Danish Defense Estates &
Infrastructure
Organization

Bilag 2

SPECIFICATION
PIPELINE INSPECTION
PIGGING CONTRACT

VERSION 1.0

Pipeline Skrydstrup - Hohn
Inspection of 6" pipeline.

CONTENTS.

1. Introduction

The *'Danish Defense Estates & Infrastructure Organization'* (DDEIO) wishes to perform an inline corrosion inspection project for inspection of the 6" pipelines from Danish Depot 841 Skrydstrup to the Danish/German border. The pigging tool will have to travel the full distance between the Danish depot and the German Depot in Hohn.

The project is also implemented in cooperation with the *'Danish Defence Supply Agency* (DDSA) who are responsible for daily operation and maintenance of DDEIO pipelines.

This document is part of the tender material for potential pigging contractors.

Description of the pigging project

The full pipeline distance between the depot in hohn, Germany and Skrydstrup, Denmark is 122 km, which will be the full travel distance for the pigging tool. However, it is only the distance from Depot Skrydstrup in Denmark to the Danish/German border that needs to be inspected. A distance of approximately 44 km.

The launcher/receiver in depot Skrydstrup is for normal pigging tools, with a length of 650 mm. Prefabrication of launcher/receiver to match the intelligent pigging tools, has to be done by the contractor. The works and economy for this, has to be included in the tender.

The main scope for the pigging contractor is to carry out an intelligent pigging inspection, that contains an intelligent deformation measurement as well as an ultra sonic measurement of corrosion/metal loss. This must be done by using an intelligent calibration pig as well as an intelligent measuring pig and pass these through the 6" pipeline system.

The pigging contractor must document the findings of the pigging inspections in a final report.

2. Requirements to quotation from pigging contractor

The quotation for the intelligent pigging inspection must include the works described in section 3 taking the details regarding workspace of section 4 and pipeline line date of section 5 into consideration.

Besides this the quotation must contain main deliverables:

- Intelligent measurement of deformations in the 6" pipelines.
- In-line corrosion inspection of corrosion in the 6" pipelines using the ultrasonic technique.
- Assessment of all inspection data into a final report for the pipeline given by table 1.

The quotation for the inspection tool must contain the information according to the relevant sections of chapter 4 in appendix *"Specification and requirements for intelligent pig inspection of pipelines"* version 2021.

Requirements to intelligent pigging tools

The pigging contractor must provide tools with sufficient equipment to fulfil the following minimum requirements:

- The measuring method for the corrosion inspection tool must use the ultra sonic measuring principle
- The corrosion inspection tool must be able to distinguish between the following features:
    - Deviations in wall thickness.
    - Internal and external corrosion.
    - Pittings.
    - Cracks.
    - Lamminations.
    - Roling laps.
- When a feature is detected the tool must be able to determine length, depth and width of this as well as the circular and longitudinal position of this.
- Equipped with a unit to determine features with x,y,z coordinates (GPS).
- The calibration tool must be able to detect dents and deformation of the pipeline.
- All tools must be approved according to the ATEX directive

The tender shall include a description of how the tools fulfill the above listed requirements.

Requirements to the report
The result of the intelligent pigging examination must be presented in a 'Final Report' including executive summery. The documentation must be handed over in 4 hard copies as well as 4 copies on CD/USB.

The report must contain data and information as specified in appendix *"Specification and requirements for intelligent pig inspection of pipelines"* version 2021, and for each pipeline include detailed information on the following issues:

- Executive summary.
- Intelligent calibration report
- Ultrasonic inspection report
- Feature lists (with GPS coordinates of all features found on the pipeline)
- Fitness- for-purpose report
- Evaluation of lammination defects (incl. GPS positions) split into two tasks:
  Task1: Qualitative categorization of lamminations.
  Task 2: Fracture and Fatigue assessment of Laminations according to BS7910.

The report must as minimum, if relevant, include 15 inspection sheets describing severity, type and location of individual features with identification of metal loss, flaws, dents and pinhole detection wall thickness, type, location etc.

The fitness-for-purpose report must take into account that the requirement for pigging interval is 15 years. All features must be identified with calculated repair dates as well as estimation of corrosion rates based on industry best practice if data is not present. Features with repair dates before next pigging interval must be accessed.

Time schedule
The pigging inspection is planned[1] between June 20 and July 01 2012. The works described in this document shall be performed during this period. The overall planning is as follows:
Setup, preparation and intelligent calibration pig run, and also the intelligent corrosion pig run is to take place from June 20 at the earliest, and to finished at July 01 at the latest..

The works of the pigging contractor must be coordinated with the construction manager and a detailed time schedule must be worked out in co-operation before the pigging inspections begin.

If the pigging inspection is not completed within the above period due to delays caused by the pigging contractor the employer shall be entitled compensation from the pigging contractor for any suffered losses.

The final report must be handed within 8 weeks after completion of the pigging inspection. The works is not considered complete until the handover of the report.

[1] The period may be subjected to adjustments. The time schedule must be confirmed during the contract negotiation.

3. Scope of work for the pigging inspection

The matrix below gives the scope of work. The matrix splits the works between the pigging contractor (this specification) and other contactors. "Other" includes DORSA, DDEIO and DDSA as well as their piping contractors. The purpose of other contractors is to prepare and re-establish the pipeline before and after the pipeline inspection as well as to aid the pigging contractor during the inspection.

Scope of work		
	Pigging contractor	Other contractors
Preparation of Inspection (off site)		
Site survey (preferably 1 week before inspection start).	X	
All necessary working permits for own crew.	X	
Detailed planning relevant for Pigging contractor.	X	
Detailed planning relevant for Other contractors.		X
Mobilization of inspection personnel and operation specialists.	X	
All expenses for accommodation and meals for pigging contractor.	X	
In-country personnel mobilization (to/from site).	X	
Mobilization of equipment from pigging contractor to site, where inspection work is to be performed.	X	
Supply of pipeline details and maps as well as product sample.		X
Analysis of product sample.	X	
Phase 1. Pipeline cleaning		
Pipeline preparation.		X
Pipeline passage clearance and cleaning. Cleaning program: Run 1: Medium density Foam pig. Run 2: Pig fitted with gauge plate. (Pigging contractor must confirm diameter of gauge plate)		X
Phase 2. Temporarily modifications to pipework		
Mounting and installation of prefabricated launcher and receiver traps	X	
Temporarily modifications to pipeline routings and manifolds.		X
Provision of workshop facilities such as power, light and heating.		X
Phase 3. Pigging Inspection.		
Transportation of pigging tools to site	X	
Setup pigging contractor field base.	X	
Instruction meeting with personnel from DDEIO/DDSA and other contractors.	X	
Delivery of TBMS (Time Based Marker System) boxes.	X	
Placing of TBMS (Time Based Marker System) boxes.	X	
Technical and mechanical preparation of pigging equipment.	X	
Testing and commissioning of pigging equipment.	X	
Qualification test.	X	

Scope of work

	Pigging contractor	Other contractors
Pre-inspection setup, rigging.	X	
Inspection equipment setup, test etc.	X	
Tool for pulling pig into launcher chamber.	X	
Pigging Inspection Run 3: Intelligent calibration Run 4: Intelligent pigging	X	
Dismounting (incl. tools for pulling pig out) intelligent pigs in receiver trap Hohn Germany	X	
Disposal and handling of all waste emanating from pipeline.		X
Phase 4. Re-establish		
Reestablish pipeline routing at pits and manifolds.		X
Dismounting (collecting) of temporarily items (Pumps, TBMS boxes etc.).		X
Provision of cleaning facilities to clean equipment after operation. (If necessary).		X
De-mobilization of equipment and personnel from Denmark to contractor base and transportation of pigging equipment from site to contractor base, including craneage of equipment.	X	
Read-out measurement data, data backup and submission to data analysis department.	X	
Analysis of inspection data.	X	
Preparation and delivery of pigging inspection report.	X	
Meeting to present the results of the pigging inspection	X	

4. Details and special considerations

Health & Safety

The pigging contractor must work according to the Health & Safety (H&S) regulations for working on DORSA, DDEIO or Shell areas respectively.

H&S regulations as well as any site-specific instructions are obtained from the construction manager. At entry to the site and before working the pigging contractor must seek information and follow regulations regarding the H&S regulation for work in ATEX classified zones and make sure that this is deployed among the employees. Further information is obtained from the construction manager.

5. Pipeline Data.

Basic Pipeline data for 6" pipelines:

Pipe nominal diameter:	168.3 mm
Nominal wall thickness:	5,56-7, mm^2
Steel Grade:	API 5L Grade B
Pipe type:	Seamless
Minimum bending Radius:	1.5D
Valve type:	6" ball or gate valves, fully open
Internal volumen :	18.6 l/m
Largest disc size of alu-disc caliper:	152.5 mm
Product type:	F35
Operating temperature:	Ambient

The wall thickness of the pipe can be interpreted as a higher design pressure. However this is not the case the design pressure stated for the DDEIO pipelines are given at a higher safety factor than normal. In the report the pigging contractor shall calculate this safety factor and base the conclusions in the report upon the margin between this safety factor and the commonly used safety factor of 1.39.

Price in total ex VAT _____