team and return of experience (local content)
- Key Skills
 - Proven competency and experience in equipment and technology
 - OEM authorized or certified technicians
- Equipment
 - 29 reciprocating Ariel compressor packages installed on well pads (90kw to 250kw)
- Manpower estimation
 - 1 full time resident engineer position for initial year(s)
 - Team of 4 trained technicians for major overhaul 60 days per year after 2 years



Valve Management and Repair



- Service Overview
 - Contract shall cover Level 4 and Level 5 maintenance services for the Pressure Safety Valves and Process valves (ESDVs, BDVs, Control valves, isolation valves).
 - On site correct maintenance and repair
 - General corrective maintenance of all type of valves in supplier workshop
 - PSV recertification program
 - Technical support
- Key Skills
 - Proven competency and experience in equipment and technology
 - Workshop facilities with testing facilities
- Equipment
 - Pressure Safety Valves
 - Manual valves
 - Control valves
- Manpower estimation
 - 240 mandays per year



Operation and Maintenance of Fired Heaters



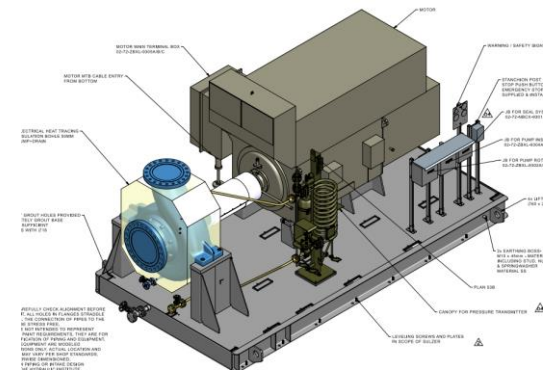
- Service Overview
 - Contract shall cover Level 4 and Level 5 maintenance services for the Operational support and Maintenance Services relation to Fired Heaters.
 - Planned Maintenance (Level 4/5)
 - Corrective maintenance
 - Offsite Testing
 - PLC System trouble shooting
 - Technical Support
 - Modifications/ Upgrades
 - Training
- Key Skills
 - Proven competency and experience in equipment and technology
 - Qualified to international standards and regulations
- Equipment
 - 9 Heaters from Thermax, 22 MW
- Manpower estimation
 - 1 full time resident engineer position for initial year(s)
 - 1 service engineer 45 days per year



Pump Maintenance



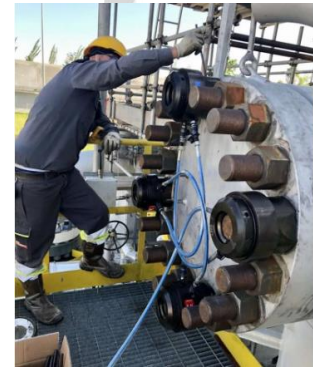
- Service Overview
 - Contract management
 - Technical support - 24/7 Hotline - Engineering services
 - Planned Maintenance – Level 4 and Level 5
 - Spare parts and Special Tools management / supply / repair
 - Overhauls in contractor workshop
 - Training and return of experience (local content)
- Key Skills
 - Proven competency and experience in equipment and technology
 - OEM trained or certified technicians
- Equipment
 - 21 Centrifugal API (multistages) pumps Clyde Union/Celeros (hot water injection, cold water injection, oil export). Pump's powers from 355KW to 4MW
 - 54 Pumps Sulzer API and ISO (single stage) 90 kw to 800 kw
- Manpower estimation
 - On Call Field engineer supervisor, 40 mandays per year



Bolt Tensioning & Leak Test Services



- Service Overview
 - Bolt tensioning/torquing & HP N2 Leak Testing services and Flange Management
 - Equipment provision
 - Testing Gases (N2) supply
 - Consumables materials/equipment
 - Training
 - Test Procedure development
- Key Skills
 - Proven competency and experience in equipment and technology
- Equipment
 - All equipment which need High torque tensioning
 - Pressure vessel, heat exchanger, piping...
- Manpower estimation
 - 40 days per year (2 technicians)



Fabrication



- Service Overview
 - Contract shall provide specialist piping and structural fabrication and modifications (Cutting, bending, welding, Pressure testing, NDT etc).
 - Scope shall include
 - Coded welder provision and qualification
 - Piping Fabrication inc testing and painting (in contractor workshop)
 - Structural fabrication (in contractor workshop)
 - Site fabrication works
- Key Skills
 - Welders and NDT services qualified to international standards
- Equipment
 - Piping
 - All metal structures, platforms, stairs, guardrails...
- Manpower estimation
 - On demand



Condition Based Maintenance



- Service Overview
 - Contract shall support operations by providing specialized support to the monitoring of equipment condition and performance based on key monitored parameters.
 - Scope of Contract shall be
 - Detailed Oil analysis and follow-up for pre-determined packages.
 - Vibration Analysis - On-call basis
 - Remote Support (analysis of performance/condition trends)
 - Site Surveys
- Key Skills
 - Proven competency and experience in equipment and technology
- Equipment
 - All Vital and Important rotating equipment
- Manpower estimation
 - 28 days on site per year for 1 Field Eng.
 - Remote monitoring => 60days for 1 specialist



Supply of Bolting and Gasket Materials



- Service Overview
 - Supply of galvanized coated pipework bolting (studbolts and nuts) e.g. A193-B7; A194-2H:
 - Supply of metallic gaskets (Spiral wound gaskets, Corrugated gaskets, Kammprofile gaskets, Ring type Joints)
 - Supply of CNAF (compressed non-asbestos fibre)
 - Comply with the standards including ASME B16.5, ASME B18.2.1., ASME B18.2.2. ASME BPVC Section VIII Div 1,
- Key Skills
 - Robust QA/QC process
 - In country manufacturing for “routine” items
 - Robust supply chain for “specialist” item
 - In country stock holding and warehousing
- Purchase estimation
 - \$500k per annum



Maintenance & Inspection

ELECTRICAL & INSTRUMENTATION

Summary – Electrical and Instrumentation



- Specialized Electrical Maintenance
- Industrial HVAC Maintenance
- Analyzer Maintenance

Specialized Electrical Maintenance



- Service Overview
 - High Specialized Electrical Maintenance Services to Level 4 and Level 5
 - Contract management
 - Maintenance & Troubleshooting visit (Hardware & Software)
 - Spare parts management
 - Provision of remote technical support services (Hot line-Web service)
 - Execution of technical training related to the services
 - Obsolescence management
- Key Skills
 - Proven experience in the maintenance of Industrial Electrical Equipment
 - Capacity to provide trained & experienced field service engineers
 - Certified field service engineers in Electricity & IECEx, and ERA Level A
- Equipment
 - HV& LV Electrical switchboards & switchgears (35 Elec buildings)
 - Power Transformers (60 Tr 11Kv to 66 KV - 2.5Mva to 50Mva)
 - Industrial UPS & batteries (45 UPS 25KVa to 145Kva)
 - High Voltage variable speed drives (16 VSD 3.3Kv – 3.6Kva)
- Manpower estimation
 - 150 equivalent man days / year with training for first years PM



Industrial HVAC Maintenance



- Service Overview
 - High Specialized HVAC Maintenance Services to Level 4 and Level 5
 - Contract management
 - Maintenance & Troubleshooting visit (Hardware & Software)
 - Spare parts management
 - Provision of remote technical support services (Hot line-Web service)
 - Execution of technical training related to the services
 - Obsolescence management
- Key Skills
 - Proven experience in the maintenance of Industrial HVAC Equipment in Major Electrical buildings in Industrial Areas
 - Capacity to provide trained & experienced field service engineers
 - Certified field service engineers in Electricity & IECEX
- Equipment
 - HVAC for **Industrial area** with **VITAL** EIT buildings – Central control building – OC-OSB : AHU / UCP / HMI / **Industrial Chillers** / VSD
 - 29 Wellpad EIT buildings with 2x40Kw 58 AHU / 3 streams / with dedicated UCP
 - Manpower estimation
 - 50 Days with training



Analyzer Maintenance



- Service Overview

- High Specialized Analysers Maintenance Services to Level 4 and Level 5
- Contract management
- Calibration with Maintenance & Troubleshooting visit (Hardware & Software)
- Spare parts management
- Provision of remote technical support services (Hot line & Web service)
- Execution of technical training related to the services
- Obsolescence management

- Key Skills

- Proven experience in the maintenance of Industrial Online analysers instruments
- Capacity to provide trained and experienced field service engineers
- Certified field service engineers in Electricity & IECEX

- Equipment

- HART Protocol O2 - CEM (Continuous emission) - Turbidity - Water in oil- Oil in Water – O2 in HC
- 45 Analyzers and 20 Sampling Cabinets

- Manpower estimation

- 25 Days (one FSR) with training



Additional Elec and Inst Support Services



- While contracts shall be awarded for some services, there are additional “ad-hoc” service and equipment repairs that shall be required.
- These smaller services include
 - Electrical Motors repairs and rewinds.
 - Wiring and Electrical Cabinet modification (on site and in Electrical buildings)
 - Transformers repairs
 - Cables installation on site with support
 - Instrumentation Tubing & Fitting replacement / modifications
 - Lighting replacement
 - New instrument or Elec equipment mounting
- As per previous slides, the key elements that are required are:
 - Proven competency and experience in work scope, equipment and technology
 - Trained or certified technicians
- Low spend expected over initial years of the plants operation, building over the life

Maintenance & Inspection

INSPECTION



Summary - Inspection



- In-Line Inspection (ILI) of Pipelines services
- Underwater Inspection Services
- Unmanned Aerial Vehicle Services

In-Line Inspection (ILI) of Pipelines services



In-Line Inspections (ILI), also named Intelligent pigging operation, is the main mean to detect, locate and size internal and external anomalies on pipelines

- Service Overview
 - Preparation, execution and reporting of intelligent pigging operations of Pipelines
 - Provision of skilled and trained technicians with technical knowledge of the equipment
 - Temporary Pig launcher provision
- Key Skills
 - ASNT-ILI-PQ certification for ILI tool operator and for data analyst
 - Proven competency and experience in the type of operation
- Equipment
 - 15 production trunklines/gathering lines
 - 16 Water Injection Pipelines
 - Cumulated 180 km
- Manpower estimation
 - 1 operation per pipeline every 5 years from FO + 3 years



Underwater Inspection Services



- Service Overview
 - Preparation, execution and reporting of underwater inspection by diver and ROV
- Key Skills
 - IMCA certification for diver
 - Internal accreditation for ROV driver
 - Proven competency and experience in the type of operation
 - Provision of ROV and diving equipment for intervention
- Inspected Equipment
 - Lake Water Abstraction platform structure
 - Lake Water Abstraction pipeline (subsea section)
- Manpower estimation
 - Diver: ~ 20 mandays every 2 years
 - ROV: ~16 mandays every 2 years



Unmanned Aerial Vehicle Services



- Service Overview
 - External inspection (visual, UT thickness)
 - Major internal inspection of big volume equipment
 - Pipelines surveillance
- Key Skills
 - Proven competency and experience in the type of operation
 - Internal accreditation
- Equipment
 - Structures
 - Big volume equipment such as tanks, heaters
 - Pipelines
- Manpower estimation
 - 80 mandays /year from FO + 2 years



Maintenance & Inspection

SUPPORT SERVICES

Summary – Support Services



- Fabric Maintenance / Scaffolding / Painting
- Industrial Area Maintenance
- Workshop Services

Fabric Maintenance/Scaffolding/Painting



- Service Overview
 - Scaffolding services
 - Cold and Hot Piping and Vessel Insulation
 - Painting and coating services
 - Installation and repair for passive fireproofing material
 - IRATA Rope access personnel
- Key Skills
 - Trained and competent personnel to recognized International Std
 - Experience in execution of similar workscopes in Industrial Environment
- Key Equipment to be provided
 - Scaffolding provision
 - Tools and equipment to be provided eg. Air compressors, BA, application tools, Handtools, metal forming etc
 - Materials provision (insulation, paint, blasting media)
- Manpower estimation
 - Approx 12,000 mandays per year



Industrial Area maintenance



- Service Overview

Maintenance of non- process equipment on the Industrial Area.

Scope on;

- Buildings
 - Potable water/Water treatment/ Sewerage plant and Distribution system.
 - Canteen, gymnasium, and Laundry equipment
 - Security fences and gates, Flood lights.
- Key Skills
 - Experience in electrical, mechanical, plumbing, HVAC and civil maintenance.
 - Capability in the preparation of a maintenance regimes.
 - Spare parts identification and inventory management.
 - Equipment
 - Civil structures and carpentry
 - Fire monitoring and detection system
 - Heating, Ventilation and Air Conditioning (HVAC) system
 - Manpower estimation
 - Approx. 4,000 Man Days per year



Workshop Services



- Service Overview
 - Provide access to a large workshop facility with tools and equipment of higher capacity than Tilenga workshop to execute repairs and machining or other workshop-based scopes.
- The scope of the contract will be:
 - Machining Services
 - Pressure testing
 - Rotating equipment overhaul (minor equipment) and repairs
 - Calibration
- Key Skills
 - Reputable workshop with highly experienced and certified personnel.
- Equipment
 - Machine tools(Lathes, milling machines)
 - Hydraulic Press/Jacks/spreaders, Pneumatic tools, Air powered tools (e.g air drill, air screw drivers)



PRODUCTION OPERATIONS

Summary – Production Operations



- Technical Metering Services
- Allocation and Fiscal Meters for Kabaale Hub
- Operational Pipeline Pigging
- Water Treatment Package Operational support
- Sludge Treatment Package and Drainage support

Technical Metering Services



- Service Overview
 - Calibration and maintenance of Technical meters: Venturi and Orifice meters, Coriolis, Ultrasonic flow, Magnetic and Vortex meters
 - Advanced troubleshooting
- Key Skills
 - Experience in the maintenance and calibration of technical m
 - Experience in the maintenance and calibration of multiphase
 - Requirement for monitoring and troubleshooting (through PI
- Equipment
 - Calibration tools if any
 - Dedicated equipment for calibration and communication on-site
 - Laptops for site visit
- Manpower estimation
 - Ad hoc Vendor personnel for site support
 - Remote assistance via Technical support from Vendor



Allocation and Fiscal Meters



- Service Overview

- This applies to the oil measurement at the delivery point with a +/- 0.3% uncertainty on the net standard volume.
- Calibration and maintenance of Tilenga Allocation and EACOP Fiscal metering skid at Kabaale hub including meters, associated instruments, compact prover, flow computer and sampling loop with autosampler and online analyzers.

- Key Skills

- Experience in the maintenance and calibration of metering stations
- Knowledge of the API Manual of Petroleum Measurement Standards (MPMS) and local regulations
- Experience in the calibration and certification of fiscal meters

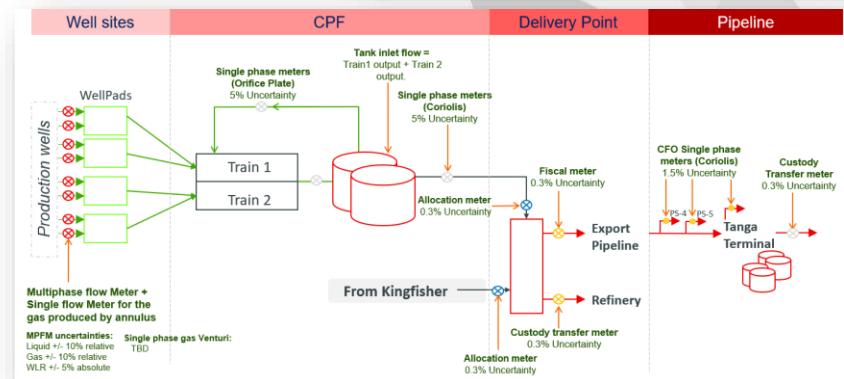


- Equipment

- Certified calibration tools for each equipment calibration type
- Specific digital tools for calibration, etc
- Laptops for site visit

- Manpower estimation

- Vendor personnel for site support/calibration
- Remote assistance via Technical support from Vendor



Operational Pipeline Pigging



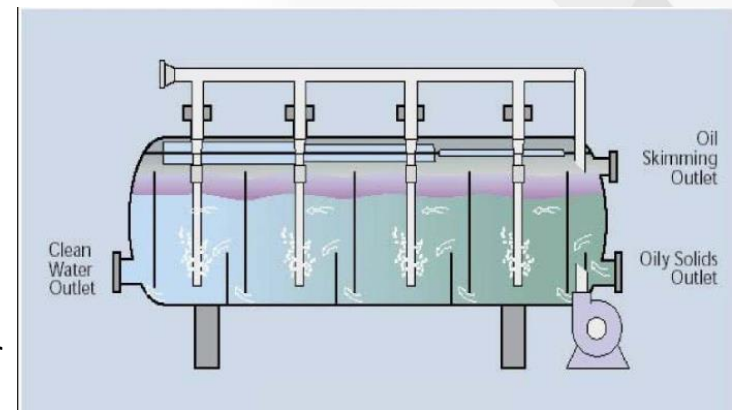
- Service Overview
 - Perform an initial study to define the types of pigs required
 - Manufacture of pigs, production and identification of spare parts and refurbishment documentation
 - Supply of cleaning pigs
 - Supply of pig tracking equipment
 - Supply of routine pigging spares
 - Annual support services and pigs restock
- Key Skills
 - Experience in the design and refurbishment of pigs
 - Experience in launching and receiving pigs
- Equipment
 - Pigs (Bi-Di Dewaxing pig, Hard deposit removal pig, Circular brush arm brush pig)
- Manpower estimation
 - N/A



Water Treatment Package Operational Support



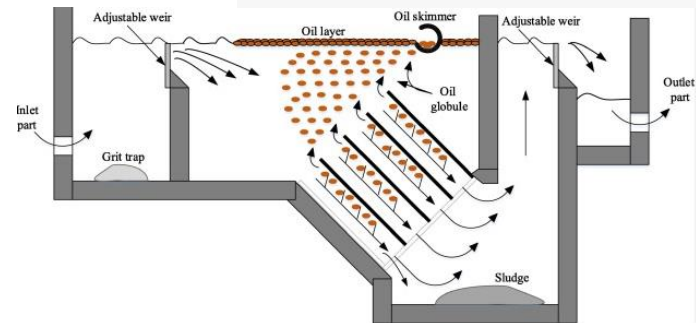
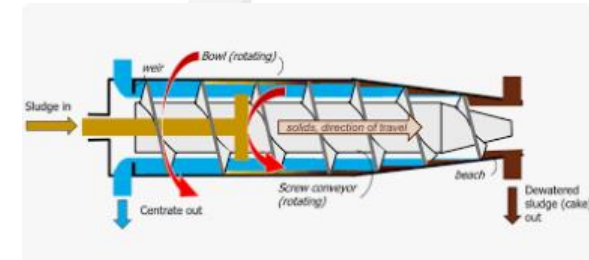
- Service Overview
 - Monitoring of the package with sampling and analysis to ensure each piece of equipment is performing to meet the required outlet specification
 - Troubleshooting to return package outlet to the required specification
 - Optimization of Chemical injection
 - Optimization of oil skimming rates, induced gas flow rates, and filters' backpressure control
 - Replacement of media filters' packing (estimated every 5 yrs.)
- Key Skills
 - Troubleshooting skills in mentioned equipment/process
 - OEM trained or certified engineer
- Equipment
 - Degasser/Skimmer Vessel
 - Induced Gas Flotation Vessel
 - Media Filters
- Manpower estimation
 - 1 specialist on a rotational basis on the Tilenga Site for first operation years



Sludge Treatment Package and Drainage Support



- Service Overview
 - Monitoring of package with sampling and analysis to ensure each piece of equipment is performing to meet the required Environmental Discharge Limits
 - Troubleshooting to return package outlet to the required specification
 - Optimization of Chemical injection
 - Optimization of oil skimming rates, induced gas flow rates, and filters' backpressure control
 - Replacement of media filters' packing (estimated every 5 yrs.)
- Key Skills
 - Troubleshooting skills in mentioned equipment/process
 - OEM trained or certified engineer
- Equipment
 - CPI separator
 - Thickener and Coagulation Vessels
 - Decanter Centrifuge
- Manpower estimation
 - 1 specialist every 28 days – OPTIONALLY same operator as for PWT package





Maintenance & Inspection

SITE OPERATIONS



Catering and housekeeping services



- Service Overview
 - Operation of company owned and built accommodation camp and support buildings
 - Daily meals for up to 500 pax.
 - Hygienically clean and maintain kitchen, dining hall, food storage area
 - Accommodation Housekeeping – room cleaning, bedsheet change
 - Daily laundry of POB garments
 - Cleaning - Buildings, kitchen, dining hall, toilets, common areas,
- Key Skills
 - Food supply chain as per HACCP.
 - ISO 22000 Food Safety Management Sys Certification
 - Trained and skilled workforce
- Equipment
 - Provision to procure specific additional / missing / defective material
 - Kitchen equipment, bedding, laundry equipment, tea coffee facilities
- Manpower estimation
 - 11,000 mandays



Maintenance & Inspection

SCHEDULE





- The following slides gives an indicative timeline for the launching of the Call for Tenders
- The schedule will be adapted overtime to meet changing priorities and needs to support the operations.
- Some services may be removed or added after further review of the operational and maintenance requirements after detailed review of the suppliers documentation and completion of operating procedures

Summary Schedule of Main Contracts presented



GTG	Gas Compressor			
Operational Pigging	Valve Man. and Repair	Condition Based Maintenance	Bolting and Gasket Materials	
Specialized Electrical	Ind. Area Maint	Analyzer Maintenance	Allocation and Fiscal Meters	Fabrication
Catering and Housekeeping	Recip. Gas Compressor	Unmanned Aerial Vehicles	Tech. Metering Services	In-Line Inspection
Industrial HVAC	Fabric Maintenance	Workshop Services	Water Treatment Package	Bolt Tensioning & Leak Test Svs
Air Compressor	Fired Heaters	Pump Maintenance	Sludge Treatment Package	Underwater Inspection
2024		2025		2026

Conclusion



- This presentation aims to give you the first insight into the services that shall be required to support the Tilenga field operations
- Further dedicated workshops and engagement will be held for the for larger scopes during the Call for Tender process.
- Opportunity now exist for in country providers to take advantage of this information, in order to build and be ready for the operational phase of the Tilenga development

Focal Points



Mechanical

Nicolas
POULIN



Electrical &
Instrumentation

Jean-Pierre
DEBLANDER



Inspection

Olivier
GILLIERON



Support
Services

Solomon
BITAMAZIRE



Production Operations

Sheba
BYAMUGISHA



Violaine
SONTOT



Operations

Denis
Nikolaev

April 8th, 2024



谢谢
Xièxiè

Merci

Thank you

Thank you,
Asante Sana