INSPECTION
OF
JETTY PIPELINES

OISD STANDARD 140

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INSPECTION OF JETTY PIPELINES

Prepared by
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Preamble

Indian petroleum industry is the energy lifeline of the nation and its continuous performance is essential for sovereignty and prosperity of the country. As the industry essentially deals with inherently inflammable substances throughout its value chain – upstream, midstream and downstream – Safety is of paramount importance to this industry as only safe performance at all times can ensure optimum ROI of these national assets and resources including sustainability.

While statutory organizations were in place all along to oversee safety aspects of Indian petroleum industry, Oil Industry Safety Directorate (OISD) was set up in 1986 Ministry of Petroleum and Natural Gas, Government of India as a knowledge centre for formulation of constantly updated world-scale standards for design, layout and operation of various equipment, facility and activities involved in this industry. Moreover, OISD was also given responsibility of monitoring implementation status of these standards through safety audits.

In more than 25 years of its existence, OISD has developed a rigorous, multi-layer, iterative and participative process of development of standards – starting with research by in-house experts and iterating through seeking & validating inputs from all stake-holders – operators, designers, national level knowledge authorities and public at large – with a feedback loop of constant updation based on ground level experience obtained through audits, incident analysis and environment scanning.

The participative process followed in standard formulation has resulted in excellent level of compliance by the industry culminating in a safer environment in the industry. OISD – except in the Upstream Petroleum Sector – is still a regulatory (and not a statutory) body but that has not affected implementation of the OISD standards. It also goes to prove the old adage that self-regulation is the best regulation. The quality and relevance of OISD standards had been further endorsed by their adoption in various statutory rules of the land.

Petroleum industry in India is significantly globalized at present in terms of technology content requiring its operation to keep pace with the relevant world scale standards & practices. This matches the OISD philosophy of continuous improvement keeping pace with the global developments in its target environment. To this end, OISD keeps track of changes through participation as member in large number of International and national level Knowledge Organizations – both in the field of standard development and implementation & monitoring in addition to updation of internal knowledge base through continuous research and application surveillance, thereby ensuring that this OISD Standard, along with all other extant ones, remains relevant, updated and effective on a real time basis in the applicable areas.

Together we strive to achieve NIL incidents in the entire Hydrocarbon Value Chain. This, besides other issues, calls for total engagement from all levels of the stake holder organizations, which we, at OISD, fervently look forward to.

Jai Hind!!!

Executive Director

Oil Industry Safety Directorate
FOREWORD

The Oil Industry in India is 100 years old. Due to various collaboration agreements, a variety of international codes, standards and practices are in vogue. Standardisation in design philosophies and operating and maintenance practices at a national level was hardly in existence. This, coupled with feed back from some serious accidents that occurred in the recent past in India and abroad, emphasised the need for the industry to review the existing state of art in designing, operating and maintaining oil and gas installations.

With this in view, the then Ministry of Petroleum and Natural Gas in 1986 constituted a Safety Council assisted by Oil Industry Safety Directorate (OISD) staffed from within the industry, in formulating and implementing a series of self regulatory measures aimed at removing obsolescence, standardising and upgrading the existing standards to ensure safer operations. Accordingly, OISD constituted a number of Functional Committees comprising of experts nominated from the industry to draw up standards and guidelines on various subjects.

The present standard on “Inspection of Jetty Pipelines” was prepared by the Functional Committee on “Design and Inspection of Pipelines”. This standard is based on the accumulated knowledge and experience of industry members and the various national and international codes and practices. This standard is meant to be used as a supplement and not as a replacement for existing codes and practices. It is hoped that the provision of this standard, if implemented objectively, may go a long way to improve the safety and reduce accidents in the Oil and Gas Industry. Users are cautioned that no standard can be a substitute for the judgement of a responsible and experienced engineer. Suggestions are invited from the users after it is put into practice to improve the standard further. Suggestions for amendments to this standard should be addressed to

the Coordinator,
Committee on of “Design and Inspection of Pipelines”,
Oil Industry Safety Directorate,
8th Floor, OIDB Bhavan, 
Plot No. 2, Sector - 73
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This standard in no way supersedes the statutory regulations of CCE, Factory Inspectorate or any other Statutory body which must be followed as applicable.
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These documents are intended to supplement rather than replace the prevailing statutory requirements.

Note 3 in superscript indicates the modification/changes/addition based on the amendments approved in the 19th Safety Council meeting held in September, 2001July, 1999.
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In addition to the above, several other experts from the industry contributed in the preparation, review and finalisation of this document.

*(Took over as Leader w.e.f June/89 on Shri Karode's retirement from Oil India Ltd).*
# INSPECTION OF JETTY PIPELINES

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INSPECTION OF JETTY PIPELINES

1.0 INTRODUCTION

Safety in Petroleum Installations and pipelines comes through continuous efforts at all stages and as such it can be ensured by observing that installations and piping are designed, constructed and tested as per recognised engineering standards and that they are periodically inspected and maintained. Systems and procedures for carrying out inspection and maintenance go a long way in ensuring safe operation.

2.0 SCOPE

This standard covers the minimum inspection requirements for Jetty Pipelines used in transportation of crude petroleum and petroleum products.

3.0 DEFINITIONS

i) JETTY PIPELINES

Jetty Pipelines are pipelines used for loading/unloading of crude oil/petroleum products to/from Refinery/Terminals from/to Ships/Barges.

ii) SHALL

The word "Shall" is used to indicate that the provision is mandatory.

iii) SHOULD

The word "Should" is used to indicate that the provision is recommendatory as sound engineering practice.

4.0 COMPONENTS OF JETTY PIPELINES

i) PIPELINES/VALVES/MANIFOLD

a) Jetty Pipelines run to/from Jetty both underground or above ground as per available ROW/ROU.

b) Jetty Pipelines run over water or under water (i.e. submerged). Jetty Pipelines shall follow the codes ANSI B 31.4 and OISD 141.

ii) HOSES

The Jetty Pipelines is connected to the floating ship/barge with a flexible pipe or hose to transport fluids and is therefore the weakest point in the discharge/loading operations. A hose burst can result in heavy spill, pollution and fire hazard.

III) JETTY EMBANKMENT/RCC SUPPORT/STAGING

Jetty embankment/RCC Support/Staging projecting into sea and supporting pipelines require good housekeeping and constant inspection and timely maintenance.

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5.0 INTERNAL CORROSION OF JETTY PIPELINES

Jetty Pipelines, which occasionally carry water, are subjected to considerable internal corrosion. This is particularly the case with cargo lines carrying gasoline and other refined oils at Marine Terminals. In such pipelines salt water frequently remains in the pipeline after a barge or ship completes loading/unloading operations. In such cases, where possible it is desirable to flush the pipeline with fresh water to stall corrosion. Inhibiting chemicals shall be used if the pipeline is left with Salt Water.

6.0 EXTERNAL CORROSION OF JETTY PIPELINES

External corrosion of above ground lines shall be prevented by regular maintenance/ Painting.

External corrosion of underground pipelines shall be prevented by suitable coating/wrapping and cathodic protection system.

7.0 INSPECTION ITEMS OF JETTY PIPELINES/SYSTEM

7.1 INSPECTION OF JETTY PIPELINES

i) Jetty Pipelines above ground shall be ultrasonically gauged for thickness once every three years at vulnerable points. Visual inspection shall be carried out by walking along the pipelines once in a month.

ii) The PSP reading at feeding locations shall be monitored fortnightly.

iii) The PSP readings at test lead points for entire pipelines shall be taken quarterly. The PSP survey shall be plotted graphically to identify and locate cathodic holidays. The minimum pipe to soil potential PSP shall be more negative than -0.85 volts with respect copper/copper sulphate half cell. The areas where anaerobic bacterial are active minimum PSP shall be more negative than -0.95 volts instead of -0.85 volts. Over protection of coated pipelines shall be avoided by ensuring that polarisation potential is below -1.2 volts with respect to copper/copper sulphate half cell. Polarisation potential can be measured at a given location on a coated pipeline by measuring pipe to earth potential immediately (within the first second or two) after simultaneously interrupting the current output from all cathodic protection sources affecting that portion of the pipeline.

iv) Pearson Survey for underground section of Jetty Pipelines shall be carried out once in three years.

v) Jetty Pipelines should be pressure tested at 1.5 times the maximum operating pressure once in a year.

vi) Repaired section Jetty Pipelines shall be tested as per ANSI B.31.4

7.2 INSPECTION OF BLOCK VALVE

A Block valve is installed in Jetty Pipeline where the land section ends and pipeline comes out to go into the dock approach. This valve shall be kept closed at all times when the pipeline is not in actual operation. The reason for this is to minimise spillage of products. The block valve of Jetty pipelines shall be tested and serviced once in a year.  

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7.3 INSPECTION OF MARINE HEADER.

The marine header shall be inspected and tested once in a year along the testing of the line. The header pit shall be maintained dry and shall be inspected daily.

7.4 INSPECTION OF HOSE.

OISD 135, Inspection of Hoses shall be referred.

7.5 INSPECTION OF JETTY EMBANKMENT/ RCC SUPPORT/STAGING

i) Grade levels shall be checked once in a year to ensure embankment/supporting structures etc., are rigid and have not undergone gradual settlement/erosion.

ii) Conditions of concrete/steel tressels/supports shall be visually checked once in a quarter for erosion/cracks/corrosion.

iii) Structural steel supports likely to touch sea water shall be inspected for condition of the protective coating once in six months.

iv) PSP readings of structures cathodically protected shall be monitored once in a fortnight.

7.6 INSPECTION OF EARTHING.

Earthing connections between Ship/Barge and shore pipeline shall be visually inspected before EVERY loading and unloading operation.

Earthing connections shall be inspected as per OISD 137, Inspection of Electrical Equipment.

7.7 INSPECTION OF FIRE FIGHTING EQUIPMENT

OISD 142, Maintenance and Inspection of Fire Fighting Equipment, shall be referred.

7.8 PATROLLING

Ground patrolling by walking along the pipeline, shall be done daily by line walkers.

7.9 INSPECTION OF COLOUR CODE.

Colour codes on Jetty Pipelines and appurtenances shall be inspected quarterly for clear identification of the different pipelines.

7.10 INSPECTION OF COMMUNICATION SYSTEM

Functional test of communication system between Jetty to Terminal shall be done before commencement of loading/unloading operation.

8.0 DOCUMENTATION

Formats for recording inspection findings shall be designed specifically for the equipment/system used in the Pipeline/System.

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The following data shall also be available on record in all Jetty Pipeline Installations.

i) The basic data and parameters of the pipeline system such as Layout, Length, Diameter etc.,

ii) A complete route strip map showing all the details of passage of the pipelines.

iii) List of various codes to which the Pipeline/System have been designed.

9.0 REFERENCES

This standard shall be read in conjunction with the following standards, codes and publications:

i) API 1104 - Standard for Welding Pipelines and Related Facilities.

ii) API 1102 - Recommended Practice for Liquid Petroleum Pipelines crossing Railroads and Highways.

iii) API 1107 - Recommended Pipeline Maintenance Welding Practice.

iv) API 1109 Recommended practice for Marking Liquid Petroleum Pipeline facilities.

v) API 1110 - Recommended Practice for Pressure Testing of Liquid Petroleum Pipelines.

vi) API 2200 - Repairs to crude Oil, Liquefied Petroleum Gas and Products Pipelines.

vii) API 2201 - Procedures for Welding or Hot Tapping on Equipment containing Flammables.

(i) (VIII) API-2209 Pipeline Plugging practices.

(ii) API 500 C - Classification of Locations for Electrical Installations at Pipeline Transportation Facilities.

(iii) NACE-RP 01-69 - Recommended Practice. Control of External Corrosion of Underground or Submerged Metallic Piping Systems.

(iv) NACE RP-01-75 - Recommended Practice - control of Internal corrosion in Steel Pipelines Systems.

(V) ASME - Boiler and Pressure Vessel Code, Section VIII Division 1 Pressure Vessels, Section VIII Division 2, Alternate Rules for Pressure Vessels, and section IX - Welding Qualifications.

(VI) ANSI B.31.4 - Liquid Transportation Systems for Hydrocarbon, Liquid Petroleum Gas, Anhydrous Ammonia and Alcohols.

(VII) OISD 135 - Inspection of Loading and Unloading Hoses.

(VIII) OISD 137 - Inspection of Electrical Equipment.

(ix) OISD 141 - Design and construction requirements for Cross Country Hydrocarbon Pipelines.

(x) OISD 142 - Inspection of Fire Fighting Equipments.

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