

DRAFT

Practical Pigging Training Course

Programme

CTDUT Test Loop Brazil

27 April – 1 May, 2009

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27 February 2009

Day 1 – Introduction to pigging

0745 Depart Pestana Rio Atlantica Hotel, Copacabana

0845 Arrive CTDUT

0845 – 0900 Registration, safety information, general information, course introduction and overview of 5-day schedule.

0900 – 1030

1. Introduction and history of pigging
 - a. What is a pig? Where does the name 'Pig' originate?
 - b. Why pigs were developed and reasons for use
 - c. Different types of pig (cleaning, proving, inspect)

1030 – 1045 Coffee break

1045 – 1230

2. When and why do you pig
 - a. Construction
 - b. Maintenance
 - c. Inspection

1230 – 1315 Lunch

1315 – 1445

3. Review of utility pigs
 - a. Types and uses
 - b. Selection of pigs
 - i. Internal coating
 - ii. Objectives
 - iii. Duration and length of run
 - iv. Pig efficiency
 - v. The unknown (how much, dust, dirt, wax)
 - vi. Transmitters and tracking

1445 – 1500 Coffee break

1500 – 1615

4. PRACTICAL EXERCISE

Description and visit to the test loop – view example of a cleaning pig, proving pig and transmitter.

1615 – 1630 Review of Day 1, Q&A's, Overview for Day 2

1630 Depart CTDUT

1730 Arrive Hotel.

Day 2 – Pig traps, pig loading, extraction, launch and receive procedures

0745 Depart Hotel

0845 Arrive CTDUT

0900 – 1030

5. Pig traps

- a. What are they
- b. Why do we need them
- c. Different types
- d. Trap doors
- e. Procedures for operation

1030 – 1045 Coffee break

1045 – 1230

6. PRACTICAL DEMONSTRATION AT TEST LOOP – Operation and maintenance of trap doors, pig signaller, valves.

1230 – 1315 Lunch

1315 – 1445

7. Launch and receive of pigs

- a. Launch
 - i. Equipment
 - ii. How the launch pipework and trap design are set for pig launching
 - iii. Procedures to launch a pig
 - iv. Safety
 - v. Lifting and loading
- b. Receive
 - i. Equipment
 - ii. How the receive pipework and trap designs are set for pig receiving
 - iii. Procedures
 - iv. Safety
 - v. Extraction and lifting

1445 – 1500 Coffee break

1500 – 1615

8. PRACTICAL DEMONSTRATION & EXERCISE AT TEST LOOP: Loading and launching and receiving and extraction of a cleaning pig and other utility pig in the test loop.

1615 – 1630 Day 2 Q&A's, Overview for Day 3

1630 Depart CTDUT

1730 Arrive Hotel

Day 3 – How to carry out a feasibility study and planning for a pigging project

0745 Depart Hotel

0845 Arrive CTDUT

0900 – 1030

9. How to carry out a feasibility and assessment process for a pipeline pigging project

- a. Piping Aspects (and how they affect pig selection and feasibility)
 - i. Presence of pig traps and type of pig traps commonly used.
 - ii. Alternatives to pig traps?
 - iii. Temporary or permanent
 - iv. Pipeline bends (what are the limits?)
 - v. Tees
 - vi. Valves
 - vii. Special fittings
 - viii. Distance
 - ix. Multiple diameters
 - x. Special pig designs used now and possible in the future.
- b. Operational conditions (how they affect pig selection and feasibility)
 - i. Pressure
 - ii. Flow rate
 - iii. Temperature
 - iv. Dust, debris, wax
 - v. Special pig design to overcome these

1030 – 1045 Coffee break

1045 – 1230

10. HSE during pigging projects

- a. Environmental and safety aspects
 - i. Waste handling
 - ii. NORM
 - iii. H₂S
 - iv. Venting restrictions
 - v. Noise
 - vi. Purging
 - vii. Cleaning and washing pigs after a pig run
 - viii. Pyrophoric dust
 - ix. Other contaminants
 - x. Pig speed.

11. Developing a cleaning and proving pig programme plan

- a. Considerations
 - i. Type of product
 - ii. Last cleaning run (if any)
 - iii. Type of debris/ deposits/ waste expected
- b. What are the basics needed to carry out a pig run.
- c. How many runs will be needed
- d. Types of pig to be used and in which order
- e. What are the issues to consider?
- f. Frequency of pig runs.

1230 – 1315 Lunch

1315 – 1445

12. CLASSROOM and PRACTICAL EXERCISE – Collecting information for a proposed pigging project

- a. Flow calculations, completing a pigging vendor questionnaire
- b. Developing your own site survey forms
- c. The critical measurements to take on site
- d. The importance of following a set method.
- e. Taking and logging relevant pictures.
- f. Writing a site visit report (what is the key information).
- g. Asking the right questions
- h. Looking at the history of the pipeline.

1445 – 1500 Coffee break

1500 – 1615

13. Planning a pigging project up to and including inspection pigging.

- a. Priority of pipelines
- b. Risk assessments
- c. Budgets
- d. Engineering
- e. Manpower

1615 – 1630 DAY 3 Q&A's, Overview for Day 4

1630 Depart CTDUT

1730 Arrive Hotel

Day 4 – Ancillary equipment, tracking and record keeping

0745 Depart Hotel

0845 Arrive CTDUT

0900-1030

14. Pig running

- a. Ancillary equipment
 - i. Loading and extraction trays
 - ii. Pushers
 - iii. Extractors
- b. Signalling
 - i. Types and application
- c. Tracking
 - i. Why we need to
 - ii. Different trackers
 - iii. Tracking onshore
 - iv. Tracking subsea
- d. Stuck pig
 - i. How it can happen
 - ii. Consequences and actions for removal of a stuck pig

1030 – 1045 Coffee break

1045 – 1230

15. Documentation and record keeping

- a. Maintenance of cleaning pigs, spares, quantities
- b. Record keeping of pig runs.
- c. Feedback documents, QA and performance management of pigs
- d. Developing a pig database

1230 – 1315 Lunch

1315 – 1445

16. Inspection tools

- a. The need to inspect
- b. Different ILI tools (loggers, geometry, corrosion, crack)
- c. Choosing your ILI tool
- d. Setting inspection levels

1445 – 1500 Coffee break

1500 – 1615

17. PRACTICAL EXERCISE AT TEST LOOP – Pig tracking, locating a pig, completing documentation. Repair to a utility pig. What can the damage to a pig tell us about the pipeline?

1615 – 1630 DAY 4 Q&A's, Overview for Day 5

1630 Depart CTDUT

1730 Arrive Hotel

1900 Course dinner

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Day 5 – Understanding pig data and carrying out verification digs

0745 Depart Hotel

0845 Arrive CTDUT

0900 – 1030

18. Pig inspection data reports

- a. Understanding what they say
- b. Defects
- c. What actions are required?

1030 – 1045 Coffee break

1045 – 1230

19. Planning and carrying out verification digs

- a. How to measure location
- b. Site safety for excavations
- c. Planning the work
- d. Cleaning pipe surface
- e. Measuring defects (equipment to use)

1230 – 1315 Lunch

1315 – 1445

20. PRACTICAL EXERCISE - On site practical example of finding defect location and measuring a defect.

1445 – 1500 Coffee break

1500 – 1600

21. Overview of unpiggable pipelines

- a. What makes them unpiggable
- b. How could they be inspected
- c. Pigging offline
- d. Tethered pigs
- e. Crawlers

1600 – 1630

Final discussion, feedback, end of course

1630 Depart CTDUT

1730 Arrive Hotel