



TCO Future Growth Project - Wellhead Pressure Management Project Construction Contractors' Forum

FGP-WPMP Major Construction Scope Overview

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Presentation Overview

- 3GP Mechanical, Electrical & Instrumentation
- 3GI Mechanical, Electrical & Instrumentation
- Gathering Area Mechanical, Electrical & Instrumentation
- Gathering Area Pipelines



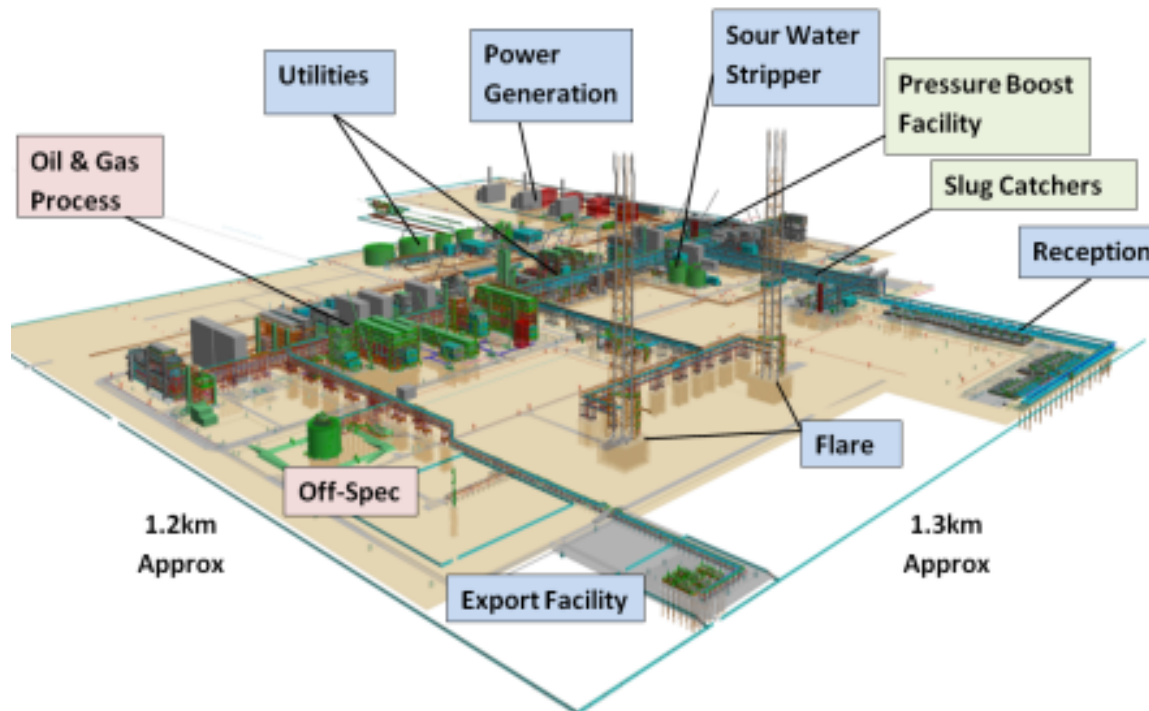
3GP – Mechanical, Electrical & Instrumentation

Scope of Work Summary

- Module re-integration and hook-up
- Stick-built construction of steelwork
- Piping & Mechanical equipment installation
- Insulation, painting, fireproofing
- Electrical/instrumentation cable and device installation
- Erection of permanent buildings

Preliminary Metrics

Field man hours	~ 20 Million
Contract Award	Q3 2017
Installation of First Module	Q2 2018
Construction Finish	Q3 2021
Footprint	1.5 km ²



3GP Consists of -

- 69 Modules
- 142 PAUs
- 46 Pipe Racks
- 13 Skids
- 8 Substations
- 2 Flares



3GP – Mechanical, Electrical & Instrumentation

Key Work Scopes

- Module re-integration and hook-up of 142 pre-assembled units from Korea into 69 Modules at Tengiz. Gross weight of 140,000 tonnes (cut of First module steel planned for Q1-2017)
- Installation of 46 pipe racks from Kazakhstan. Gross Pre-Assembled Racks (PAR) weight of 41,000 tonnes (fabrication has commenced)
- Installation of 5 modularized Frame 9 Gas Turbine Generators from Italy. Fabrication is 45% complete. First shipment planned in Q2-2018
- Stick-build installation of Structural Steel, Piping & Mechanical Equipment Insulation, Painting, Fireproofing
- Over 2,300,000 meters of Electrical, Instrumentation, Telecom cable and device installation
- Erection of 23 permanent buildings



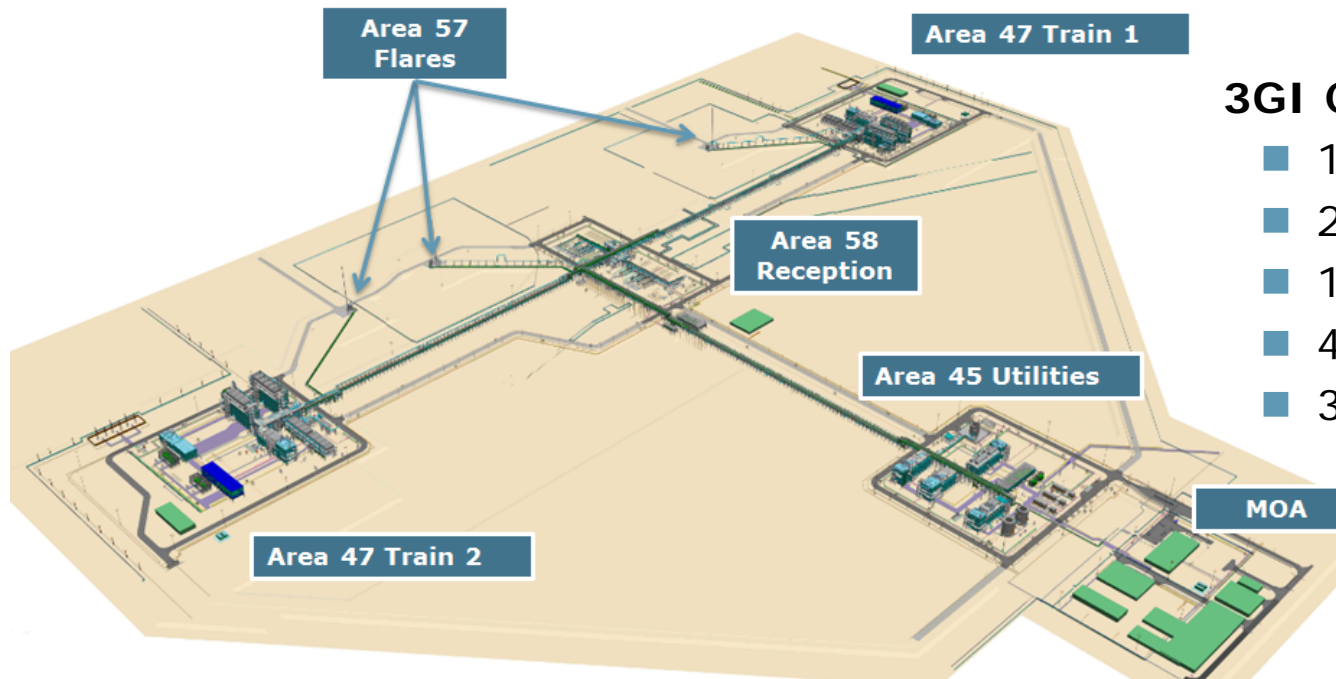
3GI – Mechanical, Electrical & Instrumentation

Scope of Work Summary -

- Module re-integration and hook-up
- Stick-built construction of steelwork
- Piping & Mechanical equipment installation
- Insulation, painting, fireproofing
- Electrical/instrumentation cable and device installation
- Erection of permanent buildings
- Welding of F22 Pipe

Preliminary Metrics

Field man hours	5 Million
Contract Award	Q3 2017
Construction Finish	Q3 2021
Footprint	4 km ²
Stick built steelwork	4,000 Te



3GI Consists of -

- 19 Modules
- 29 PARs
- 1 Skid
- 4 Substations
- 3 Flares



3GI – Mechanical, Electrical & Instrumentation

Key Work Scopes

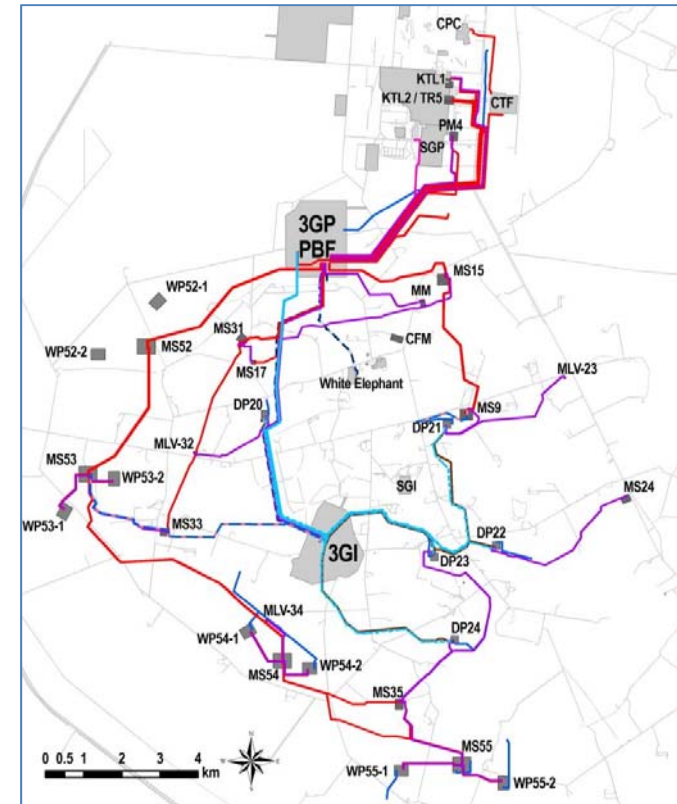
- Module re-integration and hook-up of 35 pre-assembled units from Korea into 19 Modules at Tengiz. Gross weight of 41,000 tonnes (cut of First module steel planned for Q1-2017)
- Installation of 29 pipe racks from Kazakhstan. Gross PAR weight of 7,700 tonnes (fabrication has commenced)
- Stick-build installation of Structural Steel, Piping & Mechanical Equipment Insulation, Painting, Fireproofing
- Over 430,000 meters (including 210,000m underground) of Electrical, Instrumentation, Telecom cable and device installation
- Erection of 4 permanent buildings



Gathering Area MEI Contract

Multi Well Pads, Metering Stations, and Modifications to Facilities

- Site Preparation
 - Soil removal and leveling
 - Transportation and installation of fill and surface material
- Civil Works
 - Pile installation
 - Concrete foundation (pre-cast and in-situ)
- Mechanical and Piping
 - Specialist F22 Welding
 - Pipe Prefabrication and installation
 - Steel Erection
 - Equipment Installation
- Electrical and Instrumentation
 - Cable Installation
 - Termination
 - Device Installation
- Construction Services
 - Document Control
 - Dewatering and water disposal
 - QA/QC
 - Logistics and transportation
 - Material Handling/Storage/Preservation
 - Pipe Cleaning



Metrics

Direct man hours	15-20 MM
Contract Award	~Q3 2017
Construction Finish	~Q3 2021
Stick built steelwork*	approx 4,000 Te
Piles*	approx 9,000
Concrete*	approx 80,000 M ³

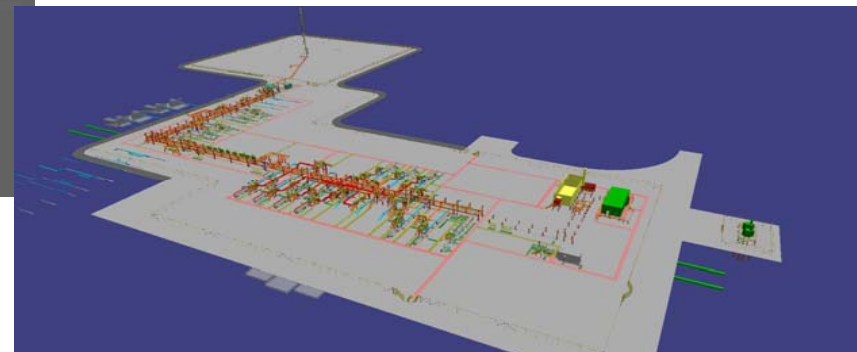
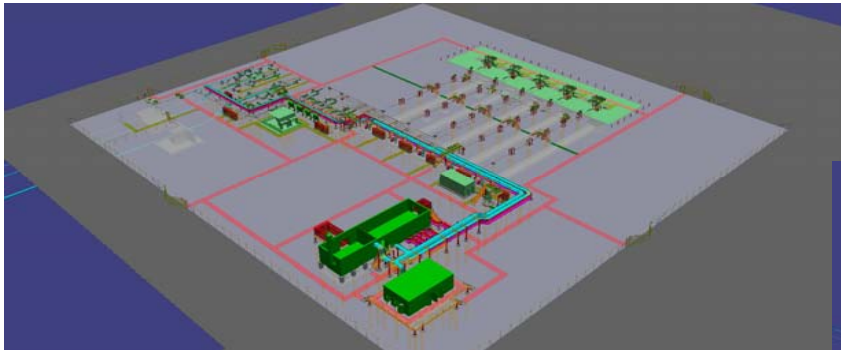
* Includes materials installed under other contracts



Area 51D – Production MWP

- 8 5-Well Pads (WP)
- 4 Meter Stations (MS)
- Remote Instrument Enclosures (RIEs), substations
- Civils, Piping, valves, manifolds, structural steel, piles, equipment
- Clad Piping
 - Company issued pre-fabricated CRA clad spools for production flowlines from each well

Greenfield WP52-1 & MS52

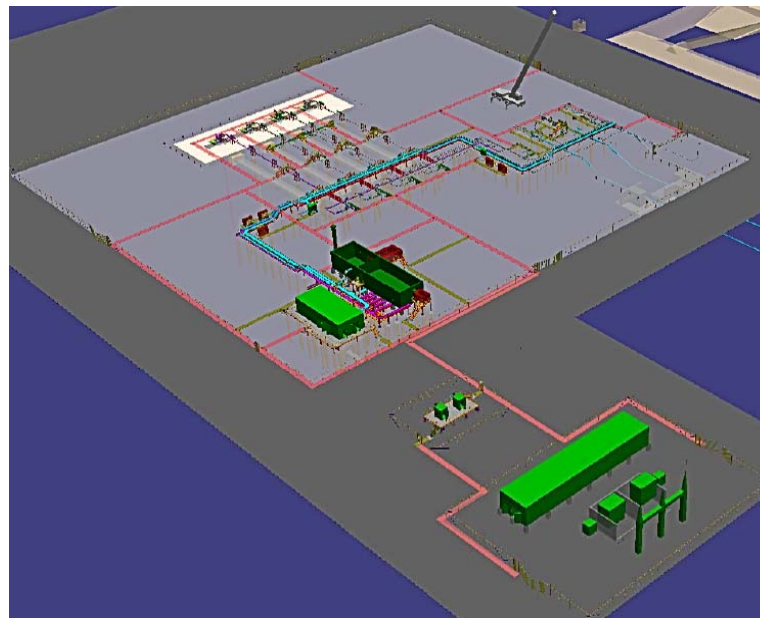




Area 51B – 3GI MWP

- 5 Drill Pads
- 3 wells to be drilled at each MWP
- Remote Instrument Enclosures (RIEs), substations
- Civils, Piping, valves, manifolds, structural steel, piles, equipment
- F22 (heavy wall) piping welding

MWP – DP20

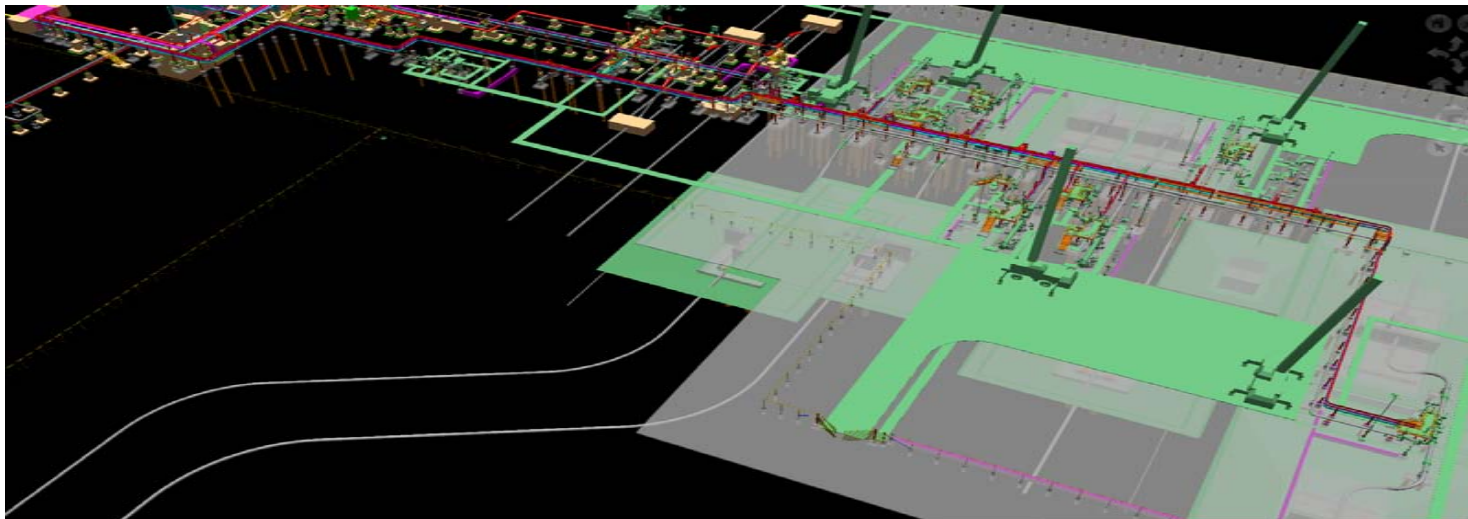




Area 51E – Brownfield Modifications

- Approximately 26 locations require brownfield modifications
 - New facilities and equipment
 - Tie-Ins performed during shutdowns
- TCO Operations retain control of Brownfield sites
- Work associated with Brownfield locations shall be performed while the location is operational

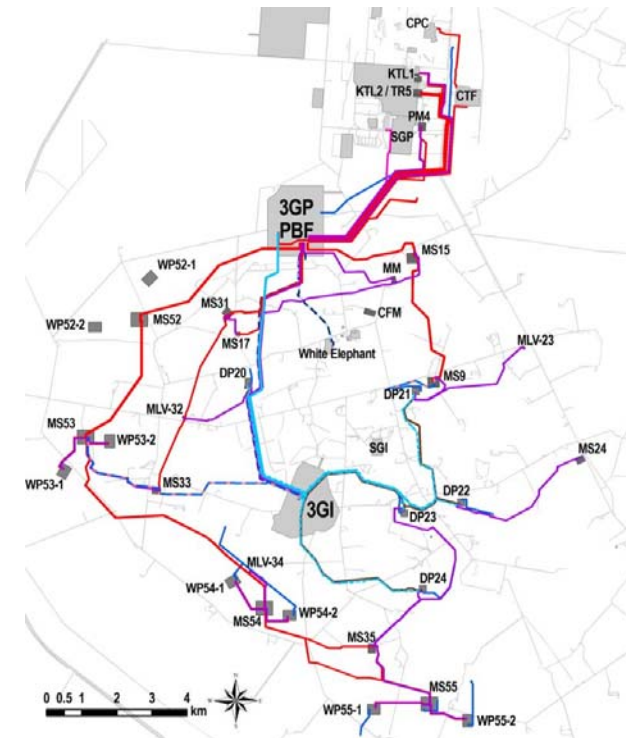
Brownfield - MS31





Pipelines Scope Package

- ~ 380km Pipelines
 - Production Gathering System
 - High Pressure Sour Gas Injection
 - Utilities – water, fuel gas, diesel
- ~ 1,800 Pipeline and 2000 cable, O/H line, road, track and SOR Crossings
- ~ 160 Concrete anchor blocks, often in or around existing facilities



Metrics

Field man hours	5 Million
Contract Award	3Q 2017
Construction Finish	3Q 2021
Footprint	500 km ²



Pipelines

- Pipelines support production gathering system, high pressure sour gas injection and various utilities
- Ninety-five (95) pipelines totaling 381 km in length
 - Eighty-two (82) steel pipelines totaling 349 km in length
 - Thirteen (13) plastic pipelines totaling 32 km in length
- Steel pipelines range in outside diameter (OD) from 4" to 26"
 - Wall thickness for non-HPHT ranges from 6.02 mm to 20.6 mm
 - Wall thickness for 3GI HPHT (heavy wall) pipelines is 57.5 mm
- Plastic pipelines range in outside diameter (OD) from 7" to 16"
 - Wall thickness ranges from 18.2 mm to 30.8 mm
- Construction scope battery limits are generally between the inlet flanges on the pig traps



Crossings

Group	Number of Crossings	Total
Pipeline Crossings – Existing Lines	1,540	1,790
Pipeline Crossings – FGP Lines	250	
Buried Cable Crossings	350	350
Overhead Line Crossings	1,150	1,150
Roads and Track Crossings	360	360
SOR area Crossings	110	110
Total	3,760	3,760



Summary

- Large, complex construction contract awards expected Q3 2017
- Subcontracting opportunities remain for Kazakhstani companies

