Pipeline Construction Project

Products
- LPG / Propane Piping with Ship Unloading Platform
- Crude Oil, Petrol, Diesel Piping with Platform
- Cross Country Oil/Gas Pipeline
- Ammonia Storage Vessels and Piping
- CO2, H2, N2 and other Industrial Gas Pressure Vessel
- Stainless Steel Storage Tanks and Vessels
- Fire Water Tanks and Piping
The detailed scope of work tendered includes design, engineering & procurement, installation, testing and commissioning along with all associated works pertaining to complete pipeline system.
CODES, STANDARDS AND SPECIFICATIONS

All welded work, equipment for welding, heat treatment, other auxiliary functions and the welding personnel shall meet the requirements of the codes, standards and specifications listed with the latest edition:

- ASME B 31.8 – Gas Transmission and Distribution Piping Systems
- ASME B 16.9 – Wrought steel butt-welding fittings
- ASME B 31.3 Chapter V - Fabrication, Assembly and Erection
- ASME B 31.3 Chapter VI - Examination, Inspection and Testing
- ASME BPVC Sec. II Part C - Welding Rods, Electrodes and Filler Metals
- ASME BPVC Sec. V - Nondestructive Examination
- ASME BPVC Sec. IX - Welding and Blazing Qualifications
- API 5 L – Specification for line pipe
- API 6 D – Specification for steel gate, plug, ball and check valves for pipeline service
- API std 1104 – Standard for welding pipelines and related facilities
- EN 12186 – Gas supply systems – Gas pressure regulating stations for transmission and distribution – Functional requirements
- NACE RPO-0274-93 Recommended Practice, High Voltage Electrical Inspection of Pipeline Coatings Prior to Installations
1. Design
2. Engineering
3. Planning
4. Procurement
5. Resources
6. Storage & Handling
7. Site Occupation
8. Construction Procedure
   - Quality Assurance Plan
   - Painting
   - Prefabrication
   - Pipe joint Set up
   - Welding
   - NDT Inspection
   - Joint Wrapping/Painting
   - Holiday Test
9. Quality
10. Safety
11. Aboveground Piping
12. Underground Pipeline
   - Pipe section Pre-Fabrication
   - Excavation for trench
   - Underground Laying of pipe sections
   - Field joint fabrication inside trench
   - Backfilling
   - Crossing
13. Subsea Pipeline
   - Barge Selection
   - Barge Modification
   - Onshore prefabrication on Rollers
   - Pushing Pipe sections with floaters
   - Lifting floating pipe section at barge
   - Field joint fabrication at barge platform
   - Unloading from Barge
14. Ship Unloading Platform
15. Offshore/Onshore Tie-in
16. Hydro-test of pipeline
17. Pre-Commissioning
18. Commissioning
Pipeline design includes:

- Selection of the route traversed by the pipe
- Determination of required rate of fluid/solid transport The operational velocity
- Calculation of pressure gradient
- Selection of pumps and other equipment
- Determination of pipe thickness and material
- Engineering economic analysis
- Safety
- Leak Prevention
- Ease of Maintenance etc
- Government regulations
- Environmental Concern
Pre-engineering, conceptual engineering, detailed engineering addressing the economic aspects of pipelines.

This phase ensures design is correct, safe and cost effective.

Implementation of design requirement by translating into technical specification that describe a system that the engineer is personally responsible for knowing said correctness and safety of the system.
We at Optech formulate the project from the owner's perspective and its effectiveness in project control is demonstrated. This provides client multiple opportunities for decision making in continuously changing project circumstances keeping eye on the completion timeline and budget.

A methodology is proposed for project control through risk analysis, contingency allocation and hierarchical planning models.

A cross-country pipeline construction project is exposed to an uncertain environment due to its enormous size (physical, manpower requirement and financial value), complexity in design technology and involvement of external factors. These uncertainties can lead to several changes in project scope during the process of project execution. Unless the changes are properly controlled, the time, cost and quality goals of the project may never be achieved.
The procurement process lies on the projects critical path and therefore it is essential to set up the process using the approach of strategic procurement. Setting the right strategy shall affect the efficiency of procurement process hence will bring positive influence to project schedule performance.

As being in core piping domain for several years, Our technical & commercial intelligence in market makes us to know what is required, where to source, how to mobilise and most importantly ensuring optimum Quality and cost.

Our Customisation, Integration, Innovation and Delivering strategies contribute in project control and significantly assist client to perform within budget.
Resources

Mobilizing and providing:

- Equipment's
- Manpower (skilled and unskilled)
- Material supply
- Consumables
- Services including logistics, power, liaisoning, and other resources etc. as required for the execution of complete work.
Storage & Handling

Loading, transportation, unloading, handling, and stacking of material at worksite(s)/workshop till the pipes are installed in permanent installation.
Site Occupation:

- As soon as the Contract is signed and permitted, the Optech team will proceed with the setting-up of the site installation as agreed with the Owner according to relevant approved drawings.
- The site shall be levelled, sealed and hardened with a layer of murrum soil.
- It must be possible to reach the site with trucks and cars from the public road.
CONSTRUCTION
PROCEDURE

- Painting of pipes & fitting
- Prefabrication
- Pipe Joint Set up
- Pipe Joint Welding
- QA/QC/NDT inspection
- Joint Wrapping/ Coating
- Holiday test for painting/coating
- Aboveground/Underground/
  Subsea Field Joint Fabrication
- Hydro-test
Pipe are cleaned by surface blasting to the standard surface finish.

OEPL painters are highly skilled professionals in optimising the quality and quantity of paint.
Prefabrication

Allows to start mechanical construction from 1st day, without hindering civil work schedule.
Joint Set up

Joint set shall meet the standard joint profile mentioned in Welder Procedure Qualification.
OEPL has a brigade of Qualified welders with years of experience in domain at any point of the time.
Heat Shrink Sleeve Application at Joint
Quality

Conformance to the requirement shall be achieved by:

- Qualification of Man-Material-Machine
- Work procedures
- Each stage inspection and control
- Well documented Records
- Example, snap shows stage inspection of Joint set up, welding, NDT, Holiday test etc
SAFETY

All work must be performed in consideration of all risk assessments, applicable operating instructions for technical equipment, work processes and hazardous substances as well as environmental aspects. Before commencing work, an agreement must be signed with the client with regard to health, safety, and environmental protection.

Optech team believe in safe system of work is the only shortcut to hit the target and have completed such Projects with zero LTI.
Aboveground Piping
Typical Aboveground ex.

- Common Uniform Manifold
- Product Mass Flow Meter Unit
- Pig Launcher
- Fire Hydrant
UNDERGROUND PIPING
Pipe laying,
Joint Set up,
Welding inside trench
Postweld Pipelay Inside trench
Special provisions at Road/Culvert Crossings
SUBSEA PIPELINE
Subsea Pipeline will be constructed in two modules:

- Onshore Prefabrication of pipe sections
- Subsea field joint with the help of barge/vessel.
Barge Selection
Barge Modification with lower Level Platform
Onshore Prefabrication
On Rollers

- A concrete platform with pipe roller will be constructed to facilitate shore to water transition.

- Opening of 1st pipe end will be sealed with blind and provided with pulling lug.

- Pipe joints then fabricated on the roller platform in sequence.
Pipe Buoyancy & Floaters

- Pipe Buoyancy is calculated and Buoyancy force is provided by the floaters.
- Pipe sections will be pushed in Ocean during high tide.
- These sections will be carried out by tug boat to safe parking area and adequately anchored to restrict unwanted movement with waves.
- Part of these sections near shore rest on bed during low tide without affecting floaters and floated again with full tide.
Pipe Section Lifting at Barge Platform

- Barge will positioned at the location of subsea field joint and firmly anchored.
- The floating pipe sections will then be carried by Tug boat and aligned with barge Platform.
- Pipe ends to be joined are then lifted by Crane on the barge within pipe bending limits.
- Barge platform has adequate facilities to align the pipe end for fabrication.
Fabrication at Barge Platform

- Tie the pipe ends with chain pulley and position as required.
- Remove pipe caps by cutting.
- Joint set up
- Welding
- NDT inspection
- Joint coating by Heat Shrink sleeve Application
- Holiday test
- Final approval by TPIA for unloading from barge.
Unloading from Barge
Ship unloading platform / Jetty
Hydro-test

- The pipeline will be tested for strength and leak at pressure 1.5 times of design pressure.
- Hydro-test will be conducted in Pipe sections.
- Prior to hydro-test, line will be cleaned by air blowing or pigging.
- Post hydro-test dewatering will be done by pigging or air blowing.
- Pipeline will be preserved with nitrogen purging in case of delayed commissioning.
Commissioning

• Pipeline will be intended to commission immediately after the Hydro-test.

• Pre-commissioning is the series of processes carried out on pipeline system to prove its ability to contain final product without leak.

• Team will inspect all the components installed are correct according to standards, fit for the purpose and verified with the records.

• A pre commissioning punch list will point out all the non conformities and team will ensure they are acted upon.

• The process during which the pipeline is made "live" i.e. the product is put in the pipeline, is called pipeline commissioning or start-up.

• After successful clearance and regulatory approval, line will be made live.
Thank You!