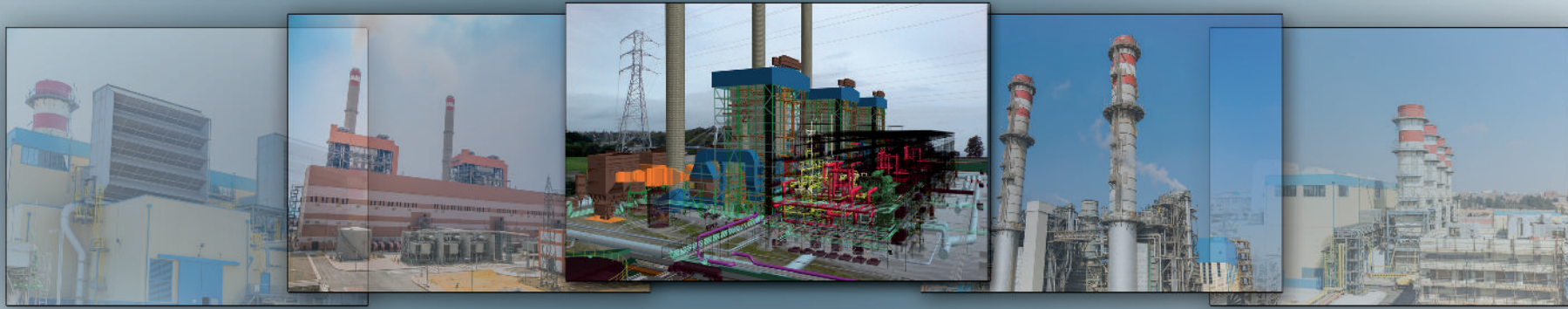




PGESCO



SERVICES PORTFOLIO



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Startup and commissioning Management
ES&H Management
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Document Control / Record management

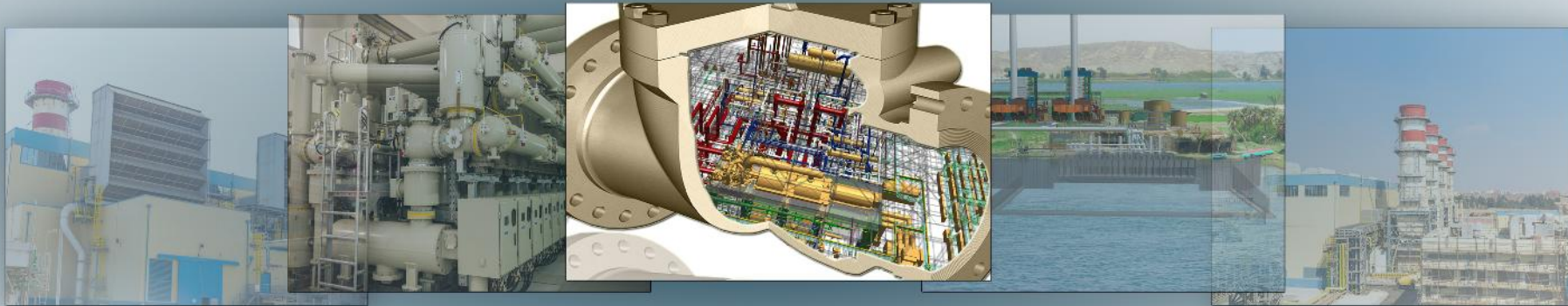
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PGESCO Records

Since 1993, Power Generation Engineering and Services Company “PGESCO” has manifested proven capabilities by providing Innovative engineering solutions for energy projects and industrial sector in Egypt and MENA region.

With focus on delivering top quality and best services, PGESCO has engineered and managed sophisticated projects in challenging environments. From business planning up to operation and maintenance, PGESCO provides complete integrated services over the project’s life.

To ensure seamless digital exchange between organization functions, PGESCO develops and applies world advanced technology that provides the tools and environment needed to achieve its goals delivering quality projects that meet client expectations.

PGESCO provides services and support to the governmental utilities, EPC contractors, independent and private developers using State-of-the-Art design and communication technology platforms.

100 Extra
High/High Voltage
Switchyards

\$ 21,5B
Projects

49,930 MW
in Egypt & MENA
Region

1500 KM
OHTL Projects

285,000
M³/Day Sea Water
Desalination

Combined
Cycle
16

Conversion
7

Simple
Cycle
15

Thermal
14



52
Power Generation
Projects

Completed
32,760 MW

Ongoing
14,880 MW

On Hold
2,290 MW



130,000 Ton
Structure Steel

1,370,000 M³
Concrete Structures

Engineering Design of

Managed > 344
Million
Construction
Job Site HRs

Managed over
342 contracts,
19 EPC Contracts
and 267
Purchase Orders

Large Scale
Industrial
Project for
ELMACo
Transformers
Factory

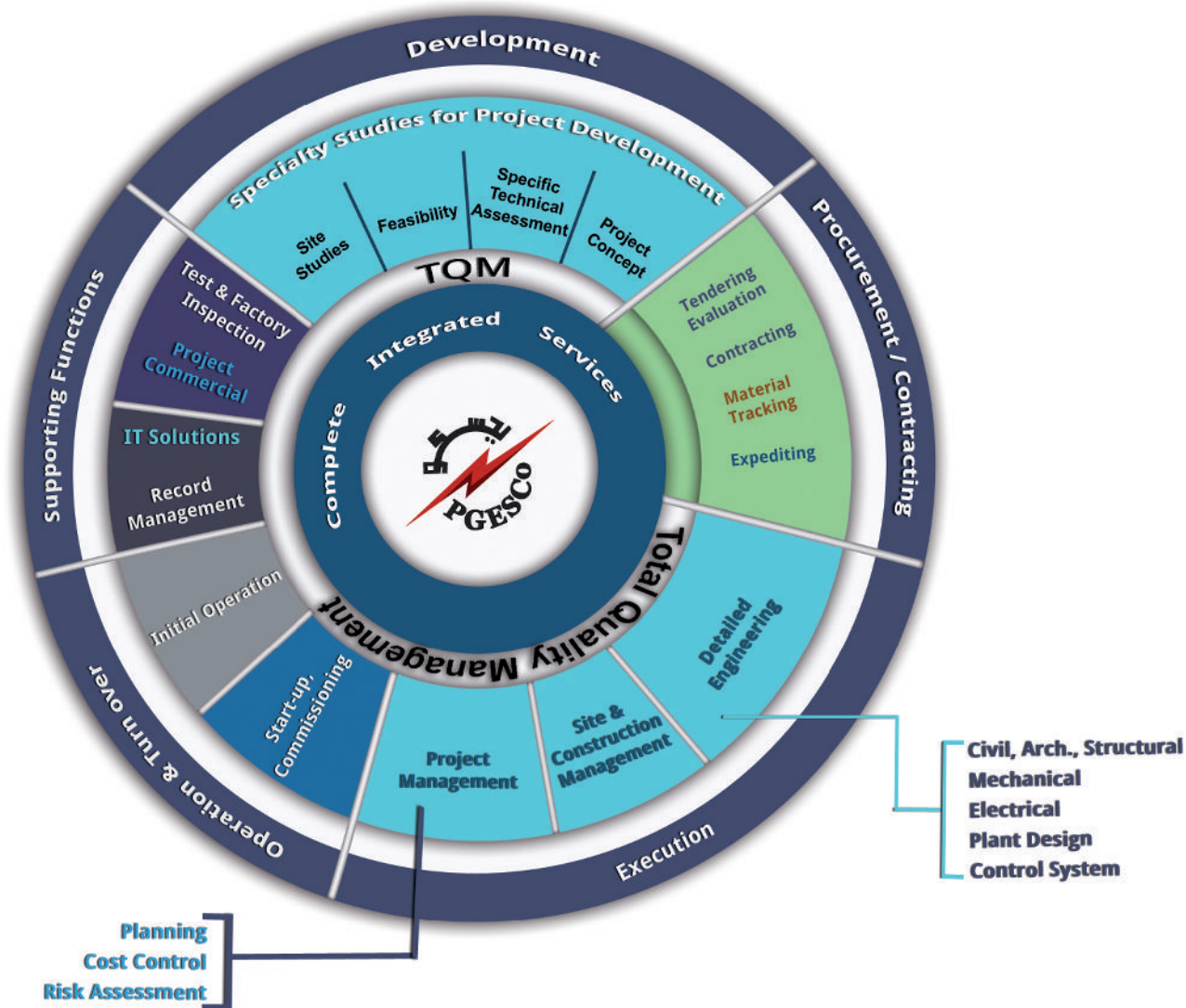


9,170,000 LM
Electrical System
Cabling

254,000 LM
Mechanical Systems
Piping



This Vast Experience Contributed Significantly to PGESCO's Understanding of Power & Industrial Projects Requirements, Especially in Engineering, Procurement, Construction Management Services (EPC/EPCM) as well as Project Management and Startup Management Services.



OFFERED SERVICES
COMPLETE INTEGRATED
PROJECT SERVICES



PGESCO ISO CERTIFICATES



ISO 27001:2013



PGESCO is the first runner in Africa, also one of few pioneers around the world to have **ISO 9001:2015** certification



OHSAS 18001: 2007 ISO 14001: 2004





ENGINEERING SERVICES

PGESCO engineering provides innovative solutions in various fields of power generation and industry including conceptual, detailed and final engineering design for civil, mechanical, electrical, control system and communication systems Services.

PGESCO executes detailed engineering plans from licensing to vendor interfacing.

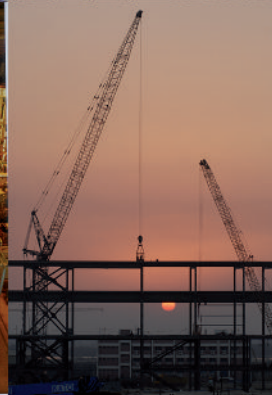
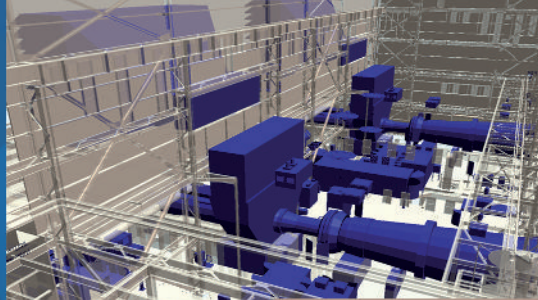
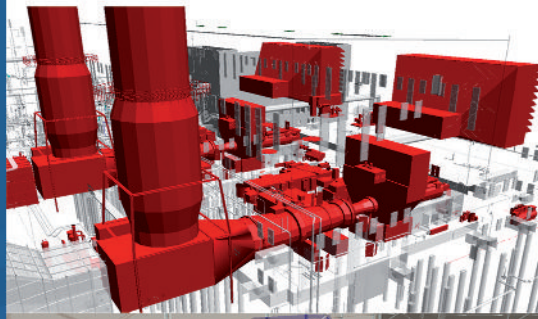
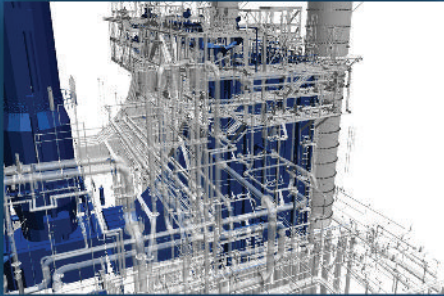
Our skills include structural steel design, foundations design such as large rotating equipment foundations design, architectural design, electrical engineering design, equipment management and process design, Piping Stress analysis, layout, load analysis and piping supports design.

Engineering activities of conceptual, detailed or final design are covered by our highly experienced team

- **Architectural**
- **Civil / Structural**
- **Control Systems**
- **Electrical**
- **Mechanical**
- **Plant Design**
- **Engineering Quality Assurance & Quality Control**
- **Environmental**
- **Engineering Platform**



ENGINEERING SERVICES OVERVIEW



PGESCO Engineering Typically Provides:

- . Technical Specification Preparation for each Equipment & Detailed Design
- . Pre-tender Clarifications
- . Technical Evaluation of Tenders
- . Pre-award Clarifications
- . Review of Contractors Technical Documents and Technical Coordination
- . Construction Support Services
- . Startup and Acceptance Testing Support
- . Plant Performance Tests
- . Training Services
- . Plant Data Book
- . Engineering Studies



BUILDING CODE ANALYSIS:

- . Buildings Occupancy Classifications
- . Means of Emergency Exits
- . Life Safety Requirements



FINISHING MATERIALS SPECIFICATIONS INCLUDING:

- . Multi-Project Standard Specifications
- . Project Technical Specifications
- . Design Criteria for Architectural Works



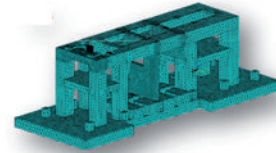
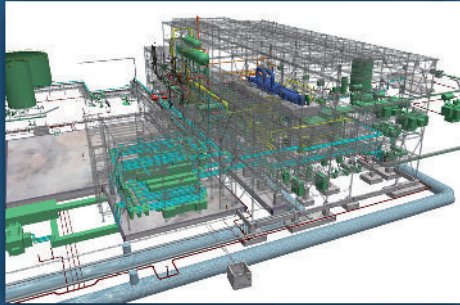
FULL RANGE OF ARCHITECTURAL DESIGN INCLUDING:

- . Power Plant / Buildings
- . Auxiliary Buildings
- . Ancillary Buildings and Colony

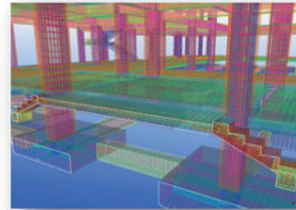
3D MODELING



CIVIL ENGINEERING SERVICES



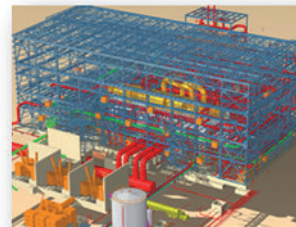
Abu Qir Power Plant
Turbine pedestal
ANSYS FEA



Steel RFT & Workshop
Drawings
TEKLA structures



Intake Head
Offshore structure



Suez Power Plant
3D Modeling of Plant Civil
Commodities

Civil/Structural

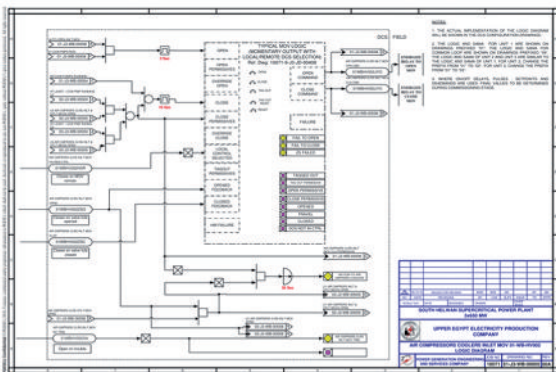
- . Dynamic Analysis and Design of Machine Foundation and Complex Structures.
- . Analysis and Design of:
 - Steel Structures/Buildings.
 - Reinforced Concrete Structures and Foundation (Shallow and Deep Foundation).
- . Preparation of Technical Specifications, Tender Documents, Evaluation of Bidders, and Recommendation of Civil Related Award Contracts.
- . 3D Modeling of Civil-Commodities; including Steel Structures, Concrete Buildings, Rebar Detailing and Underground Circulating Water Piping.
- . Storm Drainage & Roads Design.

Geotechnical

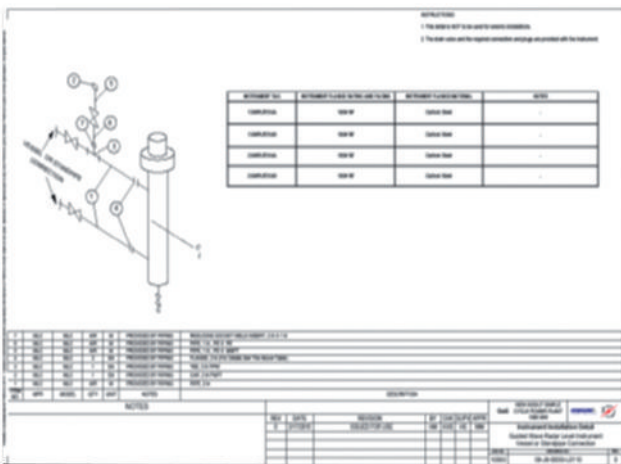
- . Onshore/offshore Soil Investigation and Geophysics.
- . Geotechnical Analysis and Design.
- . Seismic Hazard Assessment & Analysis.
- . Topographic Survey and Underground Detection.

Hydraulic Works

- . Hydrographic Survey, Hydraulic Modelling.
- . Design of Circulating Water System (Onshore/Offshore).



Two tables representing instrumentation data sheets. The left table is a comprehensive list of instruments with columns for instrument type, name, location, and specifications. The right table is a more detailed sheet for a specific instrument, including its function, setpoints, and control logic.



Automation and Control Design

Distributed Control System (DCS) Specification

Control Systems Architectural Drawing

DCS Sizing and I/O Assignment

Logic Diagrams (Plant Protection, Function Block, and Digital Logic)

Set Point Index

Factory Acceptance Test (FAT)

Instrumentation and Analysis Design

Instrument Selection.

Instrument Data Sheets

Control Valve Data Sheets

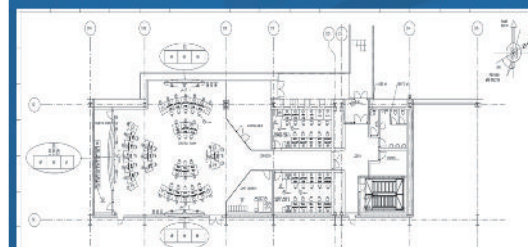
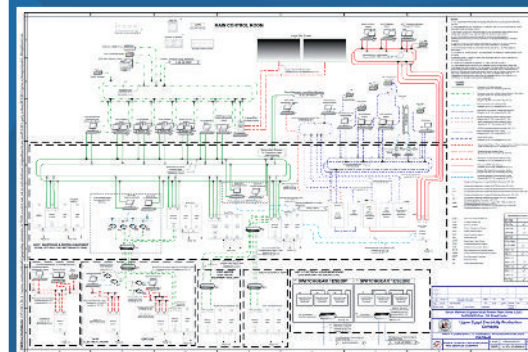
Control Valve Sizing and Selection

Instrument Location Plans

Instrument Installation Details (IID)

Continuous Emissions Monitoring System (CEMS)

Steam & Water Analysis System (SWAS)





ELECTRICAL ENGINEERING SERVICES

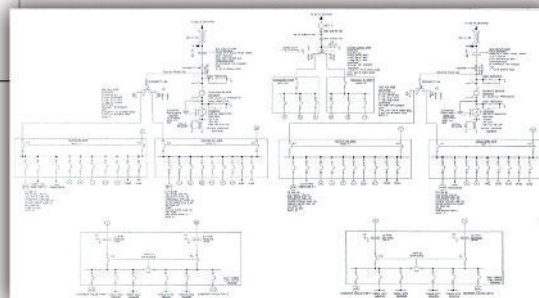
The screenshot displays the PGESCO software interface for cable design. At the top, a 'Special Cable Design' window shows parameters like Voltage Type (3Ph), Voltage (400), Power Factor (0.85), and Cable Length (100). Below this, a 'CABLE PULLING CARD' and 'CABLE TERMINATION CARD (FROM)' are visible, containing fields for Cable ID, From Equipment, and Cable Formation. The bottom portion of the screenshot shows two detailed cable termination diagrams with labels for conductors and terminals.

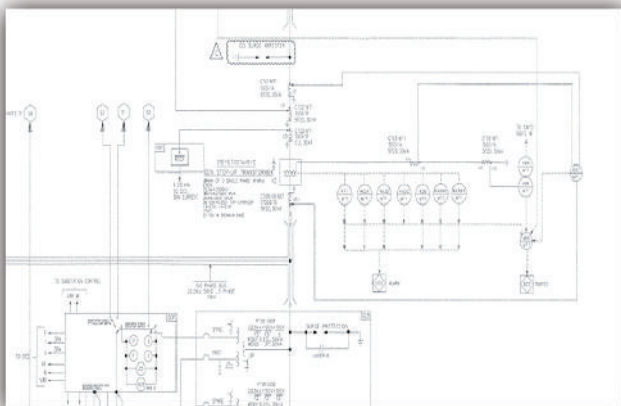
Single-line and Phasing Diagrams

- Main Plant Electrical Distribution System (Single-Line Diagrams)
- Plant Phasing Diagrams

Plant Cabling

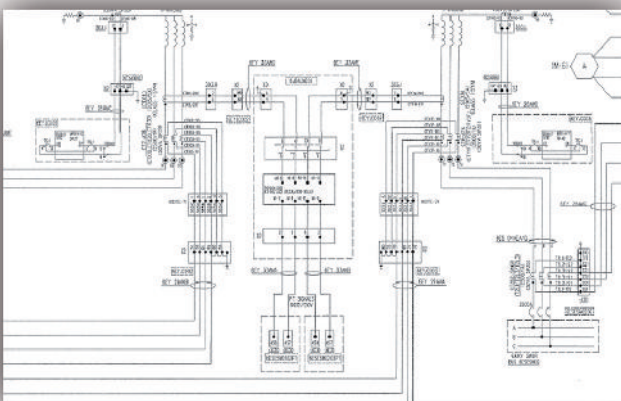
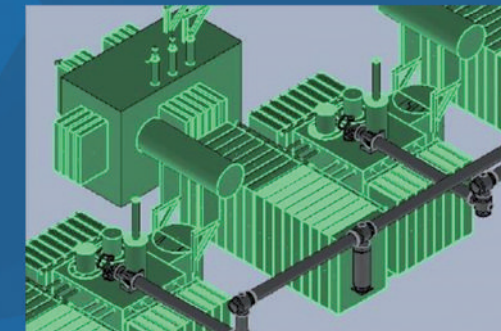
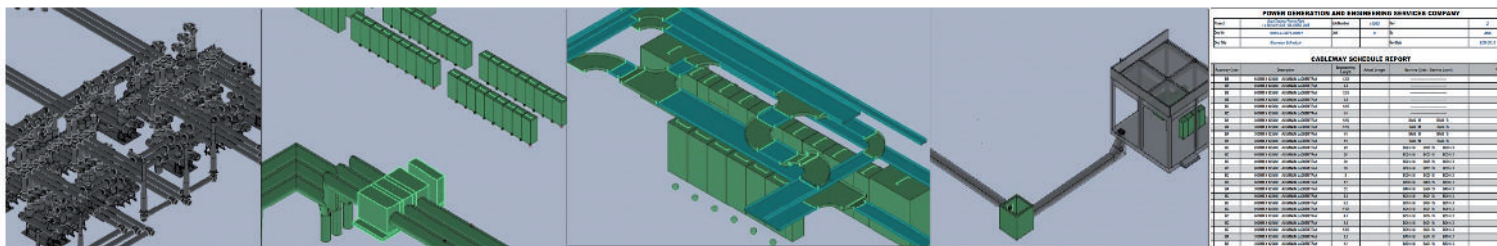
- Cable Design that Includes Cable Type and Size Selection Using PGESCO Proprietary Software.
- Cable Routing that Includes Cable Pathway Selection, Cable Filling and Length Calculations, and Cable Pulling Cards Using Both PGESCO Proprietary and International Software.
- Cable Termination that Includes Cable Termination cards.
- Cable MTOs and Material Tracking that Includes: Cable Quantities Estimation and MTOs, Cable Installation Follow-Up and Material Tracking.





Metering and Relaying Single and Three-Line Diagrams

- Plant Metering and Relaying Single-Line Diagrams
- Plant Protection Three-Line Diagrams

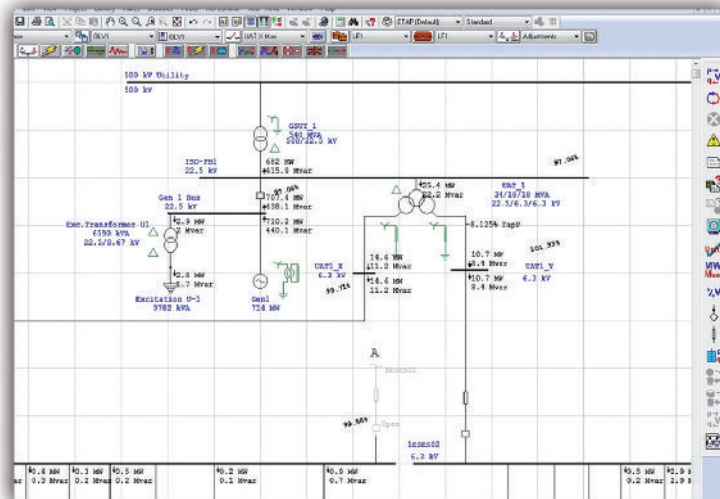
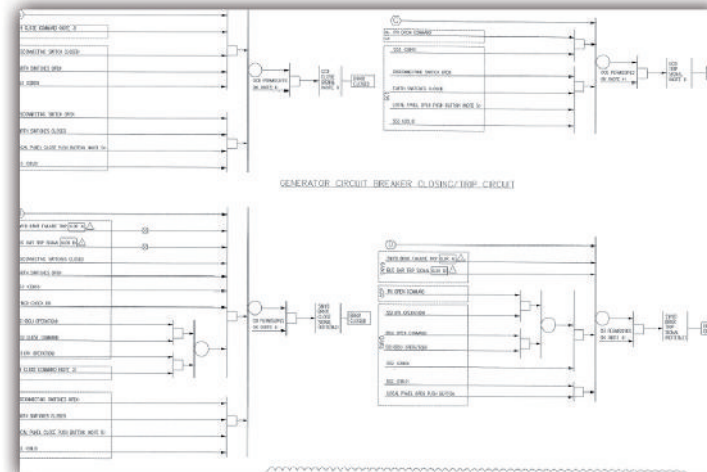


Equipment Modeling, Layout Drawings and Raceway System Design

- Equipment Layout Drawings
- Raceway System Design

Breaker Logic Diagrams Power System Studies

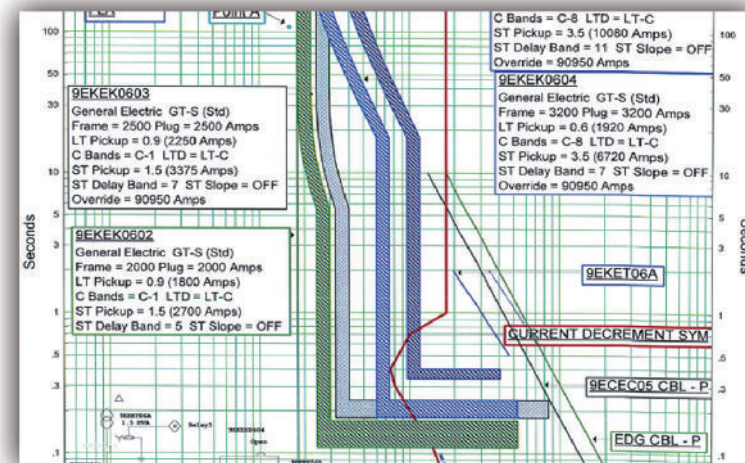
- Short Circuit Calculations
- Load Flow
- Motor Start Simulations



Protection Setting and Relay Coordination Study

Electrical Equipment Sizing and Specification

Sizing and Specification for the Following:
MV and LV Switchgear, Plant Power and LV Transformers, DC and UPS Equipment, Grounding System, Switchyard Equipment and Systems, Generator Circuit Breaker, and Isolated Phase Bus Duct



Mechanical discipline is responsible for the process design and equipment specifications. The discipline has its distinguished expertise in all types of systems and mechanical equipment. Through its crew of mechanical specialists, PGESCO can cover any mechanical Engineering need that may arise.

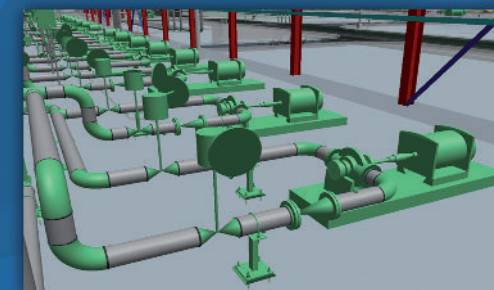
MECHANICAL ENGINEERING SERVICES

Discipline maintains a long list of projects Design Documents, Studies and Drawings:

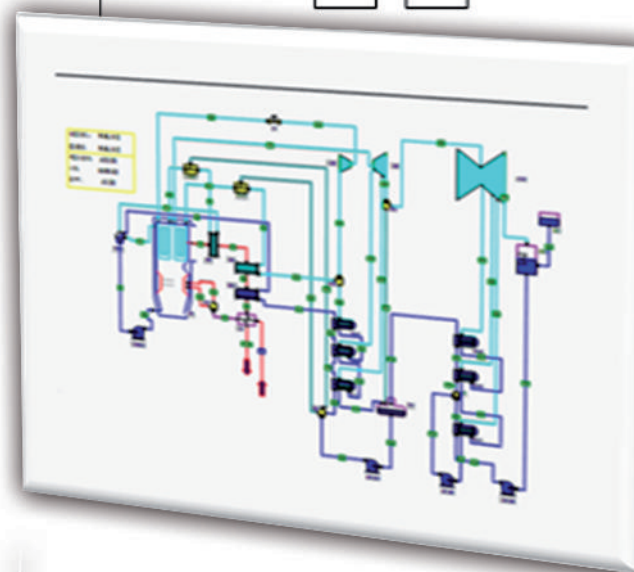
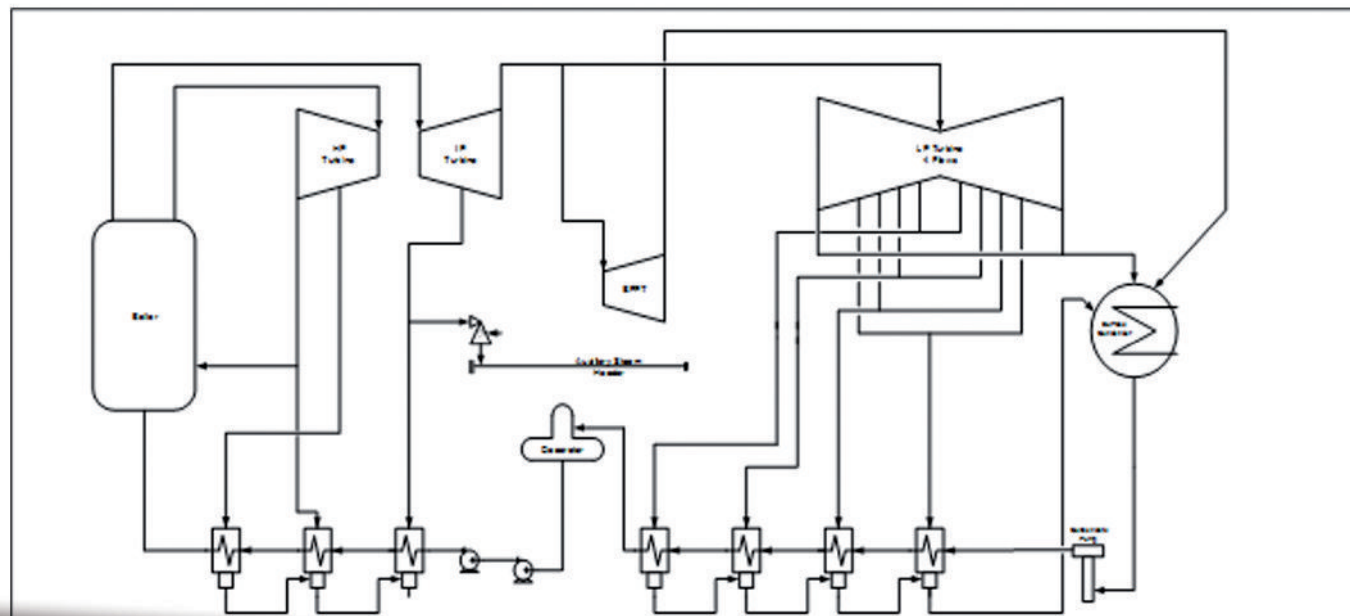
- . Power Plant heat & Mass Balance Conceptual Design
- . Preliminary Design Report
- . Process piping and Instrument diagrams P&IDs
- . Pipe List, Valve List, Equipment List and Specialty List
- . Detail systems design calculation including piping and mechanical sizing
- . Equipment technical specifications
- . Bidders Evaluation Report

MECHANICAL ENGINEERING TECHNICAL SPECIALISTS

- . Fired Heat Transfer Equipment (Boiler/HRSG)
- . Unfired Heat Transfer Equipment (Deaerator/Feedwater Heaters/Heat Exchanger)
- . Rotating Equipment (Compressors/Pumps)
- . Performance Test
- . Firefighting/HVAC
- . Water Treatment Group
- . Environment
- . Heat and Mass Balance



Power Plant heat & Mass Balance Conceptual design

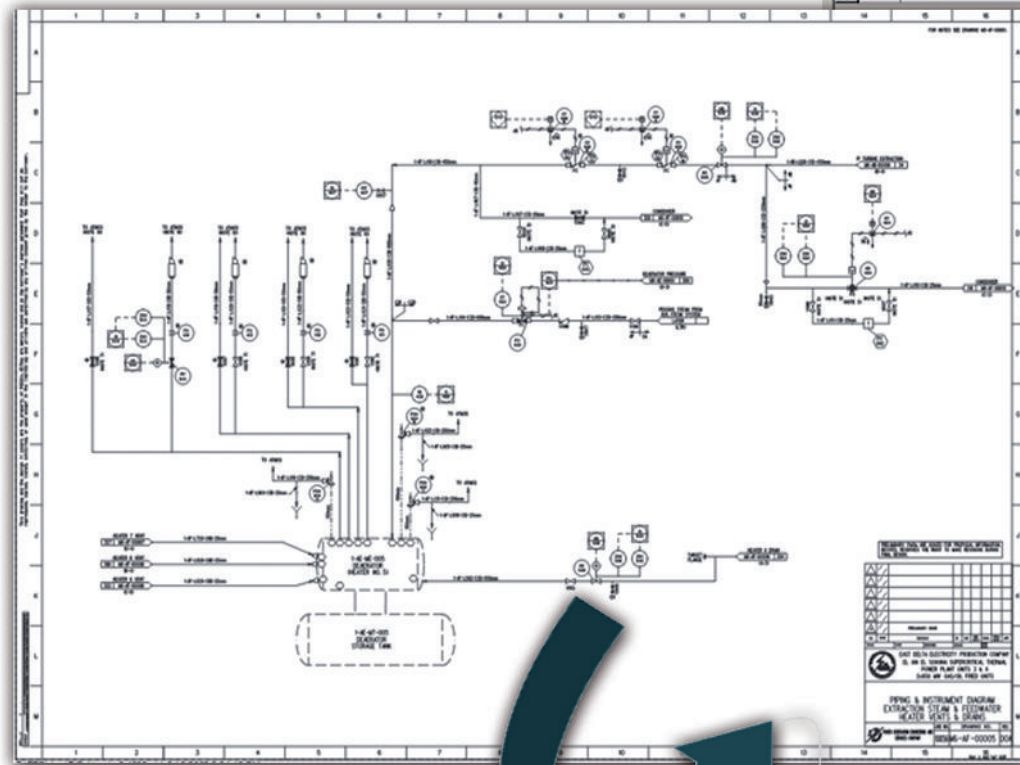


Rev.	Date	Description	By	Chk	App
1		Final			
2		Final			
3		Final			
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5		Final			
6		Final			
7		Final			
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Intelligent Piping & Instrument Program

Through its Intelligent Modelling Platform that is Fully Integrated, PGESCO can Guarantee the Accuracy of all Delivered Lists



Custom View Wizard

View Properties - select the columns to view and how they will be viewed.

Order	Field Name	Field Label	Group By
1	MATERIAL_SPEC_LINE	Material Class	Group By
2	NOMINAL_DIAMETER	Diameter	Group By
3	DESIGN_TEMPERATURE	Max DTemp	Maximum
4	DESIGN_PRESSURE	Max DPress	Maximum

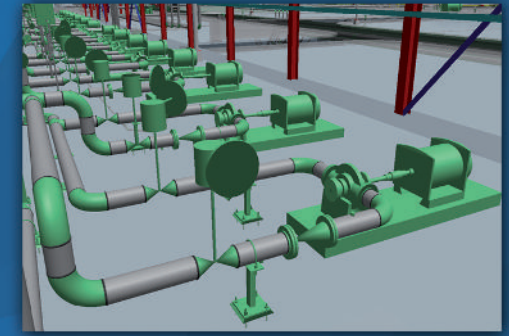
Options: Clear, Add All, Delete Row

Buttons: Cancel, < Back, Next >, Finish

Piping Class MaxDT, DP

Material Class	Diameter	Max DTemp	Max DPress
150	4	120	10
210	3	120	60
500	8	1065	750
500	20	1065	645
SLD	2	1065	710
SLD	4	200	2020
SLD	6	1065	2020
SLD	10	1065	2020
SLD	12	1065	2020
SLD	16	1065	710
SLD	0.5	630	50
SLD	0.75	630	50
SLD	1	800	50
SLD	1.5	775	50
SLD	2	630	50
SLD	3	630	50
C1D	4	630	60
C1D	6	630	600
C1D	8	775	50
C1D	10	125	60
C1D	12	650	50
C1D	14	125	125
C1D	16	140	50

MECHANICAL ENGINEERING SERVICES





MECHANICAL ENGINEERING SERVICES

Pipe List, Valve List, Equipment List and Specialty List

CAIRO WEST THERMAL POWER PLANT UNIT 7&8
2X350 MW GAS/OIL FIRED UNITS
Mechanical Specialty list

10051-9-M5X-YA-00005

Tag Number	Line Tag No	Specialty Description	Contract Specification	P&ID	Working P&ID Rev	Remarks	List Rev.
7-AB-PY-001	7-AB-L04B-C90-25mm	Y strainer	CP-118	7-M6-AB-00001	B		0
7-AB-PY-002	7-AB-L04B-C90-25mm	Steam trap	CP-118	7-M6-AB-00001	B		0
7-AB-PY-003	7-AB-L09L-46D-35mm	Y strainer	CP-118	7-M6-AB-00001	B		0

CAIRO WEST THERMAL POWER PLANT
UNITS 7&8
2X 350 MW GAS/OIL FIRED UNITS
Mechanical Equipment List

SPECIFICATION 10051-9-M5X-YA-00

TAG	REV	SY	UNIT	DESCRIPTION	QUANTITY	CP-NO	SPEC-NO	PO	P&ID	REV	REMARKS	LIST-REV
7-AB-SP-0001	01			BLUETOOTH WIRELESS PUMP	1	CP-118	SPEC-001-00001	7-AB-SP-0001	7-AB-SP-0001	01		0
7-AB-SP-0002	01			BLUETOOTH WIRELESS PUMP	1	CP-118	SPEC-001-00001	7-AB-SP-0002	7-AB-SP-0002	01		0
7-AB-SP-0003	01			DRY FUSE OIL TRANSFER PUMP	1	CP-118	SPEC-001-00001	7-AB-SP-0003	7-AB-SP-0003	01		0
7-AB-SP-0004	01			DRY FUSE OIL TRANSFER PUMP	1	CP-118	SPEC-001-00001	7-AB-SP-0004	7-AB-SP-0004	01		0

CAIRO WEST THERMAL POWER PLANT
UNITS 7&8
2X 350 MW GAS/OIL FIRED UNITS
Mechanical Equip List

10051-9-M5X-YA-00005

Tag Number	Line Tag No	Contract Specification	Specialty Description	Design Pressure (bar)	Service Pressure (bar)	Design Temp. °C	Service Temp. °C	Heat Treated	Insulated (Y/N)	Insul. Mat.	Insul. Thk (mm)	Remarks	List Rev.
7-AB-L01	7-AB-L01-010-200mm	7-M6-AB-00001	PIPE	18.8	18.1	547	541	NT	Y	MM	100		0
7-AB-L02	7-AB-L02-010-400mm	7-M6-AB-00001	PIPE	18.8	18.1	547	541	NT	Y	MM	100		0
7-AB-L03	7-AB-L03-010-200mm	7-M6-AB-00001	PIPE	18.8	18.1	547	541	NT	Y	MM	100		0
7-AB-L04	7-AB-L04-010-350mm	7-M6-AB-00001	PIPE	18.8	18.1	547	541	NT	Y	MM	100		0
7-AB-L05	7-AB-L05-010-200mm	7-M6-AB-00001	PIPE	47	39.34	350	324	NT	Y	MM	75		0
7-AB-L06	7-AB-L06-010-400mm	7-M6-AB-00001	PIPE	47	39.34	450	324	NT	Y	MM	89		0
7-AB-L07	7-AB-L07-010-500mm	7-M6-AB-00001	PIPE	47	39.34	450	324	NT	Y	MM	84		0
7-AB-L08	7-AB-L08-010-400mm	7-M6-AB-00001	PIPE	47	39.34	450	324	NT	Y	MM	89		0
7-AB-L09	7-AB-L09-010-400mm	7-M6-AB-00001	PIPE	47	39.34	450	324	NT	Y	MM	89		0
7-AB-L10	7-AB-L10-010-400mm	7-M6-AB-00001	PIPE	47	39.34	450	324	NT	Y	MM	89		0
7-AB-L11	7-AB-L11-010-300mm	7-M6-AB-00001	PIPE	13.8	9.73	400	256	NT	Y	MM	75		0
7-AB-L12	7-AB-L12-010-400mm	7-M6-AB-00001	PIPE	47	39.34	350	324	NT	Y	MM	89		0
7-AB-L13	7-AB-L13-010-400mm	7-M6-AB-00001	PIPE	110	78	230	213	NT	Y	MM	35		0
7-AB-L14	7-AB-L14-010-700mm	7-M6-AB-00001	PIPE	110	78	230	213	NT	Y	MM	35		0
7-AB-L15	7-AB-L15-010-400mm	7-M6-AB-00001	PIPE	47	39.34	450	324	NT	Y	MM	75		0
7-AB-L16	7-AB-L16-010-300mm	7-M6-AB-00001	PIPE	47	39.34	450	324	NT	Y	MM	75		0
7-AB-L17	7-AB-L17-010-450mm	7-M6-AB-00001	PIPE	18.8	18.1	547	541	NT	Y	MM	114		0
7-AB-L18	7-AB-L18-010-450mm	7-M6-AB-00001	PIPE	18.8	18.1	547	541	NT	Y	MM	102		0
7-AB-L19	7-AB-L19-010-450mm	7-M6-AB-00001	PIPE	18.8	18.1	547	541	NT	Y	MM	114		0
7-AB-L20	7-AB-L20-010-200mm	7-M6-AB-00001	PIPE	47	39.34	350	324	NT	Y	MM	75		0

CAIRO WEST THERMAL POWER PLANT UNIT 7&8
2 X 350 MW GAS/OIL FIRED UNITS
Mechanical Line List

10051-9-M5X-YA-00005

Line Visible Tag	Contract Package	P&ID	P&ID Rev	Design Pressure (bar)	Service Pressure (bar)	Design Temp. °C	Service Temp. °C	Heat Treated	Insulated (Y/N)	Insul. Mat.	Insul. Thk (mm)	Remarks	List Rev.
7-AB-L01	7-AB-L01-010-200mm	7-M6-AB-00001	01	18.8	18.1	547	541	NT	Y	MM	100		0
7-AB-L02	7-AB-L02-010-400mm	7-M6-AB-00001	01	18.8	18.1	547	541	NT	Y	MM	100		0
7-AB-L03	7-AB-L03-010-200mm	7-M6-AB-00001	01	18.8	18.1	547	541	NT	Y	MM	100		0
7-AB-L04	7-AB-L04-010-350mm	7-M6-AB-00001	01	18.8	18.1	547	541	NT	Y	MM	100		0
7-AB-L05	7-AB-L05-010-200mm	7-M6-AB-00001	01	47	39.34	350	324	NT	Y	MM	75		0
7-AB-L06	7-AB-L06-010-400mm	7-M6-AB-00001	01	47	39.34	450	324	NT	Y	MM	89		0
7-AB-L07	7-AB-L07-010-500mm	7-M6-AB-00001	01	47	39.34	450	324	NT	Y	MM	84		0
7-AB-L08	7-AB-L08-010-400mm	7-M6-AB-00001	01	47	39.34	450	324	NT	Y	MM	89		0
7-AB-L09	7-AB-L09-010-400mm	7-M6-AB-00001	01	47	39.34	450	324	NT	Y	MM	89		0
7-AB-L10	7-AB-L10-010-400mm	7-M6-AB-00001	01	47	39.34	450	324	NT	Y	MM	89		0
7-AB-L11	7-AB-L11-010-300mm	7-M6-AB-00001	01	13.8	9.73	400	256	NT	Y	MM	75		0
7-AB-L12	7-AB-L12-010-400mm	7-M6-AB-00001	01	47	39.34	350	324	NT	Y	MM	89		0
7-AB-L13	7-AB-L13-010-400mm	7-M6-AB-00001	01	110	78	230	213	NT	Y	MM	35		0
7-AB-L14	7-AB-L14-010-700mm	7-M6-AB-00001	01	110	78	230	213	NT	Y	MM	35		0
7-AB-L15	7-AB-L15-010-400mm	7-M6-AB-00001	01	47	39.34	450	324	NT	Y	MM	75		0
7-AB-L16	7-AB-L16-010-300mm	7-M6-AB-00001	01	47	39.34	450	324	NT	Y	MM	75		0
7-AB-L17	7-AB-L17-010-450mm	7-M6-AB-00001	01	18.8	18.1	547	541	NT	Y	MM	114		0
7-AB-L18	7-AB-L18-010-450mm	7-M6-AB-00001	01	18.8	18.1	547	541	NT	Y	MM	102		0
7-AB-L19	7-AB-L19-010-450mm	7-M6-AB-00001	01	18.8	18.1	547	541	NT	Y	MM	114		0
7-AB-L20	7-AB-L20-010-200mm	7-M6-AB-00001	01	47	39.34	350	324	NT	Y	MM	75		0

Detail systems design calculation including piping and mechanical sizing

Right tools and long deliberating and checking process that guarantee accurate results and optimized designs

**MECHANICAL
ENGINEERING SERVICES**

CALCULATION COVER SHEET

PROJECT: Hsreen Supercritical Power Plant	JOB NO.: 10071	CAUC NO.: B-MECAF-0002	SHEET: 1
1 of 5			
CALCULATION STATUS: PRELIMINARY	CONFIRMED with PRELIMINARY INFORMATION: <input checked="" type="checkbox"/>	CONFIRMED: <input type="checkbox"/>	SUPERSEDED: <input type="checkbox"/>
VOIDED: <input type="checkbox"/>			
SUBJECT: Extraction Steam Lines Sizing and Pressure Drop Calculations	OPERATING SYSTEM: Windows 7		
COMPUTER PROGRAM TYPE: SCP	PROGRAM NO.: PIPENET	VERSION/RELEASE: 1.7	OPERATING SYSTEM: Windows 7

Appendices
Appendix A : Extraction Steam Lines pressure Drop PIPENET 1.7 output report.

ATTACHMENTS

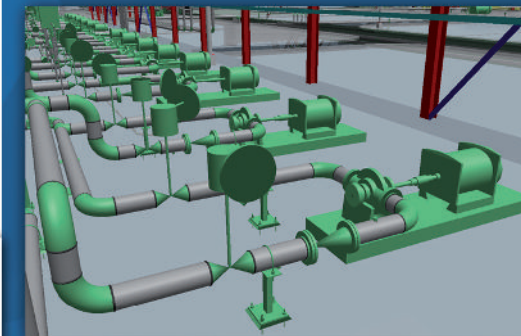
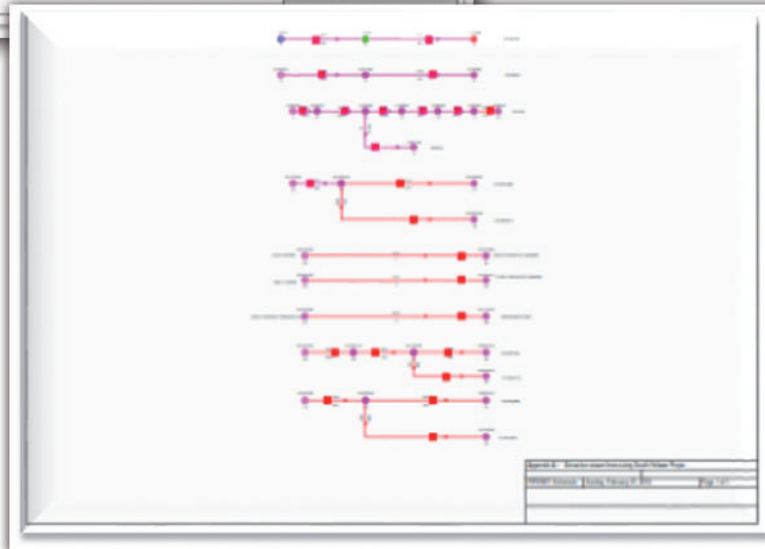
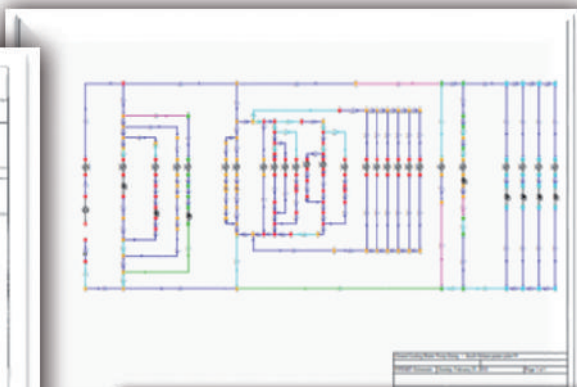
1. MFI heat balance Diagram.
2. Recommended fluid velocity chart, ISO-AF11-0001 Rev D.
3. Heater vents and drain system P&ID 10071-1-ME-AF-00023, 10071-1-ME-AF-00024, 10071-1-ME-AF-00025, 10071-1-ME-AF-00026, 10071-1-ME-AF-00027 and 10071-1-ME-AF-00028
4. AF system isometric drawing
5. Cold to hot steam system P&ID 10071-1-ME-AB-00003 and 10071-1-ME-AB-00004
6. Heat balance diagram for heater out of service cases

* Without attachments

A	Issued for Review	5	All Sheets 11 of 11	AFH	AFS	WW	11/6/2014
REV. NO.	REASON FOR REVISION	TOTAL NO. OF SHEETS	LAST SHEET NO.	BY	CHECKED	APPROVED/ACCEPTED	DATE

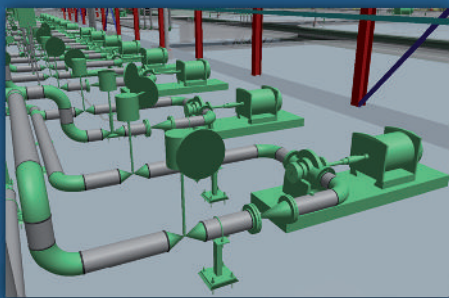
RECORD OF REVISIONS

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MECHANICAL ENGINEERING SERVICES



Equipment technical specifications

PGESCO specifications have been refined and optimized based on tens of projects installations and years of operations






TECHNICAL SPECIFICATION
10051-9-3PS-MUSG-00001
FOR
STEAM TURBINE GENERATOR(S)
AND
AUXILIARIES
FOR
CAIRO ELECTRICITY PRODUCTION COMPANY
CAIRO WEST THERMAL POWER PLANT
UNITS 7 & 8
2X350 MW GAS/OIL FIRED UNITS

POWER GENERATION ENGINEERING AND SERVICES COMPANY (PGESCO)
CAIRO, EGYPT

NO.	DATE	REVISIONS	BY	CHKD	APPROVALS
A	8/13/09	Issued for Review	SH	MM	MM
B	11/19/11	Issued for Bank Review	HR	SH	MM

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TECHNICAL SPECIFICATION
10049-9-3PS-MBPR-00001
FOR
HEAT RECOVERY STEAM GENERATOR(S)
FOR
WEST DELTA ELECTRICITY PRODUCTION COMPANY
NUBARIA POWER STATION III
750 MW (NOMINAL) COMBINED CYCLE PROJECT

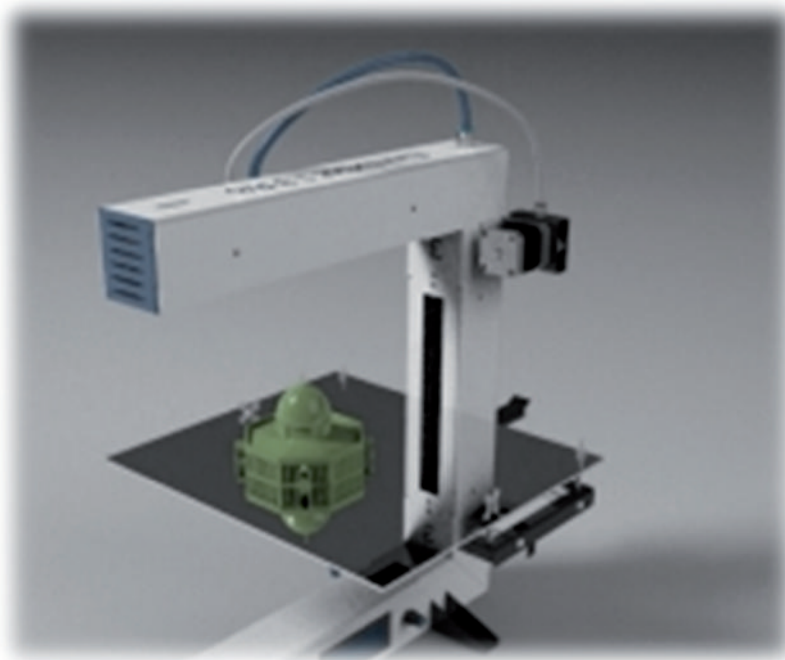
POWER GENERATION ENGINEERING AND SERVICES COMPANY (PGESCO)
CAIRO, EGYPT

NO.	DATE	REVISION	BY	CHKD	APPROVAL
0	9/4/06	ISSUED FOR BIDS	MF	SS	SS EA

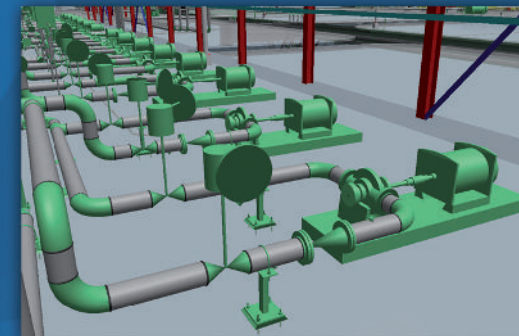
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MECHANICAL ENGINEERING TECHNICAL SPECIALISTS

- . Fired Heat Transfer Equipment (Boiler/HRSG).
- . Unfired Heat Transfer Equipment .
(Deaerator/Feedwater Heaters/Heat Exchanger).
- . Rotating Equipment (Compressors/Pumps).
- . Performance Test.
- . Firefighting/HVAC.
- . Water Treatment Group.
- . Environment.
- . Heat and Mass Balance.

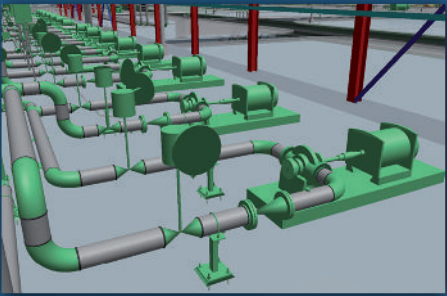


MECHANICAL ENGINEERING SERVICES





MECHANICAL ENGINEERING SERVICES



Unfired Heat Transfer Equipment (Deaerator/Feedwater Heaters/Heat Exchanger)

- Refine and Optimize Specifications for Unfired Heat Transfer Equipment
- Review Heat Exchanger Detail Design
- Review Deaerator Transient Condition Calculation
- Support Projects Engineers to Review any Technical Issues Related to Unfired Equipment.
- Prepare Study/Report for Technical Issue.
- Support Projects During Pre-Award Meeting and Other Technical Meeting
- Prepare and Issue Design Guide

Fired Heat Transfer Equipment (Boiler/HRSG)

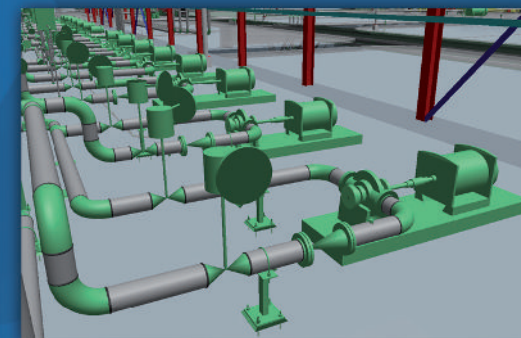
- Continuously Refine and Optimize Boiler/HRSG Specifications Based on Actual Operation Experience and Continuous Discussions With all the Leading Suppliers.
- Review the Detail Design of Boilers Components and Systems, Including Air System, Fuel System, Burner Design, Soot Blowing Design and Heat Transfer Section Design.
- Prepare Studies for Technical Issue Whether During Detail Design or Upon Request for Support from PGESCo Clients.
- Work with Projects to Evaluate Proposals, Prepare and Negotiate the Technical Aspects of the Contracts
- Prepare and Maintain Design Guides

Performance Test Group

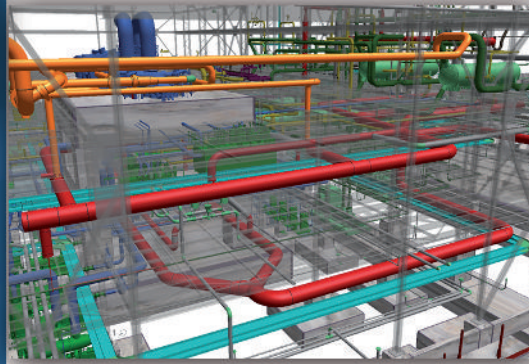
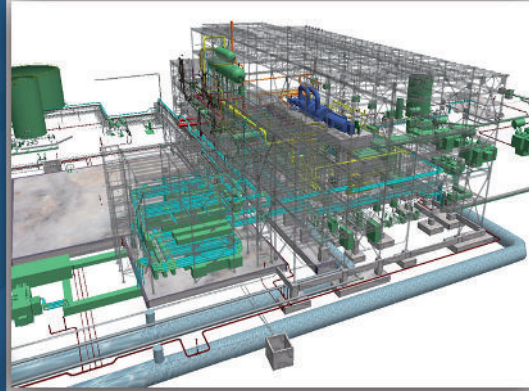
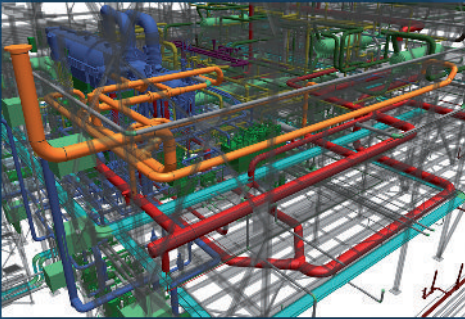
- Prepare Plant Performance Test Protocol Using ASME PTC or Other International Codes.
- Review Performance Test procedure Provided by Contractor.
- Witness units Performance Test.
- Analyze Output Data.
- Prepare and Issue Reports.

Firefighting/HVAC

- Refine and optimize Firefighting/HVAC specifications.
- Establish design basis for HVAC system.
- Detail design of plant wide Firefighting/HVAC.
- Review contractor submittals for Firefighting/HVAC.



PLANT DESIGN



PIPING & VALVES SPECIALITY

- . Issue Piping Material Classes.
- . Prepare Specifications and Material Requisitions for Piping, Valves, and other in-line Components, e.g., Expansion Joints, Traps, Strainers, etc.
- . Prepare Pipe Fabrication and Installation Specifications.
- . Prepare Pipe Insulation Specification.
- . Material Selection for Piping and Valves.

EQUIPMENT & PIPE LAYOUT DESIGN

- . Site layout Optimization.
- . 3D Modeling of Mechanical Equipment and Major Plant Commodities.
- . Design and Routing of Different Plant Piping Systems.
- . 3D Modeling of Piping, Fittings, Valves, Special Devices etc.
- . Ownership of Plant 3D Model and Exchange it with Contractors Models.
- . Run Model Review and Interference Checking of PGESCO Design and Contractors Commodities.

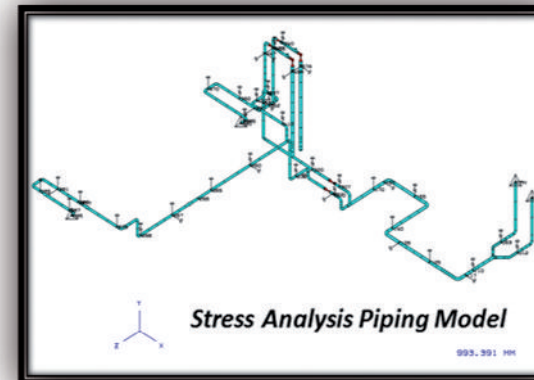
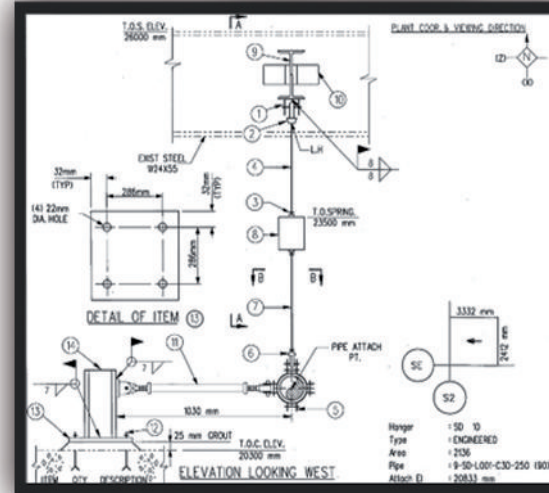
STRESS ANALYSIS

- Perform Computer Stress Analysis of Piping Systems Including:
 - Weight, Thermal, Wind, Seismic, Time History (Steam Hammer), Dynamic Loadings, and Provide Support Loads and Locations to the Pipe Support Group .
- Perform Transient Analysis .

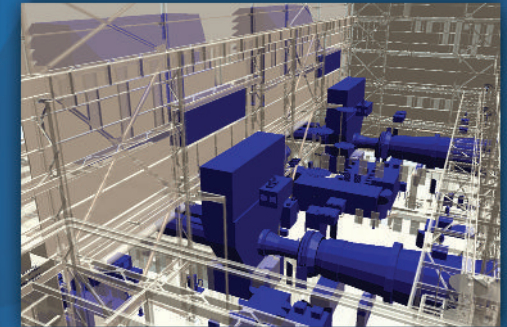
PIPE SUPPORT DESIGN

- Prepare Specifications for Fabrication and Installation of Pipe Supports.
- Prepare Requisitions for Procurement of Pipe Supports.
- Select Feasible Support Locations for Analyzed Systems.
- Select Support Locations and Type for Non-analyzed Systems.
- Pipe Support Design.
- 3D Modeling of Pipe Supports & Hangers.
- Analyzing Engineered Pipe Supports.

PIPING SUPPORT

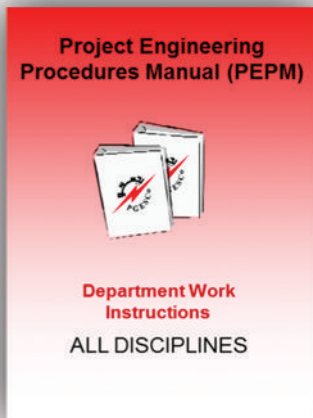
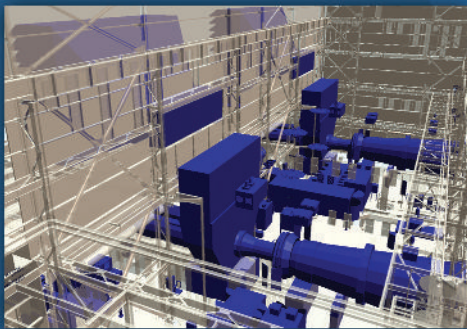


PLANT DESIGN





ENGINEERING QUALITY ASSURANCE & QUALITY



QUALITY ASSURANCE

- . Engineering Procedures & Instructions “EDPs, SEIs, GEIs & WPDs”.
- . Codes & Standards.
- . Standard Technical Specifications.
- . Continuous Training and Development of Engineers.
- . Audits Planning “internal & external”.
- . Risk Analysis & Assessment.
- . Documents and Records Numbering System.
- . Lessons Learned.

QUALITY CONTROL

- . Design Checklists
- . Documents & Drawings Register.
- . Calculation Register.
- . 3D Model Review Meeting.
- . Design Checkers.
- . Design Review Notice “DRNs”.
- . Coordination Forms.
- . Standard Drawings.
- . Standard Forms.
- . Risk Register.

- **Technical Specifications.**
- **Develop Project Environmental Impact Assessment.**
- **Coordinating and Managing Environmental Activities Between Financing Agencies such as the World Bank, African Development Bank and Client.**
- **Developing and Maintaining Environmental Monitoring and due Diligence Programs for Air, Surface & Groundwater, Noise, Traffic, Soil and Social Conditions.**
- **Writing Environmental Reports.**
- **Ensuring Project Compliance with Environmental Regulations.**

ENVIRONMENTAL





ENGINEERING SOFTWARE PLATFORM

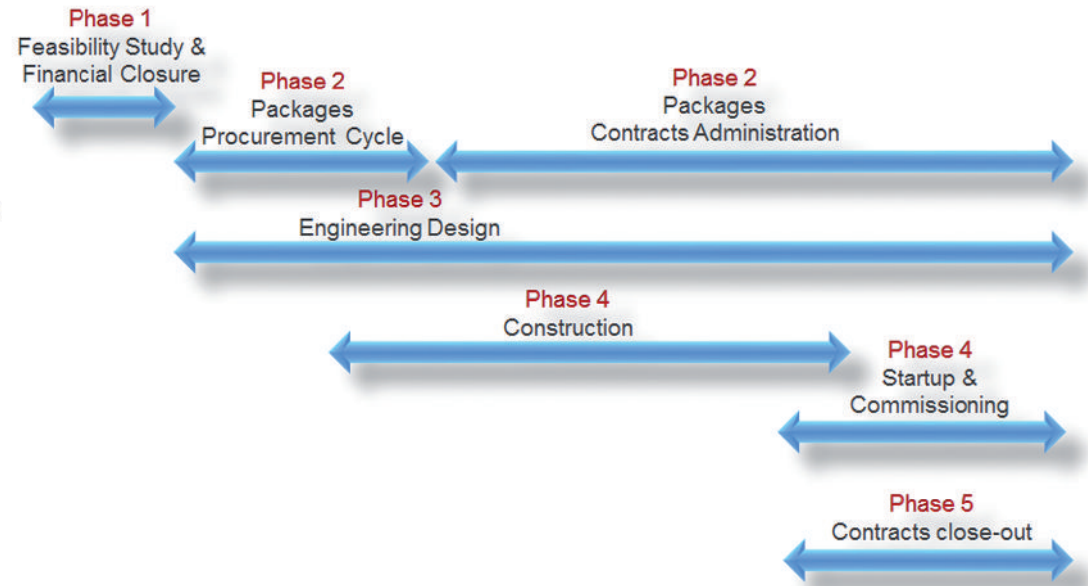
Architecture	ARCHICAD	Control Systems	Project Master
	MICROSTATION		
	Artlantis Studio		InfoMaker
Civil / Structural	GT Strudl	Mechanical / Process	WinSteam
	MATHCAD		PDS2D P&ID
	ANSYS		Gate Cycle
	SP MAT		PIPNET VISION
	SP COL		PIPNET VISION (Transient Module)
	Staad Pro	AFT Arrow 4	
	Tekla Structure	DFA (PGESCo Developed for Feed Water Heaters Drain Lines Sizing Analysis)	
	Plaxis 2D	Plant Design	3E Plus
	Plaxis 3D 2011		CAESAR II
	LPIPLE		PSD Frames (PGESCo Developed for Piping Supports Supplementary Steel Design and Analysis)
AUTOCAD		PSD Hangers (PGESCo Developed for Piping Hangers and Supports Design & Selection)	
Electrical	MICROSTATION	Smart Plant Enterprise Suite	SmartPlant 3D (SP3D)
	Staad Advanced Foundation		SmartPlant P&ID (SPPID)
	Grounding CDEGS		SmartPlant (SPEL) Import Manager
	ETAP		SmartPlant Instrumentation (SPI)
	AG Lighting		SmartPlant Review (SPR)
	PSS/E		SmartPlant Electrical (SPEL)
	PED (PGESCo Developed for Cable Desing)		SmartPlant Reference Data (SPRD)
	PVSOL Expert		SmartPlant Foundation (SPF)
PVSyst	SmartPlant Foundation (SPBI)		



PROJECT CONTROLS SERVICES:

- Planning and Scheduling
- Project Cost
- Estimating
- Monitoring and Reporting

In addition, the Estimating Function Maintains a Historical Cost Database and Skilled Resources to Support the Business Development and Proposal Process





PLANNING PROCESS

- Customer/PGESCo Expectations
- Scope of Work
- Facility Description
- Division of Responsibility Matrix (DOR)
- Implementation Methodology and Integration (Engineering, Procurement, Construction and Startup)
- Work Breakdown Structure
- Lessons Learned From Previous Similar Projects
- Execution Plan
- Integrated Cost and Schedule Control Methodology
- Integrated Detailed Schedules and Reports

PROJECT CONTROLS PLANNING & SCHEDULING

High Level Management Schedule Including the Major Project Milestones

Milestones Summary Schedule

Detailed Project Schedule Identifying All Engineering, Procurement, Construction & Startup Activities

Detailed schedules

Schedule Evaluation

Claims Evaluation

Planning & Scheduling

Developing Weekly/Monthly Work Plans Detailing Project Activity Lists

Short Term Work Plan

Tracking & Monitoring the Project Critical Path as Well as Corrective Actions Recommendation

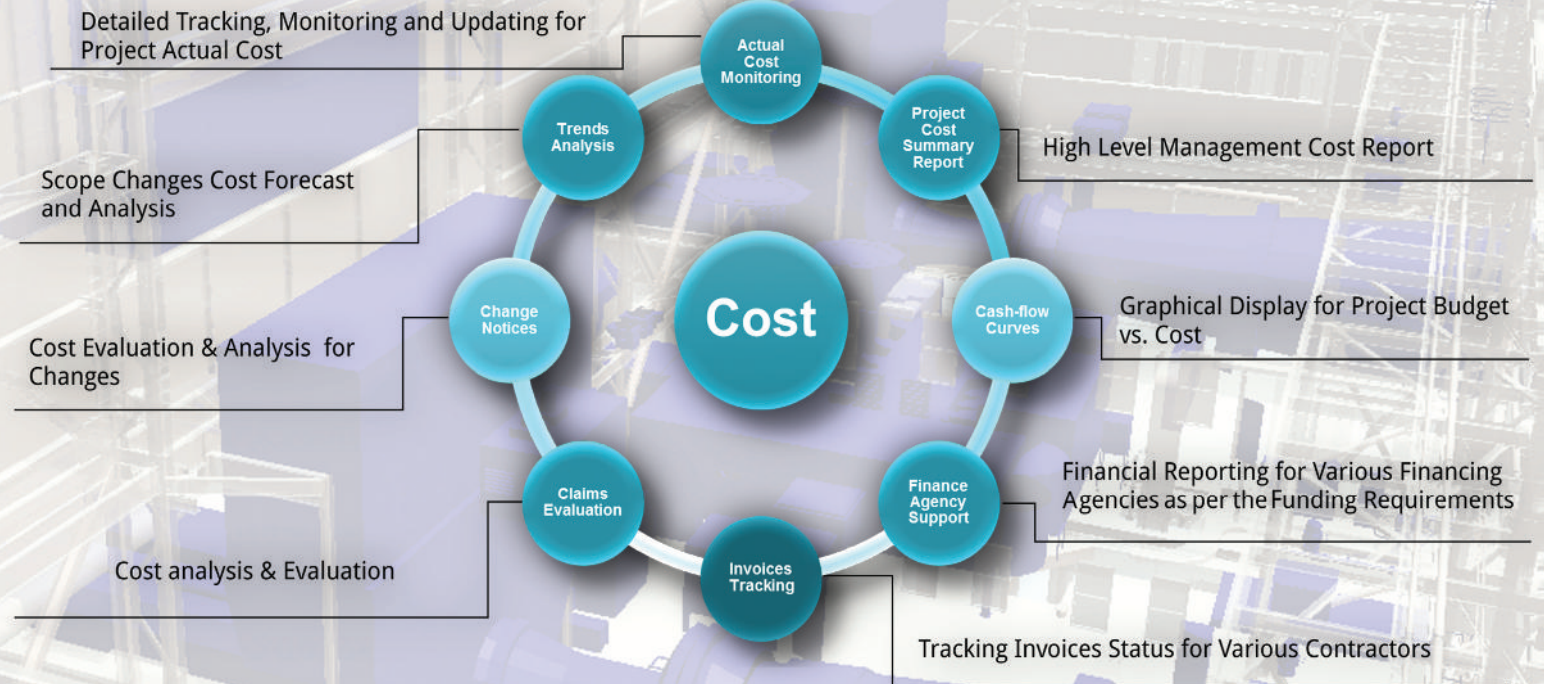
Critical Path Analysis

Bids Evaluation

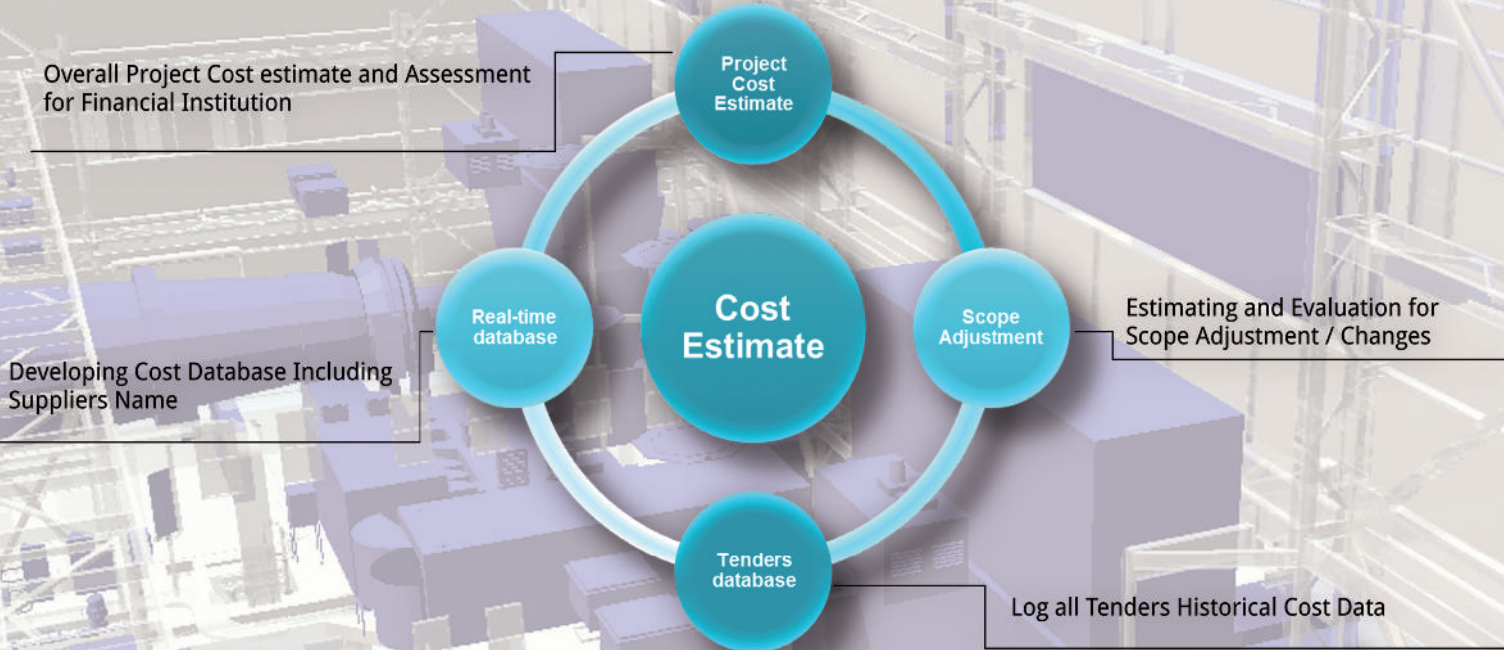
Schedule Evaluation, Clarification and Adjustment for All Bidders



PROJECT CONTROLS COST CONTROL

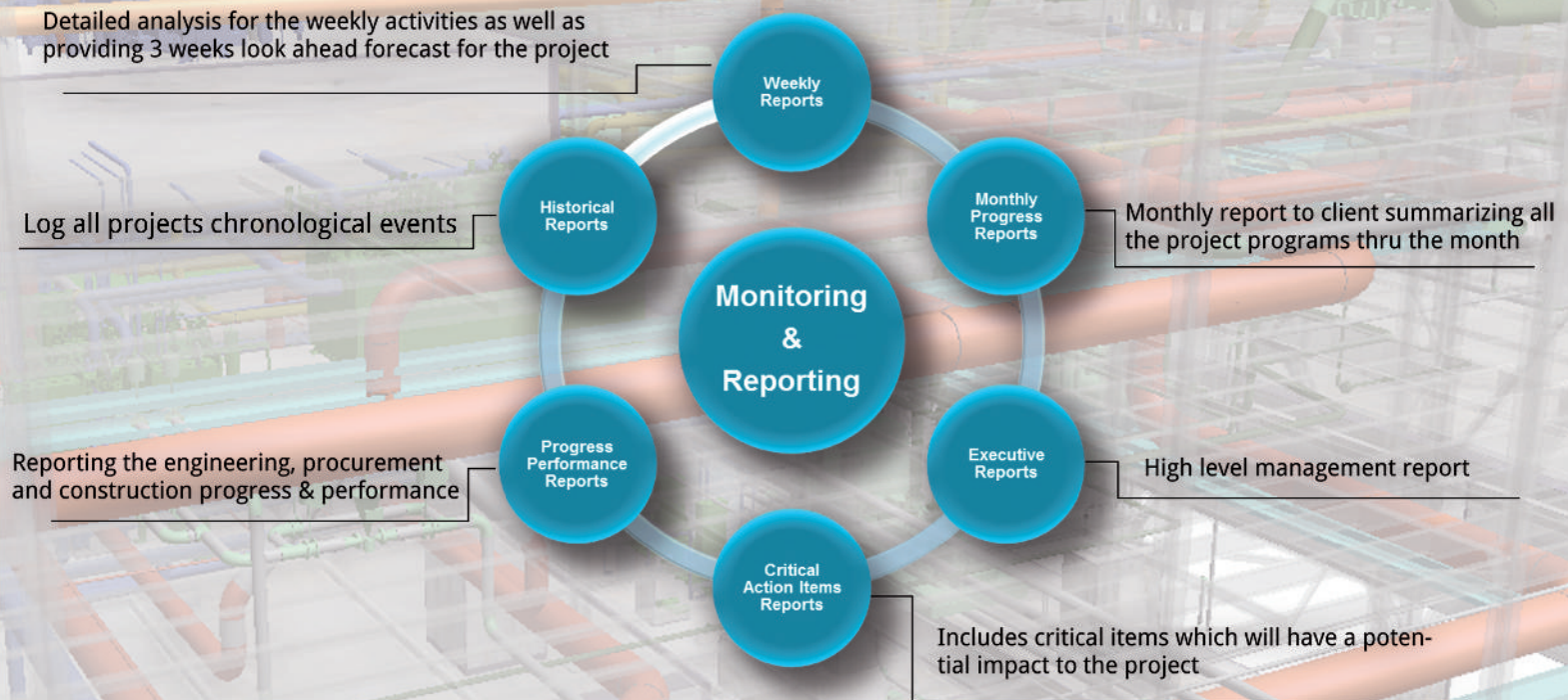
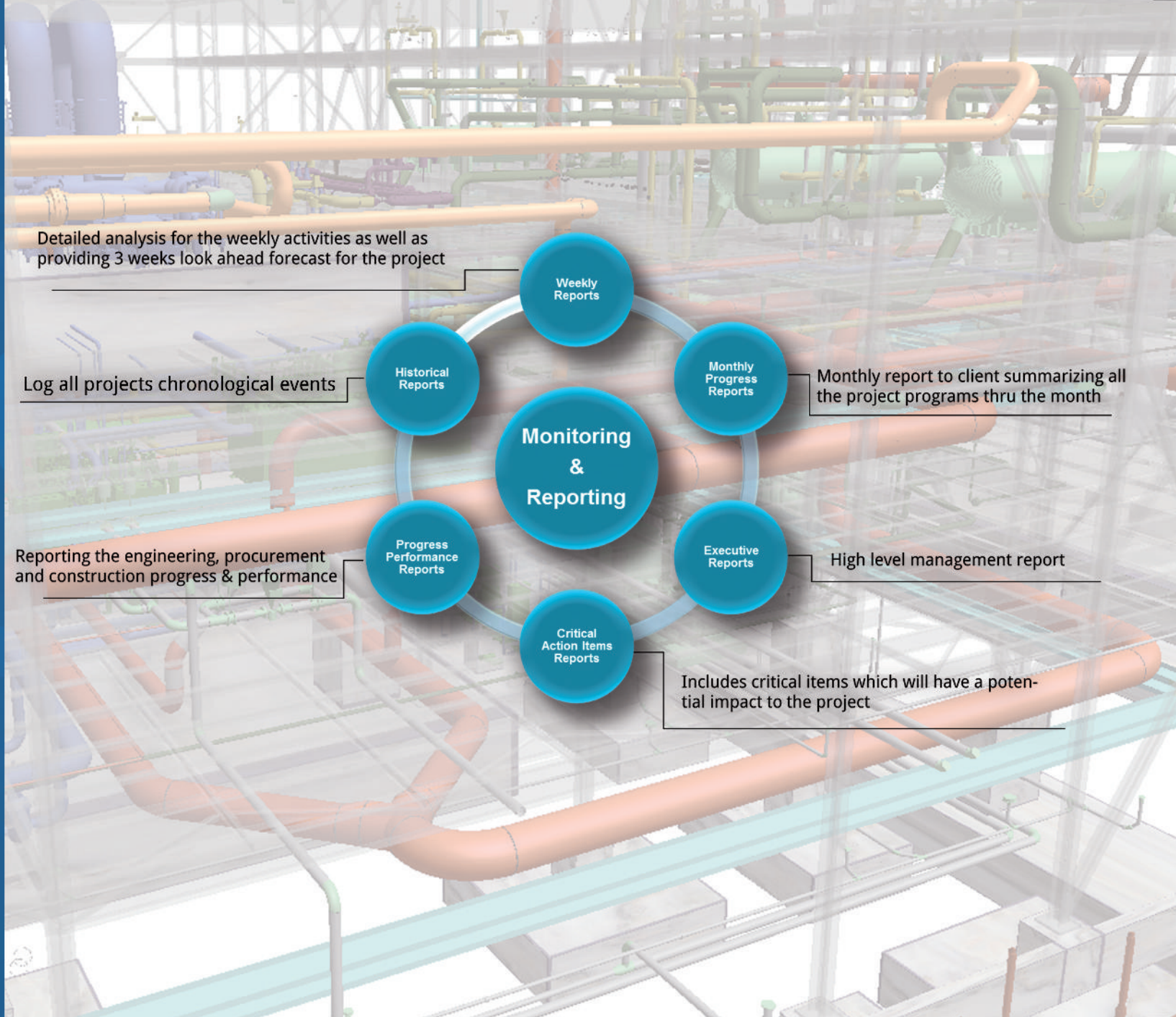


PROJECT CONTROLS PLANNING & SCHEDULING





PROJECT CONTROLS COST CONTROL



- Primavera
- Microsoft Office
- Milestones Professional
- Acumen Fuse
- Richardson Cost Estimate
- ROI (Financial model)





JOB SITE MANAGEMENT SERVICES

PGESCo Believes in Safety First, Then We Race to the end. From Site Tests to Contractor Interface, Our Team is on Schedule Rising up to your Highest Expectations Every Step of the Way .

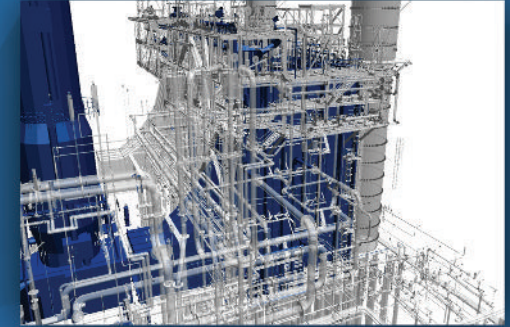
The Integrated Project Jobsite Team can Perform the Hereinafter Tasks During the Job site activities Execution.

CONSTRUCTION MANAGEMENT

- . Receive Contractor at Site via the kick off Meeting and Supervise Contractor Mobilization.
- . Review Contractor Resources Adequacy with Workload in Accordance with Schedule.
- . Review and Approve all Contractors Key Personnel Qualification.
- . Supervise all Material Delivery, Receiving, Storage and Handling in Accordance with Drawings and Specifications.
- . Review and Interpret Contractors' Drawings and Specifications.
- . Carry Out a Schedule-Monitoring Program.
- . Supervise the Construction Work.
- . Review Heavy Equipment Handling/Lifting Plans and Supervise their Execution.
- . Coordinate the Interfaces Among the Contractors and Resolve any Issues Concerning the use of Space (Coordinate and Sequence the Accessibility by the Various Contractors to the Different Work Area).
- . Conduct Periodic Coordination Meetings with the Contractors.
- . Supervise and Attend all Construction Testing Activities and Approve its Results .
- . Conduct Systems Walk Down .
- . Follow up System Punch List Closure and Turn Over to Startup and Commissioning .
- . Determine Construction Progress and Recommend Progress Payments.
- . Monitor Work Progress & Determine Extra Work and Changes.
- . Review Field Modifications and Provide their Disposition.
- . Review Test Procedures and Coordinate Engineering Comments on Field Construction, Field Surveys, Tests, Laboratory Services and Startup Management Activities.

STARTUP AND COMMISSIONING MANAGEMENT

- . Develop/Review Startup Schedules and Prepare an Integrated Startup Master Schedule.
- . Coordinate Contractors' Startup and Testing Activities.
- . Finalize Startup Scoping Drawings in Details after Design Completion.
- . Develop/Review Startup and Testing Procedures.
- . Manage and Authorize Work Permits.
- . Supervise Suppliers/Contractors' Startup and Testing Activities.
- . Establish and Control Work Permit Processes.
- . Review O&M Instructions Submitted by the Contractors.
- . Verify the Performance and Acceptance Testing of Equipment in Accordance With Previously Established Procedures and in Full Compliance With Design Specifications.
- . Prepare Turnover Schedule and Packages.
- . Assist Owner Operating Staff in Becoming Familiar With Operating the Plant, the Performance and Testing Procedures Relating to Performance Testing of Major Mechanical and Electrical Equipment and Overall Station Performance Tests.





ES&H MANAGEMENT

- . Review ES&H Plans for all Contractors During the Tender Evaluation.
- . Issue and Update ES&H Specification and Contract ES&H Requirements as a Minimum Requirements for Contractors ES&H Site Implementation.
- . Ensure Contractors Understand their ES&H Obligations by Participation on Pre-tendering, Procurements, Contract Evaluation & Pre-mobilization.
- . Develop the ES&H Requirements on Execution Plan.
- . Review and Approve Contractors ES&H Staff & Qualifications.
- . Review All Work Permits, Risk Assessments, Lifting Plans, Methods Statements, ES&H Training Programs, Medical Surveillance, Waste Management, Hazard Communications, and Others.
- . Coordinate Site ES&H Construction, Startup & Commissioning Activities.
- . Conduct ES&H Site Inspection and Issue of Corrective Actions / Nonconformance Reports.
- . Coordinate Site Emergency and Evacuation Plan & Drills.
- . Investigate Incidents & Near Misses and Issue of Lesson Learned.
- . Review All Environmental Measurements and Ensure Compliance With Laws and Regulations.
- . Review Licenses and Certifications and Conduct Inspection of Equipment's before Allowing Site Operation.
- . Coordinate, Lead Site ES&H Meetings and Site Walkthroughs.
- . Conduct Several ES&H Training for PGESCO/ Client's Employees.
- . PGESCO is Certified for ISO 14001 & OHSAS 18001.

• **PUNCH LIST PROGRAM**

Program Controls all Punch List Items (ownership Open & Close) for every Contractor Included with severity Category Leveling.

• **IO LIST PROGRAM**

Program Controls all Loop and Functional Checks for every Contractor.

• **DAILY REPORT PROGRAM**

Program Manages all Daily Reports Issued by the Construction Engineers that Shows Daily Activities Attached with Site Photos.

• **BIM PROGRAM**

BIM (Building Information Management) Program Manages the Steel Structure Work Process Starting from Engineering, Purchasing, Fabrication, Delivery, Handling and Erection.

• **LESSON LEARNED PROGRAM**

Program Captures Lessons Learned for Running Jobs to be Utilized in Future Jobs Enhancement and Improvements.



DOCUMENT CONTROL / RECORD MANAGEMENT

- Receipt of all Project Documentation.
- Control and Classify According to Assigned Document Numbering System as Per PGESCO Standard Numbering System or Client Specific System.
- Logging and add all Project Documentation to the Project Data Base (ProjectWise).
- Log Out for the Project Documents & Issue Transmittals.
- Distribute all Project Document Types Distributed as the Project Distribution Matrix.
- Maintain Project Retention Plan.



The screenshot displays the ProjectWise Explorer V8i (SELECTSeries 4) interface. The main window shows a list of documents with columns for Name, Created By, Standard Document Number, and Title. The list includes various documents such as SKIAINT DATA SHEET, GROUT DATA SHEET, SINGLE LINE DIAGRAM, MOTOR CONTROL CENTER GENERAL..., MCC SINGLE LINE DIAGRAM & GENER..., MCC CATALOGUES & CERTIFICATE, CABLE DESIGN CALCULATION, CABLE TRAY DATA SHEET, POWER CABLE LIST, CONTROL & INSTRUMENT CABLE LIST, ELECTRICAL LOAD LIST, I/O LIST FOR DCS INTERFACE, WTP & WWTP PLC SYSTEM I/O LIST, UNINTERRUPTIBLE POWER SUPPLY SVST..., SHORT CIRCUIT CALCULATION, LIGHTING POLES DATA SHEET & CAT..., RIGID STEEL CONDUIT (RSC) & FITTING..., EMBEDDED CONDUIT FOR LIGHTING P..., CHLORINATION PLC SYSTEM I/O LIST, ALUMINUM CONDUIT & ACCESSORY..., WTP PLC SYSTEM ARCHITECTURAL, CHLORINATION PLC SYSTEM ARCHIT..., FLOW SWITCH, INSTRUMENT HOOK UP DIAGRAM, INSTRUMENT INDEX, WTP & WWTP PLC CONTROL PANEL F..., and CHLORINATION SYSTEM-PLC CONTR...

Below the document list, the Project Properties (Project Type - General) are displayed:

Property	Value
Project Name	1005_Suez
Project Number	1005
Budget	0
Project Manager	
End Date	
Start Date	
Country	
Percent Complete	0
Project Status	
Project Status 2	
Review External	21
Review Internal	16



PRIME CONTRACTS & PROCUREMENT

PGESCO Uses Multi-Package and Turnkey Contracting Systems Depending on The Client Requirements and Costs Optimization opportunities.

Also Uses Competitive Tenders, Setting All Technical Terms and Commercial Conditions to Evaluate Bids.

SCOPE

Prime Contracts (Formation and administration of contracts between PGESCO and Clients).

Project Procurement.

Contract/Purchase Order Administration.

PRIME CONTRACTS MAIN TASKS

Contractual Risk Identification & Assessment

Preparation of Different Types of Agreements such as:

- Non-Disclosure Agreements.
- Memoranda of Understanding.
- Joint Venture Agreements.

Review Terms and Conditions Provided by Clients and Identification of Required Changes.

Contract Negotiations and Conforming Contract Documents to Incorporate Agreement Between Parties.

Prime Contract Administration (Invoices/Changes/Amendments, etc.)



PROJECT PROCUREMENT PRE-AWARD

- Development of Contracting Plan Depending on Client needs .
- Pre-qualification of Tenderers and Evaluation of their Capabilities Based on Previous Experience, Financial Standing, Technical Capabilities and Safety Records etc.
- Development, Review and Issuance of Tender Documents in Accordance with Owner and Financing Requirements and Procedures.
- Coordinate Tendering Period Activities such as Conducting Pre-tender Meetings, Issuance of Addenda, etc.
- Evaluation of Tenders Received and Issuance of Recommendations of Award to Owner.
- Conducting Pre-award Negotiations with Successful Tenderer/Conforming Contracts.



Typical Range: 17-22 Contract and Purchase Order Packages
(Client is Electricity Utility)

Contract Packages – Supply & Installation Scope

- Combustion Turbine Generator.
- Civil Works.
- Environmental Monitoring .
- Switchyard.
- Heat Recovery Steam Generator/Boiler .
- Steam Turbine Generator.
- Yard Tanks.
- Wrap-Up Insurance.
- Water And Waste Water Treatment.
- Elec. Equip./Instrument. Install.
- Mech. Equip./Pipe Install.
- Intake And Discharge Off-Shore.
- Site Services.

Purchase Orders – Supply only

- Pumps And Drives.
- Feed Water Heater.
- Critical Piping And Valve.
- Power Transformers.
- Distributed Control System.
- Desalination Plant.
- Medium And Low Voltage Switchgears.



EPC MODEL OF MULTI-PACKAGE CONTRACTING PLAN FOR POWER PLANTS

Typical Range: 50 Material Requisitions
(Client is EPC Contractor)

List of Material Requisitions

List of Material Requisitions

- | | | |
|--|--|--|
| <ul style="list-style-type: none">* Overhead Bridge Cranes and Gantry Crane CTG.* Overhead Bridge Cranes and Gantry Crane STG.* Water and Wastewater Treatment Package.* Hoists, lifting Devices and Monorails.* HVAC For GIS (Switch GEAR and Control Room).* HVAC For CTG.* HVAC For STG Buildings and Control Building.* HVAC for Balance of Plant.* All field Erected Tanks.* Non Metallic Tank.* Fire Water Pumps, Drives and Controllers.* Sump and Vertical Pumps.* Fire Protection Systems and Equipment (GIS , GIS Control , Central Control Building and Gas Station).* Fire Protection Systems and Equipment (BOP).* Compressed Air Plant Package.* Service Water Pumps. | <ul style="list-style-type: none">* Water pumps.* Emergency Shower and Eye/ Face Wash Stations.* Conical and Wye Strainers.* Valves.* Nitrogen Bottle Gas Distribution System.* Hydrogen Bottle Gas Distribution System.* Carbon Dioxide or Argon Bottle Gas Distribution System.* Hydro-Pneumatic Tank* Sanitary Sewage Lift Station Equipment/Pumps.* Elevators.* A/G Supports / Pipe Rack .* GIS and GIS Control. Buildings: Telecommunication system.* CTG and Central Control Buildings: Telecommunication system.* Others Buildings: Telecommunication System.* GIS, GIS Control, CTG and Central Control Buildings: Lighting Panels.* Others Buildings :Lighting Panels. | <ul style="list-style-type: none">* UPS & DC System.* Distribution Transformers and LV Switchgear (Load Center).* Cathodic Protection System (Tanks).* Cathodic Protection System (U/G Piping).* Flow Elements.* Temperature Elements.* Pressure Gauges.* Level and P/DP Transmitters.* General Service Control Valves.* Tubing & Racks.* Tanks Accessories. |
|--|--|--|

- . Issuance of Contractual Correspondence.
- . Change Management: Issuance/Tracking of Change Notices and Preparation of Contract Amendments.
- . Claims Management and Settlement.
- . Review/Processing of Invoices.
- . Follow-up and Monitoring of Submittals, Documentation, Guarantees, Insurance Coverage, Back Charges.
- . Administration of Supplier Quality Program/Plan and Manufacturing Inspection.
- . Support of Owner During Arbitration Procedures.
- . Processing and Negotiation of Insurance Claims.
- . Assessment of Contractual Liquidated Damages for Performance and/or Delays.
- . Issuance of Completion Certificates.
- . Contract Closeout Activities.
- . Local and international Expediting.



EXPEDITING SERVICES

Expediting Services

- Material Tracking Systems
- Integration with other Project schedules and Deliverable

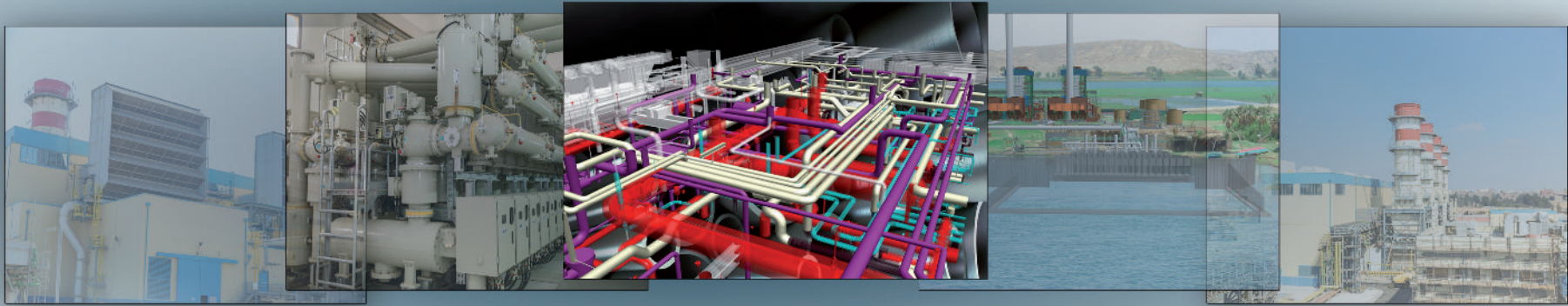
Item Description	Vendor/Country	Procurement									
		Placing Order					Receiving at Workshop				
		Planned	Forecast	Variance Forecast	Actual	Variance Actual	Planned	Forecast	Variance Forecast	Actual	Variance Actual
Equipment/Material Furnished by Supplier											
Vertical can-type condensate pumps complete with electric motor drives and accessories											
Unit 1	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/2/29	16/2/29	0	16/2/29	0
Unit 2	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/2/29	16/2/29	0	16/2/29	0
Motor driven HP/LP feedwater pumps complete with electric motor drives, accessories and individual automatic recirculation system											
Unit 1	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/5/9	16/5/9	0	16/5/9	0
Unit 2	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/6/6	16/6/6	0		
Anchor Bolts and Embedded Items(LP/HP FP)											
Unit 1	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/2/4	16/2/4	0	16/2/4	0
Unit 2	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/2/4	16/2/4	0	16/2/4	0
Startup & Commissioning Spare Parts and Special Tools(LP/HP FP)											
Unit 1	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/6/23	16/6/23	0		
Unit 2	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/6/23	16/6/23	0		
Anchor Bolts and Embedded Items(CEP)											
Unit 1	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/2/4	16/2/4	0	16/2/4	0
Unit 2	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/2/4	16/2/4	0	16/2/4	0
Startup & Commissioning Spare Parts and Special Tools(CEP)											
Unit 1	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/6/3	16/6/3	0		
Unit 2	South Korea	15/12/31	15/12/31	0	15/12/31	0	16/6/3	16/6/3	0		

Extensive Experience in Interface with Multiple Financing Agencies in:

- Preparation of Bid Documents in Accordance with Guidelines
- Coordination of Bidding Process
- Coordination of Reviews and Approvals of Tender Documents, Contract Documents, Amendments, etc.

INTERFACE WITH FINANCING AGENCIES





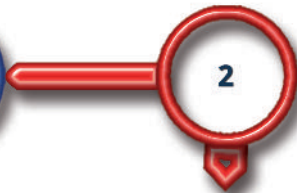
QUALITY MANAGEMENT

**Training and awareness sessions
for integrated management
system**



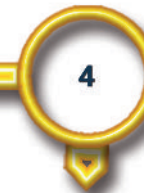
**Second party audits on contactors
and suppliers & conduct internal
audit for certified client who
haven't its own team**

**Integration of multiple
management systems**



**Certification of ISO 14001 (EMS),
Environmental Management
System establish**

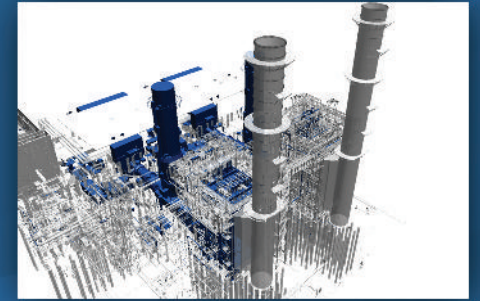
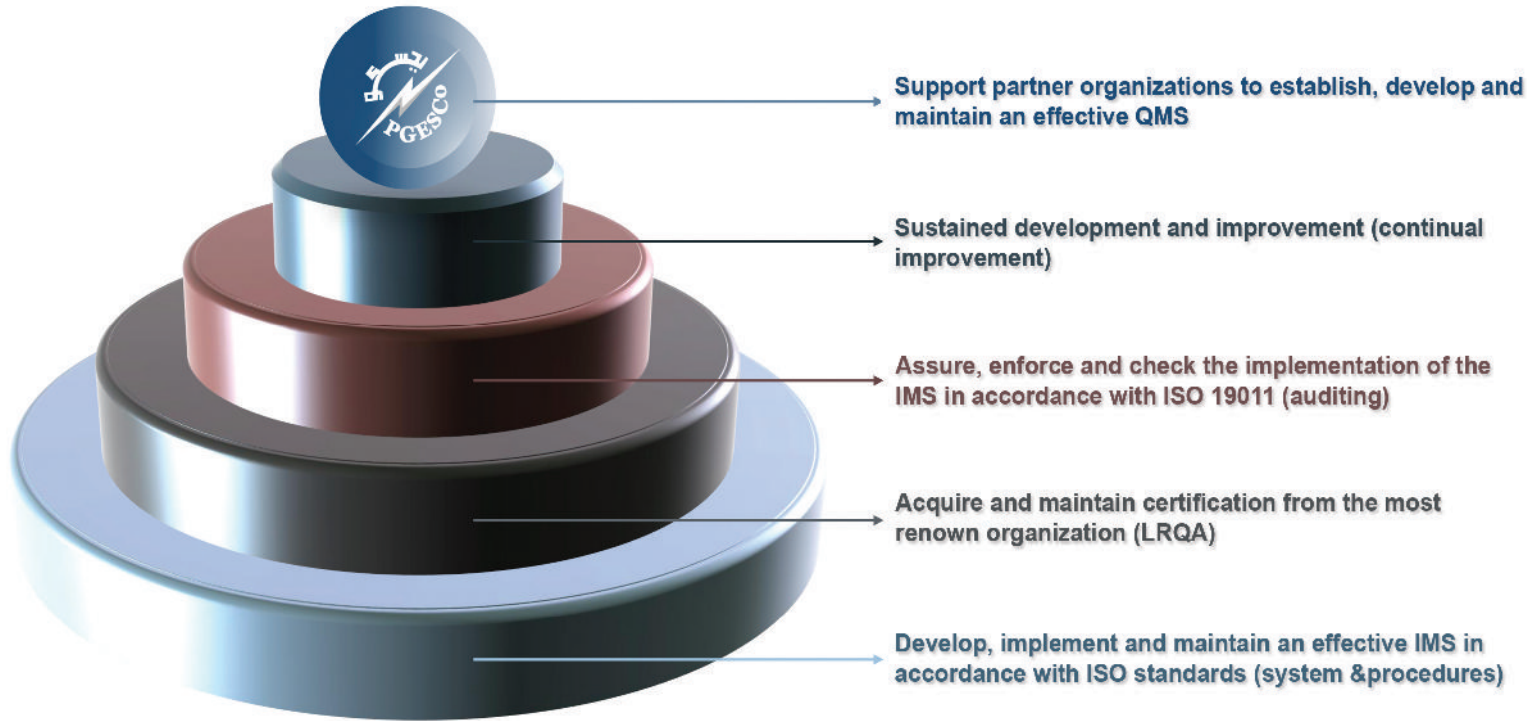
**Certification of OHSAS 18001
(OH&S), Occupational Health and
Safety Management System**



**Certification of ISO 9001
(QMS), Quality Management
System**

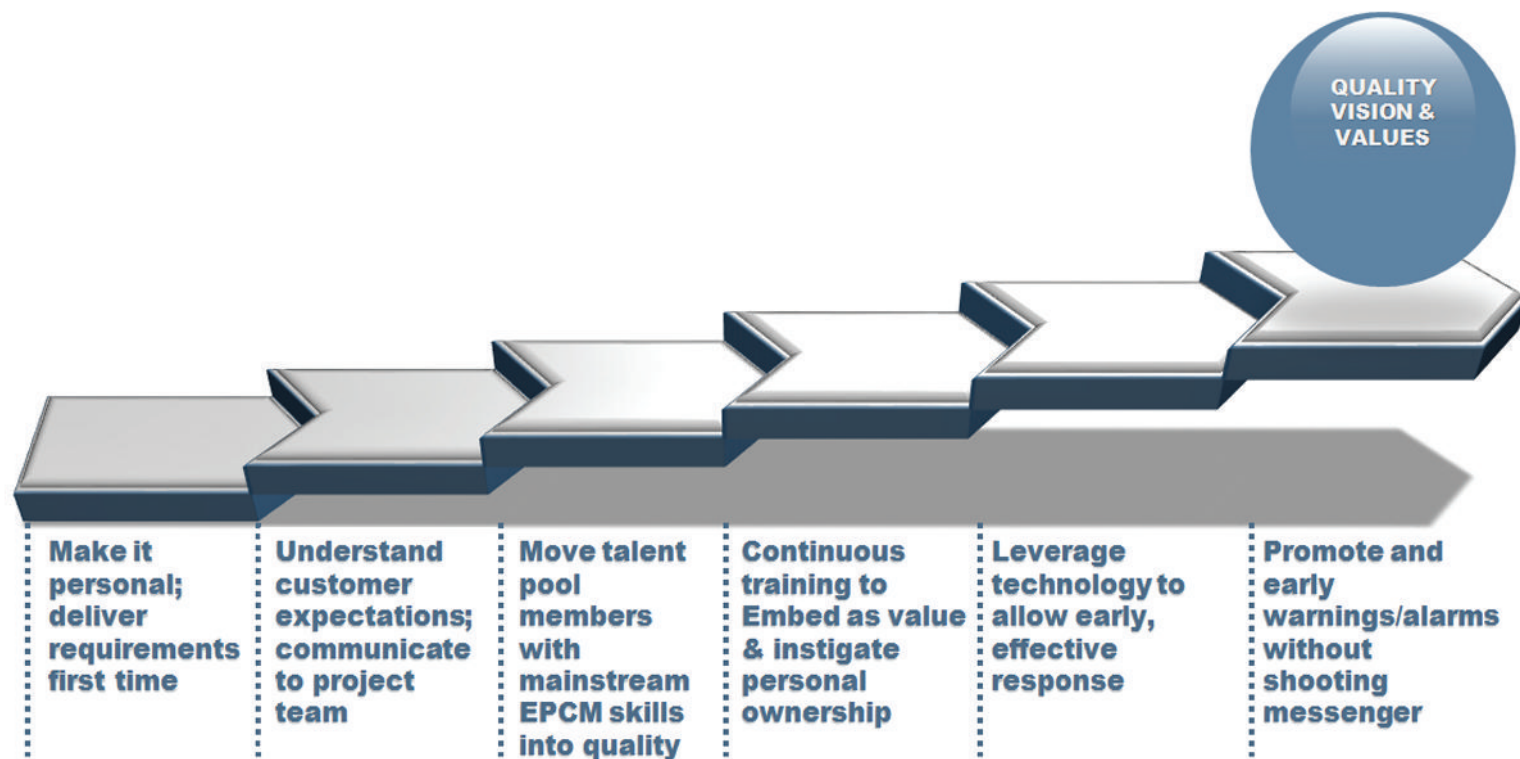


QUALITY MANAGEMENT MISSION








QUALITY MANAGEMENT VISION & VALUES





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