1 INTRODUCTION

Various committees in an organisation related to HSSE play an important role in the overall HSSE Management System. The MHSSEC gives directions and decisions on the effective functioning of the HSSE management; various other committees give opportunities for workers participation and consultation in HSSE management. The formulation of a safety committee is a statutory requirement as per Factories Act. This ROS gives guidelines on formation of various HSSE committees in Kochi Refinery for the effective HSSE management, its structure, tenure, members, level of functioning etc

1.1 PURPOSE

Employee participation in HSSE activities is an important element in the overall success of HSSE management. Such committees will help to increase and maintain the interest of employees in HSSE issues.

HSSE activities are an integral part of KR's operating procedures, culture and programs. Various awareness and training activities are conducted regularly to convince managers, supervisors and employees that they are primarily responsible for the prevention of workplace accidents. To further increase their involvement in HSSE issues and to bring an ownership among every employee on HSSE management of the refinery, various HSSE committees are formulated at different levels. These committees provide an opportunity for free & fair discussion of HSSE problems and possible solutions.

Contract work force of our refinery also plays a vital role in the functioning of the refinery. Hence it is very essential to create a forum for deliberations of HSSE concerns of contract work force also. With this vision, committees with the involvement of contract workforce also constituted.

The number of employees, departments, operating units and area of our refinery has increased many folds from its inception. It would be difficult for a single committee to address the HSSE issues of a refinery of this size. Keeping this in mind, KR has formed committees at different levels.

1.2 SCOPE

The scope of this ROS is to specify requirements related to functioning of various HSSE committees in Kochi Refinery and roles and responsibilities of the members of these committees.

Page 916 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

1.3 COVERAGE

ROS is applicable to all committees related to HSSE in Kochi Refinery and STF unless otherwise excluded in the section 1.4. The ROS covers the following committees

1. Management HSSE Committee
2. Joint HSSE Committee
3. Department HSSE Committee
4. Joint Safety Committee including Contract Labours
5. Joint Safety Committee at STF

1.4 LIMITATIONS

This ROS deals only with committees related to management of Health, Safety, Security, Environment matters in Kochi Refinery.

1.5 EXCLUSIONS

Any statutory committee or other committees that are not related to HSSE matters in Kochi Refinery are excluded in the scope of this ROS. The following committees are excluded in the scope of the ROS.

1. Committees like Works committee are not covered under this ROS.
2. Management Review Meeting (MRM) of QEHS system.
3. Safety committee formed by contractors working for Kochi Refinery.

1.6 DEVIATIONS

The procedures / practices described in the ROS are intended for standardization of the processes involved and hence the same shall be strictly adhered to. However, deviation, if any, arise due to unavoidable circumstance(s), shall be approved by Head of Kochi Refinery. The deviation note in the prescribed format specified in ROS-001 Appendix 'ROS-001/A9.4: Format for Approval of Deviation in ROS' shall be initiated by the HOD of the department proposing the deviation through the Functional Head.

2 DEFINITIONS & ABBREVIATIONS

This section lists all definitions and abbreviations used for the purpose of this ROS.

Page 917 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

2.1 DEFINTIONS

Corporation	:	Bharat Petroleum Corporation Limited.
Functional Head	:	Head of Functional Area such as General Manager, Deputy General Manager (In charge).
Functional Area	:	Operations, Technical, Finance, Human Resources, Projects etc.
KR & ME	:	BPCL Kochi Refinery Intralink
Refinery	:	Kochi Refinery premises and facilities under its administrative control
Shall	:	Mandatory
Should	:	Recommended

2.2 ABBREVIATIONS

ATR	:	Action Taken Reports
BPCL	:	Bharat Petroleum Corporation Limited
COT	:	Cochin Oil Terminal
DHSSEC	:	Department Health Safety Security Environment Committee
HOD	:	Head of the Department
HR	:	Human Resources
HSSE	:	Health Safety Security and Environment
IMS	:	Integrated Management System
IS	:	Information Systems
JHSSEC	:	Joint Health Safety Security Environment Committee
JSC	:	Joint Safety Committee
KR	:	Kochi Refinery
MAH	:	Major Accident Hazard
MHSSEC	:	Management Health Safety Security Environment Committee
MoU	:	Memorandum of Understanding
MRM	:	Management Review Meeting
MSIHC	:	Manufacture Storage and Import of Hazardous Chemicals
QEHS	:	Quality Environment Health & Safety
RC	:	Refinery Council
ROS	:	Refinery Operating System

Page 918 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

ROSC	:	ROS Committee
SBU	:	Strategic Business Unit
STF	:	Shore Tank Farm

3 REQUIREMENTS

This section outlines various HSSE committees in BPCL-KR and stipulates guidelines for their formulation, selection of members, functioning, frequency of meetings, authority and tenure. The following HSSE committees shall be formulated.

1. Management HSSE Committee.
2. Joint HSSE Committee.
3. Department HSSE Committee.
4. Joint Safety Committee including Contract Labours
5. Joint Safety Committee at STF

3.1 MANAGEMENT HSSE COMMITTEE

1. Management Health Safety Security Environment Committee is the apex committee that stipulates policies in the matter of health, safety, security and environment in BPCL-KR.

2. Members of the committee are

    a. SBU Head of BPCL-KR

    b. Heads of Functional Areas

    c. HODs of Departments

    d. Section Head of Energy & Environment, Occupational Health Centre, Security, HR-Estates

3. The Management HSSE Committee is a permanent one, though the personnel may change due to organisational role changes / transfers / superannuation.

4. SBU Head is the Chairman of the committee.

5. HOD of Fire & Safety department is the Secretary of the committee.

6. The committee shall meet every month, preferably on the first Wednesday of the month.

Page 919 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

7. The Secretary in consultation with the Chairman shall arrange the meetings and circulate the Agenda of the meeting at least five working days before the meeting.

8. Agenda of the meeting shall contain all items to be discussed in the meeting. Any item other than in the agenda shall be included only with concurrence of the Chairman.

9. The committee shall review the following as a minimum

   a. Status of Action Plan as per record notes of previous meeting.

   b. Status of implementation of MoU target with regard to HSSE

   c. Status of implementation of QEHS objectives of the refinery

   d. Items referred by Joint HSSE Committee, Joint Safety Committee at STF and Joint Safety Committee including Contract Labours

   e. Status of implementation of various external / internal HSSE audit recommendations

   f. Accidents / incidents and their timely investigation

   g. Status of implementation of Action Taken Reports (ATR)

   h. Status of implementation of Environment Management Programmes

   i. Security related items

   j. Number of first aid treatments, hospitalisations etc.

   k. Status of Occupational Health Monitoring of employees and any areas of concern

   l. Percentage compliance of periodic medical check up of employees

10. Secretary shall prepare the Record Notes of the meeting and circulate the same to all members of the committee through e-mail within three working days of the meeting.

3.1.1 MHSSEC PRE-MEETING

1. Prior to the MHSSEC meeting, a MHSSEC pre-meeting shall be conducted to update the status of implementation of the decisions taken in the previous MHSSEC meeting by representatives from various departments as given below.

2. The MHSSEC pre-meeting shall be attended by

   a. Officers nominated by HOD of Manufacturing, Oil Movement & Storage, Power & Utilities, Maintenance, Procurement & Contract Services, Engineering & Construction and Projects.

Page 920 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

b. Section Head of Energy & Environment, Occupational Health Centre, Security, Safety, Quality Control.

c. HOD of Fire & Safety Department

d. HOD of the Fire & Safety shall be chairman and Section Head of Safety shall be the Secretary of the MHSSEC pre-meeting.

3. Record Notes of the MHSSEC pre-meeting shall be prepared by Section Head of Safety. The Record Notes shall be circulated through e-mail to all the members of the MHSSEC and the MHSSEC pre-meeting team within three working days of the meeting.

3.2 JOINT HSSE COMMITTEE

1. Joint Health Safety Security and Environment Committee is a refinery level committee with workers participation and formulated as per the requirement of Section 41G of Factories Act 1948.

2. The committee shall have equal representation of Non-Management and Management staff. The total number of representatives in the committee shall be 24.

3. The SBU Head shall nominate one of the Functional Head as the Chairman of the committee

4. The following members shall be the management representatives of the committee in addition to the Chairman of the committee

   a. HOD / Section Head (as the case may be) of Manufacturing, Oil Movement & Storage, Projects (Units), Power & Utilities, Maintenance, Procurement & Contract Services, Engineering & Construction, Fire & Safety, Process Engineering, Human Resources departments.

   b. Chief Medical Officer

5. The non-management staff members of the committee shall be elected from cluster of departments / constituencies listed below with the number of representatives as given against each of them.

   a. Finance / GM (F)'s Office/ HR / Estates / L&D / Sports / P&CS / IS / Projects/ Project Technical / Legal / GM(O)'s Office / Security – 1

   b. F&S / E&C / Advisory Services / Process Engineering – 1

Page 921 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

c. Quality Control / R&D – 1

d. Manufacturing – 3

e. Maintenance – 2

f. Power & Utilities – 2 (One each from Power and Utility sections)

g. Oil Movement & Storage – 2

6. HOD of HR Department shall initiate the election process and formulate the committee.

7. HOD of Fire & Safety Department shall be the Secretary of the committee.

8. The committee shall meet once in two months.

9. The tenure of the committee shall be two years.

10. Secretary shall intimate the date & venue of meeting to all the members at least seven days prior to the meeting.

11. The members shall report the HSSE concerns specific to their workplace in their respective Department HSSE Committee. The members can report the same concern to Joint HSSE Committee, if so decided by the concerned DHSSEC, or if the concern is not resolved within two (2) months from reporting the same in the DHSSEC. The members can also report HSSE concerns directly to the Joint HSSE Committee, if the same are not specific to their department. The members shall submit their HSSE concerns for consideration of the committee in writing, within the time specified in the notice of the meeting, to Secretary.

12. The committee shall discuss all HSSE concerns brought in by the members and arrive at an action plan. The same shall be reflected in the Record Notes. The Secretary shall prepare the Record Notes of the meeting and circulate the same to all members and Functional Heads within five working days of the meeting.

13. The committee shall also discuss about the incidents happened in the refinery since its last meeting including the root cause identified and corrective / preventive actions.

14. Items brought in to the committee requiring policy decisions / directions shall be referred to Management HSSE Committee. Secretary of the committee shall report such items in the MHSSEC during its next meeting. The decision of MHSSEC on the issue shall be reported to Joint HSSEC Committee, during its next meeting, by the Secretary.

15. One month before completion of the tenure of the committee, the Secretary of the committee shall intimate HOD of HR department to initiate action for formation of the next committee.

16. HOD of HR department shall initiate actions for constitution of the committee before one month to the end of tenure of the existing committee.

3.3 DEPARTMENT HSSE COMMITTEE

1. All departments in KR shall form a Department HSSE Committee with Non-Management and Management staff as members.

2. HOD shall be the Chairman of the committee.

3. All Section Heads in the department shall be the Management Staff of the committee. In addition to Section Heads, HOD may adopt any officer(s) from his / her department to the committee as Management Staff(s).

4. HOD shall nominate the Non Management Staff of the committee and he / she shall ensure representation from all sections of the department.

5. Joint HSSE Committee member(s) of the department shall be members of the committee.

6. HOD of the Fire & Safety department shall nominate a representative officer from his / her department to each DHSSEC meeting. The representative officer should brief about near miss incidents, learning from recent incidents, HSSE highlights etc. for the benefits of the members. In order to ensure continuity, the HOD of the Fire & Safety department should send the same representative officer for the meeting of the same DHSSEC. HODs of all departments shall intimate the meeting schedule to the HOD of Fire & Safety Department in advance for deputing their representative.

7. The committee shall meet once in two months.

8. HSSE concerns reported to a DHSSEC that are not related to that department should be deliberated in that DHSSEC. JHSSEC member of that department shall report to JHSSEC if decided so in the meeting.

9. The meeting shall review the following in addition to the points brought in by the members

   a. Status of completion of Departments QEHS Objectives.

Page 923 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

b. Status of compliance of Legal and Other requirements applicable to the department

c. Status of review and updating of Register of EHS Hazard of Department

d. Review of HSSE training against the targets.

e. Review of accident / incidents occurred since last meeting in the department, status of investigation details, root cause identification.

10. The Record Notes of the meeting shall be prepared by Chairman and circulated to all members within three working days of the meeting. A copy of the Record Notes shall be forwarded to Fire & Safety department.

11. The HOD of Fire & Safety department shall monitor the schedule of meeting of various department safety committees and report short falls, if any, to the Management HSSEC Committee meeting.

3.4 JOINT SAFETY COMMITTEE INCLUDING CONTRACT LABOURS

1. To address the HSSE concern of the contract employees working inside the refinery, a Joint Safety Committee including contract labours shall be formed.

2. The committee shall have equal representation of six management and six contract labour representatives.

3. The following employees shall be the management representatives of the committee:

   a. One Section Head each from Maintenance, Projects, Engineering and Construction, Power and Utilities, Oil Movement and Storage departments and Section Head of Industrial Relations of HR Department.

   b. In addition to the above members, one medical officer and one safety officer of the refinery shall be permanent invitees.

4. The contract labours of the committee shall have attended three days HSE training conducted by BPCL Kochi Refinery and shall be working as Contractor's Supervisor in the refinery.

5. The contractor engaging the contract supervisor shall be a registered contractor with BPCL Kochi Refinery and should have sufficient experiences.

6. The contract labours / supervisors to the committee shall be nominated. New members shall be inducted into the committee during its periodic re-constitution, so that minimum 50% of the members should be new.

Page 924 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

7. The Section Head of Maintenance shall be the Chairman of the committee. The Safety Officer shall coordinate the functioning of the committee.

8. The committee shall meet once in three months.

9. The tenure of the committee shall be two years.

10. One month before completion of the tenure of the committee, the chairman shall intimate HOD of HR department to initiate action for formation of the next committee.

11. HOD of HR department shall initiate actions for constitution of the committee before one month to the end of tenure of the existing committee.

12. The schedule of meeting shall be intimated to the members through telephone, e-mail or SMS, at least seven calendar days prior to the date of the meeting.

13. The members may give their concerns / points for improvement on HSSE matters in writing at least one day prior to the meeting. The members shall deliberate all the points brought in by the members and arrive at an action plan. Points requiring policy decision / capital expenditure of shall be brought to the MHSSEC for its directions.

14. The committee shall discuss the HSSE matters / concern affecting the employees / contract workers, report unsafe conditions, encourage near miss accident reporting and work to develop a positive safety culture among contract workers.

15. The Chairman shall prepare the Record Notes of the meeting with 5 workings days of the meeting and circulate the hard copy to contract workers.

3.5 JOINT SAFETY COMMITTEE AT STF

The Shore Tank Farm of BPCL Kochi Refinery at Puthuvype is a separate licensed factory and is classified as MAH installation as per MSIHC Rules 1989. It is mandatory to form a safety committee as per Section 41G Factories Act 1948 at STF. Unlike in Refinery at Ambalamugal, the non-management staffs at STF are contract employees. The following are the guidelines for Joint Safety Committee to be in operation at STF, Puthuvype.

1. The Joint Safety Committee at STF shall have equal number of Management Staff and Contract employees. In case of Non-management staff(s) posted at STF, one such employee per department shall also be the members of the committee. In any case the ratio of Management Staff to Non-management staff / contract staff shall be 1:1.

2. The following employees shall be the management representatives of the committee:

   a. HOD of Oil Movement and Storage Department and Fire & Safety Departments

   b. One company medical officer

c. One officer each from Oil Movement and Storage, Maintenance, Power & Utilities and HR Departments.

d. Safety Officer of STF

3. The Contract Labour /non management staff shall be nominated to the committee. The following is the details of the number of representative from each department.

   a. Two employees each from Oil Movement and Storage, Maintenance and Fire & Safety Departments.

   b. One employee each from Power and Utilities and Security Department.

4. HOD of Oil Movement and Storage department shall be the Chairman of the committee.

5. Safety Officer of STF shall be the Secretary of the committee. The Secretary shall prepare the Record Notes of the meeting and circulate the same to all members and Functional Heads within five working days of the meeting.

6. The committee shall meet once in three months.

7. The tenure of the committee shall be two years.

8. The notice regarding the meeting shall be intimated to the members at least seven days prior to the meeting.

9. The committee shall deliberate all HSSE concerns brought in by the members and arrive at an action plan. The same shall be recorded in the Record Notes of the meeting. The committee shall also discuss about the accidents / incidents happened in the refinery since its last meeting including the root causes identified and corrective / preventive actions.

10. Items brought in to the committee requiring policy decisions / directions shall be referred to Management HSSE Committee. HOD of Fire & Safety department shall report such items in the MHSSEC during its next meeting. The decision of MHSSEC on the issue shall be reported back to committee during its next meeting by HOD of Fire & Safety Department.

11. One month before completion of the tenure of the committee, the chairman shall intimate the HOD of HR department to initiate action for formation of the next committee.

12. HOD of HR department shall initiate actions for constitution of the committee one month prior to the end of tenure of the existing committee.

Page 926 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

4 ROLES AND RESPOSIBILITIES

This section outlines the roles and responsibility of various stakeholders related to ROS-014.

4.1 CHAIRMAN OF THE COMMITTEE

1. The chairman of the committee shall ensure that the meetings are conducted as detailed in this ROS and the record notes are circulated in time to all members.
2. The chairman of each committee listed in this ROS shall ensure that all HSSE concerns/matters brought to the notice of the committee are deliberated in detail and most suitable decisions are taken.
3. Chairman of DHSSEC shall ensure that the committee is formed and functioning as detailed in this ROS.
4. The chairman shall ensure that the decisions of the committee are implemented in the agreed timeframe.

4.2 SECRETARY OF THE COMMITTEE

1. The secretary of the committee shall arrange meetings in consultation with the chairman of the committee.
2. The secretary of the committee shall inform the meeting schedule to all the members well in advance as envisaged in this ROS.
3. The secretary of the committee shall prepare the record notes of the meetings and circulate the same to all members as envisaged in this ROS
4. The secretary of the JHSSEC and JSC-STF shall intimate HOD of HR to initiate action for formulating the new committee before one month to the end of the tenure of the present committee.

4.3 HOD OF HR

1. HOD of HR shall ensure that JHSSEC and JSC-STF are formed before the end tenure of the present committees.
2. HOD of HR department shall ensure that JHSSEC and JSC-STF are formed as detailed in this ROS

5 APPROVAL

This ROS undergoes a review and approval process in line with the process specified in Section 5.0 of ROS-001.

Page 927 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

5.1 REVIEW OF ROS

1. HODs of F&S, HR and Functional Heads of Operations, Technical and HR are the reviewing authorities of this ROS.
2. Reviewing authority shall ensure that requirements of ROS are relevant with respect to context of the business and are in line with current environment.
3. Reviewing the authority shall sign on the Document Release Note of this ROS.

5.2 APPROVAL OF ROS

Refinery Council (RC) is the approving authority for the approval of this ROS. Head of KR is the signatory on behalf of the RC and shall sign on the Document Release Note of this ROS.

6 MONITORING AND CONTROL

1. The HOD of Fire & Safety Department shall monitor the constitution of various HSSE committees, their scheduled meeting and effective functioning. He shall report the details such as number of committees, their meetings, any shortfall in meetings, and percentage compliance of decisions taken as per Record Notes of the respective meeting to Management HSSE Committee during its monthly meeting.

7 RECORDS

1. Record of constitution of MHSSEC
2. Record notes of the MHSSEC meeting
3. Record notes of MHSSEC pre-meeting
4. Record of constitution of JHSSEC
5. Record of intimation of the meeting, agenda and release note of the members of JHSSEC
6. Record notes of the JHSSEC meeting
7. Record of constitution of JSC including Contract Labours
8. Record of intimation of the meeting and attendance of the members of JSC-Contract Workers
9. Record notes of the JSC including Contract Labours meeting
10. Record of constitution of JSC at STF
11. Record of intimation of the meeting and attendance of the members of JSC at STF

Page 928 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

12. Record notes of the JSC at STF meetings

8 REFERENCES

1. Factories Act 1948
2. Kerala Factory Rules 1956
3. MSIHC Rules 1989
4. ROS-10 Rev 6

9 APPENDIX

Nil

Page 929 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Refinery Operating System

ROS-017

Edition: 2015, Revision: 00/2015

MANAGEMENT OF PERSONAL PROTECTIVE EQUIPMENT

Kochi Refinery

This ROS outlines procedure for identification, selection, procurement, storage, issue, usage, maintenance and disposal of personal protective equipment in BPCL Kochi Refinery.

This ROS or any part of this publication shall be reproduced, published or transmitted, in any form or by any means, only with the prior written permission of BPCL-KR.

DOCUMENT RELEASE NOTE

Document Details

Document Name	:	Management of Personal Protective Equipment
Document No	:	ROS-017
Edition	:	2015
Revision	:	00/2015
Issue	:	Sept-2015

Reviewed by

HOD - Fire & Safety

Functional Head - Operations

Functional Head - Technical

Approved in : **Refinery Council**

RC Meeting Record Note : No: 105 dated 01-08-2015

Approved By

Head of Kochi Refinery

Digitally controlled document and hence sign is not requird for pdf version of ROS. Signed Mastercopy is available with Custodian

Only for internal use and distribution

Page 931 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

AMENDMENT SHEET

All amendments in the ROS shall be documented in the following table. The details of the amendment shall be elaborated in a separate document (Amendment Document) and shall be available with custodian.

Tracking ID	Section No	Amendment		Reason	Amendment Document No
		From	To		
ROS-017/15-01	All			Revised in total	ROS017/AD-01

Only for internal use and distribution

Page 932 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Table of Contents

Section No	Title	Page No
	Document Release Note	**2**
	Amendment Sheet	**3**
	Table of Contents	**4**
	Preface	**6**
1	**Introduction**	**8**
1.1	Purpose	8
1.2	Scope	8
1.3	Coverage	8
1.4	Limitations	8
1.5	Exclusions	9
1.6	Deviations	9
2	**Definitions & Abbreviations**	**9**
2.1	Defintions	9
2.2	Abbreviations	10
3	**Requirements**	**10**
3.1	PPE-Identification	11
3.2	Selection of PPE	11
3.3	PPE Storage	12
3.4	PPE Issue	12
3.5	Mandatory PPE	12
3.5.1	Foot Protection	13
3.5.2	Head Protection	13
3.5.3	Clothing	14
3.5.4	Eye Protection	14

Only for internal use and distribution

Page 933 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3.5.5 Ear Protection 15
3.5.6 Personal Gas Monitoring 15
3.6 Training 16
3.7 PPE Maintenance 16
3.7.1 SCBA 16
3.7.2 Full Body Safety Harness 17
3.7.3 Helmets 17
3.7.4 Safety Shoes 17
3.7.5 Clothing 17
3.8 PPE Disposal 17
4 Roles and Resposibilities 18
4.1 Head of All Departments 18
4.2 Head of Fire and Safety Department 18
4.3 Head of P&CS Department 19
5 Approval 19
5.1 Review of ROS 19
5.2 Approval of ROS 19
6 Monitoring and Control 19
7 Records 20
8 References 20
9 Apprendix 20
9.1 Appendix ROS-017/A9.1: Guidelines for Identification of PPE 21
9.2 Appendix ROS-017/A9.2: Guidelines for Selection of Safety Eye Wear 24

Only for internal use and distribution

Page 934 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

PREFACE

Director (Refinery) of erstwhile Cochin Refineries Limited (CRL) appointed a committee in 1994 for devising a procedure of standard operations. The committee formulated a system named Refinery Operating System (ROS). A set of ROS was formulated and released by the committee. Over years, the ROS was evolved to a well-documented Refinery Operating System (ROS), which outlines the Management System Procedure for various business processes in the refinery. There were 90 approved ROS and 12 ROS under formulation before the current edition. Prior to 2015 edition, Project (Technical) department, which was earlier known as Corporate Planning, before organizational re-structuring in 2006, was the custodian of the ROS.

In 2014, General Manager (Operations) constituted a task force for a thorough revision of ROS in terms of the purpose, relevance, scope and work flow in the current business context vide office note KDD/03/09 dated 28-02-2014.

The task force reviewed entire ROS and concluded that entire structure and contents required a major revision. In order to incorporate standardization, the task force decided to formulate the first ROS, which outlines procedure for formulating a ROS. Hence the first ROS in the series was revised in full incorporating document structure, numbering philosophy and new approval procedure.

Personal Protective Equipment (PPE) is worn by a worker to minimize exposure to specific occupational hazards. Examples of PPE include respirators, gloves, aprons, and full body suits, as well as PPE for head, eye and foot protection. Using PPE is only one of the elements in a complete safety program that would use a variety of strategies to maintain a safe and healthy occupational environment. PPE does not reduce the hazard itself nor does it guarantee permanent or total protection.

PPE part covered in the earlier ROS34 was separated and revised as ROS-017: Managing of Personal Protective Equipment. The new edition of the ROS-017 was formulated in line with the requirement of ROS-001. This ROS details about the procedure for identification, selection, storage, issue, maintenance and disposal of appropriate PPE at BPCL Kochi Refinery.

The procedures / practices described in the ROS are not intended to supplant other practices / procedure that have proven satisfactory, nor is the ROS intended to discourage innovation and originality in the best practices in the refinery. Users of the ROS are reminded that no ROS is a substitute for the judgment of a responsible, qualified person.

Only for internal use and distribution

Page 935 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Task Force for ROS Edition-2015

The Task Force was constituted by Mr. Soman C. K., General Manager (Operations) in 2014 for revision of the existing Refinery Operating System.

Task Force

Sl. No.	Name	Designation
1.	Muralidharan V.	Manager (E & C)
2.	Naizu A. V.	Manager (F & S)
3.	Roopesh M.	Manager (Inspection)
4.	Saji Babu	Manager (Manufacturing)

In addition to the above, several experts from various departments contributed in the preparation, review and finalisation of this document.

Only for internal use and distribution

Page 936 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

1 INTRODUCTION

Personal protective equipment (PPE) is any equipment / clothing worn by personnel to protect / shield their bodies from workplace hazards. PPE does not reduce the hazard itself nor does it guarantee permanent or total protection. In the hierarchy of controls *(elimination, substitution, engineering, administration and PPE)*, personal protective equipment is considered as the last method in the prevention of work-related injury or illness. PPE should be used, however, to supplement or augment other means of hazard control, to further minimise the risk of injury.

1.1 PURPOSE

The purpose of the ROS is to establish control on PPE used in Kochi Refinery for ensuring personal safety.

1.2 SCOPE

ROS-017 outlines the procedure for identification, selection, procurement, storage, issue, usage, maintenance and disposal personal protective equipment in BPCL Kochi Refinery unless otherwise excluded in section 1.5 of this ROS.

A brief on different PPEs covered in this ROS are given in Appendix.

1.3 COVERAGE

ROS is applicable to the following facilities under KR SBU

1. Kochi Refinery
2. Jetty Facilities like NTB, STB, & COT
3. Pipeline corridor
4. STF and SPM
5. SWSS Aluva

1.4 LIMITATIONS

PPE neither reduces the hazard itself nor does it guarantee permanent or total protection against exposure to hazards. Hence the requirement specified in the ROS may not alone suffice for the personal safety and care should be taken to identify appropriate PPEs for each job.

Only for internal use and distribution

Page 937 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

This ROS shall not be used in conflict with legal and other requirements applicable to KR. However, if the requirements of this ROS are more stringent than the requirements of the above, then the requirements of this ROS shall govern.

1.5 EXCLUSIONS

Canister Mask type air purifying respirators are not used in refinery and hence are excluded from the scope of this ROS.

1.6 DEVIATIONS

The procedures / practices described in the ROS are intended for standardization of the processes involved and hence the same shall be strictly adhered to. However, deviation, if any, arise due to unavoidable circumstance(s), shall be approved by Head of Kochi Refinery. The deviation note in the prescribed format specified in ROS-001 Appendix 'ROS-001/A9.4: Format for Approval of Deviation in ROS' shall be initiated by the HOD of the department proposing the deviation through the Functional Head.

2 DEFINITIONS & ABBREVIATIONS

This section lists all definitions and abbreviations used for the purpose of this ROS.

2.1 DEFINTIONS

Corporation	:	Bharat Petroleum Corporation Limited.
Functional Head	:	Head of Functional Area such as General Manager, Deputy General Manager (In charge).
May	:	Optional
PPE	:	Personal protective equipment (PPE) is any equipment / clothing worn by personnel to protect / shield their bodies from workplace hazards.
Refinery	:	Kochi Refinery premises and its connected facilities.
Safety Goggles	:	An eye protector which fits the contour of the face to enclose the optical area, and is held in position by a head band
Safety Spectacle	:	An eye protector that oculars (that part of an eye-protector through which an operator sees) of which are mounted in spectacle type frame, with or without side shield.
Shall	:	Mandatory

Only for internal use and distribution

Page 938 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Should	:	Recommended
Welding Goggles	:	Goggles designed to filter, absorb, or reflect harmful radiations emitted during welding, cutting and similar operations

2.2 ABBREVIATIONS

ANSI	:	American National Standards Institution
BIS	:	Bureau of Indian Standards
BPCL	:	Bharat Petroleum Corporation Limited
CISF	:	Central Industrial Security Force
COT	:	Cochin Oil Terminal
E&E	:	Energy and Environment
F&S	:	Fire & Safety
HOD	:	Head of the Department
IMS	:	Integrated Management System
KR	:	Kochi Refinery
MHSSEC	:	Management Health Safety Security Environment Committee
NTB	:	North Tanker Berth
P&CS	:	Procurement and Contract Services
PE	:	Process Engineering
PPE	:	Personal Protective Equipment
ROS	:	Refinery Operating System
SBU	:	Strategic Business Unit
SPM	:	Single Point Mooring
STB	:	South Tanker Berth
STF	:	Shore Tank Farm
SWSS	:	Standalone Water Supply Scheme

3 REQUIREMENTS

This section outlines detailed procedure for identification, selection, storage, issue, requirements of PPEs, and training on usage, maintenance and disposal of PPEs.

Only for internal use and distribution

Page 939 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3.1 PPE-IDENTIFICATION

1. The requirement of PPE in a department / section shall be identified based on a detailed Hazard Identification and Risk Assessment of all activities carried out in the area. The requirement of the type of the PPE identified shall clearly be documented in the Register of EHS Hazard & Risk of the department for each activity. *Refer ROS-013 for details about Hazard Identification and Risk Assessment.*

2. Each department / section shall compile types of PPE identified and the numbers required for each type of PPE for their area from the Register of EHS Hazard & Risk and forward the list to HOD of Fire & Safety during the month of April every year.

3. HOD of F&S shall compile the total requirement PPE with respect to the type and number for KR SBU.

4. HOD of F&S department shall communicate the total requirement of PPEs to HOD of Procurement & Contract Service (P&CS) with minimum and maximum storage limit for each type of PPE in the month of May every year.

5. HOD of P&CS shall ensure availability of required number of all indentified type of PPEs in the inventory.

6. Usage of air purifying respirators (canister masks) is discontinued in KR and shall not be included in selection of PPEs.

7. A guide for PPE identification is enclosed as Appendix *ROS-017/A9.1.*

3.2 SELECTION OF PPE

1. Selection of the right type PPE in the refinery shall be based on national / international standards such as BIS / EN / ANSI etc. HOD of Fire & Safety shall ensure stringent specifications for PPEs are maintained in the inventory. The specification shall consider quality, compatibility, fitment & ergonomics factors. The specifications of all PPEs maintained in the inventory shall be reviewed by F&S department once in 3 years to ensure that they are current and updated with respect to the technological advancement.

2. Technical evaluations of the PPEs shall be done by the Fire & Safety department whenever PPE is purchased.

3. Purchase of any PPEs other than that maintained in the warehouse inventory shall be carried out only based on a purchase requisition initiated by Fire & Safety department who compiles various requests from other departments.

Only for internal use and distribution

Page 940 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

4. Fire & Safety department shall initiate the Non Plan Capital Budget (NPCB) required for procuring PPEs other that maintained in warehouse inventory for the total requirement of KR.

3.3 PPE STORAGE

1. All PPEs shall be stored properly after their purchase in the warehouse inventory in their original packing. This will help in ensuring that the PPE issued are in good and usable condition at all point of time.

2. PPEs having a specific shelf life shall be monitored by P&CS department till it is issued to the user department. P&CS department shall ensure that PPEs are not stored in the inventory after the expiry of their shelf life.

3. PPEs other than Helmet, Safety Shoe, Boiler Suit / Duster Coat shall be drawn from the warehouse and be kept in the respective units / area / tool room. The PPE drawn by the department / section for issue to the employees shall be stored only in the PPE shelf kept in the area for this purpose. The minimum and maximum level of each PPE stored in the PPE shelf shall be identified and displayed on the PPE shelf. The respective area in charges shall ensure that PPEs are not stored in the PPE shelf after the expiry of their shelf life. A stock list shall be exhibited on or near the PPE shelf.

3.4 PPE ISSUE

1. Basic PPE like Safety Shoe, Safety Helmet and Boiler Suit shall be issued individually to employees against SAP reservation slip. The record of PPE issued to employees shall be maintained by P&CS department.

2. All other PPEs shall be issued to employees, based on specific job requirement, hazard identification and risk assessment, from the respective Department / Section.

3. The respective Department / Section in charge shall draw the required PPEs from the warehouse against SAP reservation slip and maintain the minimum level in the PPE shelf of the area at all point of time.

3.5 MANDATORY PPE

1. Safety Shoes, Safety Helmets (Hard Hats), Clothing, Safety Eye Wears and Ear Protection are the basic mandatory Personal Protective Equipment. All personnel (including employees, contract personnel, visitors etc.) shall wear these mandatory PPEs in all process units. All mandatory PPEs except eye and ear protection shall be worn while entering construction sites and other operating sites where it is not mandated. However,

Only for internal use and distribution

Page 941 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

the eye and ear protectors are mandatory in the construction sites if nature of the job demands usage of the same.

2. Personal H_2S monitoring meter shall be worn while entering all process plants handing H_2S gas (DHDS, VGO HDS, SRUs, SWS etc) and floating roof of crude oil storage tanks.

3. All process plants shall be barricaded and entry of personnel shall be controlled by HODs of the process units ensuring compliance of mandatory PPE requirements

4. The details regarding mandatory PPEs are given below:

3.5.1 FOOT PROTECTION

1. All personnel shall wear Safety Shoes while entering process area, workshops, fabrication and construction area except administration building, control rooms, cafeteria. This exemption rule shall not be applicable where the job / operation or permit conditions demands the usage of safety shoes.

2. All personnel engaged in excavation, grass cutting etc. shall wear rubber Gum Boots.

3. All personnel working in energised electrical equipment shall wear non conductive safety shoes having appropriate electrical hazard ratings.

3.5.2 HEAD PROTECTION

1. Personnel shall wear hard hats (Safety Helmets) issued by the company while working in all areas, except administration building, control rooms, laboratory, cafeteria building and in roads. This exemption rule will not be applicable where the job / operation or permit conditions demands the usage of helmets.

2. Colour of the safety helmets used in KR shall be as per the *table 1*.

Table 1 Colour Coding of Safety Helmets in KR

No	Category	Colour of Helmets
1.	Employees of BPCL-Kochi Refinery (excluding those listed in No 2 & 3) including management trainees, general workman trainees etc.	White
2.	Fire crew of BPCL Kochi Refinery	Red
3.	Security staff / CISF (in operating area including plant, offsite, utilities etc.)	Grey
4.	Apprentices / in plant trainees	Blue

Only for internal use and distribution

Page 942 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

5.	Contract worker other than contract safety supervisor	Yellow
6.	Contract Safety Supervisor	Green
7.	Visitors (for entering in operating area including plant, offsite, utilities etc.)	Blue

3. Electricians and personnel working on or near energised electrical equipment shall not use metallic safety helmets.

3.5.3 CLOTHING

1. In all plant areas including offsites and utilities, personnel shall wear boiler suits / stipulated uniforms / duster coats / full legged long pants and collared shirts with long or short sleeves properly tucked-in.

2. Loose, free flowing or baggy clothing like Jubba, Kurtha, Dhothi, Sarees, Shawls etc. shall not be worn in plant area.

3. Laboratory personnel shall wear white overcoat while performing duty in the laboratory.

4. Nursing staff in the Occupational Health Centre (OHC) shall use white uniform while on duty.

5. Fire crew shall use orange cotton boiler suit or fire fighters suit while on duty in the operating areas.

6. All student trainees / visitors shall not wear any loose cloths in the operating areas.

7. Ladies or gents with long hair shall secure it properly to avoid entanglement in moving machineries while working or visiting operating areas.

8. Other body protective clothing shall be based on the risk assessment of the activities performed and as specified in the work permit.

9. Personnel shall not wear neck ties or other loose articles of apparel when working around moving machinery.

3.5.4 EYE PROTECTION

1. Safety eyewear (safety spectacle or safety goggles as the case may be) shall be worn in all areas where there is a hazard of eye exposure to dust, chemicals, impact with tools, materials, or flying objects etc.

2. Safety eyewear shall be worn in all process units.

Only for internal use and distribution

Page 943 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3. The safety eyewear used for welding protection shall be of appropriate shade for protection against radiant energy.

4. Type of eye protection shall be identified by the departments during Hazard Identification and risk assessment of their area

5. The details regarding selection of eye wear is given in Appendix ROS-017/A9.2.

3.5.5 EAR PROTECTION

1. Ear protectors shall be worn in areas where there is a potential exposure to high noise.

2. Ear protectors shall be worn in all process units.

3. Type of ear protection shall be identified by the departments during Hazard Identification and Risk Assessment of their area.

4. Fire and Safety Department shall carry out periodic monitoring of the workplace for identifying high noise areas. The details of such monitoring shall be intimated to the HOD of the area.

5. HODs shall ensure that appropriate pictorial warning boards are displayed in areas where noise level is higher than 90 dbA.

3.5.6 PERSONAL GAS MONITORING

1. Personnel shall carry portable Gas monitor while entering the process units where the usage of such gas monitors are mandatory.

2. Portable H2S gas monitors for entering all process units where there is likely exposure to H_2S and roofs of all crude oil storage tanks.

3. Other personal portable gas monitors shall be worn inside the process units where the usage is mandated by Hazard Identification and Risk Assessment.

4. Appropriate signage mandating the usage of personal portable gas monitors shall be displayed in all units / areas.

5. Owner of the process units / area shall keep sufficient number of appropriate type of gas monitors in the respective control rooms / weather shelters for operators for use of the employees, visitors, contractors, consultants etc.

Only for internal use and distribution

Page 944 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

6. If needed, departments / sections that have to work in the above process units / areas (like Maintenance, PE, E&E, Safety, Inspection etc.) shall procure the portable gas monitors.

3.6 TRAINING

1. Proper usage of each Personal Protective Equipment is very important for effective protection. Periodic training on the proper usage of PPEs shall be imparted in the induction training, annual Fire & Safety training and during technical refresher training of the employees and HSE training of contract workers.

2. However, further training of requirement if any, shall be imparted by Fire & Safety personnel on request.

3.7 PPE MAINTENANCE

1. Without proper maintenance, the effectiveness of PPE cannot be assured. The proper maintenance should include inspection, care, cleaning, repair, and proper storage. The most important part of maintenance is the need for continuing inspection of the PPE. If carefully performed, inspections will identify damaged or malfunctioning PPE before it is used. PPE that is not performing effectively should be discarded. Wearing poorly maintained or malfunctioning PPE could be more dangerous than not wearing any form of protection at all.

3.7.1 SCBA

1. All reusable PPEs like Self Contained Breathing Apparatus, Trolley Mounted Air Line Breathing Apparatus shall be properly maintained and kept ready for use at any point of time by area in charges wherever available. The same shall be stored in such a way that it gives protection from weather conditions like dust, direct sunlight etc.

2. The masks of the breathing apparatus shall be cleaned & disinfected in mild soap water and kept dried after every use.

3. All SCBAs and trolley mounted air line breathing apparatus shall be inspected by Fire & Safety personnel once in a month and records shall be maintained.

4. The spare air cylinder for SCBAs and trolley mounted air line breathing apparatus shall be available at Fire station. All empty / partially empty cylinders shall be replaced immediately by intimating fire station by the end users.

Only for internal use and distribution

Page 945 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

5. The repair / maintenance of all SCBAs and trolley mounted air line breathing apparatus shall be coordinated by Fire & Safety department. As far as possible, the repair of SCBAs and trolley mounted air line breathing apparatus shall be done by the authorised service personnel of the manufacturer / supplier.

3.7.2 FULL BODY SAFETY HARNESS

1. The full body safety harness including the lanyards shall be inspected by a competent person once in a year and records shall be maintained. No safety harness, which is not in good condition shall be used / issued to employees.

3.7.3 HELMETS

1. Safety helmets shall be replaced upon visible cracks or breakages.
2. The head band of the helmet shall be inspected by user before use. Helmets with damaged head bands shall not be used.
3. The chin strap / head band ratchet shall be in good condition. The helmet shall be used tight to the head by proper adjustment of head band / chin straps.
4. The safety helmets shall be periodically cleaned in mild soap water and dried for use.

3.7.4 SAFETY SHOES

1. Safety shoes shall be inspected by user before use. Damaged / worn out safety shoe exposing the metallic toes shall not be used.

3.7.5 CLOTHING

1. The boiler suit, duster coat and other body protective clothing shall be periodically cleaned and used.

3.8 PPE DISPOSAL

1. Disposable type PPEs like ear plugs, dust respirators, cotton gloves etc. shall be disposed after use in the respective waste collection bins.
2. Air cylinders of SCBAs shall be cut making it not reusable and disposed off in the metallic scrap yard.
3. All full body safety harness shall be disposed off after cutting it making it not reusable by anybody.

Only for internal use and distribution

Page 946 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

4. Safety shoes, helmets, clothing etc shall be disposed in the waste collection bin after its life.

4 ROLES AND RESPOSIBILITIES

This section outlines only the major roles and responsibilities of various stakeholders related to ROS-017. The roles and responsibilities are detailed in the requirement given in Section of 3.0 of this document. The stakeholders shall comply with these requirements.

4.1 HEAD OF ALL DEPARTMENTS

1. Ensure that the PPE requirements are identified based on proper hazard identification and risk assessment (HIRA) document.
2. The consolidated PPE requirement of the department shall be forwarded to HOD of F&S department in the month April every year.
3. Ensure that PPEs are stored in PPE shelves in all sections with proper labelling.
4. Ensure that all employees in the department are conversant with usage of PPEs and have received necessary training in their usage.
5. Ensure that PPEs are not stored in the department for usage after the expiry of shelf life.
6. Ensure that all personnel wear mandatory PPEs in process units / areas under their ownership.
7. Ensure that all process units are barricaded to restrict the entry.

4.2 HEAD OF FIRE AND SAFETY DEPARTMENT

1. Ensure to compile the total PPE requirement of KR and communicate to HOD of P&CS.
2. Ensure that the PPEs procured in KR are based on specification meeting national / international standards.
3. Ensure that the specifications of PPEs kept in the inventory are reviewed once in 3 years.
4. Ensure that NPCB for procurement of PPEs other than that maintained in inventory are initiated for the compiled requirement of KR.
5. Ensure that training on usage of various types of PPEs are imparted during the annual Fire & safety Training.

Only for internal use and distribution

Page 947 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

6. Ensure that random worksite inspection on daily basis is carried out for checking the PPE compliance and report on the same is forwarded to Functional Head of Operations on all working days.

7. Ensure the compliance of PPE requirements is included in the scope of annual Internal Safety Audit of refinery.

4.3 HEAD OF P&CS DEPARTMENT

1. Ensure the availability of required number of all indentified type of PPEs in the inventory.
2. Ensure that PPEs are not stored in the inventory after the expiry of their shelf life.
3. Maintain record of PPEs personally issued to employees such as Safety Shoes, Helmets etc.

5 APPROVAL

This ROS undergoes a review and approval process in line with the process specified in Section 5.0 of ROS-001.

5.1 REVIEW OF ROS

1. HODs of F&S, Functional Heads of Operations and Technical are reviewing authorities of this ROS.
2. The reviewing authorities shall ensure that requirements of ROS are relevant with respect to context of the business and are in line with current environment.
3. The reviewing authorities shall sign on the Document Release Note of this ROS.

5.2 APPROVAL OF ROS

Refinery Council (RC) is the approving authority for the approval of this ROS. Head of KR is the signatory on behalf of the RC and shall sign on the Document Release Note of this ROS.

6 MONITORING AND CONTROL

1. F&S Department shall conduct daily inspection at random of worksites and identify the compliance of PPE. The daily report of PPE compliance shall be forwarded to the Functional Head of Operations.
2. PPE compliance as per this ROS shall be audited during the annual Internal Safety Audit of the refinery.

Only for internal use and distribution

Page 948 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

7 RECORDS

1. Register of EHS Hazards and Risk of the department.
2. Copy of the note forwarded by HODs to Fire & safety Department regarding the PPE requirement of the department.
3. PPE issue register maintained at P&CS dept.
4. Daily Safety Check report
5. Internal Safety Audit report.

8 REFERENCES

1. Factories Act 1948
2. Personal Protective Equipment OISD-155 Part -I and Part-II.

9 APPRENDIX

1. Guidelines for Identification of PPE (ROS-017/A9.1)
2. Guidelines for Selection of Eyewear (ROS-017/A9.2)

Only for internal use and distribution

Page 949 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

9.1 APPENDIX ROS-017/A9.1: GUIDELINES FOR IDENTIFICATION OF PPE

Activity/Area	PPE & Purpose	
For all activities being carried out in the plant.	**Helmets:** Protects the head from any impact.	
High noise level area.	**Ear Plugs**: Protects ears from noise induced hearing loss.	
Where possible injuries to eyes can take place (exposure to toxic chemical atmosphere/dust /fumes/spray of chemicals/flash/ flying insects/ objects/others flying things)	**Spectacle type goggles**: It protects the eye from dust/ insects/objects/ others flying things	
	Zero power goggles: It protects the eye from dust/ insects/objects/ others flying things	
	Panaroma type goggles: It protects the eye from exposure to toxic chemical atmosphere/ dust /fumes/spray of chemicals/flash/ flying insects/ objects/others flying things	
Welding area & grinding area.	**Face Shield:** It protects the face from sparks / hot iron chips & turnings	

Only for internal use and distribution

Page 950 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Activity generating fine dusts.	**Dust Masks:** It protects from inhaling dust particles	
Welding / cutting / grinding/ hot work	**Leather hand gloves:** Protects from heat/burn	
Mechanical maintenance or ordinary use	**Cotton hand gloves:** Protects from minor cut/impact/ bruise.	
Ammonia, acid & other toxic chemical	**PVC hand gloves:** Protects from acid/ ammonia burn.	
Electrical work	**Rubber hand gloves:** Protects from electric shock	
Working at height	**Full body safety harness:** Reduces the consequences of a fall	
Working in confined space / low oxygen atmosphere / toxic gas presence	**SCBA :** Respiratory protection	

Only for internal use and distribution

Page 951 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

	Airline Breathing Apparatus:	
Working in areas of toxic chemical leaks/spills / fumes	**Chemical suit:** Protects from chemical spill / splash	
Chemical handling	**PVC Suits:** Protects from chemical splashes	
Welding/cutting/ grinding/ hot work	**Leather apron:** Protects the body from sparks/hot iron chips & turnings.	

Only for internal use and distribution

Page 952 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

9.2 APPENDIX ROS-017/A9.2: GUIDELINES FOR SELECTION OF SAFETY EYE WEAR

Table 2 Types of Hazards and hazard codes

Hazard Code	Hazard	Type of Occupation
H1	Impact	Chipping, coiling, grinding of metals, stone dressing, turning of cast iron ,non-ferrous metal etc.
H2	Dust	Sealing, grinding, handling of cement, clay earth work, sand / short blasting etc.
H3	Splash of liquids	Handling of acids, alkalies, hot and cold hydrocarbons, other chemicals, de-chocking etc.
H4	Irritating gases, vapours	Blinding / de-blinding of flanges, cleaning of tanks, vessels, blow-down pits etc.
H5	Reflected light & glare	Testing of lamps, sheet metal and lathe work etc.
H6	Injurious radiant Energy	Oxy-acetylene welding and cutting, electric arc welding etc.

Table 3 : Type of Eye protection recommended

Brief Description of Equipment	Recommended against hazard (Codes)	Remarks
Safety Spectacle with side shields, safety lenses mounted in spectacle type frame	H1, H5, H6	Spectacle may be fitted with clear, tinted blue or welding filter glass lenses.
Cup type goggles, two separate cupped eye pieces holding safety lenses and connected across the nose and provided with head band or harness.	H1, H5, H6	Goggles may be fitted with clear, tinted blue or welding filter glass lenses.
Goggles with or without ventilation.	H3 & H4	
Dust Goggles	H2	
One piece eye protectors (mono goggles)	H1, H2, H3, H5, H6	Should be capable of being used over prescription glasses
Face shields	H1, H2, H3, H6	

Only for internal use and distribution

Page 953 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

The shade numbers of the filter lenses used in welding helmets are determined by the visible density of the glass. The recommended shade numbers are given in the following table

Table 4 Recommended shades for radiant energy

Shade No	Type of Protection
3	For protection against glare or reflected light, spot welding operations or light brazing.
4 & 5	For light acetylene cutting
6	For general acetylene welding and also for use by welders helper
8	For heavy acetylene welding or cutting, also for light arc welding
10	For arc welding using current up to 250A
12	For arc welding using current more than 250A and for automatic hydrogen welding
14	For argon arc welding.

..... *End of the Document*.....

Only for internal use and distribution

Page 954 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Refinery Operating System

ROS-018

Edition: 2015, Revision: 00/2015

SAFETY GUIDELINES FOR WORKING IN CONFINED SPACE

Bharat Petroleum

Kochi Refinery

This ROS outlines the safety guidelines for working in confined space and associated activities like identification of confined spaces and hazards, preparing entry into confined space including emergency preparedness.

This ROS or any part of this publication shall be reproduced, published or transmitted, in any form or by any means, only with the prior written permission of BPCL-KR.

DOCUMENT RELEASE NOTE

Document Details

Document Name	:	Safety Guidelines for Working in Confined Space
Document No	:	ROS-018
Edition	:	2015
Revision	:	00/2015
Issue	:	Sept-2015

Reviewed by

HOD – F & S | HOD – Manufacturing | HOD – OM&S | HOD-P&U

HOD – Maintenance | HOD – E&C

Functional Head - Operations | Functional Head - Projects

Approved in : **Refinery Council**

RC Meeting Record Note : No. 105 dated 01-08-2015

Approved By

Head of Kochi Refinery

Digitally controlled document and hence sign is not requird for pdf version of ROS. Signed Mastercopy is available with Custodian

Only for internal use and distribution

Page 956 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

AMENDMENT SHEET

All amendments in this ROS shall be documented in the following table. The details of the amendment shall be elaborated in a separate document (Amendment Document) and shall be available with custodian.

Tracking ID	Section No	Amendment		Reason	Amendment Document No
		From	To		
ROS-018/15-01	All			Revised in Total	ROS018/AD-01

Only for internal use and distribution

Page 957 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Table of Contents

Section No	Title	Page No
	Document Release Note	2
	Amendment sheet	3
	Table of Contents	4
	Preface	6
1	**Introduction**	8
1.1	Purpose	8
1.2	Scope	8
1.3	Coverage	8
1.4	Limitations	9
1.5	Exclusions	9
1.6	Deviations	9
2	**Definitions & Abbreviations**	9
2.1	Defintions	9
2.2	Abbreviations	10
3	**Requirements**	11
3.1	Hazard Indentification in Confined Space	11
3.1.1	Hazards in Confined Spaces	11
3.1.2	Hazard Identification	12
3.2	Control and Preventive Mesures for Confined Space Entry	12
3.2.1	Identification of Confined Spaces	12
3.2.2	Option of Avoiding Entry to a Confined Space	12
3.2.3	Preparing Confined Space for Entry	13
3.2.4	Opening Manway	15
3.2.5	Ventilation in the Confined Space	15

Only for internal use and distribution

Page 958 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3.2.6 Atmospheric Testing 17

3.2.7 Lighting 18

3.2.8 Safety Briefing 19

3.2.9 Entry into Confined Space 19

3.2.10 Standby Persons 19

3.2.11 Communication 20

3.2.12 Personal Protective Equipment 20

3.2.13 Access and Egress 21

3.2.14 Emergency Preparedness 21

3.3 Entry into Inert / Low Oxygen Atmosphere 21

4 Roles and Responsibilities 22

4.1 Owner Department 22

4.2 Executing Department 22

4.3 Fire & Safety Department 23

5 Approval 23

5.1 Review of ROS 23

5.2 Approval of ROS 23

6 Monitoring and Control 23

7 Records 23

8 References 23

9 Appendix 24

9.1 Appendix ROS-018/A9.1: Format for record of entry / exit into confined space . 25

Only for internal use and distribution

Page 959 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

PREFACE

Director (Refinery) of erstwhile Cochin Refineries Limited (CRL) appointed a committee in 1994 for devising a procedure of standard operations. The committee formulated a system named Refinery Operating System (ROS). A set of ROS was formulated and released by the committee. Over years, the ROS was evolved to a well-documented Refinery Operating System (ROS), which outlines the Management System Procedure for various business processes in the refinery. There were 90 approved ROS and 12 ROS under formulation before the current edition. Prior to 2015 edition, Project (Technical) department, which was earlier known as Corporate Planning, before organizational re-structuring in 2006, was the custodian of the ROS.

In 2014, General Manager (Operations) constituted a task force for a thorough revision of ROS in terms of the purpose, relevance, scope and work flow in the current business context vide office note KDD/03/09 dated 28-02-2014.

The task force reviewed the existing ROS47 and concluded that entire structure and contents required revision and was revised in line with ROS-001. The existing ROS was renamed as ROS-018 as per the new ROS index.

The previous version of this ROS was ROS-47 Rev0. The ROS is fully restructured to include all types of confined space with more stress on hazard identification, risk assessment and control measures.

The procedures / practices described in the ROS are not intended to supplant other practices / procedure that have proven satisfactory, nor is the ROS intended to discourage innovation and originality in the best practices in the refinery. Users of the ROS are reminded that no ROS is a substitute for the judgment of a responsible, qualified person.

Only for internal use and distribution

Page 960 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Task Force for ROS Edition-2015

The Task Force was constituted by Mr. Soman C. K., General Manager (Operations) in 2014 for revision of the existing Refinery Operating System.

Task Force

Sl. No.	Name	Designation
1.	Muralidharan V.	Manager (E & C)
2.	Naizu A. V.	Manager (F & S)
3.	Roopesh M.	Manager (Inspection)
4.	Saji Babu	Manager (Manufacturing)

In addition to the above, several experts from various departments contributed in the preparation, review and finalisation of this document.

1 INTRODUCTION

Confined Space means a space that is (a) large enough and so configured that a person can bodily enter and perform assigned work, (b) has limited or restricted means for entry or exit and (c) is not designed for continuous human occupancy. In a refinery entry into confined spaces are inevitable as part of operation, inspection and maintenance. A confined space can be more hazardous than regular workspaces for many reasons. Many workers are injured or killed each year while working in and around confined spaces across the world. Those injured or killed were not only persons who worked in confined spaces but also others who tried to rescue them. Hence adequate control measures are essential for the safe working in the confined space.

1.1 PURPOSE

The purpose of this ROS is to control risks associated with working in a confined space and eliminate the incidents related to working in and around confined spaces.

1.2 SCOPE

The scope of this ROS is to specify the safety guidelines related to man entry into various confined spaces in Kochi Refinery and establish roles and responsibilities of stakeholders involved in such jobs.

The scope includes the following unless otherwise excluded in Section 1.5 of this document.

1. Identification of confined space and hazard associated with it.
2. Control and preventive measures for entry into confined space.
3. Emergency preparedness.

1.3 COVERAGE

This ROS is applicable to the following facilities under the administrative control of Kochi Refinery unless otherwise excluded in the section 1.5.

1. Kochi Refinery
2. Jetty Facilities like NTB, STB, & COT
3. Pipeline corridor
4. STF and SPM
5. SWSS Aluva

Only for internal use and distribution

Page 962 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

1.4 LIMITATIONS

This ROS shall not be used in conflict with legal and other requirements applicable to KR for working in confined space. However, if the requirements of this ROS are more stringent than the requirements of the regulation, then the requirements of this ROS shall govern.

1.5 EXCLUSIONS

1. Other SBUs of the Corporation.
2. Procedures and guidelines required for carrying out the jobs in the confined space.

1.6 DEVIATIONS

The procedures / practices described in the ROS are intended for standardization of the processes involved and hence the same shall be strictly adhered to. However, deviation, if any, arise due to unavoidable circumstance(s), shall be approved by Head of Kochi Refinery. The deviation note in the prescribed format specified in ROS-001 Appendix 'ROS-001/A9.4: Format for Approval of Deviation in ROS' shall be initiated by the HOD of the department proposing the deviation through the Functional Head.

2 DEFINITIONS & ABBREVIATIONS

This section lists all definitions and abbreviations used for the purpose of this ROS.

2.1 DEFINTIONS

Confined Space	:	Confined Space means a space that is (a) large enough and so configured that a person can bodily enter and perform assigned work, (b) has limited or restricted means for entry or exit and (c) is not designed for continuous human occupancy. Confined spaces can be enclosed or partially enclosed and can be above or below ground. Examples of confined space are: vessels in process units, utility and offsite areas, storage tanks, fired heaters, boiler furnaces, cooling tower sumps, silos, bins, sumps, pits, excavation exceeding 1.2m in depth, roof of floating roof tanks when products level is below 3m from tank top, junction pits of OWS, CDS pits, pipeway culverts, large diameter piping (inside) etc.
Corporation	:	Bharat Petroleum Corporation Limited.
Executing Agency	:	Person(s) or agency authorised by Kochi Refinery to carry out the work involving confined space entry.

Only for internal use and distribution

Page 963 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Executing Department	:	Department responsible for carrying out the work involving confined space entry. E.g. Maintenance, E&C etc.
Functional Head	:	Head of Functional Area such as General Manager, Deputy General Manager (In charge).
Functional Area	:	Operation, Technical, Finance, Human Resources, Projects etc.
KR & ME	:	BPCL Kochi Refinery Intralink
May	:	Optional
Owner Department	:	Department which owns the process units, operational area etc. where the work involving confined space is carried out. E.g. Manufacturing, OM&S, P&U etc.
Refinery	:	Kochi Refinery premises and its connected facilities.
Shall	:	Mandatory
Should	:	Recommended
Owner	:	Section / Department in Kochi Refinery responsible for area, unit, complex or facility where work involving confined space is carried out. E.g. Manufacturing, Stock & Oil Movement (OM&S), Power and Utility (P&U) etc.

2.2 ABBREVIATIONS

BPCL	:	Bharat Petroleum Corporation Limited
COT	:	Cochin Oil Terminal
HOD	:	Head of the Department
KR	:	Kochi Refinery
PDP	:	Pressurization and de-pressurization
PPE	:	Personal Protective Equipment
RC	:	Refinery Council
ROS	:	Refinery Operating System
SBU	:	Strategic Business Unit
SCBA	:	Self Contained Breathing Apparatus

Only for internal use and distribution

Page 964 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

STF : Shore Tank Farm

3 REQUIREMENTS

The following sections specify the requirements to be met as a minimum.

3.1 HAZARD INDENTIFICATION IN CONFINED SPACE

All hazards found in a regular workspace can also be identified in a confined space. However, they can be even more hazardous in a confined space than in a regular worksite.

3.1.1 HAZARDS IN CONFINED SPACES

1. Hazards in confined spaces include:

   a. Poor air quality: There may be an insufficient amount of oxygen for the worker to breathe. The atmosphere might contain a poisonous substance that could make the worker ill or even cause the worker to lose consciousness and death. Natural ventilation alone may not be sufficient to maintain breathable quality air.

   b. Chemical exposures due to skin contact or ingestion as well as inhalation of contaminated air.

   c. Fire Hazard: There may be an explosive / flammable atmosphere due to flammable liquids and gases and combustible dusts, which if ignited would lead to fire or explosion.

   d. Process-related hazards such as residual chemicals, release from supply line.

   e. Noise.

   f. Safety hazards such as moving parts of equipment, structural hazards, entanglement, slips, and falls.

   g. Radiation.

   h. Atmospheric and surface temperature extremes.

   i. Shifting or collapse of bulk material.

   j. Barrier failure resulting in a flood or release of free-flowing solid.

   k. Uncontrolled energy including electrical shock.

   l. Poor visibility.

   m. Claustrophobia.

Only for internal use and distribution

Page 965 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

2. Some of the above conditions may already be present in the confined space. However, some may arise when the work is carried out or because of ineffective isolation of plant nearby. E.g. leakage from a pipe connected to the confined space.

3.1.2 HAZARD IDENTIFICATION

1. Many factors need to be evaluated when looking for hazards in a confined space. An error in identifying or evaluating potential hazards can have more serious consequences. In some cases the conditions in a confined space are always extremely hazardous. In other cases, conditions are life threatening under an unusual combination of circumstances. This variability and unpredictability make hazard assessment extremely important and hence the health assessment must be taken very seriously.
2. Before carrying out the confined space entry, Owner department shall identify all the hazards and assess the risks thereof. The analysis shall include assessment of the chance of encountering such hazards by any person, the extent of impact, the effectiveness of the existing measures for controlling risks. Additional precautions, if needed, specific to the activities related to the confined space entry / jobs shall be taken. The assessment shall consider
    a. the task
    b. the working environment
    c. working materials and tools
    d. suitability of those carrying out the task
    e. arrangements for emergency rescue

3.2 CONTROL AND PREVENTIVE MESURES FOR CONFINED SPACE ENTRY

Control and preventive measures are important in the management of jobs in the confined space. The following steps are included as control and preventive measures.

3.2.1 IDENTIFICATION OF CONFINED SPACES

1. Section Head of all operating areas shall ensure that confined spaces in their respective area are identified, listed and displayed in the respective control rooms / operator cabin.

3.2.2 OPTION OF AVOIDING ENTRY TO A CONFINED SPACE

1. Confined space entry shall be exercised only if there are no other means of executing the jobs effectively without entry.
2. The engineer in charge of the job shall check for alternatives for carrying out the work so as to avoid entry and work in confined space.

Only for internal use and distribution

3.2.3 PREPARING CONFINED SPACE FOR ENTRY

The following procedure may be adopted for preparing a confined space for entry inside. All the steps may not be applicable in all cases; however, the same shall be applied based on the hazard identification and risk assessment.

3.2.3.1 Initial Isolation

1. For confined space connected to a process system, the Owner department shall isolate the confined space at the nearest possible point(s), using valves, dampers, guillotines etc.

3.2.3.2 Emptying Out

1. The Owner department shall empty out the confined space by removing the contents by pumping, draining / venting / flaring of liquid / gases etc. If emptying of the confined space is not possible due to the construction of the confined space or process involved, the same shall be taken care during the risk assessment.

2. Any temporary connection used for emptying out the contents such as fittings, hoses etc. shall be recorded by the Owner department and the same should be removed before entry.

3.2.3.3 Initial Purging

1. The initial purging shall be carried out using steam / air / nitrogen to remove the flammable / toxic gas / vapours to facilitate positive isolation and safe opening of the manways.

2. Pressurization and de-pressurization (PDP) with nitrogen may be adopted in special cases for effective purging. While performing PDP, extra care shall be taken to avoid pressurization and vacuum beyond design pressure of equipment.

3. Purging shall be continued for required time period for safe isolation and opening of manways. The time shall be reviewed as per the site condition.

3.2.3.4 Water Boiling

1. If applicable, water boiling shall be conducted in systems handling toxic material such as benzene to remove all traces of the material.

2. The water boiling shall be continued for required time period for safe isolation and opening of manways. The time shall be reviewed as per the site condition.

Only for internal use and distribution

Page 967 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3.2.3.5 Electrical Isolation

1. If the confined space is connected with any equipment that is powered using electricity, such as pumps, blowers, mixers, igniters, soot blowers, transformer grids, electrodes etc., the same shall be electrically isolated before permitting entry inside.

2. All electrical isolations shall be done using the electrical de-energisation permit and the certificate of isolation shall be obtained from the authorised personnel from P&U Electrical section before entering the confined space.

3.2.3.6 Final Positive Isolation

1. The confined space shall be positively isolated to prevent the ingress of contaminants through piping, ducts, vents, drains, conveyors, service pipes and fire protection equipment etc.

2. The final isolation shall be by using mechanical blinds or disconnecting / dismantling the connections and blanking off them as detailed in the approved blind list. The blind shall be installed as close as possible to the confined space.

3. Nitrogen connections if used for purging shall be disconnected and positively isolated before permitting entry. During turnaround, the positive isolation of nitrogen header should be carried out at the battery limit of process units.

4. While opening the flange for inserting blinds, the chances of exposure to toxic / inert gas contained / trapped in the process system shall be considered and appropriate air supplied respirators shall be worn by the workers.

5. The blind once installed and certified shall not be altered or disturbed until completion of confined space entry job.

3.2.3.7 Final Purging

1. After installing the blinds as per the blind list, the confined space shall be thoroughly purged using steam / air / nitrogen to remove the residual flammable / toxic gas / vapours.

2. Final purging shall be continued for required time period for opening of manways. The time shall be reviewed as per the site condition.

3.2.3.8 Water Washing

1. Depending on the service of the confined space, water washing shall be done, unless it is prevented by process reasons, to remove any residual material and to keep pyrophoric substances are wet.

Only for internal use and distribution

2. Chemical neutralisation (e.g. by using KMnO4) of pyrophoric substances should be considered wherever presence of pyrophoric is expected.
3. Care should be taken to distribute the water / chemical to minimise channelling inside the vessel / column.

3.2.3.9 Chemical Decontamination

1. Once initial isolation and purging is completed, chemical decontamination may be an alternative for making the confined space free from hydrocarbon / gas / vapours / chemical etc. However, the chemical decontamination shall be done by an approved procedure.

3.2.4 OPENING MANWAY

1. The external manways on the confined space, if any shall be opened by the executing agency to facilitate cooling by natural draft or mechanical type ventilation. The manway shall be opened from top to bottom, one at a time to control the ingress of air, which may lead to pyrophoric fires.
2. If temperature monitoring is available for the confined space at local panel or at control room, the same shall be monitored continuously to detect any abnormal rise in temperature during opening of manways due to pyrophoric fires inside. In case of temperature rise, the water / chemical washing should be continued or inert atmosphere should be maintained, as the case may be, to control the pyrophoric burning. In case of uncontrolled rise in temperature, all manways shall be closed to avoid air ingress and the water or chemical washing / inert gas purging / steam purging shall be ensured to control the pyrophoric burning.
3. Each entry point to the confined space shall be secured against entry inside using metallic covers and physical barriers, which requires special tools and equipment for their removal.
4. Whenever the entry point to a confined space is open, a warning sign displaying "Danger; Confined Space; No Unauthorised entry" must be placed near the opening.

3.2.5 VENTILATION IN THE CONFINED SPACE

1. Ventilation in the confined space with fresh air, by natural, forced or mechanical means, may be necessary to establish and maintain a safe and comfortable atmosphere for people entering and working inside. Wherever the confined space has sufficient openings, natural ventilation may be adequate; but in cases where natural ventilation is not adequate, the ventilation through forced / mechanical means shall be resorted to.

Only for internal use and distribution

Page 969 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

2. Selection of mechanical ventilating equipment shall be based on type and size of the confined space as well as the number of openings available in them. Depending on the above, air eductors / heavy duty exhaust fan shall be used for ventilating the atmosphere. The exhaust fan used in ventilating potential flammable atmosphere shall be flame proof type.

3. While using air eductors for dilution ventilation of confined space, effective circulation throughout the confined space shall be ensured considering the configuration of the space, the position of the openings and the properties of the contaminants in the confined space.

4. The air eductors shall be positioned in such a way that the contents from the confined space are sucked outside. Nitrogen or any gas other than air shall not be used as drive force for eductors.

5. Air eductors shall be bonded effectively to avoid static charge accumulation.

6. Exhaust of eductors shall not be pointed towards personnel or ignition source during ventilation.

7. The confined space shall not be ventilated by inserting air hoses directly into it and also by using pure oxygen. However, for effective ventilation of the confined space with single manway, air hoses should be used for introducing fresh air into it. For this, special blinds with provision of connecting air hoses may also be considered. The hoses used for ventilating shall be tagged at both ends as 'Air Hose'. Work permit for such direct ventilation using air hose shall be controlled to prevent untoward incidents. Nitrogen utility points in all process units shall be flanged and kept positively isolated (by providing blind) under normal operating conditions to avoid accidental ventilation by Nitrogen. Also air from an oil lubricated compressor should be avoided for direct ventilation of confined spaces.

8. Ventilation may be necessary even after entry of personnel inside the confined space, to maintain a breathable atmosphere by removing / diluting the contaminants generated out of the activity inside. This shall be affected using suitable local exhaust ventilation or dilution ventilation. Air Conditioning of the confined space should be considered for long duration jobs in confined space for better comfort of the personnel.

9. During ventilation of confined space, it shall be ensured that contaminants such as pollutants exhaust gases from Internal Combustion (IC) engines, inert gases etc. are not accumulated in the confined space.

10. IC engines shall not be used inside confined space.

Only for internal use and distribution

Page 970 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

11. Ventilation equipment shall not impede access or egress.

12. When more than one manway is available for a confined space, all the available manways shall be kept open during entry unless prevented by operational / process constraints.

13. Ventilation shall be continued for required time period for safe entry. The time shall be reviewed as per the site condition.

3.2.6 ATMOSPHERIC TESTING

1. Atmosphere inside the confined space shall be tested using a calibrated portable single / multi gas detectors (direct reading instrument) for oxygen content, flammable gases / vapours and toxic or harmful gases. Gas detectors having suitable sensors for the target gases identified during risk assessment shall be used for atmosphere testing.

2. Initial testing should be done from outside the confined space by inserting a sample probe and / or portable gas detection device at appropriately selected access holes, nozzles and openings.

3. Combustible gases or vapours can accumulate within a confined space due to inefficient or insufficient ventilation. Gases that are heavier than air will accumulate in the lower levels of a confined space and lighter than air will accumulate at top regions. Each part of the confined space shall be tested – side to side and top to bottom because contaminants can settle at different levels.

4. Adequate precautions shall be taken during the gas testing as lighter gases may be vented into the breathing zone of the person conducting the tests can endanger him / her.

5. Gases that are dissolved in liquids accumulated inside the confined space may be released when the liquid is disturbed. The liquids shall be agitated therefore before monitoring the atmosphere. Precautions shall be taken in case of trapped gases in solids too.

6. If it is necessary to enter the space to test remote regions away from entrances or access openings, then air-supplied respiratory equipment shall be worn by the person entering. All precautions envisaged in an inert atmosphere entry shall be followed during entry inside for testing (Refer Section 3.3).

7. Re-testing and continuous monitoring of the air quality inside the confined space shall be carried out if the risk assessment indicates that conditions may change due to the work

Only for internal use and distribution

Page 971 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

being done or due to disturbance of hazardous material in the confined space for the reasons as listed below. The atmosphere shall be tested continuously in all such cases.

a. Jobs like spray painting, coating etc. or use of flammable solvent for cleaning in the confined space can generate a flammable atmosphere.

b. Welding or cutting with oxyacetylene / oxy-LPG equipment can also result in formation of an explosive mixture / low oxygen atmosphere inside.

c. Gas cylinders, welding machines etc. shall never be kept inside confined space.

d. Minor gas leaks through cutting / welding gas hoses can generate an explosive atmosphere and therefore, shall be removed from the confined when not in use.

8. Nearby facilities shall be closely monitored for possible release of toxic or flammable material, inert gas or hot or cold gases / liquids before and during entry in to the confined space.

9. The readings of the gas testing shall be recorded in the Work Permit for confined space.

10. Entry shall not be permitted if oxygen content is less than 19.5% volume or greater than 23% volume without proper supplied air respirators.

11. No person shall be permitted to enter the confined space containing toxic atmosphere at a level exceeding the TLV without proper supplied air respirators.

12. No hot work shall be permitted in the confined spaces unless the hydrocarbon reading is zero in the gas detector.

3.2.7 LIGHTING

Adequate lighting is important for safe working inside the confined spaces. The following shall be complied for the lighting.

1. The portable lighting used inside confined space shall be of flame proof type with voltage not exceeding 24 volts. All the portable lights shall be adequately protected from breakage with suitable guards.

2. Step-down transformers used for converting into 24v shall be kept outside the confined space.

3. Ordinary portable lights below 24v and fixed lighting above 24v up to 230v may be used in confined space that is tested and confirmed as gas free and is found fit for hot work (inside the confined space).

4. When fixed lighting above 24v is provided, the same shall be adequately protected using safety devices such as ELCB with 30mA rating. The body of such equipment shall be properly grounded.

Only for internal use and distribution

Page 972 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3.2.8 SAFETY BRIEFING

1. Before entering the confined space for any job execution, tool box meeting should be conducted for workers involved in the job about the hazards and precaution in place by the Owner and / or Execution department.
2. The attendance of the safety briefing shall be recorded in the approved format.

3.2.9 ENTRY INTO CONFINED SPACE

1. All confined space entry shall be with an authorised hot work permit issued by the Owner of the area.
2. The work permit for confined spare entry shall mention the number of entrants for the job. The number of entrants for a confined space job shall be restricted as minimum as possible.
3. Care should be taken to avoid same person(s) working for a prolonged period in the confined space.
4. The work permit shall be displayed in a conspicuous space within the immediate vicinity of the confined space for workers' reference.
5. Any other work which may jeopardize the safety of workers inside a confined space shall never be permitted outside, outside and in the vicinity of the confined space.
6. The work permit for confined space entry shall be given only after thorough atmospheric monitoring as detailed in section 3.2.6 for ensuring the presence of adequate oxygen.

3.2.10 STANDBY PERSONS

1. A healthy person of the executing agency shall be present outside near the manway as safety standby so long as people are inside the confined space.
2. The standby person shall wear a green coloured vest for identification.
3. Until relieved by an authorized person, standby person shall be available near the manway of the confined space as long as people are inside the confined space.
4. The standby person shall not be assigned any other work other than standby duties.
5. In case of independent entry to multiple section of the same equipment, the standby should be available at each section.
6. The standby person shall be a person well versant on the hazards that may arise during entry as well as working inside, including mode of communication, signs or symptoms, and consequence of exposure to low oxygen / toxic atmosphere.

Only for internal use and distribution

Page 973 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

7. The standby person shall maintain a record containing names of entrants with time of entry and exit in a register kept at the entry area of the confined space in the format given in Appendix ROS-018/A9.1. Owner of the area should verify the same in every shift and ensure compliance.
8. Standby person shall monitor the personnel entering with self contained breathing apparatus (SCBA) and make sure that they are not overstaying beyond the working duration of the SCBA.
9. In the event of any emergency, the standby person shall immediately intimate the same to the operating staff / permit issuing authority. Fire station shall also be intimated by Owner and / or Execution Department in case additional help is required for the rescue operation during emergency.
10. The standby person shall be equipped with all required rescue equipment (for example, safety harnesses, lifting equipment, a lifeline, communication facility etc.) for removing the workers from the confined space in case of an emergency.
11. The standby person shall have the required authority to order workers to exit the space if any hazardous situation arises.
12. The standby person shall never enter the space to attempt rescue unless properly trained and equipped with all necessary personnel protective equipment.

3.2.11 COMMUNICATION

1. Executing department shall ensure effective two way communication facilities between standby persons and entrants. Depending up on the type of the confined space any one or combination of the communication mode namely; UHF set, VHF set, lifeline with bell, oral, signal, audio or visual communication, shall be used.
2. The standby person shall ensure return communication with each entrant at regular intervals.

3.2.12 PERSONAL PROTECTIVE EQUIPMENT

1. Owner department shall identify and specify the requirement of PPE while issuing the confined space entry permit.
2. The identified PPE shall be provided for each entrant by the Executing Agency. The same shall be ensured by the Executing and Owner departments.
3. If the entrant is unaware of the use of the PPE, they shall be briefed about proper usage of the PPE. Bearded personnel shall not be allowed to enter a confined space where entry is permitted only with the use of supplied air breathing apparatus sets such as SCBA, air line trolley.

Only for internal use and distribution

3.2.13 ACCESS AND EGRESS

1. A safe means of access to and within the confined space, such as fixed ladders, rope ladders, platforms and walkways shall be provided by the executing department.
2. Access points should be unobstructed by fittings or equipment that could impede rescue and should also be kept free of any obstructions during work in the confined space. If equipment such as electrical cables, leads, hoses and ventilation ducts are required to pass through an access hole, a second access point should be provided, if available.
3. The size of the manways shall be considered while selecting PPEs such as SCBA for easy access and egress of the persons wearing them.
4. Persons entering the confined space shall be provided with proper fall restraining system like full body harness with lanyards, retractable fall arrestors and / or life lines where the nature of the confined space warrants the usage.

3.2.14 EMERGENCY PREPAREDNESS

1. All entrants to confined space shall wear full body harness with lifeline it the same is warranted by the nature of confined space. The lifeline shall be under the control of the standby person.
2. Wherever practicable, appropriate lifting equipment, e.g. rescue hoist or winch, safety harness, lifeline, split-leg tripod with a frame-mounted hoist and one-man access cradle should be available for rescue purposes.
3. Executing department shall ensure that the space near the entrance / exit is always clear for free movement in case of emergency.
4. Fire and Safety shall conduct random visit to the confined spaces when people are working inside, check the emergency preparedness of the standby person and plan the rescue procedures.

3.3 ENTRY INTO INERT / LOW OXYGEN ATMOSPHERE

1. In very special cases where entry has to be made into a confined space where the oxygen level is below 19.5% or in an inert / toxic atmosphere (e.g. reactor entry for catalyst replacement), specific and detailed control procedure based on the hazard identification and risk assessment shall be prepared and approved by the HOD / Section Head of Owner, Executing Department and Fire & Safety. The approval from other departments / sections may be included on need basis.

Only for internal use and distribution

Page 975 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

2. In such cases, entire work shall be carried out under the close supervision of authorized officers of the Owner, executing and Fire & Safety departments.

4 ROLES AND RESPONSIBILITIES

This section outlines only the major roles and responsibilities of various stakeholders related to ROS-018. The roles and responsibilities are detailed in the requirement given in Section of 3.0 of this document. The stakeholders shall comply with these requirements.

4.1 OWNER DEPARTMENT

1. Identify all confined spaces in area of ownership and display the same in control room / operator cabin.
2. Conduct hazard identification and risk assessment and determine control measures for each entry into confined space before issuing entry permit.
3. Prepare the confined space for entry as given in Section 3.2.3.
4. Monitor the temperature of the confined space while opening manways, if available, to detect any abnormal rise in temperature due to pyrophoric fires.
5. Test the atmosphere inside the confined space for presence of flammable / toxic gases and oxygen deficient atmosphere.
6. Conduct safety briefing / tool box talk to the workers before starting confined space entry and record the attendance.
7. Identify the PPE requirement for the confined space entry job as per the hazard identification and risk assessment of the works involving confined space entry.
8. Verify and sign on the confined space entry record.

4.2 EXECUTING DEPARTMENT

1. Ensure that manways of confined spaces are opened from top to bottom one at a time.
2. Ensure that only 24V Direct Current flame proof lighting is used in confined space.
3. Ensure an exclusive standby person for all confined space jobs and that he is maintaining an entry / exit log of the entrants.
4. Ensure that the workers are provided with all identified PPE for the job and are conversant with their use.
5. Ensure that entrance / exit of confined space where entry job is carried out is always clear for free movement in case of emergency.

Only for internal use and distribution

Page 976 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

4.3 FIRE & SAFETY DEPARTMENT

1. Conduct random visit to the confined spaces when people are working inside, check the emergency preparedness of the standby person and plan the rescue procedures.
2. Provide necessary technical advises and suggestions for improving the safety precautions and emergency preparedness for confined space entry and rescue.

5 APPROVAL

This ROS undergoes a review and approval process in line with the process specified in Section 5.0 of ROS-001.

5.1 REVIEW OF ROS

1. HODs of F&S, Manufacturing, OM&S, P&U, Maintenance and E&C, Functional Heads of Operations and Projects are the reviewing authorities of this ROS.
2. Reviewing authorities shall ensure that requirements of ROS are relevant with respect to context of the business and are in line with current environment.
3. Reviewing authority shall sign on the Document Release Note of this ROS.

5.2 APPROVAL OF ROS

Refinery Council (RC) is the approving authority for the approval of this ROS. Head of KR is the signatory on behalf of the RC and shall sign on the Document Release Note of this ROS.

6 MONITORING AND CONTROL

1. Fire & Safety personnel shall conduct periodic visits and verify compliance with this ROS. Any deviation shall be reported in the operations meeting by HOD of Fire and Safety for necessary corrective action.

7 RECORDS

1. Record of entrants with in and out time and duration of stay.
2. Work permits with record of confined space atmospheric monitoring.

8 REFERENCES

1. Factories Act 1948
2. Kerala Factory Rules 1956
3. OISD STD 105: Work Permit System

Only for internal use and distribution

Page 977 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

4. Confined space code of practice, Safe Work Australia
5. Confined space guideline, Ministry of Labour, Ontario, Canada
6. Confined Spaces: A brief guide to work safely, HSE, UK
7. Confined Space Safety Guidebook, Workplace Safety and Health Council, Singapore

9 APPENDIX

1. Format for record of entry / exit into confined space: ROS-018/A9.1

Only for internal use and distribution

Page 978 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

9.1 APPENDIX ROS-018/A9.1: FORMAT FOR RECORD OF ENTRY / EXIT INTO CONFINED SPACE

Confined space location / Area / Equipment:				Permit No:	
Sl No	Name of entrant	Pass No	Date	Time	
				In	Out

.....End of Document.....

Only for internal use and distribution

Page 979 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Refinery Operating System

ROS-020

Edition: 2015, Revision: 00/2015

SAFETY GUIDELINES FOR SCAFFOLD

Bharat Petroleum

Kochi Refinery

This ROS outlines safety guidelines for erection, use and dismantling various types of temporary working platforms such as scaffolds in BPCL Koch Refinery.

This ROS or any part of this publication shall be reproduced, published or transmitted, in any form or by any means, only with the prior written permission of BPCL-KR.

DOCUMENT RELEASE NOTE

Document Details

Document Name	:	Safety Guidelines for Scaffold
Document No	:	ROS-020
Edition	:	2015
Revision	:	00/2015
Issue	:	Sept-2015

Reviewed by

HOD - F & S

HOD - Maintenance

HOD - E & C

Functional Head - Operations

Functional Head- Projects

Submitted for Approval

Approved in : **Refinery Council**

RC Meeting Record Note : No. 105 dated 01-08-2015

Approved By

Head of Kochi Refinery

Digitally controlled document and hence sign is not requird for pdf version of ROS. Signed Mastercopy is available with Custodian

AMENDMENT SHEET

All amendments in this ROS shall be documented in the following table. The details of the amendment shall be elaborated in a separate document (Amendment Document) and shall be available with custodian.

Tracking ID	Section No	Amendment		Reason	Amendment Document No
		From	To		
ROS-020/15-01	All			Revised in total	ROS020/AD-01

Only for internal use and distribution

Page 982 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Table of Contents

Section No	Title	Page No
	Document Release Note	2
	Amendment Sheet	3
	Table of Contents	4
	Preface	6
1	**Introduction**	8
1.1.	Purpose	8
1.2.	Scope	8
1.3.	Coverage	8
1.1	Limitations	8
1.2	Exclusions	9
1.3	Deviations	9
2	**Definitions & Abbreviations**	9
2.1	Defintions	9
2.2	Abbreviations	10
3	**Requirements**	11
3.1	Hazard Identification and Risk Assessment	11
3.1.1	Identifying the Hazard	11
3.1.2	Assessing the Risk	11
3.2	Types of Scaffold	12
3.2.1	Bird Cage Scaffold	12
3.2.2	Tower Scaffold	12
3.2.3	Mobile Scaffold	12
3.2.4	Tube and Coupler Scaffold	12
3.2.5	Pre-fabricated Frame Scaffold	13

Only for internal use and distribution

Page 983 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3.2.6 Hung Scaffold 13
3.2.7 Single Pole Scaffold 13
3.2.8 Suspended (Swing-Stage) Scaffold 13
3.3 General Requirements 13
3.4 Material of Contruction 14
3.5 Erection of Scaffold 15
3.6 Pre-fabricated Scaffold 17
3.7 Suspended Scaffold 17
3.8 Internal Scaffold 18
3.9 Inspection and Maintenance of Scaffold 18
3.10 Safety During Usage of Scaffold 18
4 Roles and Responsibilities 19
4.1 Engineer in Charge 19
5 Approval 19
5.1 Review of ROS 20
5.2 Approval of ROS 20
6 Monitoring and Control 20
7 Records 20
8 References 20
9 Appendix 20
9.1 Appendix ROS-015/A9.1: Scaffold Checklist 21
9.2 Appendix ROS-020/A9.2: Scaffold Tags 22
9.3 Appendix ROS-020/A9.3: Scaffold Terminologies and Components 23

Only for internal use and distribution

PREFACE

Director (Refinery) of erstwhile Cochin Refineries Limited (CRL) appointed a committee in 1994 for devising a procedure of standard operations. The committee formulated a system named Refinery Operating System (ROS). A set of ROS was formulated and released by the committee. Over years, the ROS was evolved to a well-documented Refinery Operating System (ROS), which outlines the Management System Procedure for various business processes in the refinery. There were 90 approved ROS and 12 ROS under formulation before the current edition. Prior to 2015 edition, Project (Technical) department, which was earlier known as Corporate Planning, before organizational re-structuring in 2006, was the custodian of the ROS.

In 2014, General Manager (Operations) constituted a task force for a thorough revision of ROS in terms of the purpose, relevance, scope and work flow in the current business context vide office note KDD/03/09 dated 28-02-2014.

The previous version of this ROS was ROS-94 Rev0. The task force revised the previous revision with new structure in line with ROS-001 and renumbered as ROS-020 as per the new ROS index.

The procedures / practices described in the ROS are not intended to supplant other practices / procedure that have proven satisfactory, nor is the ROS intended to discourage innovation and originality in the best practices in the refinery. Users of the ROS are reminded that no ROS is a substitute for the judgment of a responsible, qualified person.

Only for internal use and distribution

Page 985 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Task Force for ROS Edition-2015

The Task Force was constituted by Mr. Soman C. K., General Manager (Operations) in 2014 for revision of the existing Refinery Operating System.

Task Force

Sl. No.	Name	Designation
1.	Muralidharan V.	Manager (E & C)
2.	Naizu A. V.	Manager (F & S)
3.	Roopesh M.	Manager (Inspection)
4.	Saji Babu	Manager (Manufacturing)

In addition to the above, several experts from various departments contributed in the preparation, review and finalisation of this document.

1 INTRODUCTION

Working at height is unavoidable for operations, maintenance and construction in refinery and hence, temporary platforms and scaffolding are provided for the safe working of personnel at height. Scaffold is a temporary safe work platform, either supported from below or suspended from above, on which workers can perform tasks at heights above the ground when work cannot be done at ground level or on a finished floor. Scaffolds, once properly erected, are a control measure to prevent risk of persons and objects falling while working at height.

Working at height remains one of the biggest causes of fatalities and major injuries in the workplace. Common cases include falls from ladders and through fragile surfaces. If there are no precautions in place, a person may fall a distance liable to cause personal injury and hence control measures are inevitable.

1.1. PURPOSE

The purpose of this ROS is to establish the minimum safety guidelines for scaffolds used in BPCL Kochi Refinery.

1.2. SCOPE

The scope of this ROS is to establish procedure for safe erection, use, and dismantling of scaffolds for operations, maintenance, and construction activities by BPCL or by contractors at facilities of KR and project sites.

1.3. COVERAGE

ROS is applicable to the following facilities under KR SBU

1. Kochi Refinery
2. Jetty Facilities like NTB, STB, & COT
3. Pipeline corridor
4. STF and SPM
5. SWSS Aluva

1.1 LIMITATIONS

This ROS shall not be used in conflict with legal and other requirements applicable to KR for erection of scaffold and working at height. However, if the requirements of this ROS are

more stringent than the requirements of the above, then the requirements of this ROS shall govern.

1.2 EXCLUSIONS

1. Other SBUs of the Corporation.

1.3 DEVIATIONS

The procedures / practices described in the ROS are intended for standardization of the processes involved and hence the same shall be strictly adhered to. However, deviation, if any, arises due to unavoidable circumstance(s), shall be approved by Head of Kochi Refinery. The deviation note in the prescribed format specified in ROS-001 Appendix 'ROS-001/A9.4: Format for Approval of Deviation in ROS' shall be initiated by the HOD of the department proposing the deviation through the Functional Head.

2 DEFINITIONS & ABBREVIATIONS

This section lists all definitions and abbreviations used for the purpose of this ROS.

2.1 DEFINTIONS

Base Plate	:	A plate for distributing the load from an upright.
Bay	:	The space between the centre lines of two adjacent standards along the face of the scaffold.
Brace	:	A tube incorporated diagonally in scaffolding for stability.
Corporation	:	Bharat Petroleum Corporation Limited.
Coupler	:	A fitting by which a grip is applied to the external surfaces of two tubes that thereby holds them together.
Functional Head	:	Head of Functional Area such as General Manager, Deputy General Manager (In charge).
Functional Area	:	Operations, Technical, Finance, Human Resources, Projects etc.
Guardrail	:	A tube connected at the edge of platform and other places to prevent persons falling from platform or place. It is also known as a Handrail.
Lanyard	:	The line used to connect the safety harness to anchorage point.
Ledger	:	A tube spanning horizontally and tying a scaffold longitudinally that may act as a support for putlogs or transoms.

Only for internal use and distribution

Page 988 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Lift	:	The height from the ground or floor to the lowest ledger or the vertical distance between any two adjacent ledgers.
May	:	Optional
Putlog	:	A tube or other member spanning from a ledger to the wall of a building that may have a specially formed end (may be detachable) for the purpose of fixing into the brickwork.
Raker	:	An inclined tube having a bearing on the ground or on an adjacent structure or if carrying portion of the projecting scaffolding being connected to a horizontal member of the scaffold at a lower level.
Refinery	:	Kochi Refinery premises and facilities under its administrative control.
Safety harness	:	Personal Protective Equipment consists of waist belt together with shoulder straps and leg straps.
Shall	:	Mandatory
Should	:	Recommended
Standard	:	A tube used as a column or vertical in the construction of a scaffold, and transmitting a load to the ground via a base plate. It is also known as an Upright or Column.
Transom	:	A tube spanning across ledgers to tie a scaffold transversely that may also support a working platform.

2.2 ABBREVIATIONS

BPCL	:	Bharat Petroleum Corporation Limited
COT	:	Cochin Oil Terminal
HOD	:	Head of the Department
KR	:	Kochi Refinery
PPE	:	Personal Protective Equipment
RC	:	Refinery Council
ROS	:	Refinery Operating System
SBU	:	Strategic Business Unit
SCBA	:	Self Contained Breathing Apparatus
STF	:	Shore Tank Farm

Only for internal use and distribution

Page 989 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3 REQUIREMENTS

This section of ROS covers hazard identification and risk assessment, types, requirements for materials used, safety requirements in erection and dismantling of scaffolds.

3.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT

Since working at height involves various hazards and care shall be taken to identify the hazards and assess the risk to minimise untoward incidents.

3.1.1 IDENTIFYING THE HAZARD

Some examples of the hazards associated with work involving the erection, use, maintenance, alteration and dismantling of scaffolds include:

a. Scaffolding collapse (before, during and after placement of the scaffold)

b. Overhead electric lines

c. Mobile plant and other workplace traffic

d. Fall from heights

e. Falling objects

3.1.2 ASSESSING THE RISK

Risk assessment shall be carried out to select the most suitable type of scaffold for the work and minimise number of persons working at heights for erecting, use and dismantling scaffolds. The following aspects are to be considered while carrying out the risk assessment.

a. type of scaffold to be used

b. height of the scaffold to be erected

c. scheduling of the scaffolding work

d. layout of the workplace, including proximity to public areas

e. surface on which the scaffold will be erected (ground conditions, the structural integrity of the surface to support the scaffold and its load)

f. number of people intend to work on the scaffold

g. machinery that will be used on the scaffold, plant and equipment near the scaffold

h. skill and competencies required to erect, use, maintain, alter and dismantle the scaffold

i. local weather conditions, particularly wind forces

Only for internal use and distribution

Page 990 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

j. type of work

3.2 TYPES OF SCAFFOLD

Various types of scaffolds are used based on the job requirements and some of the commonly used ones are described below.

3.2.1 BIRD CAGE SCAFFOLD

A birdcage scaffold is an independent scaffold that consists of more than two rows of standards in both directions and is connected by ledgers and transoms. It is mainly used for working on a single level, such as ceilings.

3.2.2 TOWER SCAFFOLD

A tower scaffold is an independent scaffold consisting of four vertical members connected longitudinally and transversely.

3.2.3 MOBILE SCAFFOLD

A mobile scaffold is a tower scaffold that is mounted on castors as shown in *Figure- 1*.



Figure- 1 : Mobile Scaffold

3.2.4 TUBE AND COUPLER SCAFFOLD

Tube and coupler scaffolds are so-named because they are built from tubing connected by coupling devices. They are frequently used where heavy loads need to be carried, or on structures with unusual design, shape and locations because of their strength. The versatility

Only for internal use and distribution

of tube and coupler scaffolds enables them to be assembled in multiple directions in a variety of settings.

3.2.5 PRE-FABRICATED FRAME SCAFFOLD

Frame scaffold is a scaffold assembled from prefabricated frames, braces and accessories. Frame scaffolds such as 'A' and 'H' frame trestle scaffolds are commonly used by bricklayers, plasterers and painters, and for general fit-out and finishing work.

3.2.6 HUNG SCAFFOLD

A hung scaffold is an independent scaffold that hangs from another structure, but is not capable of being raised or lowered when in use.

3.2.7 SINGLE POLE SCAFFOLD

A single pole scaffold consists of a single row of standards connected by ledgers. Putlogs are fixed to the ledgers and built into the wall of the building or structure. A single pole scaffold is dependent upon the structure against which it is placed for support. It is important that no components of this type of scaffold are removed until the scaffold is being dismantled.

3.2.8 SUSPENDED (SWING-STAGE) SCAFFOLD

A suspended scaffold incorporates a suspended platform that is capable of being raised or lowered when in use. An example of a suspended scaffold is a swing-stage scaffold.

3.3 GENERAL REQUIREMENTS

1. Scaffold shall be erected in accordance with the guidelines specified in this ROS for persons engaged in work at height that cannot be done safely from the ground so as to prevent fall of person and material from height.

2. Scaffolds shall be provided with safe means of access, such as stairs or ladders. Ladders shall be secured against inadvertent movement.

3. Every scaffold shall be properly designed, constructed, erected and maintained so as to prevent collapse or accidental displacement.

4. Every scaffold and parts thereof shall be

   a. so designed as to prevent hazards for workers during erection and dismantling.

   b. so designed that guardrails and other protective devices, platforms, putlogs, rakers, transoms, ladders, stairs or ramps can be easily put together.

Only for internal use and distribution

Page 992 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

c. of suitable and sound material and of adequate size and strength for the purpose for which it is to be used.

d. maintained in a proper condition.

5. Scaffolds and their components shall be capable of supporting without failure at least four times maximum intended load.

3.4 MATERIAL OF CONTRUCTION

1. Scaffolds tubes are to be made from heavy class welded or seamless steel tubes of 40mm nominal bore conforming to IS: 1161-1998.

2. Steel tubes for individual component type scaffolding shall be of 6ft., 8ft., 10ft., 12ft., 14ft., 16ft. and 20ft. in length and may be either galvanized or plain. Plain steel tube shall be protected against corrosion by applying two coats of zinc chromate primers or zinc phosphate primer followed by two coats of chlorinated rubber based finish paint. The plain ends of tubes shall be chamfered off preferably to 3mm.

3. Straight clamps should be used to connect two tubes at 90 degrees. Cross clamps or swivel camps should be used to connect two tubes at an angle.

4. Bolts and Nuts used shall be of mild steel / black bolt confirming to IS: 1362.

5. Scaffold steel boards shall be lightweight, sturdy and rugged construction preferably 300mm wide, 2000 to 2500mm long maximum and free from any defects likely to affect its strength. Steel board gratings shall be designed such a way that no tools shall fall through it.

6. Wooden boards shall not be used to substitute of steel boards.

7. When steel boards are used, use wire rope for tying the boards or alternate safe method may be used.

8. Rope made of plastic, coir etc. shall not be used for erection of scaffolds and for tying scaffold boards.

9. Materials used in the construction of scaffolds should be stored in good condition and in a manner that shall not affect the integrity of the scaffold materials.

10. All tubes, couplers and fittings used for scaffolds shall be free from damage and distortion and shall be maintained in rust free condition.

11. Couplers shall be made of drop forged steel or equivalent material.

Only for internal use and distribution

Page 993 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3.5 ERECTION OF SCAFFOLD

1. All unwanted materials shall be removed from the area before erection of scaffold.

2. Ensure the ground is firm where the scaffold is intended to be erected. When scaffold is to be erected in the vicinity of excavation or on low earth, ensure that ***standards*** are not likely to slide or cave in.

3. The ***bay length*** is dependent upon the height and load on the scaffold but shall never exceed 2500mm. All base ***lift*** shall be supported on metallic base plates of adequate size and must be erected straight.

4. Except on the side adjacent to the site of work all ***standards*** shall extend at least 1050mm above the top most working platform to enable handrail / guard rail to be fitted. Guardrail, mid rail and toe rail may be fitted 1050mm, 525mm and 75mm respectively above the platform level across the scaffold structure.

5. The vertical distances between ***ledgers*** shall not be more than 2100mm.

6. The horizontal distance between ***transoms*** and ***putlogs*** carrying 32mm thick boards shall not exceed 1500mm.

7. The gap between front edge of platform and work shall not be more than 350mm.

8. The area within toe guard and handrail shall be fully covered using scaffold boards. There shall not be any gap between the scaffold boards.

9. The end of the scaffold board shall not extend more than 300mm or less than 150mm beyond the transoms.

10. The ledgers shall not extend more than 250mm beyond the standards at the ends. The ledgers up to a height of two metres shall be provided with rubber end covers to prevent injury to people moving in the area.

11. Safety harness shall be used while working at height above 2m and it shall be suitably anchored to limit the fall distance to minimum and also to avoid falling on to the ground.

12. Every scaffold shall be effectively ***braced*** to make it rigid and ***tied*** to make it stable. Scaffolds may be effectively tied to adjacent structure to ensure stability.

13. A safe and convenient means of access shall be provided to the platform level of a scaffold. Portable ladders may be used for this purpose up to a height of 4 m. When

Only for internal use and distribution

Page 994 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

used, it shall be placed at an angle of approximately 75 degrees from the horizontal. For platforms above 4 m height, fixed ladders shall be provided and tied or hooked with scaffold to take adequate load of people.

14. Wherever provision of a ladder is not feasible, provide additional rungs at a spacing of 450mm at any convenient side of the scaffold.

15. Ensure that no un-insulated overhead electric lines exist within 3m of the working platform.

16. Scaffolds, which are not designed to be independent, should be rigidly connected to a structure or a building at suitable vertical and horizontal distances.

17. A scaffold shall never extend above the highest anchorage to an extent, which might endanger its stability and strength.

18. Sufficient putlogs and transoms shall remain in position and securely fastened to the ledgers, uprights or standards as the case may be, to ensure the stability of the scaffold until it is finally dismantled.

19. All scaffolds and appliances used as supports for working platforms shall be of sound construction, have a firm footing and be adequately braced to maintain their stability.

20. When necessary to prevent danger of falling objects, overhead screens / safety net of adequate strength and dimensions shall be provided for working platforms and stairways of scaffolds.

21. Scaffolding materials shall not be thrown from scaffolds or from heights. Other materials may be thrown (if material is not affected by the action) from scaffolds or heights only when the landing areas has been designated, protected, appropriate notice displayed and is under the supervision of a person on the landing level.

22. Platforms on scaffolds shall be of adequate dimension, especially in width, for the tasks to be performed from the scaffold.

23. Resting platforms shall be provided at every six meter heights for high rise scaffolds.

24. Utmost care is to be taken against fall while erecting a scaffold. Use of full body safety harness with double lanyards is recommended to ensure that at least one is always anchored at all times even when moving up or down.

25. Only trained persons shall be allowed to erect scaffolds with valid work permit.

Only for internal use and distribution

Page 995 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

26. During erection of scaffold a red coloured "DO NOT USE SCAFFOLD" tag as given in Appendix ROS-020/A9.2 shall be displayed on the scaffold for preventing usage of incomplete scaffold.

3.6 PRE-FABRICATED SCAFFOLD

1. Prefabricated frame scaffold should be erected and dismantled by a competent person in a progressive manner to ensure both the installers' safety and the stability of the overall structure.

2. Braces shall be attached to the frames in accordance with the manufacturer's or supplier's instructions. As the height of frames increase, there is a greater need to provide lateral stability to the frames.

3. Prefabricated frame scaffold shall be stable and erected on a suitable foundation to ensure that it can adequately carry and distribute the loads such as materials and workers evenly to each frame.

3.7 SUSPENDED SCAFFOLD

In addition to the requirements for scaffold in general as regards to soundness, stability and protection against the risk of falls, suspended scaffolds shall meet the following specific requirements:

1. Two point suspension scaffold platforms shall be not less than 500mm and no more than 914mm wide overall. The platform shall be securely fastened to the hangers by U-bolts or by equivalent means.

2. The hangers of two point suspension scaffolds shall be made of wrought iron, mild steel, or other equivalent material having a cross-sectional area capable of sustaining four times the maximum intended load.

3. When hoisting machines are used on two-point suspension scaffolds, such machines shall be design tested and approved by a competent person.

4. Wire or fibre rope used for scaffold suspension shall be capable of supporting at least six times the intended load.

5. The safety of workers shall be safeguarded by an extra rope having a point up attachment independent of the anchorage arrangements of the scaffold

6. The anchorage and other elements of support of the scaffold shall be designed and built in such a way as to ensure sufficient strength.

Only for internal use and distribution

Page 996 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3.8 INTERNAL SCAFFOLD

1. While erecting scaffold inside heaters, vessels, columns, the Engineer in Charge of the job may grant relaxation in width and height of scaffold to be erected due to space constraint. However fitness of scaffolds shall be ensured and certified. Safety harness shall be used at heights above 2 m and same shall be suitably anchored.

2. Provide platform all around at one meter below the tube clamp level while erecting scaffold inside heaters.

3.9 INSPECTION AND MAINTENANCE OF SCAFFOLD

1. After erection, the Engineer in Charge of the job shall inspect and ensure construction of the scaffold as per the plan.

2. The Engineer in Charge of the job shall inspect the scaffolding as per the checklist given in Appendix ROS-020/A9.1. He /she shall certify the scaffolding fit for use and provide the duly filled green 'READY FOR USE SCAFFOLD' tag with his / her signature given in Appendix ROS-020/A9.2. The Red coloured 'DO NOT USE SCAFFOLD' tag shall be removed from the scaffold, which was put during erection of scaffold.

3. No person shall be allowed to work on scaffolds during storms or high winds. After heavy rains or storm the Engineer in Charge of the job shall inspect scaffolds; ensure that the integrity is not lost and certify once again.

4. A scaffold once erected shall not be substantially altered or dismantled without the concurrence of the executing Engineer in Charge.

5. The validity of an approved scaffold is up to 7 days. Thereafter the scaffold shall be revalidated by the Engineer in Charge of the job using the checklist given in Appendix ROS-020/A9.1 and renew the certification by signing on that renewal column in the tag.

6. No scaffold should be partly dismantled and left with 'READY FOR USE SCAFFOLD' tag. In case the scaffold is to be used for other works (e.g. using the partially dismantled scaffold with lower height), it shall be used only after recertification by the Engineer in Charge.

3.10 SAFETY DURING USAGE OF SCAFFOLD

1. Ensure that scaffolds are used appropriately and only for the purpose for which they are designed or erected.

2. In transferring heavy loads on or to a scaffold a sudden shock to the scaffold shall be avoided.
3. When necessary to prevent danger, loads being hoisted on or to scaffolds should be controlled by a guide line so that they don't strike against the scaffold.
4. The load on the scaffold should be evenly distributed, as far as practicable, and in any case should be so distributed as to avoid disturbance of the stability of the scaffold.
5. During the use of a scaffold care should constantly be taken that it is not overloaded or otherwise misused.
6. Scaffold should not be used for the storage of material except that required for immediate use.

4 ROLES AND RESPONSIBILITIES

This section outlines only the major roles and responsibilities of various stakeholders related to the ROS-020. The roles and responsibilities are detailed in the requirement given in Section of 3.0 of this document. The stakeholders shall comply with these requirements.

4.1 ENGINEER IN CHARGE

1. Ensure that the contractor erecting the scaffold is putting a red tag on the scaffold giving warning "DO NOT USE SCAFFOLD" during erection.
2. Ensure that the scaffold erected is strictly as per the guidelines of ROS-020.
3. Inspect the scaffold after erection as per the checklist given in Appendix ROS-020/A9.1 and certify the scaffold ready for use by replacing the red tag "DO NOT USE SCAFFOLD" with the green tag " READY FOR USE SCAFFOLD" with signature duly endorsed.
4. Inspect the scaffold after heavy rain or storm and ensure that the integrity of the scaffold is not lost.
5. Revalidate the scaffold in every 7 days using checklist and by signing on the renewal column of the green "READY FOR USE SCAFFOLD" tag.

5 APPROVAL

This ROS undergoes a review and approval process in line with the process specified in Section 5.0 of ROS-001.

Only for internal use and distribution

Page 998 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

5.1 REVIEW OF ROS

1. HODs of F&S, Maintenance and E&C and Functional Heads of Operations and Projects are the reviewing authorities of this ROS.
2. The reviewing authorities shall ensure that requirements of ROS are relevant with respect to context of the business and are in line with current environment.
3. The reviewing authorities shall sign on the Document Release Note of this ROS.

5.2 APPROVAL OF ROS

Refinery Council (RC) is the approving authority for the approval of this ROS. Head of KR is the signatory on behalf of the RC and shall sign on the Document Release Note of this ROS.

6 MONITORING AND CONTROL

1. Fire & Safety department shall conduct periodic visits to the site and verify compliance with this ROS. Any deviation shall be reported in the operations meeting by HOD of fire and safety department for necessary corrective action.
2. The compliance of this ROS shall also be verified during the periodic safety walk of senior executives and non-compliance shall be reflected in the report generated.
3. The compliance shall also be ensured during the internal safety audit.

7 RECORDS

1. Work permit
2. Duly filled Scaffold Tags

8 REFERENCES

1. IS:4014 Part-1: Code of Practice for Steel Tubular Scaffolding - Definitions and Materials.
2. IS:4014 Part-2: Code of Practice for Steel Tubular Scaffolding - Safety Regulations for Scaffolding
3. OISD STD 105: Work Permit System
4. ROS94,Revision prior to Edition 2014

9 APPENDIX

1. Appendix ROS-020/A9.1: Scaffold checklist
2. Appendix ROS-020/A9.2: Scaffold Tags

Only for internal use and distribution

Page 999 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3. Appendix ROS-020/A9.3: Scaffold Terminologies and Components

9.1 APPENDIX ROS-015/A9.1: SCAFFOLD CHECKLIST

SCAFFOLD CHECKLIST		
LOCATION (Unit/Equip):	PURPOSE:	ERECTED BY (Contractor):
Item	Check point	Condition
Base Plate	In place	
Sole Plate	On lose ground	
Tubes	Proper size	
	Straight	
Standards (Uprights)	Vertical	
	Staggered joints	
	Right spacing	
	Not damaged	
Ledgers (Runner)	Level	
	Staggered joints	
	Not loose	
	Not damaged	
Bracing Ties	In place	
	None missing	
	Not loose	
Fittings	Right fitting	
	Not damaged	
	Check couplers	
Boards	Not damaged	
	Not loose	
	Right support	
Ladders	Proper angles	
	Right length	
	Properly secured	
	Separate landing	
	Right extension	
Guardrails	Top rail	
	Mid rail	
	None missing	
Toe boards	In place	
General comments		

Only for internal use and distribution

Page 1000 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

9.2 APPENDIX ROS-020/A9.2: SCAFFOLD TAGS





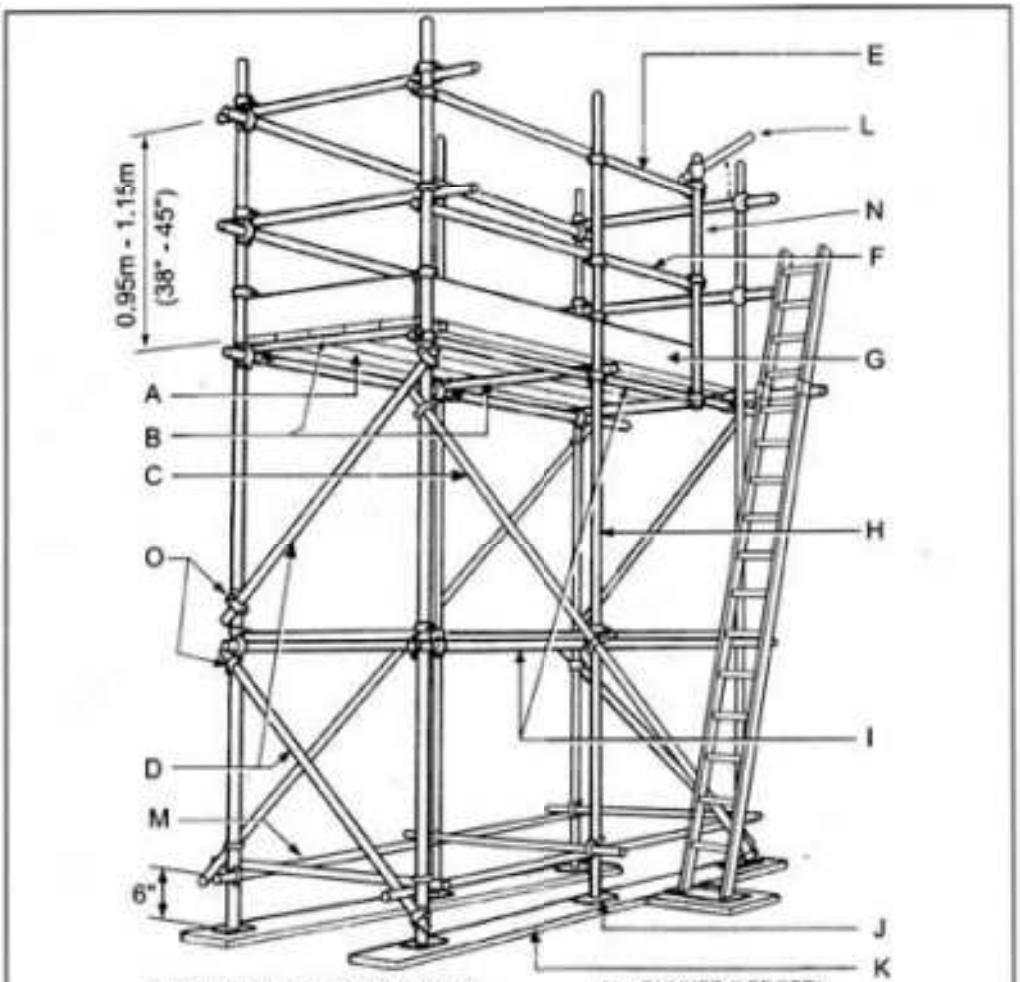




Only for internal use and distribution

Page 1001 of 4087 : B895-TENDER_DOC-B895-999-85-41-EP-T-9802 : Rev. A

9.3 APPENDIX ROS-020/A9.3: SCAFFOLD TERMINOLOGIES AND COMPONENTS

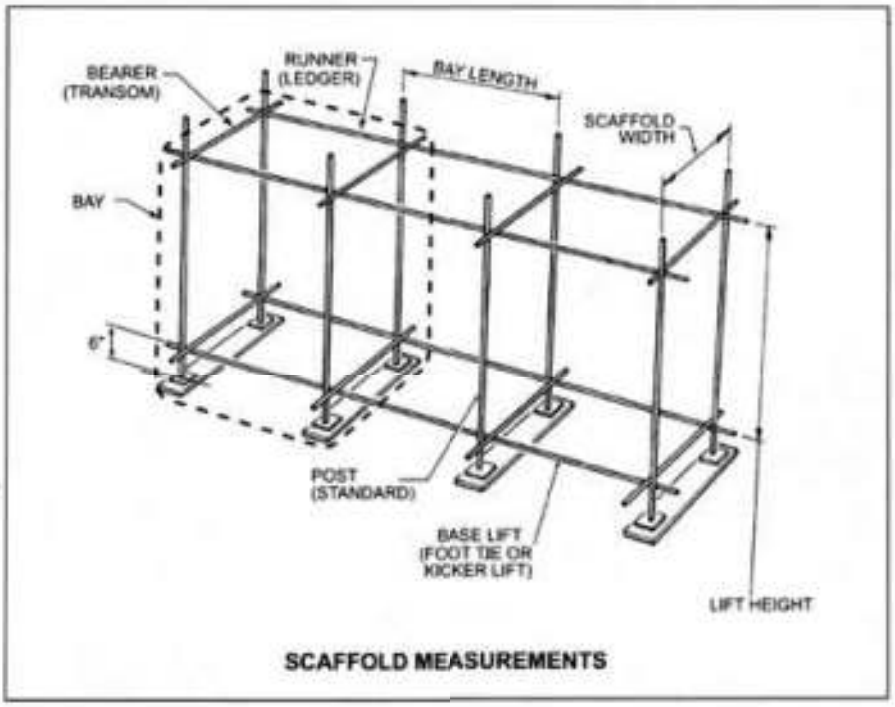


A) SCAFFOLD PLANKS (BOARDS)
B) BEARER (TRANSOM)
C) LONGITUDINAL (FACADE) BRACING
D) TRANSVERSE (SECTIONAL) BRACING
E) TOPRAIL
F) MIDRAIL
G) TOEBOARD
H) POST (STANDARD)
I) RUNNER (LEDGER)
J) BASE PLATE
K) SILL (SOLE BOARD)
L) SELF-CLOSING DROP BAR (INSIDE POSTS)
M) BASE LIFT (KICKER LIFT)
N) FALSE UPRIGHT (PUNCHEON)
O) COUPLER

SCAFFOLD TERMINOLOGY

Only for internal use and distribution

Page 1002 of 4087 : B895-TENDER_DOC-B895-999-85-41-EP-T-9802 : Rev. A



SCAFFOLD MEASUREMENTS

.....End of Document.....

Refinery Operating System

ROS-019

Edition: 2015, Revision: 00/2015

SAFETY GUIDELINES FOR EXCAVATION

Kochi Refinery

This ROS outlines safety guidelines to be followed in BPCL Kochi Refinery for excavation / trenching activities to prevent accidents / incidents endangering people and property.

This ROS or any part of this publication shall be reproduced, published or transmitted, in any form or by any means, only with the prior written permission of BPCL-KR.

DOCUMENT RELEASE NOTE

Document Details

Document Name	:	Safety Guidelines for Excavation
Document No	:	ROS-019
Edition	:	2015
Revision	:	00/2015
Issue	:	Sept-2015

Reviewed by

HOD – Fire & Safety

HOD – E & C

HOD-Maintenance

Functional Head - Operations

Functional Head - Projects

Reviewed in : Refinery Council

RC Meeting Record Note : No...105..... dated..01-08-2015....

Approved By

Head of Kochi Refinery

Digitally controlled document and hence sign is not requird for pdf version of ROS. Signed Mastercopy is available with Custodian

Only for internal use and distribution

Page 1005 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

AMENDMENT SHEET

All amendments in the ROS shall be documented in the following table. The details of the amendment shall be elaborated in a separate document (Amendment Document) and shall be available with custodian.

Tracking ID	Section No	Amendment		Reason	Amendment Document No
		From	To		
ROS-019/15-01	All			Revised in total	ROS019/AD-01

Only for internal use and distribution

Page 1006 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Table of Contents

Section No	Title	Page No
Document Release Note		**2**
Amendment Sheet		**3**
Table of Contents		**4**
Preface		**6**
1	**INTRODUCTION**	**8**
1.1	Purpose	8
1.2	Scope	8
1.3	Coverage	8
1.4	Limitations	8
1.5	Exclusions	9
1.6	Deviations	9
2	**Definitions & Abbreviations**	**9**
2.1	Defintions	9
2.2	Abbreviations	10
3	**Requirements**	**11**
3.1	Hazard Identification and Risk Assessment	11
3.2	Underground Services and Overhead Power Line	12
3.3	Excavation Collapse	13
3.4	Materials Falling into Excavations	14
3.5	People and Vehicles Falling into Excavations	14
3.6	People Struck by Machinery	16
3.7	Stability of Nearby Structures	16
3.8	Accumulation of Gases and Vapours	16
4	**Roles and Responsibility**	**17**
4.1	Engineer in Charge	17

Only for internal use and distribution

Page 1007 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

5 Approval 17

5.1 Review of ROS 17

5.2 Approval of ROS 17

6 Monitoring and control 18

7 Records 18

8 References 18

9 Appendix 18

9.1 Appendix ROS-19/A9.1: Checklist for Excavation 19

Only for internal use and distribution

Page 1008 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

PREFACE

Director (Refinery) of erstwhile Cochin Refineries Limited (CRL) appointed a committee in 1994 for devising a procedure of standard operations. The committee formulated a system named Refinery Operating System (ROS). A set of ROS was formulated and released by the committee. Over years, the ROS was evolved to a well-documented Refinery Operating System (ROS), which outlines the Management System Procedure for various business processes in the refinery. There were 90 approved ROS and 12 ROS under formulation before the current edition. Prior to 2015 edition, Project (Technical) department, which was earlier known as Corporate Planning, before organizational re-structuring in 2006, was the custodian of the ROS.

In 2014, General Manager (Operations) constituted a task force for a thorough revision of ROS in terms of the purpose, relevance, scope and work flow in the current business context vide office note KDD/03/09 dated 28-02-2014.

The task force reviewed entire ROS and concluded that entire structure and contents required a major revision. In order to incorporate standardization, the task force decided to formulate the first ROS, which outlines procedure for formulating a ROS. Hence the first ROS in the series was revised in full incorporating document structure, numbering philosophy and new approval procedure.

Excavation is one of the dangerous construction activities. Various types of excavations are necessitated within the refinery facilities related to maintenance, additions as well as major projects. The excavations vary from minor road cuttings to major site grading jobs such as major projects like IREP.

The earlier version of ROS 63 (Rev 2) was guidelines for excavations. On review the task force reviewed the entire ROS and renamed as ROS-019 as Guidelines for Safety Guidelines for Excavation.

Hence the ROS-019 is revised with wider understanding and explicit guidelines for preventing accidents / incident related with the excavation activity thereby preventing damage to personnel, structures and equipments. The 13 point checklist of the earlier version of ROS 63 is retained in this edition.

Only for internal use and distribution

Page 1009 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Task Force for ROS Edition-2015

The Task Force was constituted by Mr. Soman C. K., General Manager (Operations) in 2014 for revision of the existing Refinery Operating System.

Task Force

Sl. No.	Name	Designation
1.	Muralidharan V.	Manager (E & C)
2.	Naizu A. V.	Manager (F & S)
3.	Roopesh M.	Manager (Inspection)
4.	Saji Babu	Manager (Manufacturing)

In addition to the above, several experts from various departments contributed in the preparation, review and finalisation of this document.

Only for internal use and distribution

Page 1010 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

1 INTRODUCTION

Work associated with excavation is one of the most hazardous construction activities. Accidents are caused mainly by land slide of the side walls of the excavation, toppling of machinery into the trench or people getting struck by the bucket of the excavator and hazards associated with underground power / instrument / communication cables.

To ensure safety of persons involved and to prevent accidents in the excavation works, they have to be properly planned, managed, supervised and executed. The persons involved in all stages should be aware of the hazards involved and procedures should be in place to control risks associated with works involving excavation.

1.1 PURPOSE

The purpose of this Refinery Operating System (ROS) is to provide guidelines for carrying out excavation works in BPCL Kochi Refinery so as to safe guard the persons carrying out them, to avoid process interruption and to ensure structural integrity of the nearby facilities.

1.2 SCOPE

This ROS details guidelines with regard to hazard identification, risk assessment and precautions to be taken with respect to the hazards identified such as underground services, excavation collapse, falling of people, materials and vehicle into the excavations, accumulation of water and gases etc. The scope also includes the guideline to ensure integrity of structures close to excavations.

1.3 COVERAGE

ROS is applicable to the following facilities under KR and facilities under its administrative control such as

1. Kochi Refinery
2. Pipeline corridor
3. STF
4. SWSS Aluva

1.4 LIMITATIONS

This ROS covers excavations in land only. The procedures / practices described in the ROS are not intended to supplant other practices / procedure that have proven satisfactory, nor is the ROS intended to discourage innovation and originality in the best practices in the refinery.

Only for internal use and distribution

Page 1011 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Users of the ROS are reminded that no ROS is a substitute for the judgment of a responsible, qualified person.

1.5 EXCLUSIONS

The following works are excluded from the scope of this ROS

1. Underwater excavations are not covered
2. Manual / mechanical piling activities
3. Tunnelling
4. Horizontal Directional Drilling

1.6 DEVIATIONS

The procedures / practices described in the ROS are intended for standardization of the processes involved and hence the same shall be strictly adhered to. However, deviation, if any, arises due to unavoidable circumstance(s), shall be approved by Head of Kochi Refinery. The deviation note in the prescribed format specified in ROS-001 Appendix 'ROS-001/A9.4: Format for Approval of Deviation in ROS' shall be initiated by the HOD of the department proposing the deviation through the Functional Head.

2 DEFINITIONS & ABBREVIATIONS

This section lists all definitions and abbreviations used for the purpose of this ROS.

2.1 DEFINTIONS

Adjacent Structures Stability	:	This refers to the stability of the foundation(s) of adjacent structures whose location may create surcharges, changes in soil conditions or other disruptions that have the potential to extend into the failure zone of the excavation or trench.
Angle of repose	:	It is the steepest angle of descent or dip relative to the horizontal plane to which a material can be piled without slumping
Battering	:	Battering means forming face or side or wall of an excavation to an angle, usually less than the natural angle of repose to prevent earth slippage.
Corporation	:	Bharat Petroleum Corporation Limited.

Only for internal use and distribution

Page 1012 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Excavation	:	An excavation is any man-made cut, cavity, trench, or depression in an earth surface that is formed by earth removal.
Functional Head	:	Head of Functional Area such as General Manager, Deputy General Manager (In charge).
Functional Area	:	Operations, Technical, Finance, Human Resources, Projects etc.
KR & ME	:	BPCL Kochi Refinery Intralink
May	:	Optional
Refinery	:	Kochi Refinery premises and its connected facilities.
Shall	:	Mandatory
Shoring	:	Shoring is an assembly of structural members designed to prevent earth or material from falling, sliding or rolling into an excavation.
Should	:	Recommended
Trench	:	Trench means an excavation that is deeper than its width measured at the bottom. In general, the depth of a trench is greater than its width, and the width (measured at the bottom) is not greater than 15 ft (4.6 m). If a form or other structure installed or constructed in an excavation reduces the distance between the form and the side of the excavation to 15 ft (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.
Zone of influence	:	Zone of influence means the volume of soil around the excavation affected by any external load (for example vehicles, plant, excavated material).

2.2 ABBREVIATIONS

BPCL	:	Bharat Petroleum Corporation Limited
COT	:	Cochin Oil Terminal
GOVT	:	Government
HOD	:	Head of the Department

Only for internal use and distribution

Page 1013 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

KR	:	Kochi Refinery
MHSSEC	:	Management Health Safety Security Environment Committee
RC	:	Refinery Council
ROS	:	Refinery Operating System
SBU	:	Strategic Business Unit
SPM	:	Single Point Mooring
STB	:	South Tanker Berth
STF	:	Shore Tank Farm
SWSS	:	Standalone Water Supply Scheme

3 REQUIREMENTS

Hazards in excavation, their identification and risk assessment and management of risks are covered in this section. Requirements for carrying out these steps to be followed in works involving the excavation are specified.

3.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT

1. A hazard identification and risk assessment shall be carried out in relation to activities undertaken by persons at a place of excavation work and that a safe system of work be prepared and implemented to protect employees and persons engaged or affected by the activities taking place at that place of work.

2. The common hazards associated with excavation works are

   a. contact with underground services like electric cable, pipelines etc.

   b. contact with overhead pipelines and power transmission lines

   c. collapse of the excavation's sides (cave-in) and land slides

   d. materials falling onto people working in the excavation

   e. people and vehicles falling into the excavation

   f. struck by machinery

   g. collapse of nearby structures

   h. ingress / egress to / from the excavation

   i. presence of fumes gases etc. and lack of oxygen.

   j. ground water, flooding

Only for internal use and distribution

Page 1014 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

k. accidents to public

3. The job shall be planned considering the hazards identified and the risk posed by the activities. The job shall be carried out only using valid work permits (Earth work permit, cold / hot work permit as the case may be) issued as per ROS-016.

3.2 UNDERGROUND SERVICES AND OVERHEAD POWER LINE

If the presence of underground services like cables, sewers, hydrocarbon pipelines etc. or overhead lines cannot be identified or diverted, then the following steps should be taken to avoid contact.

1. Look around for obvious signs of underground services, e.g. valve covers, patching of the road surface, cable markers etc.
2. Use locators, if available, to trace for any services and mark the ground accordingly.
3. Mechanical excavations, using earth movers, shall be started only after excavating up to 1.2m by manual methods. If the area to be excavated is free of any underground lines or cables, excavation using mechanical devices can be started directly.
4. Manual excavations shall be carried out using equipment having wooden / non conductive handles.
5. Pointed tools shall not be used to probe for underground gas and electrical services.
6. If possible, blunt shovels should be used to expose the facility. Adequate caution should be taken especially, if new and sharp spade shovels are used.
7. Trees, utility poles, rocks, or similar objects near the edge of an excavation must be removed or secured to prevent workers getting injured.
8. Survey the area for overhead obstructions such as power transmission lines, pipeline, structures etc.

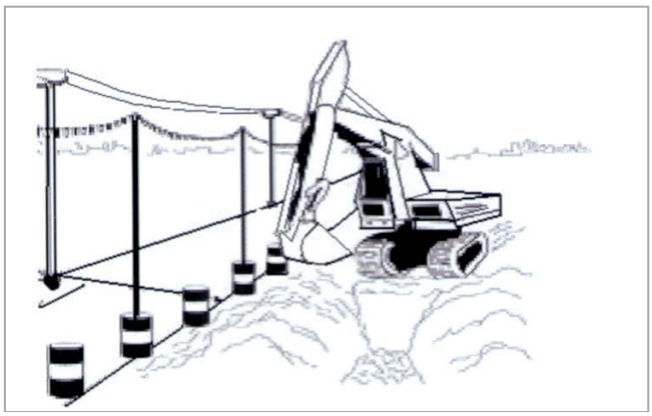


Figure 1: Bunting to Protect Equipment from Coming into Contact with Overhead Electricity Line

Only for internal use and distribution

Page 1015 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

9. Works that are in close proximity to overhead lines should be conducted as per advice of Electrical Safety Officer. Goal posts and bunting if required should be erected (*Figure 1*).

10. No electric power driven pumps or machinery shall be kept inside the excavation whenever not in use.

3.3 EXCAVATION COLLAPSE

1. Excavation deeper than 1.2m shall be protected from dislodgement of the sides of the excavation. This protection could be in the form of shoring and strutting (support for the excavation), battering (sloping excavation) or other suitable means. Notwithstanding this, all excavations and the area in the vicinity of an excavation must be safe (when people have access to them) and without risk to health as far as reasonably practicable.

2. All or a combination of the following steps shall be taken to prevent a person becoming engulfed or injured in an excavation due to its collapse.

   a. Battering: Battering is where the wall of an excavation is sloped back to a predetermined angle to ensure stability (*Figure 2*). Battering prevents ground collapse by cutting the excavated face back to a safe slope.

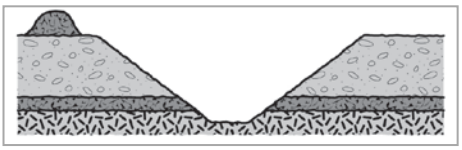


Figure 2: Battering

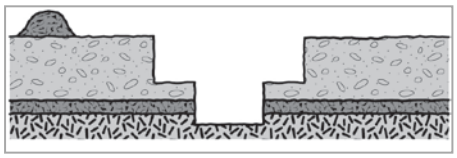


Figure 3: Benching

   b. A safe angle of repose shall be maintained for excavation exceeding 1.5 m depth up to 3.0m. Based on soil conditions, a slope of 45^0 (45 degree) should be provided.

   c. Benching: Except hard rock area, suitable bench of 0.5 m width at every 1.5 m depth of excavation in all soils shall be provided (*Figure 3*).

   d. Shoring and Strutting: Alternatively, proper shoring and strutting, which match the depth of excavation shall be ensured to prevent cave-in. (*Figure 4)*.

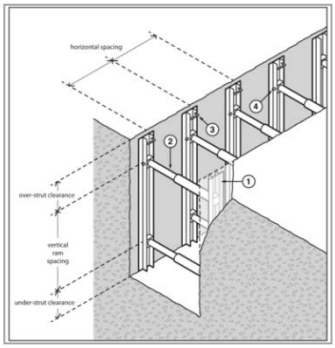


Figure 4: Shoring and strutting

Only for internal use and distribution

Page 1016 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3. No vehicle or machinery shall be allowed near an edge of an excavation, which is likely to cause collapse.

4. Excavated earth should be placed at least 1m away from the edge of the trench or to a distance equal to the depth of trench whichever is greater.

5. A ladder shall be provided for easy ingress to / from egress for excavations more than 1.2m deep. The ladder shall extend minimum 1m above ground level.

6. Water accumulation in the trench shall be pumped / bailed out. Necessary precautions should be taken to prevent entry of surface water in trenches.

3.4 MATERIALS FALLING INTO EXCAVATIONS

1. Spoil or other materials shall not be stored close to the sides of excavations. The spoil may fall into the excavation and the extra loading will make the sides more prone to collapse.

2. The edges of the excavation shall be protected against falling materials. Provide toe boards where necessary.

3. Hard hat shall be worn when working in excavations.

4. In rock cut excavations where the rock is friable, netting should be used.

3.5 PEOPLE AND VEHICLES FALLING INTO EXCAVATIONS

1. Adequate steps shall be taken to prevent people falling into excavations. Provide substantial barriers, for example guard rails and toe boards. Barricade of 1m height shall be provided for excavations beyond 1.2m depth. Provide two entries / exists for such excavation.

2. Mechanical plant, vehicles, storage of materials (including excavated material) or any other heavy loads should not be located in the 'zone of influence' of an excavation.

3. In case of excavation provided with shoring and strutting, the mechanical plant, vehicles, storage of materials etc. shall be kept away from the edge of excavations as shown in *Figure 5*.

4. In all other cases vehicles shall not be allowed to operate too close to excavated area. At least 2m distance from edge of excavation shall be maintained while operating the vehicles.

Only for internal use and distribution

Page 1017 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

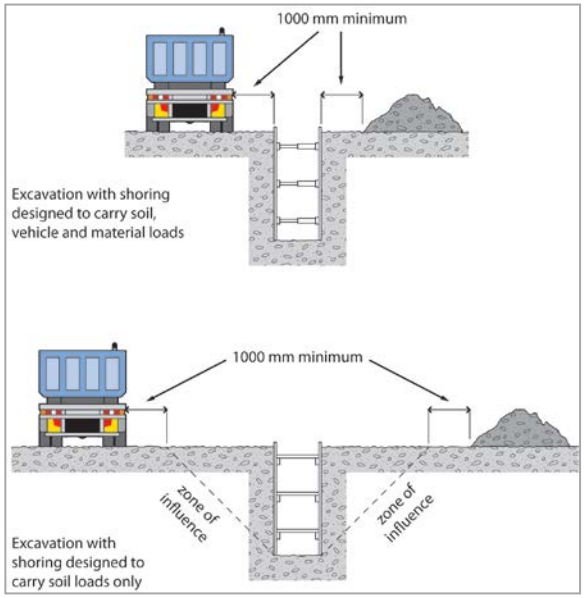


Figure 5: Excavated material and loads near excavations

Top: an excavation with shoring that has been designed to carry vehicle and material loads.

Bottom: an excavation with shoring that has been designed only to carry the load of the excavated faces and the related zone of influence.

5. If vehicles have to tip materials into excavations, use stop blocks to prevent them from over-running (*Figure 6)*. The sides of the excavation shall be provided extra support to prevent collapse.

6. Powered mobile plant / excavators shall not operate near the edge of an excavation unless the ground support system is installed. Physical barriers, such as wheel stoppers, shall be considered for restricting movement near an excavation.

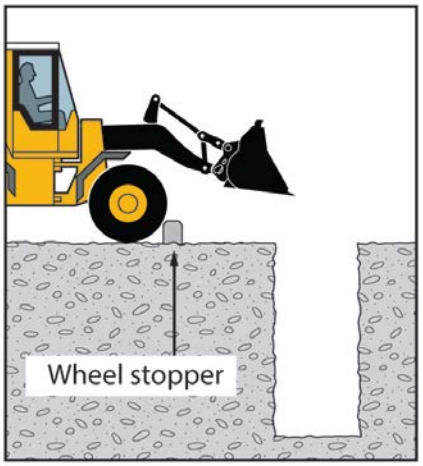


Figure 6: Preventing plant operation near excavations

7. Never have a person in an excavation while machinery is working over it. The extra surcharge from the weight of the machine may induce a collapse.

Only for internal use and distribution

Page 1018 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3.6 PEOPLE STRUCK BY MACHINERY

1. Workers should be away from moving machinery such as excavators. The workers should work outside the reach of the excavator bucket. Safe systems of work shall be used to prevent people getting struck if this is not possible.
2. The machinery operators shall be competent and possess necessary license to operate the type of equipment.
3. Attachments for excavators fitted via quick hitch mechanisms must be effectively secured.
4. All moving machinery shall be fitted with reverse horns that operate automatically while reversing.

3.7 STABILITY OF NEARBY STRUCTURES

1. Excavations shall not affect the foundations of nearby structures or footings of scaffolds. Walls may have very shallow foundations that can be undermined by even small trenches.
2. In case the location of the excavation is close to other structures, the engineer in charge of the work involving excavation shall consult the Section Head of Civil section of E&C Department and obtain foundation details of nearby structures and measures to be adopted for ensuring their stability before starting digging.

3.8 ACCUMULATION OF GASES AND VAPOURS

1. Internal Combustion engine driven equipment such as generators or compressors shall not be placed in or near the edge of an excavation unless the exhaust gases can be ducted away to a safe area or the area can be adequately ventilated.
2. The activity inside an excavated area shall not introduce toxic, flammable or other asphyxiant gases within, which can endanger workers.
3. Gas cylinders shall not be kept inside the excavation unattended, to avoid accidental leakage and possible gas accumulation.
4. Oxygen / flammable / toxic gas presence shall always be checked before starting jobs inside the excavation.

Only for internal use and distribution

Page 1019 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

4 ROLES AND RESPONSIBILITIES

This section outlines only the major roles and responsibilities of various stakeholders related to ROS-019. The roles and responsibilities are detailed in the requirement given in Section of 3.0 of this document. The stakeholders shall comply with these requirements.

4.1 ENGINEER IN CHARGE

1. Before carrying out excavation, the engineer in charge of the job shall prepare a check list in the format given as Appendix ROS-19/A9.1. The filled in checklist shall form a part of the hot / cold work permit taken for the job.
2. Excavation permit shall be obtained as per the Work Permit System ROS-016.
3. Site of excavation shall be thoroughly inspected by the Engineer in Charge as per the below given schedule:
    a. Daily, prior to starting of work
    b. After every blasting operation
    c. After an unexpected fall of ground
    d. After substantial damage to supports
    e. After rain.

5 APPROVAL

This ROS undergoes a review and approval process in line with the process specified in Section 5.0 of ROS-001.

5.1 REVIEW OF ROS

1. HODs of F&S, E&C and Maintenance and Functional Heads of Operations and Projects are reviewing authorities of this ROS.
2. The reviewing authorities shall ensure that requirements of ROS are relevant with respect to context of the business and are in line with current environment.
3. Reviewing authority shall sign on the Document Release Note of this ROS.

5.2 APPROVAL OF ROS

Refinery Council (RC) is the approving authority for the approval of this ROS. Head of KR is the signatory on behalf of the RC and shall sign on the Document Release Note of this ROS.

Only for internal use and distribution

Page 1020 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

6 MONITORING AND CONTROL

Fire & Safety department shall conduct random site inspections and verify records thereof as per this ROS and ensure the compliance. Any discrepancy noticed shall be reported along with corrective action.

7 RECORDS

1. Duly filled excavation checklist.
2. Excavation permit obtained from the department.

8 REFERENCES

1. Excavation work: Code of Practice, Safe work Australia
2. OHSA technical manual
3. OISD105- Work Permit System
4. Previous revision of ROS63 Safety guidelines for excavation in refinery premises

9 APPENDIX

1. Appendix ROS-019/A9.1- Checklist for Excavation

Only for internal use and distribution

Page 1021 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

9.1 APPENDIX ROS-19/A9.1: CHECKLIST FOR EXCAVATION

Name of the Job:..... Area / Location:.....

Sl. No.	Check Point	Checked (√)		If No, what other remedial steps taken?	Remarks
		Yes	No		
1	Is the ground stable for excavation?				
2	Are the adjoining buildings, structures or roadways unaffected by the excavation?				
3	Have gas, water, electrical and other public utilities shut off or disconnected?				
4	Is the area to be evacuated free of underground pipes, cables, conductors etc.				
5	Is it possible to maintain a safe repose angle of 45^0 for the excavation?				
6	Is it possible to provide suitable bench of 0.5 m wide at every 1.5 m depth of excavation?				
7	If the above points 5 & 6 cannot be met, has proper shoring and strutting to prevent cave-in or slides be provided?				
8	Has exit route in case of emergency decided and marked at site? Does facilities like ladder etc., has been kept ready to enable workers to come out quickly?				
9	Has steps taken to place the excavated earth at least one meter away from the trench?				
10	Has steps taken to prevent vehicular movement or locating the plant or equipment close to 1.5m from the edge of the trench?				
11	Has necessary precautions taken to comply with the conditions in work permit				

Only for internal use and distribution

Page 1022 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

	system in KR regarding underground utility lines taken?				
12	Has steps taken to prevent entry of surface water into the trenches? Does the site has facilities for pumping out water, if any accumulating in the trench?				
13	Has steps taken to prevent superimposed load like new construction coming near the excavation site within a distance equal to depth of excavation?				

Signature	Name	Designation	Department
---	---	---	---

.....End of Document.....

Only for internal use and distribution

Page 1023 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Refinery Operating System

ROS-023

Edition: 2015, Revision: 00/2015

REGULATIONS FOR HANDLING AND STORAGE OF RADIOGRAPHY DEVICES

Kochi Refinery

This ROS outlines procedure for movement / transportation, handling and storage of industrial radiographic devices in Kochi Refinery and facilities under its administrative control.

This ROS or any part of this publication shall be reproduced, published or transmitted, in any form or by any means, only with the prior written permission of BPCL-KR.

DOCUMENT RELEASE NOTE

Document Details

Document Name	:	Regulations for Handling and Storage of Radiography Devices
Document No	:	ROS-023
Edition	:	2015
Revision	:	00/2015
Issue	:	Sept-2015

Reviewed by

HOD - F&S | HOD - Maintenance | HOD - E&C

Functional Head - Operations | Functional Head - Projects

Approved in : **Refinery Council**

RC Meeting Record Note : No.....105..... dated 01-08-2015

Approved By

Head of Kochi Refinery

Digitally controlled document. Seal & sign not requird for pdf version of ROS. Signed Mastercopy available with Custodian

Only for internal use and distribution

Page 1025 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

AMENDMENT SHEET

All amendments in the ROS shall be documented in the following table. The details of the amendment shall be elaborated in a separate document (Amendment Document) and shall be available with custodian and in KR&ME.

Tracking ID	Section No	Amendment		Reason	Amendment Document No
		From	To		
ROS-023/15-01	All			New ROS	Not Applicable

Only for internal use and distribution

Page 1026 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Table of Contents

Section No	Title	Page No
Document Release Note		**2**
Amendment Sheet		**3**
Table of Contents		**4**
Preface		**6**
1	**Introduction**	**8**
1.1	Purpose	8
1.2	Scope	8
1.3	Coverage	8
1.4	Limitations	9
1.5	Exclusions	9
1.6	Deviations	9
2	**Definitions & Abbreviations**	**9**
2.1	Defintions	9
2.2	Abbreviations	10
3	**Requirements**	**11**
3.1	General Safety Precautions	11
3.2	General Requirements for Radiography Equipment	12
3.2.1	Gamma Radiography Equipment	12
3.2.2	X-Ray Radiography Equipment	13
3.3	Selection of Radiography Site	13
3.4	Bringing Radiography Equipment	13
3.5	Conducting Radiography	14
3.5.1	Radiation Level at Cordon Off Area	14

Only for internal use and distribution

Page 1027 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

3.6 Storage of Radiography Equipment 15
3.7 Taking Out Radiography Equipment 16
3.8 Radiation Emergencies 17
3.8.1 Actions by Engineer-in-Charge / Shift-in-Charge of the Affected Area 18
3.8.2 Actions by Head of Fire & Safety 18
4 Roles and Responsibilities 18
4.1 HOD Fire & Safety Department 18
4.2 Security 20
4.3 Engineer in Charge 20
4.4 Owner Department (Permit Issuer) 21
5 Approval 22
5.1 Review of ROS 22
5.2 Approval of ROS 22
6 Monitoring and Control 22
7 Records 22
8 References 23
9 Appendix 23
9.1 ROS-023/A9.1: Format for Request for Carrying out Radiography 24
9.2 ROS-023/A9.2: Format for Authorisation for Carrying out Radiography 25

Only for internal use and distribution

Page 1028 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

PREFACE

Director (Refinery) of erstwhile Cochin Refineries Limited (CRL) appointed a committee in 1994 for devising a procedure of standard operations. The committee formulated a system named Refinery Operating System (ROS). A set of ROS was formulated and released by the committee. Over years, the ROS was evolved to a well-documented Refinery Operating System (ROS), which outlines the Management System Procedure for various business processes in the refinery. There were 90 approved ROS and 12 ROS under formulation before the current edition. Prior to 2015 edition, Project (Technical) department, which was earlier known as Corporate Planning before organisation re-structuring in 2006, was the custodian of the ROS.

In 2014, General Manager (Operations) constituted a task force for a thorough revision of ROS in terms of the purpose, relevance, scope and work flow in the current business context vide office note KDD/03/09 dated 28-02-2014.

In this process, new ROS requirements were also identified. ROS on Regulations for Handling and Storage of Radiography Devices is a new ROS identified.

Open field industrial radiography is conducted for assessing the soundness of weld joints as well as for developing thickness profile mainly for small bore piping (profile radiography). It is a regular non-destructive examination (NDE) carried out in our refinery. Radiography is carried out using radiographic devices brought in by radiographic agencies approved by Atomic Energy Regulatory Board (AERB). The storage, handling and movement of radiographic sources are controlled by AERB in our country. However, existing measures followed in KR are to be made more effective for controlling the usage of radiographic equipment handling sources and associated activities like movement / transportation, handling and storage of them.

Health hazard due to radiation exposure, concerns regarding the strength of the source, cordon off distance, storage location etc. were highlighted in various forums. To address these concerns and to establish effective control of movement / transportation, handling and storage of radiographic devices, it was decided to formulate a ROS as ROS-023. This ROS (ROS-023) also ensures that the relevant statutory requirements with regard to entry, storage and movement of radiographic devices within our refinery are complied with.

The procedures / practices described in the ROS are not intended to supplant other practices / procedure that have proven satisfactory, nor is the ROS intended to discourage innovation and originality in the best practices in the refinery. Users of the ROS are reminded that no ROS is a substitute for the judgment of a responsible, qualified person.

Only for internal use and distribution

Page 1029 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Task Force for ROS Edition-2015

The Task Force was constituted by Mr. Soman C. K., General Manager (Operations) in 2014 for revision of the existing Refinery Operating System.

Task Force

Sl. No.	Name	Designation
1.	Muralidharan V.	Manager (E & C)
2.	Naizu A. V.	Manager (F & S)
3.	Roopesh M.	Manager (Inspection)
4.	Saji Babu	Manager (Manufacturing)

In addition to the above, several experts from various departments contributed in the preparation, review and finalisation of this document.

Only for internal use and distribution

Page 1030 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

1 INTRODUCTION

Ensuring mechanical integrity of equipment is of utmost important to avoid any untoward incidents resulting in release of flammable and toxic substance to environment as well as fluid at high pressure and / or temperature. Open field industrial radiography is a common means of non-destructive examination (NDE) used to asses for flaw in weld joint / material to ensure the mechanical integrity of equipment and pipelines. In Kochi Refinery radiographic jobs are carried out by AERB approved agencies. Severe, acute or prolonged exposure to ionising radiation can have serious health hazard and it is important to monitor and control the entry, movement, transportation, handling and storage of radiography devices in Kochi Refinery and facilities under its administrative control.

Any type of work involving ionizing radiation shall be carried out in a manner that the radiation exposure to the individuals (radiation workers, refinery employees and contract workers) is As Low As Reasonably Achievable (ALARA) without exceeding the limits stipulated by Atomic Energy Regulatory Board (AERB). This ROS is made to comply with the requirements of Atomic Energy Regulatory Board (AERB) and Atomic Energy (Radiation Protection) Rules, 2004.

1.1 PURPOSE

The purpose of the ROS-023 is to establish a procedure for better control in movement, transportation, handling and storage of the radiography devices containing radioactive devices in KR to promote standardised process for safe radiography complying statutory regulations.

1.2 SCOPE

The scope of this ROS includes all open field industrial radiography jobs including X-ray radiography carried out in KR as part of new, repair / replacement or testing jobs.

1.3 COVERAGE

This ROS is applicable to Kochi Refinery and its connected facilities under its administrative control as listed below

1. Kochi Refinery
2. Jetty Facilities like NTB, STB, & COT (when job is directly executed by KR)
3. Pipeline corridor

Only for internal use and distribution

Page 1031 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

4. STF and SPM
5. SWSS Aluva
6. Pre-treatment plant (Chullichira Quarry)

1.4 LIMITATIONS

Requirements of ROS-023 shall not be used in conflict with any requirement of Legal, Statutory or Jurisdiction norms or codes / standards. However, if the requirements of this ROS are more stringent than the requirements of the above, then the requirements of this ROS shall govern.

1.5 EXCLUSIONS

This ROS does not cover the requirements related to Nucleonic Gauges. The requirements regarding Nucleonic Gauges are covered in ROS-024.

Radiography devices used for interpretation or review, digital image processing are excluded.

1.6 DEVIATIONS

The procedures / practices described in the ROS are intended for standardization of the processes involved in bringing movement, storage and handling of radioactive isotopes for industrial radiography and hence the same shall be strictly adhered to. However, deviation, if any, arise due to unavoidable circumstance(s), shall be approved by Head of Kochi Refinery. The deviation note in the prescribed format specified in ROS-001 Appendix 'ROS-001/A9.4: Format for Approval of Deviation in ROS' shall be initiated by the HOD of the department proposing the deviation through the Functional Head.

2 DEFINITIONS & ABBREVIATIONS

This section lists all definitions and abbreviations used for the purpose of this ROS.

2.1 DEFINTIONS

Becquerel : Becquerel (Bq) is the unit of radioactivity. Activity (A) of a radioactive nuclide in a particular energy state at a given time is the quotient of dN/dt, where dN is the expectation value of the number of spontaneous nuclear transitions from that energy state in the time interval of dt. 1Bq = $1s^{-1}$. Old unit of activity is curie (Ci)

Only for internal use and distribution

Page 1032 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

and is defined as 1 Ci = 3.7 × 10^{10} s^{-1}. One curie is roughly the activity of 1 gram of the radium isotope ^{226}Ra.

Corporation	:	Bharat Petroleum Corporation Limited.
Functional Area	:	Operations, Technical, Finance, Human Resources, Projects etc.
Functional Head	:	Head of Functional Area such as General Manager, Deputy General Manager (In charge).
Gray (Gy)	:	The gray (symbol: Gy) is a derived unit of ionizing radiation dose in the International System of Units (SI). It is defined as the absorption of one joule of radiation energy by one kilogram of matter.
KR & ME	:	BPCL Kochi Refinery Intralink
May	:	Optional
Refinery	:	Kochi Refinery premises and its connected facilities.
Shall	:	Mandatory
Should	:	Recommended
Sievert (Sv)	:	Sievert is a derived unit of ionizing radiation dose in the International System of Units (SI). It is a measure of the health effect of low levels of ionizing radiation on the human body. One sievert equals 100rem. The rem is an older (CGS), a non-SI unit of measurement.

2.2 ABBREVIATIONS

ALARA	:	As Low As Reasonably Achievable
AERB	:	Atomic Energy Regulatory Board
BARC	:	Bhabha Atomic Research Centre
BPCL	:	Bharat Petroleum Corporation Limited
BRIT	:	Board of Radiation and Isotope Technology
COT	:	Cochin Oil Terminal
HOD	:	Head of the Department
KR	:	Kochi Refinery

Only for internal use and distribution

Page 1033 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

NDE	:	Non Destructive Examination
MHSSEC	:	Management Health Safety Security Environment Committee
MRM	:	Management Review Meeting
RC	:	Refinery Council
Rem	:	Roentgen equivalent man
ROS	:	Refinery Operating System
ROSC	:	ROS Committee
RSO	:	Radiological Safety Officer
SBU	:	Strategic Business Unit
STF	:	Shore Tank Farm

3 REQUIREMENTS

Various ionisation radiation sources are used for field industrial radiography. The choice of a particular radiation source is decided on the basis of the material, thickness of the object to be radio-graphed etc. The sources used for the industrial radiography jobs are

1. Gamma emitting radio nuclides such as Iridium-192 (^{192}Ir), Cobalt-60 (^{60}Co), Casesium-137 (^{137}Cs), Selenium-75 (^{75}Se)
2. X-ray

In KR, gamma emitting radio nuclides are generally used for the radiography.

Source Pellets and Source Pencils

The isotopic sources used for gamma radiography are generally in metallic form. The normal sources used for radiography are Cobalt-60 (^{60}Co), Selenium-75 (^{75}Se) and Iridium-192 (^{192}Ir). These sources are sealed in stainless steel capsules to avoid any damage to the source during handling.

The minimum requirements to be followed as part of carrying out any radiography jobs (using ionisation radiation) are specified in the following sub-sections.

3.1 GENERAL SAFETY PRECAUTIONS

1. All radiography jobs shall be duly authorised by F&S Department.

Only for internal use and distribution

Page 1034 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

2. Radiography shall be performed only by AERB approved agencies and all radiographers (excluding workers assisting the job) shall be AERB certified personnel. The radiography personnel shall be either ISNT / ASNT level I or II certified.
3. Radiography shall be performed with valid work permit as per ROS-016 'Work Permit System'.
4. All radiographers shall wear film badges / dosimeter during the radiography jobs.
5. Area around radiography job shall be cordoned off. Calculations and documents certified by Radiological Safety Officer (RSO) of the radiography agency shall be submitted for the cordon off distance. Fire & Safety department shall review and verify the cordon off distance certified by the RSO of the radiography agency.
6. Radiation level along the cordon shall be monitored and shall be within 0.25mR/hr for radiography within refinery premises.
7. Radiation warning symbols and red lights shall be exhibited along the cordon.
8. Entry into the cordoned area shall be restricted to Radiographers only.
9. The concerned radiographer / a coordinator from the contractor side is available at the site very near the cordoned area throughout the exposure for proper coordination.
10. Wherever practicable, field radiography work shall be limited to collimated exposures.
11. Remote control devices shall be used while using higher strength sources or while working at elevated areas / where accessibility is restricted.
12. All radiography jobs shall be planned in advance to reduce the exposure duration and should be carried out when the occupancy site is minimum such as night, holidays, and work intervals.
13. After each exposure, source shall be securely kept in the camera.
14. A minimum of one radiation survey meter shall be available at the radiography site.

3.2 GENERAL REQUIREMENTS FOR RADIOGRAPHY EQUIPMENT

3.2.1 GAMMA RADIOGRAPHY EQUIPMENT

Each model of radiography camera is designed to house a particular source of specified maximum strength. Gamma ray sources of appropriate strength are used in radiography cameras. Depending upon the nature and strength of the source used and the type of radiography work, radiography equipment either of the stationary type or of the mobile type

Only for internal use and distribution

Page 1035 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

can be used. The following shall be ensured while carrying out the radiography jobs *(Ref: AERB Guide No. SG/ IN-2 Radiological Safety in Open Field Industrial Radiography).*

1. Higher strengths source {i.e. more than 20 Curie of Iridium-192 (^{192}Ir) and 5 Curie of Cobalt-60 (^{60}Co) shall be used only in radiographic cameras provided with remote handling mechanisms for minimizing radiation exposure to the operator.
2. The leakage radiation levels in the 'OFF' position of industrial gamma radiography equipment shall be limited to the values stipulated by the competent authority (AERB).

3.2.2 X-RAY RADIOGRAPHY EQUIPMENT

X-ray equipment used in Industrial Radiography must be provided with adequate built-in safety features so as to minimise radiation hazards to its users and to the public. X-ray tubes are provided with lead lined housing so as to reduce the leakage radiation below the levels specified by the competent authority.

3.3 SELECTION OF RADIOGRAPHY SITE

Radiography jobs, to the extent possible, shall be carried out at site or areas where occupancy is minimum. The following shall be ensured.

1. Radiography jobs should be carried out at fabrication yard to the extent possible to minimise the radiography jobs in the process plant or facilities.
2. Radiography should be carried out preferably during night, holidays, intervals, etc.
3. Radiography site shall be kept sufficiently away from nucleonic devices installed in process plants such as Continuous Catalyst Regeneration Reforming Unit. If any situation warrants for radiography close to or within such process plants, adequate measures such as additional shielding of the nucleonic gauges shall be taken to avoid erratic behaviour of the nucleonic devices that may lead to plant upsets.

3.4 BRINGING RADIOGRAPHY EQUIPMENT

1. Engineer in Charge of job shall furnish the detailed radiography plan in the prescribed format (Appendix ROS-023/A9.1: 'Request for carrying out radiography') to the Fire & Safety department for allowing the radiography contractor to bring radiography devices.
2. The following documents certified by Radiological Safety Officer (RSO) of the radiography agency shall be submitted along with the request for carrying out radiography

Only for internal use and distribution

Page 1036 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

a. Decay chart for the source prepared based on the decay factor of the source.

b. Detailed calculation of the cordon off distance considering the source strength, occupancy factor, location, radiography plan etc.

3. Copy of the packaging note of the camera from BRIT (Board of Radiation and Isotope Technology), permission from AERB for the movement of radiography devices to BPCL Kochi Refinery, details of the radiographers intended to be employed, etc. shall also be enclosed along with the above format.

4. The Fire and Safety department shall review the documents submitted and give a written authorisation for bringing in the radiography equipment inside the refinery for specified duration. (Appendix - ROS-023/A9.2). This authorisation shall be made in triplicate. The original and duplicate are issued to intender.

5. Security Section shall permit entry of radiography devices only on production of the above written authorisation (Original & Duplicate) from Fire and Safety department. The details of movement of such equipment in and out of the refinery shall be maintained in a register kept at the Security Office. Security Section shall forward the duplicate copy of the authorisation to Fire and Safety department upon entry of the indented device to refinery with entry seal from security office. The original with entry seal shall be returned to the radiography personnel bringing the source.

6. Fire and Safety department shall verify the register in the Security Section and sign the register on monthly basis.

3.5 CONDUCTING RADIOGRAPHY

1. The written authorisation (Appendix ROS-023/A9.2) issued by the Fire and Safety department shall be produced for obtaining work permit for radiography from the respective work area.

2. The radiography shall be performed with valid work permit as per ROS-016.

3. When conducting radiography in running units where nucleonic gauges are installed or in the proximity of running units where nucleonic gauges are installed, the work permit shall be countersigned from the respective area to enable unit personnel to provide additional shielding for the gamma receptors to avoid malfunctioning of the gauges, if required.

3.5.1 RADIATION LEVEL AT CORDON OFF AREA

Only for internal use and distribution

Page 1037 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

1. The calculated cordon off distance shall be given in the authorization given by Fire and Safety department for carrying out radiography, considering the type and strength of radiation source, the type of exposure given, the location of radiography, the nature of occupancy and the total exposure time per week to restrict the annual dose equivalent limit to 1mSv (0.1Rem) on the basis of the documents submitted and calculations furnished by the RSO of the radiography agency.

2. Considering a very conservative 400 hours of radiation exposure per employee over a period of one year the exposure dose works out to be 0.25mR/hr. Hence the radiation level at the cordon boundary area in KR shall be less than 0.25mR/hr during any radiography job.

3. The calculated cordon off distance is indicative and the actual cordon off distance may vary as per the actual work and site condition. Hence the cordon distance shall be established such that the radiation level outside the cordon shall be less than 0.25mR/hr.

4. When a source is used for carrying out radiography with at a different source location (e.g. changing the source spot from outside of the vessel to inside of vessel) or at later time (considering the disintegration of the source) than that mentioned in the original approval, the cordon off distance shall be reviewed and altered by Owner and Executing Department and this should be intimated to the Fire and Safety department. The new cordon off distance shall be marked in the work permit. However, in no case, the radiation level outside the cordon shall be more than 0.25mR/hr.

3.6 STORAGE OF RADIOGRAPHY EQUIPMENT

1. Fire and Safety department shall maintain the list of AERB approved storage rooms in KR for storage of radiography devices (camera).

2. If the radiography device brought inside the refinery is required to be stored inside the refinery, the Engineer In Charge (EIC) shall obtain the storage room allotment and receive the storage room key from Fire and Safety department.

3. The Fire and Safety department shall put a seal on the original approval highlighting “storage room allotted” whenever a source storage room is allotted. At a time, no more than one room shall be allotted to a radiography agency unless it is really warranted.

4. The radiography devices (camera (s)) brought inside the refinery shall be stored only at the designated radiography source storage room allotted by the Fire and Safety department.

Only for internal use and distribution

Page 1038 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

5. Radiography devices (camera (s)) of two radiography agencies shall not be stored in the same storage room.

6. The details of the movement of radiographic source in and out of the source storage room shall be recorded by the certified radiographer in a log book kept at the respective source storage rooms. The log book shall be verified and signed by the Safety Officer once in a month.

7. The approved radiography source storage room shall be kept locked always and key shall be under the custody of Fire and Safety department. Once the room is allotted, one key shall be issued to the radiography agency and the spare key shall be available at the Fire and Safety department.

3.7 TAKING OUT RADIOGRAPHY EQUIPMENT

1. All radiography equipment shall be taken out of the refinery immediately after the completion of the radiography job or the approved period, whichever is earlier with the intimation to the Fire and Safety department.

2. The Engineer-In Charge shall obtain the source storage room key and sign on the original authorisation with remark 'storage room key returned' whenever a source camera, which has been allotted storage room, is taken out of the refinery.

3. The details of radiography device taken out of the refinery shall be intimated to the security and shall be entered in the register kept for the purpose at security gate.

4. The earlier obtained authorisation (Appendix- ROS-023/A9.2) for bringing in the radiography device shall be surrendered at security while taking out the radiography device from the refinery

5. Security shall ensure that devices having storage room allotment permits are allowed to be taken out only if there is signature from Engineer in Charge (EIC) with endorsement 'storage room key returned'. If the radiography agency has another device stored in the same room, the agency may be allowed to retain the key on production of the authorization of the other devices. The EIC shall mention the authorisation number of the other device in such cases.

6. Security shall forward the closed authorisation so obtained to the Fire and Safety department immediately for final closure of the records.

Only for internal use and distribution

Page 1039 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

7. The radiography devices without the authorisation for storage (see section 3.6) shall be taken out by the radiography agency within 24 hours from the time of entry. In case the devices required to be kept beyond 24 hours, the authorisation for storage shall be obtained along with the request for carrying out radiography. In extreme emergency case, if the device is to be taken out after 24 hours without authorisation for storage (e.g. radiography jobs postponed due to an emergency in the process plants), the Security section shall ensure that material pass is counter signed by HOD of Fire and Safety during normal working hours or from CM (SHA) during other than normal working hours and holidays.

3.8 RADIATION EMERGENCIES

1. Even though the radiation exposure devices are designed and manufactured with maximum built in safety features, untoward incidents involving them may lead to radiation emergencies. The occurrence of any one or more of the following situations may be deemed constitute an emergency:
   a. Receipt of radiography devices in the damaged form.
   b. Loss / theft or damage to Radiography device
   c. Accidental exit of Radiography radio nuclides from the confinement
   d. Failure of cranking devices to retract the source to the camera
   e. Emergency at the radiography site or area such as fire during the course of radiography period.
   f. Any other off-normal situation with a potential to result in exposure of individuals to radiation
2. HOD of Fire & Safety shall ensure an Emergency Response Plan with respect to each of the above radiation emergencies in line with the model emergency plan published by the Radiological Safety Division of AERB. The same shall be reviewed periodically once in three years.
3. The Emergency Response Plan shall be rehearsed once in a year by conducting mock drills on any of the emergency scenario mentioned in the plan. The functioning of all personnel in the emergency plans shall be tested. A review meeting shall be conducted after the exercise. The lessons learnt from the exercise should be judiciously incorporated in the emergency response plan.

Only for internal use and distribution

Page 1040 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

4. In the unlikely event of a radiation emergency, leading to radiation exposure to workers and members of the public, the following actions as below shall be taken.

3.8.1 ACTIONS BY ENGINEER-IN-CHARGE / SHIFT-IN-CHARGE OF THE AFFECTED AREA

1. Immediately report to Fire & Safety and CM (SHA) regarding the emergency situation, respond quickly and initiate actions to mobilize resources at the shortest possible time.
2. The Engineer-in-Charge shall locate radiation zone using radiation survey meter and arrange to cordon off the affected area.
3. Evacuate all personnel from the cordon off area.

3.8.2 ACTIONS BY HEAD OF FIRE & SAFETY

1. Inform AERB about the incident within 24 hrs of its occurrence and submit a detailed report on the incident after carrying out investigations
2. Lodge a written complaint with the local police station in case of loss or theft, if the radiography source(s) are not traced within 24 hours.
3. When all efforts to locate the source have failed or when the source cannot be brought to its safe shielded location, necessary assistance shall be sought from Division of Radiological Protection, BARC, Trombay, Mumbai giving particulars regarding the incident. Decontamination of rooms and buildings shall only be done under the supervision of Radiological Safety Officer.
4. Medical management of the affected person must be carried out in consultation with the competent authority of AERB.

4 ROLES AND RESPONSIBILITIES

This section outlines only the major roles and responsibilities of various stakeholders related to ROS-023. The roles and responsibilities are detailed in the requirement given in Section of 3.0 of this document. The stakeholders shall comply with these requirements.

4.1 HOD FIRE & SAFETY DEPARTMENT

HOD of Fire and Safety Department

Only for internal use and distribution

Page 1041 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

1. Shall coordinate all correspondence with Atomic Emergency Regulatory Board and ensure that all applicable legal requirements with regard to open filed industrial radiography are complied with.

2. Shall ensure that the emergency preparedness plan is available and are reviewed periodically (once in three years).

3. Shall rehearse the emergency plan once in a year by conducting a mock drill on any of the emergency scenario mentioned in the plan. The functioning of all personnel in the emergency plans shall be tested. A review meeting shall be conducted after the exercise. The lessons learnt from the exercise should be judiciously incorporated in the emergency response plan.

4. Communicate to AERB about the emergency occurrences, if any, within 24 Hrs and submit a detailed report on the incident after carrying out investigations.

5. Filing written complaint with the local police station, in case of loss or theft of radioactive source, if it is not traceable within 24 Hrs.

6. Conduct a yearly review and verify records thereof as per this ROS and ensure the compliance. Any discrepancies noticed shall be reported to the MHSSEC.

7. The proper records of incoming and outgoing of radiography devices shall be maintained.

8. Advise the various agencies regarding safety measures and coordinate with various departments to comply the requirements of Atomic Energy Act and Radiation Protection Rules.

9. Authorise the in / out movement, storage and use of radiography equipment inside the refinery.

10. Based on the radiography requirements, ensure that source packaging note, disintegration chart, cordon off distance etc. are verified and written authorisation for bringing in the radiography equipment inside the refinery is issued.

11. Upon request from the Engineer in Charge, the Fire and Safety department shall issue storage room for the radiography equipment in the approved source storage rooms, ensuring that radiography equipments of two different agencies are not stored in the same source storage room at any time.

Only for internal use and distribution

Page 1042 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

4.2 SECURITY

1. The Security shall permit entry of radiography equipment only on production of the written approval from Fire and Safety department. The duplicate copy of the authorisation shall be forwarded to Fire and Safety department with entry seal upon entry of the device to refinery.

2. The proper records of incoming and outgoing of radiography devices shall be maintained separately at security department.

3. Whenever a radiography device is taken in or out of the refinery, the security personnel shall enter the time and date of such movements in the written authorisation issued from Fire and Safety department as well as in the register kept at Security Gate with his signature. Also, the details of such movement shall be informed to Fire and Safety department immediately.

4. Security shall ensure that authorisation with storage room allotment entry is permitted to be taken out only if there is signature from Engineer in Charge regarding return of key or on production of the authorization of the other devices.

5. Whenever a radiography device is taken out of the refinery, the security shall collect the earlier issued authorisation to the agency and forwarded the same to the Fire and Safety department for final closure of the records.

6. Ensure that the material pass is counter signed by HOD of Fire and Safety during normal working hours or from CM (SHA) during other than normal working hours and holidays, if the radiography device is to be taken out after 24 hours without authorisation for storage

4.3 ENGINEER IN CHARGE

Whenever a radiography job is awarded to any contractor, the executing engineer of the job shall ensure that:

1. The radiography agency is duly authorized by Radiological Safety Division (RSD), AERB to move the radiography source to BPCL Kochi Refinery.

2. The radiography work has got prior written authorisation from the Fire and Safety department.

3. All the radiographers (excluding workers assisting the job) are certified by BARC / AERB.

Only for internal use and distribution

Page 1043 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

4. The radiographer has at least one radiation survey meter in working condition.
5. The radiographer cordons sufficient area to control access of unauthorized person during radiography at the site.
6. Radiation warning symbols are conspicuously posted along the cordon by the radiographer.
7. When the radiography work is carried out at night time, red warning lights must be conspicuously displayed along the cordon.
8. The concerned radiographer / a coordinator from the contractor side is available at the site very near the cordoned area throughout the exposure.
9. The radiographers are wearing film badges / dosimeters during the radiography job.
10. Wherever practicable, field radiography work shall be limited to collimated exposures.
11. During collimated exposures the primary beam shall be directed towards areas of minimum occupancy.
12. All panoramic exposures with sources of activities greater that 20 Ci of ^{192}Ir or 5 Ci of ^{60}Co shall be carried out using remote control system.
13. All operations should be planned in advance and executed in minimum possible time.
14. All radiography works shall be done with a proper permit as envisaged in ROS-016 'Work Permit System'.

4.4 OWNER DEPARTMENT (PERMIT ISSUER)

1. Ensure that the radiography job is duly authorized by Fire and Safety department before issuing the permit for radiography.
2. Ensure that licensed radiographers (workers for assisting the radiography jobs need not require the license) are available for carrying out the radiography
3. Ensure that the radiographer cordons sufficient area to control access of unauthorized person during radiography at the site.
4. Ensure that radiation warning symbols are conspicuously posted along the cordon.
5. The radiation levels along the cordon shall be monitored by a suitable radiation survey meter brought in by radiographer / or available with the area and confirm that the cordon distance maintained by the radiographer is adequate to restrict the radiation level outside the cordon to below 0.25mR/hr.

Only for internal use and distribution

Page 1044 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

6. Ensure that road blocks due to cordon off during radiography is informed to CM (SHA), Fire Station control room and Security Officer.

5 APPROVAL

This ROS undergoes a review and approval process in line with the process specified in Section 5.0 of ROS-001.

5.1 REVIEW OF ROS

1. HODs of F&S, Maintenance, E&C and Functional Heads of Operations and Projects are the reviewing authorities of this ROS.
2. Reviewing authorities shall ensure that requirements of ROS are relevant with respect to context of the business and are in line with current environment.
3. Reviewing authority shall sign on the Document Release Note of this ROS.

5.2 APPROVAL OF ROS

Refinery Council (RC) is the approving authority for the approval of this ROS. Head of KR is the signatory on behalf of the RC and shall sign on the Document Release Note of this ROS.

6 MONITORING AND CONTROL

The HOD of Fire and Safety shall monitor the compliance of the requirements specified in this ROS. He / she shall compile deviations from the requirements specified in this ROS and report the status to MHSSEC.

7 RECORDS

1. Record of application and radiography plan in Appendix (ROS-023/A9.1) with required attachments.
2. Record of authorisation for carrying out radiography (Appendix ROS-023/A9.2).
3. Record of allotment of radiography source storage room.
4. Record of movement of radiographic sources at Security Gate.
5. Record of storage of radiographic sources kept at source storage room.
6. Record of approval of radiographic source storage rooms.

Only for internal use and distribution

Page 1045 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

8 REFERENCES

1. AERB Guide No SG/IN-2, Radiological Safety in Open Field Industrial Radiography.
2. Atomic Energy Act, 1962.
3. Radiation Protection Rules, 1971.
4. Atomic Energy (Radiation Protection) Rules, 2004.

9 APPENDIX

List of appendixes used in ROS-023 is listed below.

1. Format for request for carrying out radiography (No: ROS-023/A9.1)
2. Format for authorisation for carrying out radiography (No: ROS-023/A9.2)

Only for internal use and distribution

Page 1046 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

9.1 ROS-023/A9.1: FORMAT FOR REQUEST FOR CARRYING OUT RADIOGRAPHY

BHARAT PETROLEUM CORPORATION LTD
KOCHI REFINERY

Request for carrying out radiography

Sl. No.....

1	Executing department			
2	Exact location of radiography: Unit / Area / Equipment No			
3	Expected duration of radiography	Date / Time	From	
			To	
4	Exposure device model and Serial number			
5	Name of the radiography agency			
6	Source type and present activity (Copy of source packing note shall be enclosed)			
7	Reference number of permission for movement of radiography exposure device to BPCL Kochi Refinery (Copy of the AERB permission shall be enclosed)	AERB Ref. No	Period of approval	
8	Cordon off distance (Attach detailed calculation duly certified by RSO of the radiography agency)			
9	Name of certified radiographers and license number (Copy of the certificate shall be enclosed)- *Not required for assistants*			
10	Dosimeter Number			
11	Type of exposure (With collimator / without collimator)			
12	Whether source storage room allotment required for the radiography equipment			
13	Name, staff number and signature of executing agency.	Name & Staff No	Signature	

To: Fire and Safety department

Authorisation No:.....
(To be issued by Fire & Safety)

Only for internal use and distribution

Page 1047 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

9.2 ROS-023/A9.2: FORMAT FOR AUTHORISATION FOR CARRYING OUT RADIOGRAPHY

BHARAT PETROLEUM CORPORATION LTD
KOCHI REFINERY

Authorisation for carrying out radiography

Request Doc No:..... *Sl. No.....*

1	Executing department				
2	Location of radiography: Unit/Area/Eqpt. No				
3	Permission duration	Date		Time	
		From	To	From	To
4	Exposure device model and Serial number				
5	Name of the radiography agency				
6	Source type and present activity.				
7	Calculated Cordon off distance *				
8	Panel of Certified radiographers				
9	Type of exposure with / without collimator				
10	Location of storage pit allotted				

*****_Calculated value is indicative and the actual cordon off distance to be established as per the actual work and site condition. In no case, the radiation level outside the cordon shall be more than_ ***0.25mR/hr.***

Name, Staff No and Signature of Safety Officer	Name	Staff No	Date	Signature

Key returned **:** Yes / Not Applicable Key No: ..... Date.....Sign: .....

Remarks (*Engineer In Charge*) :..... .....

Details of movement of radiography device in / out of the refinery

1	Date and time the above device is taken inside the refinery	Date	Time	Signature of security personnel	Name and staff number
2	Date and time the above device is taken out of the refinery	Date	Time	Signature of security personnel	Name and staff number

(Security personnel shall inform Fire and Safety department regarding the movement of the radiography device in / out of the refinery. The above permit shall be forwarded to Fire and Safety department once the material is taken out of the refinery).

..... *End of Document*.....

Only for internal use and distribution

Page 1048 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Rev.: 3	PORTABLE ELECTRICAL APPLIANCES - HAND LAMPS, TOOLS, ETC.	ROS: 31
Date: Aug. 2005		Page: 1 of 1

Master Copy

During operation or turnaround of plant and facilities, portable electrical appliances are used in the Refinery for maintenance and/or for new construction activities. For ensuring Safety of the plant and personnel, following precautions shall be taken.

1. All hand lamps used shall be of 24 volts rating, using 3 core flexible cables. The third core shall be used for earthing the hand lamp. The length of cable shall be limited to 50 mts. and without any joints in them. However in special cases, a length of 100 mts. may be permitted on special written instruction from Electrical Engineer in-charge.

2. In case 110/ 230 volts portable lamps are needed to provide additional illumination during a turnaround, outside confined spaces (vessels, columns tanks, OWS chambers etc.) and in areas where hydrocarbon vapours are not likely to be present, the same shall be distinguishable from the 24 volt hand lamps with cautionary signs in red colour (indicating DANGER, 230 Volts etc.). The junction boxes of 230 volts shall have red colour marking and cautionary signs to distinguish them from 24 volt system.

3. For using 110/ 230 volts portable lamps during turnarounds as noted above, prior permission from Safety and Fire section shall be obtained in writing satisfying the conditions stated under item: 2 above.

4. Portable lamps, tools and other electrical appliances (single phase and three phase) shall have proper earthing.

5. All portable appliances shall have a P.M. schedule. In addition, every time before use, the healthiness of the equipment, cabling and earthing shall be ensured once again.

6. All the portable appliances are to be connected using standard fittings like plugs, sockets, metallic distribution boards etc., suitable for the area. Loose or temporary fittings shall not be used.

7. Portable hand lamps and transformers shall be issued only against a formal written request by the Engineer in-charge and on approval by the Electrical Engineer in P&U department.

GM (T&D)	GM (O	GM (P)
DIRECTOR (REFINERIES)		

29/09/05

The existing ROS 56 Rev 1 requires a revision in view of the new facilities came up along with the existing locations viz., City office at Maradu, Shore Tank Farm(STF) at Puthuvyppin, Single Point Mooring(SPM) at Offshore, Learning and Development (L&D) department, HR-Estates Section, Information Services(IS) in Jwalagiri, Marketing Office in old IOC building, SWSS at Alwaye and other off site locations.

Following revised procedures shall be followed by the concerned in respect of the movement of materials from one office / location / place to another:

1.0 Revised Procedure

1.1 The existing terminology of the material passes viz., Returnable Material Pass and Non-Returnable Material Pass shall be changed to Company Material Pass (CMP) and Vendor Material Pass (VMP) respectively. Formats of CMP and VMP are attached as **Annexure-1 & 2** respectively.

1.2 CMP shall be issued by the authorized signatories for the movement of company materials by Company employees and/or contractors to any place from all the locations owned or leased or contracted by the company for the purpose of business.

1.3 VMP shall be issued by the authorized signatories to facilitate the movement of materials belonging to Company employees, contractors, suppliers, service providers, etc. from company owned premises to any outside location, which invariably shall be accompanied by a Material Declaration Form (MDF) also. Format of MDF is attached as **Annexure-3**.

2.0 General Procedure

2.1 Management staff authorized to countersign CMP and VMP (hereinafter referred to as authorized signatories) shall be approved by the General Manager in charge of the concerned department/Section and the General Manager(HR). The number of Management staff authorized to countersign Material Passes i.e. authorized signatories shall be kept to the minimum possible. A list of such authorized signatories along with their specimen signature shall be kept with Security for verification purposes.

2.2 All gate passes should be prepared and signed by a Management staff originating the pass, known as Originating Officer, who shall enter his/her name, badge number, designation and put his signature in the pass, which shall be counter signed by the concerned authorized signatory.

2.3 The person permitted to receive the material and the authorized signatory of the pass shall not be the same person.

2.4 As far as possible authorized signatory shall use only the Material Pass Book issued in his name.

DGM(E&AS)I/C	GM(Tech)	GM(O)	GM(P)
GM(HR)	ED(KR)		

2.5 In addition to the name of the contractor or Company's, name, address and telephone/mobile number of the person taking out the material shall also be mentioned in the CMP. In case of Company material, as far as possible the person permitted to take the material and the person receiving the material shall be the same person. But this procedure is not compulsory in the case of materials moving out on a VMP.

3.0 Company Material Pass (CMP)

3.1 Whenever any material belonging to Kochi Refinery is to be taken out from the Refinery or from any out side facilities of Kochi Refinery to the Refinery or from one location to another location belonging to the Refinery, CMP only shall be used.

3.2 If a company material is supposed to come back in the same form or in same number or in different shape or size or in the repaired form or with balance pieces or unused items in such cases the anticipated date of return shall be noted in the space provided for the same in the pass. Such passes will appear in the pending list and the procedure to close the same will be as per the existing practice.

3.3 Whenever Company Material is being taken out to some other work site, or location

i) for replacement of the existing material,
ii) to be fixed permanently at any location belonging to the Refinery,
iii) to be permanently fixed in any leased location,
iv) to be permanently fixed at outside location not belonging to the Refinery,
v) to be given to outside agency as donation or gift or sponsorship
vi) as has been sold in auction, (PO for the sale of material, weighment slip and invoice shall be enclosed),
VII) for testing of samples, destructive test etc.

in all such cases, CMP shall be used

3.4 CMP shall be used for the movement of company materials to all the offices in the Housing Colony area including HR-Estates, Learning and Development Centre, Cochin Refineries School, Kochi Refinery Club, Water Treatment Plant, Water Quarry Pumping Stations, Chullichira, Pipeline Corridor, City Office, Maradu, North Tanker Berth(NTB), South Tanker Birth(STB), Standalone Water Supply Scheme(SWSS), Aluva, Shore Tank Farm (STF), Single Point Mooring(SPM), Occupational Health Centre(OHC), BPCL Kochi Refinery Employees Co-operative Credit Society, BPCL KR Cooperative stores, Governmental and non Governmental agencies. CMP shall be used when company materials are moving in between the offices or

locations; example, STF to SPM or *vice versa* or Refinery to City office or *vice versa* etc.

3.5 In the cases referred above under 3.3 It shall be responsibility of the originating officer to ensure that the purpose for which the material is required to be taken out shall be clearly mentioned in the CMP under the purpose column of the CMP and also mention that the material/materials are not to be returned. Authorised Signatory to ensure that the above is complied with. CMPs with such remarks shall be closed automatically and filed separately in security.

3.6 However, when replacement of any item is carried out as mentioned in 3(3) (i) the old item (the item got replaced) shall be returned to the original premises (from where the material is issued) and the CMPs shall be closed as per procedure. If the replaced item is of no value the item shall be disposed suitably. The fact shall be noted in the CMP by the Engineer in charge of the job and the CMP shall be closed accordingly.

3.7 It shall be responsibility of the Originating Officer to ensure that the material is returned to the company premises within the date stipulated in the pass. However, in exception circumstances when the material could not be returned within the date stipulated in the pass, requisite approvals from Department Head may be taken by the Originating Officer.

3.8 When a material is being taken out on a CMP for an external work, the Purchase Order (PO) number of the respective contract services shall also be entered in the gate pass where ever applicable.

3.9 During the movement of the material, the material passes shall invariably be got checked, stamped and signed by the security person (where security guards are posted) or by any other person authorized to do so by the facility in charge who will also record the receipt of the same in that particular location.

4.0 Materials to Canteen.

4.1 Any raw material or cooked food coming to the canteen will be permitted only after due verification of the bills accompanying the materials and also on advance intimation or arrangement for the same.

5.0 Material Declaration Form.(MDF)

5.1 When any material is brought to the company by any person, the concerned person has to file 3 copies of the Material Declaration Form (MDF) which is available with the security personnel and the same shall be got endorsed by the security personnel after due verification of the material to his full satisfaction. One copy of the MDF shall be retained by the security while one

shall be given to the concerned person and the other shall be sent by security to the concerned Department Head or Section Head, as the case may be. In case there is no security personnel in any particular location/facility, the duties of security personnel shall be discharged by the person authorized to do so by the facility in charge in this regard.

5.2 MDF shall be used by all including Refinery employees while bringing in any material for official purposes. It includes all electronic equipments, items brought in by vendors or any business agents, or returning of excess Refinery material from the work site, sand, bricks, rubbles, cement or any construction materials, etc. Any outside material brought in without MDF will not be permitted to take out at any cost.

5.3 The material brought in can be taken out in full or a portion on the same day using the same MDF. But for any subsequent movement of the same material from next day onwards, the MDF shall be accompanied by a VMP issued by the authorized signatory.

5.4 In case materials mentioned in the MDF are taken out in piecemeal on subsequent days, copy of the MDF shall be attached with each VMP on each such occasion(s).

6.0 Equipments sent to outside workshop for repair/service/calibration

6.1 CMP shall be issued to any equipment taken out for repair/service/calibration etc. The item after repair will be permitted in but this pass shall be closed only after the receipt of the statement from contractor that he has used all spares taken out for repair with specific reference to the relevant CMP of the Contractor engaged for repair duly certified by the Originating Officer or Engineer-in-Charge. The security at the gate shall make note to this effect in the CMP at the time of entry of the material.

7.0 Cloths for Stitching Uniform

7.1 CMP shall be used for the issue of clothes to tailors for stitching uniforms. The tailor/contractor should get the endorsement of the security sergeant for return of stitched material. Reconciliation of the balance quantity of cloth has to be carried out on supply of full lot of stitched uniform. As far as possible, the tailor may be advised to bring the stitched clothes in one lot,

8.0 Vendor Material Pass (VMP)

8.1 When the vendor is taking out the materials brought in through a MDF, a Vendor Material Pass (VMP) shall be issued with specific reference to the MDF and necessary endorsement should be made in the copy of the MDF retained in the issuing department. Copy of the MDF shall be attached with each VMP. In case materials covered in one MDF are taken out in different

lots, the original MDF should be attached with the VMP of the last lot. The authorized signatory shall ensure that the materials being taken out is clearly marked in the copy of the MDF and so also the corresponding number of the MDF is also mentioned in the CMP. The authorized signatory and the Originating Officer shall sign on all the attachments accompanying the VMP. Separate VMP has to be issued for each MDF i.e. one VMP should not cover materials covered in more than one MDF

9.0 Rejected Material of Suppliers, Vendors etc. Returned

9.1 VMP issued for returning of rejected materials shall be accompanied by copy of the MDF and also a confirmation from the concerned Management staff that any claim in respect of the payment already effected has already been settled. In case items has to be returned for rectification and for which payment has been released, specific approval of the HoD should be obtained and a copy of the same to be attached with the VMP.

10.0 Review Procedure

10.1 A reasonable period can be permitted for returning the items after completion of the job by which material was supplied by the company. Items issued on CMP which are delayed for more than 15 days from the due date of return should be reported by Security Co-Ordinator to the HoDs/Section Heads. There after the HoDs/Section Heads shall personally monitor the return of the item. Any item pending clearance more than 30 days shall be brought to the notice of the GMs concerned, by the Security Co-Ordinator

10.2 The Security Co-Ordinator shall ensure that the gate passes, MDF and any other attachments are filed in the chronological order on a daily basis. An active file for MDF on contractors for longer completion period shall be separately maintained. As and when the MDFs are closed, these may be removed from the current file and kept in a separate file in the order of date.

10.3 During Holidays / After Officek Hours, the material pass shall be countersigned / Signed by CM(SHA)

11.0 Disposal procedure

11.1 The Security Co-Ordinator shall ensure that the CMPs which are closed at the gates shall be disposed after a period of three years. Similarly those CMPs which have been closed on return of the materials will be disposed after one year from the date of closure.

11.2 The VMPs shall be disposed off after two years from the date of closure of the contract and on getting a confirmation from the owner department.

11.3 Copies of the MDF and other documents attached to CMP/VMP shall be disposed off along with the connected material passes. Those MDFs not linked to any Material Pass shall be disposed after one year from the date of issue and on getting a confirmation from the owner department.

DGM(E&AS)I/C	GM(Tech)	GM(O)	GM(R)
GM(HR)	ED(KR) 03/05/2010		

Different types of solid and liquid waste material are generated in the Refinery. They are mainly:

(1) Empty Carbuoys / Drums
(2) Non-Oily Waste material
(3) Oily Waste material
(4) Waste Oil (samples etc.)
(5) Metallic Scrap
(6) Insulation material, and
(7) Used Oil

Even though, insignificant in value, in the absence of suitable infrastructure and a specified procedure, these materials can hamper routine operations and cause environmental problems. Hence, it is essential to handle these materials in an effective and timely manner.

This ROS illustrates the procedures to be followed for handling and disposal of these waste materials and identifies the personnel responsible for the implementation.

(1) **Empty Carbuoys / Drums**

No.	Procedure	Responsibility
1(a)	Before giving permission for unloading chemical drums, the owner department should ensure that a procedure for cleaning and disposal of empty drums approved by Safety & Fire section is available. In the case of jobs carried out by Projects, the responsibility of obtaining the approved procedure lies with the Projects department.	HOD in-charge of the unit / HOD (Projects)
(b)	In the case of new chemicals, the concerned agency/ department procuring the material (Materials or Projects as the case may be) should obtain the procedure of disposal of empty containers/drums from the supplier/contractor. On obtaining the procedure, the same should be approved by Safety & Fire section. In case the procedure given by the supplier requires any modification to suit the site conditions, the same shall be approved by the Safety & Fire section.	HOD(Materials)/ HOD Projects)/HOD (Technical Services)
(c)	Empty hazardous and non-hazardous containers should be stacked separately at a pre-determined location around the unit	HOD in charge of the unit

ED (T&D)	GM (O)	GM (P)
	05/08/03	
DIRECTOR (REFINERIES)	13/8/03	

(d)	The empty drums should be shifted from the plant area to an open area within a week's time of stacking.	HOD in charge of the unit
(e)	The disposal operation should commence not later than one month's time from the above at least.	HOD in charge of the unit
(f)	The containers should be cleaned thoroughly as per the procedure for disposal of empty drums of chemicals, enclosed as Annexure - I. In case, the disposal procedure is not available in Annexure 1 of ROS 58, a procedure approved by Safety & Fire section should be followed. Necessary assistance for cleaning the containers shall be provided by Maintenance Department.	HOD(Projects) / HOD(Maint.)
(g)	Issue of work requisition to Maintenance Planning for the removal of containers from the Unit.	HOD in charge of the unit
2(a)	Upon receipt of the information from units through work requisition, the empty, cleaned containers except that of hazardous chemicals should be transported and stacked properly within the warehouse yard.	HOD of Maintenance
(b)	The containers of hazardous chemicals should be punctured, transported and dumped at the metal scrap yard.	
(c)	Inform Materials Department the details with respect to stacking of the containers within the warehouse yard.	
3 (a)	Identify specific locations in the Warehouse Yard to stack non-hazardous empty carbuoys / drums. Install sign boards.	HOD of Materials
(b)	The containers stacked in the warehouse to be disposed, as per procedure detailed in materials manual MT-DM-01.	
(c)	Issue of work requisition to Maintenance-Planning for the removal of containers from the Unit.	
4(a)	Safety & Fire section should update Annexure-1 of ROS 58 on a yearly basis.	HOD (TS)

ED (T&D)	GM (O) 05/08/03	GM (P) 6/8
DIRECTOR (REFINERIES)	13/Aug/2003	

(2) **Non-Oily Waste Material**

No.	Procedure	Responsibility
1	Ensure dumping of non-oily waste such as cotton, packing material, paper, gloves etc., in the non-oily waste convertainer [in yellow container] at various locations inside the Refinery.	HODs in-charge of respective areas
2	Remove the waste from the convertainer basket and transport the same to incinerator.	HOD (Maintenance)
3	Incinerate the waste in the Incinerator	HOD (Maintenance)

(3) **Oily Waste Materials**

No.	Procedure	Responsibility
1	Ensure dumping of oily waste such as oil soaked cotton, gloves, asbestos, gaskets, card-board packing etc. in the oily waste convertainer [in black container] at various locations inside the Refinery.	HODs in-charge of respective areas
2	Remove the waste from the convertainer bucket and transport the same to the incinerator	HOD (Maintenance)
3	Incinerate the waste in the incinerator	HOD (Maintenance)

(4) **Waste Oils (samples etc.)**

No.	Procedure	Responsibility
1	The drum containing samples of VR, LSHS, FO etc., and oil collected during floor scrape cleaning should be emptied out into the VAT system located near Tank 10.	HOD in-charge of the area. (seek required assistance from Maintenance Dept. for transportation of drums).
2	Operation of VAT and pumping of oil to storage.	HOD in charge of the area (seek required assistance from Maintenance Dept. for transportation of drums)

ED (T&D)	GM (O)	GM (P)
	05/08/03	
DIRECTOR (REFINERIES)	13/August/03	

(5) **Metallic Scrap**

No.	Procedure	Responsibility
1	Ensure dumping of metallic scrap / metal waste generated during normal operations of the Refinery into metallic scrap bins (green in colour) kept at different locations.	HOD in-charge of respective Dept.
2	Ensure periodic removal of scrap / waste to the metallic scrap yard.*	HOD in-charge of Maintenance Dept.
3	Ensure dumping of scrap generated during turnaround into metallic scrap yard before the start-up of the Unit.	HOD in-charge of job executing Dept.

* **The permits of the executing agencies, on completion of modification / shutdown activities are to be closed by the owner agencies only after clearing the scrap materials from the site (sides of the roads etc) and not from the unit alone.**

(6) **Insulation Material**

No.	Procedure	Responsibility
1	Keep all insulation materials removed from piping / vessels separately in a designated area	HOD in-charge of the Unit
2	Ensure removal of the materials from the Unit and dump it in the scrap yard earmarked for non-biodegradable materials immediately on completion of the jobs. (*)	HOD of Executing Department

* **To be facilitated.**

(7) **Used Oil**

No.	Procedure	Responsibility
1	Ensuring collecting the used engine oil from the stationary equipment in drums and disposed of in the API.	HOD of Maintenance Dept.
2	Dispose the oil in the API separator of ETP-II / III periodically.	HOD of Maintenance Dept. and before dumping into API get concurrence from HOD of S&OM.

ED (T&D)	GM (O) 05/08/03	GM (P)
DIRECTOR (REFINERIES)	13/August/2003	

Annexure - I

Procedure for disposal of Empty drums of Chemicals

1	Ahuralan ESK-50	-	Wash the drum initially with kerosene and final rinsing may be with naphtha and then with hot water. Drain all these wash quantities to OWS. Repeat the washing until all the chemical from the drum is removed.
2	CTC	-	Wash the drum with plenty of kerosene and finally with naphtha and drain the contents to OWS. Wash with plenty of warm water to remove the naphtha and release the drum for disposal.
3	UOP 5 / Polarchem 131	-	Wash the drum with kerosene thoroughly and final rinsing may be with Naphtha. Drain the contents to OWS and wash the drum with hot water till the naphtha traces are cleared.
4	Sulfolane	-	Sulfolane is soluble in water. Wash the drums thoroughly with water. Drain the contents to ETP II. After thorough water washing the drums can be disposed off. These drums should not be used for carrying potable water.
4(a)	Degraded Solvent	-	In case of degraded solvent, it is to be drained to ETP II and the drain rate should be one drum per day by providing a tap to the drum. Sufficient quantity of water is to be ensured for diluting the degraded sulfolane. Sulfolane is bio-degradable.
5	Merox 1S and 2S	-	Wash the containers with large quantities of water and drain to ETP II. Don't use the containers for any other purpose. Incinerate the containers for disposal after thorough washing.
6	MEA	-	MEA is water soluble. Wash the empty drums with plenty of water. Drain the contents to ETP II. Dispose the drums after thorough cleaning. While draining to ETP II the pH should be monitored.
7.	DMDS	-	Wash thoroughly and fill three fourth of the drum with water. Drain the contents to DHDS ETP Process receiving sump initially at the rate of one drum per shift, through a tap connected to the drum. The draining rate may be increased afterwards with concurrence from DHDS ETP. Check for any noticeable odor. If the odor still persists, repeat till there is no noticeable odor. Use personal protective equipments as specified in the MSDS for DMDS. The drums should be punctured before disposal to prevent usage for storing water.

ED (T&D)	GM (Q) 05/08/03	GM (P)
DIRECTOR (REFINERIES)	13/Aug/2003	

Rev 01		ROS : 90
Nov. 2010	**WORK PERMIT SYSTEM**	Page :1/44 46

1.0 INTRODUCTION

The Work Permit System is an important tool for safety in hydrocarbon processing/ handling installation. The basic purpose of the work permit system is to ensure that work is carried out in the safest possible manner to prevent injuries to personnel, protect property and environment from damage, avoid fire etc. The recommended Work Permit System is described covering various aspects like when a work permit is required, types of permits, responsibilities, check lists, validity etc. The success of a Work Permit System depends upon the training, motivation and participation of all individuals concerned with its implementation. Since several maintenance/ construction jobs are often carried out with assistance from contractors, it is essential to provide sufficient exposure to contractor and his/ their employees as well

The work permit system of BPCL-KR has been formulated in line with the recommendations laid down by the Oil Industry Safety Directorate (OISD) Standard STD-105 Revision-I, September 2004 and STD-137, August 1999.

Work permit is a written authorization for performing any job within the Refinery, Jetty facilities, STF facilities, SBM facilities, Water Quarries, Water treatment facilities at Chullichira, Water Pump House at Aluva, or on any facility belonging to the Refinery.

2.0 GUIDELINES GOVERNING THE WORK PERMIT

2.1 If a work has to be performed in BPCL-KR by any person other than the owner personnel of that area, a duly authorised written permit shall be obtained by the person/ agency executing the work from the Owner of the area before commencement of the work. However, even for operating personnel, when work has to be performed outside their normal routine, an exclusive permit to that effect by the authorized person shall be obtained. It is the policy of the company to ensure the safety of people, equipment , materials and protect the environment when performing any work within the Refinery premises, Jetty Facilities, STF Facilities , SBM Facilities Water Quarries, Water treatment plant at Chullichira, Water pump house Aluva, any other facility belonging to the company.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR	02/11/2010	

2.2 The Work Permit System shall always operate on "Owner-In-Charge" concept. The concerned Department Heads shall issue the appropriate ownership limits for various sections based on this concept. (Example: Manufacturing Units - Shift In-Charge; Laboratory – Shift in Charge; OM&S - Shift In-Charge; P&U – Shift In Charge, Fire station - Shift In-Charge; etc.)

2.3 Separate forms shall be used for Cold Work, Electrical work, Hot Work including confined space entry permit, Radiography, working on fragile roof top, and working at height above 3 meters where no permanent platform exists, Electrical Isolation & Energisation and Earth Work Permit. For carrying out the jobs which are coming under Hot Work category, (e.g. Hot Work, Confined space entry, Excavation etc.) after getting the concerned hot work permit, a Cold Work permit/ Clearance certificate shall also be obtained from the concerned owner department before starting the work.

2.4 All jobs shall be performed only after obtaining the stipulated permits from the concerned authorities. The permit forms in book form are printed serially and issued by Safety Section.

Hot work permit shall be of three copies. The original will be in pink colour. The copies will be in white colour with "COPY" printed in large pink colour letters across the form. The authorized original copy shall be given to the receiver, the duplicate to the Fire Station, triplicate retained in the book.

Cold work/Clearance Certificate for Hot work permit shall be in two copies. The original shall be in yellow colour and the copy to be in white colour with "COPY" printed in large yellow colour letters across the form. The authorized original has to be issued to the receiver, retaining the duplicate in the book.

Electrical Isolation and Energisation permit shall be in three copies. The original should be in Green colour and the copy in white colour with 'COPY" printed in large Green colour letters. The Original shall be issued to the electrical section. The authorized person from Electrical section on isolation/ energisation of the equipment/ circuit shall return the original to the issuer keeping copy for the record.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Electrical permit shall be in two copies. The original shall be in RED colour and the copy to be in white colour with "COPY" printed in large Red colour letters across the form. The authorized original has to be issued to the receiver, retaining the duplicate in the book.

Earth Work permit shall be in two copies. The original shall be in light Brown colour and the copy to be in white colour with "COPY" printed in large light Brown colour letters across the form. The authorized original has to be issued to the receiver, retaining the duplicate in the book.

2.5 All permits shall be issued/ renewed and received only by the personnel designated for the same and are to be signed by the issuing/ renewing and receiving personnel. The permit shall be signed and issued by the authorized person from the concerned Owner department/ section. The permit shall be signed and received by the authorized person from the executing department. In such areas/ facilities where the executing department itself is the owner of the area/ facility (eg. segregated project sites, designated fabrication yards) the permit can be issued to the contractor's supervisor directly on obtaining his signature.

2.6 The concerned department shall issue the appropriate authority by name for various units as well as sections for issue/ renewal/ acceptance of permits. The list of authorised persons of each departments for issuing/ renewing and receiving of various permits duly approved by the General Manager of respective departments shall be updated on yearly basis and forwarded to the Safety Section of Fire & Safety Department. The list shall be revised whenever there is a transfer/ new appointment to the department.

2.7 All necessary checks and tests shall be conducted by issuing personnel to ensure safety of the job to be performed prior to issue of permits. All precautionary measures required to be taken shall be clearly indicated in the permit and their compliance ensured both by the issuing/receiving personnel.

2.8 Critical jobs are to be carried out under specific written procedure and reference of the same shall be noted down clearly in the permit so issued. The Procedures for these critical jobs have to be prepared jointly by the section heads of the Owner dept, Safety Section of Fire & Safety Department and the Executing dept and to be concurred by the Owner Department head. Owner department shall initiate the preparation of such procedures.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

The jobs of the following nature are categorised as critical jobs for the purpose of preparing Procedures/Job safety Plans.

Critical jobs are :

1. Any activity which are critical from the point of view of operations, safety, health or environment as decided by the Department head of the concerned area or the Department head of F&S.
2. Jobs on an equipment or facility the owner ship of the equipment/facility or it operation is falling under different units, departments involving.

2.9 Permits shall be worded clearly so as to limit the work to the designated area/ equipment/ facilities, agencies, working elevation and time. The work permit shall be filled up carefully and accurately in clear writing ensuring that detailed and complete information is provided in all the sections/ sub sections. Sketches should be attached wherever possible to avoid miscommunication. Additions and alterations on the original shall also be endorsed on all the copies.

2.10 Should any of the conditions vary during the course of the work, which may affect the safety of human beings and equipment, the job shall be stopped, the permit withdrawn and given back to the issuer. Reasons for withdrawing the permit to be mentioned in the permit.

2.11 If a permit is withdrawn, the work should be restarted only after safe conditions are established back and clearance obtained from the issuing/ renewing authority.

2.12 Permits shall be made readily available at the work site for verification by concerned personnel. Failure to present the permit on demand shall result in stoppage of work.

2.13 Permits are valid only for the time period specified in the permit. Normally the permits will be issued for the shift timings of the issuing authority.

2.14 The site of hot work jobs should be indicated in the plot plans available in the control rooms and fire station with red pins. This helps the incoming supervisor/s (both in Fire and Operating departments) to get a quick idea of the hot jobs being undertaken and

help in identifying the areas which require inspection/ attention, depending upon the criticality of the area and the job.

2.15 If the job is to be continued beyond the time limit specified in the permit, it has to be renewed at the beginning of the next shift. Jobs can continue on expiry of the shift after obtaining the signatures of the authorized person from the owner department and the authorized personnel from the executing department in the original of the permit. The issuing authority can renew the permit after making a signature in both the original and the triplicate in the case of hot work permits/ electrical isolation and energisation permit and original and duplicate in the case of cold work permits. The authorized personnel of the executing department shall make his signature in the copy available in the control room as early as possible as but not later than the expiry of the shift or before completion of the job whichever is earlier.

2.16 Permits once issued shall be renewed up to a maximum 7 calendar days. The endorsement for renewal is to be done only in the space provided for the purpose. In case the job has to be continued even after the above period, a fresh permit has to be issued/ obtained for the same. The serial number of the old permit shall be mentioned in the new permit.

2.17 During Shutdown of a plant, deviation of the procedures laid down in the ROS, if any required, shall be made with the specific recommendation from a committee consisting of Heads of Owner Department, Executing Department, Fire & Safety and approved by concerned General Manager.

2.18 While renewing a permit that has already been issued by authorized person of the concerned department, the issuing/receiving persons are in no way relieved of the duties and responsibilities specified for issuing/ renewing permits.

2.19 At the time of renewal of a permit or when the job is in progress, if the issuing or renewing authority, feels that some additional conditions or precautious are to be

stipulated or are not necessary based on the prevailing conditions, a new permit has to be issued incorporating the changes and the previous permit will remain cancelled.

2.20 If the Owner/ Executing departments require any clarifications on the precautions to be followed for critical jobs, the same shall be consulted with Safety Section of Fire & Safety Department and to be incorporated in the permits.

2.21 All permits must be closed on completion of the job with signature for closure by the designated person of the executing department/ section as well as the Owner department. Permits once closed cannot be renewed.

2.22 No hot work shall be allowed to be included in the hot work permit already issued for other jobs.

2.23 The work permit should be issued for one job only. Separate permits to be issued for performing separate work on same equipment.

2.24 All the permits stands cancelled on declaration of emergency. Fresh permits/ Revalidation shall be taken on clearance of emergency.

3.0 DUTIES AND RESPONSIBILITIES UNDER WORK PERMIT SYSTEM

Before issuing any permit the authorized issuing authority shall give proper briefing of the work situation, including the possible hazards and the precautions to be taken, to the authorized executing authority or receiver of the permit and a noting to this effect should be made in the permit, at the space provided for special instructions.

3.1 ISSUING/ RENEWING AUTHORITY

The issuing/ renewing authority is primarily responsible for the safe execution of the job covered under the permit and as such is to perform the following duties.

3.1.1 Analyse and determine the condition of the facility and the area involved and stipulate necessary precautionary measures to be taken to ensure safe execution of the work. He shall ensure that all the columns of the permit forms are filled up. "NR" (Not required)

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

shall be marked wherever that particular item is not required. He shall put his full signature along with name and badge number marked in the permit.

3.1.2 Stipulate precautionary measures such as area preparation, blinding/ isolation/ tagging, provision of safety and fire protection equipment, standby personal etc. or special procedures required (in case of critical jobs) in the permits and ensure their compliance.

3.1.3 Conduct preparatory, preventive and precautionary measures to be carried out by personnel of his department and ensure compliance of the same.

3.1.4 Co-ordinate with other departments/ sections wherever precautions are necessary to be taken from their end also and counter signature to be obtained wherever needed before commencing the job

3.1.5 Ensure verification and certification of installation and removal of blinds/ isolations and their tagging.

3.1.6 Perform necessary gas and other required tests. As a pre-requisite to issue permit, particularly in the case of hot work/ confined space entry permit, gas test for hydrocarbons/ oxygen deficiency/ toxic gases shall be conducted as applicable.

3.1.7 Ensure that the facilities and the area in and around the place where the permit is issued/ renewed are made safe prior to commencement and during the progress of the job.

3.1.8 Follow up periodically the progress of the job permitted and stop the job if conditions become unsafe.

3.1.9 Ensure that while hot work is in progress no other work likely to result in hazardous conditions are permitted in the vicinity (eg: repairs to oil or gas lines, bleeding or sampling of flammable materials, draining of hydrocarbon, venting of gas, removal of blind from hydrocarbon lines etc.). Where gas-free conditions are not fully ensured for the duration of hot work, a system of monitoring either by automatic or by manual periodic verification shall be resorted to depending upon the prevalent conditions of the operating area.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

3.1.10 Ensure that all personal protective equipment/ clothing are available at site before commencement of work and the same is used by personnel while performing the work.

3.1.11 The issuing authority shall inform the Chief Manager (Shift Administration) if a hot work permit is issued/ renewed beyond the normal office working hours.

3.1.12 The issuing authority shall inform the fire station, of all the new as well as renewed hot work permits and get the token number before issuing a new hot work permit. The token number shall be written on the hot work permit in the column for token number.

3.1.13 After completion or stoppage of the job, the person to whom the permit was issued, should thoroughly check the area for clearing of debris, ensure safe working condition and then shall close the work permit.

3.1.14 The issuer on receiving back the original permit duly closed by the receiver would satisfy himself regarding completion of the job and that the area has been cleared. Then he shall also sign the permit and hand over original permit to the receiver (except in the case of Energisation/ Isolation permit in which the duplicate copy of the permit to be returned to the receiver and original permit to be retained by the issuer). Returned closed permits are to be preserved by the owner department for a minimum of 90 days.

3.2 RECEIVING AUTHORITY/ EXECUTING PERSONNEL

The fact that permits has been issued for performing a certain job in no way relieves the authorized person of the executing department or the personnel executing the work of their responsibility for safe execution and completion of the job. The receiving authority/ executing personnel is/ are responsible for the compliance of the precautions/ conditions prescribed in the permit. Their duties include the following:

3.2.1 Secure necessary permit from the concerned department before commencement of the job. He shall put his full signature along with name and badge number marked in the permit.

3.2.2 Provide for and comply with all necessary precautionary measures stipulated in the permits. Ensure that all safety equipment are in good working condition and available at site prior to commencement of the work.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

3.2.3 Take extra care when commencing the work, especially while breaking flange joints, cutting through lines, striking an arc for the first time etc.

3.2.4 Ensure vigil and work diligently for safe completion of the job. When in doubt, stop the job and obtain clarification from concerned personnel.

3.2.5 Ensure safe working practices throughout the job by continuous supervision (either by executing personnel or contractor personnel).

3.2.6 Ensure the availability of all personal protective equipment/ clothing are available at site before commencement of work and also ensure that the same are used during the work.

3.2.7 Stop the job if conditions become unsafe and report to the issuing/ renewing authority. Restart the job only after getting the clearance from the issuing/ renewing authority.

3.2.8 Ensure that the permit is readily available at the work site for verification.

3.2.9 Ensure that no blinds or other isolations, specified for the work are removed or disturbed during the work.

3.2.10 Ensure that the grade area is barricaded by red & white colour tape to cover excavated area or in case of material handling at overhead.

3.2.11 Ensure that 24 V (AC) hand lamps are used in the confined space.

3.2.12 Healthiness of the scaffolding provided for working at height shall be checked and ensured by the Engineer in Charge who is executing the job, before use. (Refer ROS 94 on Scaffolding)

3.2.13 Upon completion of the job, clear the area of all construction materials& scrap, removal of temporary electrical isolation and replace in its original location the facilities/ equipments used for the execution of the job. Maintain good house keeping.

3.2.14 All permits must be closed on completion of the job and after clearing the area by the authorized person of the executing departments/ section. The receiver will sign for

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

closure after specifying the job status at space provided at the back of the permit and return the original permit to issuer for signing. Permits once closed cannot be renewed.

3.3 FIRE STATION PERSONNEL

Fire station personnel has to register the exact location of the Hot work, issue the token number for the work and to provide necessary additional/ special fire fighting facilities at the request of the issuing/ executing authority or as desired by them depending upon the nature of hot work and hazardous nature of the area.

3.3.1 SAFETY OFFICER

The Safety Officer/ Fire Officer authorised will make periodic check of the work sites and see that the work is being carried out as per conditions laid down in the permit. At any point of time, if he considers that the conditions are not safe enough for the work, he may bring to the attention of the issuing authority or suspend the work and inform the permit issuing authority as the case may be, to restore the safe conditions so that the work can be re-started. If the job has to be stopped and permit withdrawn, the permit to be given back to the issuer with reasons for withdrawing the permit mentioned in the same.

4.0 TYPES OF PERMITS

Depending on the nature of jobs to be performed, permits issued for carrying out jobs in the Refinery are of five types. They are:

1) Cold Work Permit/Clearance Certificate for Hot work.
2) Electrical Permit
3) Hot Work Permit
4) Electrical Isolation & Energisation permit.
5) Earth Work Permit

4.1 COLD WORK PERMIT/CLEARANCE CERTIFICATE FOR HOT WORK

Cold work is an activity which does not produce sparks or sufficient heat to ignite a flammable substance or which does not normally cause a serious hazard to the life or

health of people. This includes working on process machinery, blinding and deblinding, opening and closing of flanges, hot bolting, inspection, painting, housekeeping jobs, and civil works with excavation up to 1.2 M. Whenever such a cold work is to be performed by a person or an agency other then those belonging to the department/ section to which the equipment/ area belongs, a cold work permit shall be obtained from the concerned department prior to commencement of the job. For every hot work permit, a Clearance certificate for hot work shall be issued after ensuring safe conditions stipulated in the hot work permit.

4.1.1 ISSUING/RENEWING AUTHORITY

Cold work Permits/Clearance Certificate for Hot Work will be issued and / or renewed by authorised personnel of the department /section to which the equipment or area belong.

4.1.2 RECEIVING AUTHORITY

a) For jobs performed departmentally, the new as well as renewed Cold Work Permits/Clearance Certificate for Hot work, will be received by the concerned personnel executing the job.

b) For jobs carried out through contractors, the new cold work permit issued, will be received by the officer/ authorised personnel of the executing department. The contractor/ authorised supervisor executing the job should also countersign the permit. Renewed cold work permits for such jobs can be received by the contractor or his supervisor on behalf of the officer of the executing department after obtaining the signature of the latter in the renewal column of the permit

4.2 ELECTRICAL PERMIT

For carrying out any work connected to electric power, which is having the potential to cause personal injury, equipment damage and electrical fire, requires Electrical permit.

4.2.1 ISSUING/ RENEWING AUTHORITY

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Electrical permits will be issued and/ or renewed by authorized personnel of the Electrical Section of the Power & Utilities department and HR Estates section, as the case may be, to the authorised executing Agency/ Contractor having valid Electrical License. While carrying out the work, if there exist a possibility of disruption of the continuous operations, then the permit has to be countersigned by the concerned Operating department personnel.

4.2.2 ACCEPTING AUTHORITY

The new electrical permits are to be received by the authorized officer of the executing department. The contractor who possesses valid Electrical License should countersign the permit. Renewed electrical permits can be received by the contractor or his authorized supervisor who possess valid electrical license on behalf of the officer of the executing department after obtaining the signature of the latter.

4.2.3 JOBS ON ELECTRICAL EQUIPMENTS

4.2.3.1 Supervision of all electrical contract jobs handled by Power & Utilities Department/ HR estates should be done only by an electrical supervisor or person authorized by the Head of the Power & Utilities Department and HR Estates respectively. However, respective jobs on low voltage system such as replacement of lamps and fuses, repair/ replacement of fans, switches, sockets, fittings, wirings, domestic appliances etc. are exempted from the above requirement.

4.2.3.2 Supervision of other electrical jobs handled by departments other than Power & Utilities like Projects, E&C etc. (those installations that has not been handed over to Power & Utilities Department) should be done by the person authorized by the respective department head).

4.2.3.3 An electrical work permit issued to carry out jobs like cable laying, work inside motor control centers and sub-station, work on motors inside plant, rewiring inside plant etc. becomes valid only when the permit is countersigned by an Electrical Engineer or Electrical supervisor or authorized person of the Executing department in BPCL-KR.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

4.2.3.4 All electrical jobs in sub-station, load centers, power cables, and jobs on electrical machinery inside the plant should be carried out only after getting a work permit from the Electrical Section of the Power & Utilities Department or HR Estates as the case may be, if these are done by persons other than the Electrical Section crew. This is apart from the work permit for the area. However for electrical installations under construction and not handed over to the owner department, work permits are to be issued by the electrical engineer in charge of implementation of the job.

4.2.3.5 In case the electrical work permit is issued for non-electrical jobs like cleaning the sub-station etc. the permit should be countersigned by the Executing department.

4.3 HOT WORK PERMIT

Hot work is an activity which produces sparks or sufficient heat to ignite a flammable substance. For simplification of the permit system, the jobs which can endanger the life or health of personnel are also treated as hot work.

Whenever a hot work is to be performed within the Refinery premises, a hot work permit is to be obtained by the executing person or agency from a designated person of owner department irrespective of whether the hot work is being carried out by the owner department themselves (excluding jobs dealt in 4.3.4) or by some other department. The jobs requiring hot work permits are listed in 4.3.3.

A Clearance certificate for hot work shall also be taken from concerned issuing authority for all hot works.

4.3.1 ISSUING AUTHORITY

Hot work permits will be issued and/ or renewed by authorized officers of respective area/ department.

4.3.2 ACCEPTING AUTHORITY

a. For jobs performed departmentally, the new as well as renewed hot work permits will be received by the concerned officer

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

b. For jobs carried out through contractors, new hot work permit shall be signed and received by the authorized officer of the executing department. The authorized supervisor of the contractor executing the job should also countersign the permit. Renewed cold work permits for such jobs can be received by the contractor or his supervisor on behalf of the officer of the executing department after obtaining the signature of the officer in the renewal column of the permit. The contractor's supervisor, who had undergone 3 days training, shall also sign the hot work permit, at the space provided.

4.3.3 JOBS REQUIRING HOT WORK PERMIT

1. Any job done anywhere within the refinery property (including tanker jetty facilities and excluding approved areas given in section 4.3.4) that requires the use of the following:
   a) Arc welding equipment, gas cutting and welding torches, soldering equipment, any type of electric heating devices, blow torches and other open flames ;
   b) Grinding wheels;
   c) Electric drills and other electric equipment including non-explosion proof lights, connections and extension cords ;
   d) Shot blasting and similar spark producing surface preparation ;
   e) Stress relieving, preheating and induction heating;
   f) Electric flash unit/ flash bulbs for taking photographs ;
   g) Locating and operating welding equipment, internal combustion engines or any other equipment which may create a source of ignition, outside the periphery wall of Administration building.
   h) Concrete chipping.
2. Making entry for inspection, cleaning or repairs inside;
   a) Storage tanks

b) Process and yard vessels, towers, drums, exchanger shell etc.

c) Furnaces and Boilers

d) Excavations, valve pits, sewer or sump where a man's head may be below grade

e) Sumps in the oil separator system

3. Driving any automotive equipment inside process and utility areas (except DM plant and Drinking Water Treatment plant), any tank farm, adjacent to any of the sumps in the oil separation systems and adjacent to the hydrocarbon pumps houses and flare stack areas.

4. Hot work near engine or fuel tank of automotive equipment even at approved areas
5. Entry into or hot work on vessels, drums, sections of pipe lines etc. that contained oil, chemicals or toxic products even at approved areas.

6. Going on to the roof of floating roof tanks when product level is below 3 meters from top of the tank and on roof of floating roof tanks where percentage of hydrogen sulphide is higher, irrespective of roof level.

7. Rock blasting.

8. Excavations exceeding 1.2 meters in depth.

9. Radiography.

10. Working on pressurised (above atmospheric) toxic/flammable gas lines or equipment.
11. Working at height above 3 meters where no permanent platforms are available

12. Working on fragile roof top

4.3.4 APPROVED AREAS

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Following are the areas in the refinery property where hot work (use of open flames etc.) is permitted without hot work permits.

1. Shop buildings (except carpentry shop, painting shop and enclosure adjacent to the equipment section office) for Maintenance Departmental crew only.
2. Laboratory (except store and sample rooms) – only for making and using of open flames by laboratory staff. (For testing purpose only)
3. Process unit furnaces and boilers (for firing and operating burners only).
4. Cafeteria (only for making open flame/ fire for cooking).
5. Fire training ground for training purposes.

4.4 ELECTRICAL ISOLATION & ENERGISATION PERMIT

Before issuing any work permit, it is essential that the equipment / facility to be worked on is electrically safe and electrical power is isolated to the extent necessary for the safe conduct of the authorized work.

4.4.1 The request for electrical isolation & energisation shall be issued by the owner of the equipment/facility to the authorized person of the P&U (Electrical) Department and HR Estates in their respective areas.

4.4.2. The authorized person (P&U Electrical)/HR Estates shall give the certificate of isolation/energisation as the case may be, which is attached to the Electrical Isolation & Energisation permit, to the owner department

4. 5 EARTH WORK PERMIT

4.5.1. For carrying out excavation or digging any where within the Refinery an Earth Work Permit has to be obtained from the Electrical Section of the Power & Utilities Department or Estates section of HR department as the case may be. A plot plan showing the location of the excavation shall be attached to the permit

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

4.5.2 An administrative clearance has to be obtained from the IS department and from the Instrumentation section of Maintenance Department. The time limit for the execution of the earth work has to be included in the above mentioned clearance. The administrative clearance certificate shall be attached to the earth work permit.

4.5.3 The Earth work permit shall be in addition to the hot work permit required to be taken from the concerned department in case the depth of excavation exceeds 1.2 meters and such other conditions necessitating the issue of the hot work permit. Excavation more than 1.2 meter deep, also fall under the confined space. The stipulations given in ROS-63 shall also be complied with while carrying out excavation/digging operation in the refinery. The Earth Work Permit issued for a job at one location is valid until the completion of that job. However for carrying out excavation work at critical cable sensitive areas, as decided by the Electrical section of Power &_Utility Department or Estates Section of HR Department, as the case may be, the earth work permits shall be renewed on a daily basis.

4.5.4 Mechanical excavations, using earth movers, shall be started only after excavating up to 1.2 meters by manual methods. If the area to be excavated is free of any underground lines or cables, excavation using mechanical devices can be started directly.

5.0 AREA DEMARCATION

5.1 The work permit system shall operate on the "Owner in charge" concept. Work permits for the jobs performed on or by the side of the roads will be issued by the department to which the adjacent facilities belong.

5.2 In the case of hot works that are to be carried out on equipment belonging to a department/ section that is situated in the area of another department/ section, the hot work permit becomes valid only when it is counter signed by the issuing/ renewing authority of that areas. Similarly when hot work is to be carried out on an equipment/ area belonging to a department/ section in the nearby vicinity, the permit is valid only on getting the counter signature of the issuing/ renewing authority of such facilities/ areas. Such counter signature is to be obtained every time the permits are renewed. The tables showing area demarcation is given in Annexure I.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

5.3 In case of any dispute in the area demarcation the ownership of the area shall be decided by General Manager- Operations.

6.0 GENERAL GUIDELINES FOR WORKING AT HEIGHT.

i. While working at a height of more than 3 meters, where no permanent work platform available, Hot work permit shall be obtained from the authorised person before commencement of the job.
ii. While working at a height of more than 3 meters, ISI approved full body harness shall be used.
iii. Worker should be well trained on usage of safety belt including its proper usage at the time of ascending/descending.
iv. All tools should be carried in tool kits to avoid their falling.
v. If the job is on fragile/sloping roof, roof walk ladders shall be used.
vi. Provide lifeline wherever required.
vii. Additional safety measures like safety net should be provided depending upon the site conditions/ job requirements.
viii. Keep working area neat and clean. Remove scrap material immediately.
ix. Do not throw or drop material/equipment from height.
x. Avoid jumping from one member to another. Use proper passageway.
xi. Always ensure three point contact while climbing. Don't try to bypass the steps of the ladder.
xii. Try to maintain calm at height. Avoid over exertion.
xiii. Avoid movements along beam.

6.1 List of Annexures

- Area Demarcation – Annexure I
- Copy of the formats to be used for various work permits and the general instructions for issuing the permits are given in Annexure II.
- Explanatory notes to work permit forms is given in Annexure III
- The Job Safety Plan is given as Annexure I V
- GUIDELINES FOR ISSUE OF WORK PERMIT FOR ROUTINE MAINTENANCE /HOUSEKEEPING JOBS is given as Annexure V

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Annexure- I

AREA DEMARCATION

Sl. No	Area	Permits issued / renewed by dept/section	Permits counter signed by	Remarks
01	All Electrical Sub-stations including buildings and the equipment housed within the fenced area.(Except CPP)	P&U - Electrical. Section/HR Estates as the case may be	Respective owner of the equipment.	For equipments connected to other departments.
02	SWSS Pump House including all facilities. (at Alwaye)	P&U. - Electrical. Section	Not applicable	For all types of works
03	Water quarries and water treatment facilities.	OM&S	Not applicable	For all types of works
04	Fire water lines and facilities for fire fighting inside the battery limits of operating areas	Respective owner departments.	Fire Station (Countersignature required only for the work, which requires isolation	.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

			of the fire water header)	
05	Fire water line and facilities provided for fire fighting, along road side (outside the battery limits of operating areas)	Fire & Safety (Fire Station)	Nearest facility owner departments	.
06	Fire Water Pump Houses & Fire ponds.	Fire & Safety (Fire Section)	Not applicable	For all types of work
07	Roads and the space on both sides of the road (Berm) inside Refinery premises (Excluding all the facilities existing on the side of the road.) Road around the administration building	Fire & Safety (Fire section) HR Estates	Not applicable Not applicable	For work related to road repair, and other work related to road.
08	The space above the culverts on roads, which forms part of the road.	Fire & Safety (Fire Section)	Not applicable	For work related to roads only.
09	The space below the culverts, and the facilities provided below the culverts at the offsite areas, (beyond the battery limits of operating areas). The space below the culverts are to be considered as confined space and hence Job Safety Plan is to be prepared for executing any work below culvert.	OM&S	The concerned user departments of the pipelines	For all pipelines, passing through the culverts, a **Job Safety Plan** is to made jointly by the user departments and OM&S department for the safe execution of the job. The OM&S department shall take initiative for reporting any abnormal conditions, and for the preparation of the procedure for the safe execution of the job.
10	All pipe racks, all the pipelines passing through the pipe racks and the space below the pipe racks, beyond the battery limits of Power &	OM&S	The concerned departments	For doing any unusual work on pipelines passing through offsite

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

	Utility and Manufacturing department,			area, a Job Safety Plan is to be made jointly by the departments concerned and the OM&S. The OM&S department shall take initiative for reporting any abnormal conditions, and for the preparation of the Job safety Plan for the safe execution of the job.
11	Administration Building and its surrounding area including the separation wall.	HR-Estates	Not applicable	All works
12	All Canteen Buildings and the surrounding area .including the wall.	HR-Estates	Not applicable	All works
13	Buildings housing Security office, Occupational Health Centre and KRECCS	HR-Estates	Not applicable	All works
14	Car/ scooter parking areas up to Main Gate and new car parking area outside Main Gate	HR-Estates	Not applicable	All works
15	Acquired areas where no operating facility exists	Projects	Not applicable	All works
16	Fenced Scrap yards	P&CS	Not applicable	All works
17	Project fabrication yards	Projects department	Not applicable	All works
18	Ware houses	P&CS	Not applicable	All works
19	Project Ware house	Projects	Not applicable	All works
20	Maintenance shops	Engineer-in-charge of Maintenance shops	Not applicable	All works
21	ACTP & APTP Fabrication Yards; pipe cement lining yard or any authorized fabrication yard.	Respective executing department	Not applicable	All works
22	The area between the sides of the	OM&S	Not applicable	All works

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

	inner periphery road upto the compound wall (upto a distance of 05 meters from the offsite pipe rack)			
23	The area between the sides of the inner periphery road upto the compound wall (beyond a distance of 05 meters from the offsite pipe rack)	Executing department shall give the permit for all kind of job (other than hot work) directly to the contractors (trained) supervisor	Inform the nearest facility owner department wherever required.	All works
24	For the compound wall built for security purpose	Executing department shall give the permit for all kind of job directly to the contractors (trained) supervisor.	Security	Work shall be performed only under direct supervision of security personnel.
25	All security watch towers	Executing department shall give the permit for all kind of job directly to the contractors (trained) supervisor.	Security	Work shall be performed only under direct supervision of security personnel.
26	Old sulphur ware house at DHDS	Project	Not applicable	All works including hot work.
27	New construction sites where no operating facilities exist	Executing department shall give the permit for all kind of job directly to the contractors (trained) supervisor	Inform nearest facility Owner Dept. wherever required	For all works.
28	Jwalagiri Housing colony with respect to earth work permit for jobs involving manual earth excavation beyond 0.75M depth / mechanical excavation using earth moving	HR-Estate	P&U Electrical/IS	For excavation work only.(The system followed inside refinery is to be followed)

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

	machinery except in project designated areas			
29	All electrical fittings, lamp posts, light masts inside the refinery premises.	P&U electrical	Concerned department where the facility exists	For work connected with electrical job. Electric cable tray and hot work outside battery limit of operating areas
		HR Estates (As the case may be)	Not applicable	
		Executing department shall give the permit for all kind of job (other than hot work and electrical jobs) directly to the contractors (trained) supervisor.	Owner department of the nearest facility.	All kind of job (other than hot work and electrical jobs)
		Concerned Department where the facility exists.	P&U Electrical/HR Estates as the case may be.	For hot work inside operating area.
30	Pipe rack between CPP-1 and UB 10 and the area below the pipe rack.	P&U (Utility)	Fire &Safety)	For all works including Hot work.
31	The pipe rack between CPP-1 and PWC 46	P&U (Utility)	For hot work only (OM&S)	For all type of work
32	Tk.31, TK.32 & TK 33 tank farm, pump house and connected facilities.	Manufacturing	For hot work only (OM&S)	For all types of works
33	For the tank farm ZT01, ZT 02 & ZT 03 pump house and connected facilities	Manufacturing		For all types of works
34	Rain water harvesting area	Executing	Not applicable	For all types of

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

		department shall give the permit for all kind of job directly to the contractors (trained) supervisor		works
35	Eco park	Executing department shall give the permit for all kind of job directly to the contractors (trained) supervisor	Not applicable	For all types of works

Annexure – II

Bharat Petroleum Kochi Refinery

HOT WORK PERMIT

(In Triplicate)

Serial No:.....

Permit issued on (Date):	From: (Time)	To: (Time)	Continuation of Work Permit No:	Token Number from Fire Station:	Earth Work. Permit No
				Nearest Manual Call Point No:	

(Valid for the shift unless renewed)

Permit Issuing Department/Section	**Issued to:** Department/ Section:/ Contractor
Exact location of work Area/ Unit/ Equipment No.:	

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Description of work:

.....

.....

.....

THE FOLLOWING ITEMS SHALL BE CHECKED BEFORE ISSUING THE PERMIT

Sl. No.	Item	Done	Not reqd.	Sl. No.	Item	Done	Not reqd.
A	**General points (Items to be complied by the issuer**			2	Checked for oil and Gas trapped behind the lining in Equipment		
1	Equipment/ Work Area inspected			3	Proper ventilation and Lighting provided		
2	Surrounding area checked and cleaned up.			4	Proper means of exit/ escape provided		
3	Fire water system available/ checked for readiness.			5	Scaffolding/temporary platform checked and healthiness ensured and tagged		
4	Considered hazard from other operations and concerned persons alerted.			6	Clearance obtained for excavation/ Dyke cutting from concerned departments.		
5	Equipment properly drained and depressurized / blinded/ disconnected/ closed/ isolated/ wedge opened			7	The checklist for excavation as per ROS: 63 prepared and complied with		
6	Equipment properly steamed/ purged/ water flushed			8	Roof top ladder provided (for fragile roof top work)		
7	Equipment electrically isolated and tagged vide permit No.:			**D**	**For Vehicle Entry**		
8	Iron sulfide removed/ kept wet			1	Spark Arrestor on the mobile equipment/ vehicle provided		
9	Gas test: HCs = %LEL Toxic gas = ppm ,O2 =			2	Entry route identified		
Items to be complied by the Receiver		**Done**	**Not reqd**	**E**	**For Hot work**		
B	**Radiography**			1	Earthing/return connection to the equipment being welded, provided.		
1	Precautions against public traffic taken			2	Shield provided against spark		
2	Area cordoned off and Precautionary tags/ Boards provided			3	Portable equipment / nozzles properly grounded		
3	Standby Personal provided from Radiography contractor			4	Running water hose/ Fire extinguisher provided		
C	**For Entry to confined Space/Working at height/working on top of fragile roof / Excavation works**			5	Sewers, manholes, CBD etc and hot surface nearby to be covered using fire retardant cloth		
1	Standby persons provided from Owner/Executing dept./ Contractor/F& S			6	Gas cylinders kept outside the confined space.		

SPECIAL PERMIT CONDITIONS: The activity has the following expected residual hazards (tick the relevant items):

Lack of Oxygen		H2S, Toxic Gases		Combustibles gases		Pyrophoric Iron	
Corrosive chemicals		Steam-condensate		Others (Please specify)			

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Following PPE to be used in addition to standard PPE (**Helmet, Safety shoes, hand gloves, boiler suit):**

Face Shield		Apron		Goggles		Fresh Air Line mask		Welding suit		Dust Respirator		SCBA	
Airline		Lifeline		Full body harness		Film Badges/ dosimeter		Earmuff		Others:			

Additional precautions/ instructions, if any:

.....

.....

	Name	Badge/Pass No	Signature
Issuer Name			
Receiver Name			
Contractors supervisor Name			
Counter-signatory Dept./Section & Names (if countersignature is required)			

In case of FIRE/Emergency break the nearest Fire Alarm Point glass or call 101/1922.

In case of emergency, all work must be stopped immediately

ON COMPLETION OF THE WORK, THE PERMIT MUST BE CLOSED AND KEPT AS RECORD.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Clearance for Renewal

Date	Time		Gas Test values for HCs, Toxic, O_2 etc.	Additional precautions, if any; otherwise mention "NIL"	Issuer Badge No. & Signature	Receiver Badge No. & Signature	Counter-signer Badge No. (If required)	Signature of Authorised Supervisor of the Contractor
	From	To						

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Closing of the work permit

Remarks : .....

Permit No. ..... issued for continuation.

Receiver: Certified that the subject work has been completed/ stopped and area cleared.		
Name & Badge No.	Signature	Date & Time
Issuer: Verified that the job has been completed/ stopped; area cleared		
Name & Badge No.	Signature	Date & Time

General Instructions:

1. This work permit must be available at site all times
2. The work permit shall be filled up carefully and accurately in clear handwriting ensuring that complete information is provided in all sections / subsections and none of column is left blank. Sketches should be provided wherever possible to avoid miscommunication.
3. Appropriate safe guards and required PPE shall be determined by a careful analysis of the potential hazards and the operations to be performed prior to starting the work
4. Welding machines should be located in non-hazardous and ventilated areas.
5. Only permitted type of vehicle / engines/ electrical equipment and tools are allowed in operating areas.
6. No hot work should be permitted unless the explosive meter reading is Zero.
7. Confined space entry where no hot work is to be carried out, may be permitted if combustible gases are upto 5% of LEL. Entry with appropriate respiratory equipment may be permitted with LEL upto 50%. The Oxygen level should be at least 19.5% vol and the concentration of toxic gases below the TLV. When a person is entering confined space, the receiver must keep standby-designated persons at the manhole or entry point
8. Before box up of any vessel manhole cover, ensure that no men / materials are inside the vessel.
9. For renewal of work clearance, the issuer shall ensure that the conditions are satisfactory for the work to continue. If the conditions have changed it may be necessary to issue a new permit or amend the existing permit.
10. This clearance on the same permit can be renewed / extended up to a maximum of seven calendar days.
11. The items C2 of the checklist is applicable in case of hot work involving the claded/lined surfaces , and item F3 is applicable as a precaution against static electricity generation while using portable equipment and hose nozzles (e.g. nozzle of a shot blasting gun)

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Bharat Petroleum Kochi Refinery

COLD WORK PERMIT / CLEARANCE CERTIFICATE FOR HOT WORK

Serial No:.....

Permit issued on (Date):	From: (Time)	To: (Time)	Continuation of Work Permit No:	Token Number from Fire Station:	Hot work/Earth Work. Permit No
				Nearest Manual Call Point No:	

(Valid for the shift unless renewed)

Permit Issuing Department/Section	**Issued to:** Department/ Section:/ Contractor
Exact location of work Area/ Unit/ Equipment No.:	

Description of work:

.....

.....

.....

THE FOLLOWING ITEMS SHALL BE CHECKED BEFORE ISSUING THE PERMIT

Sl. No.	Item	Done	Not reqd.	Sl. No.	Item	Done	Not reqd.
A	**General points (Items to be complied by the issuer**			2	Checked for oil and Gas trapped behind the lining in Equipment		
1	Equipment/ Work Area inspected			3	Proper ventilation and Lighting provided		
2	Surrounding area checked and cleaned up.			4	Proper means of exit/ escape provided		
3	Fire water system available/ checked for readiness			5	Scaffolding/temporary platform checked and healthiness ensured and tagged		
4	Considered hazard from other operations and concerned persons alerted			6	Clearance obtained for excavation/ Dyke cutting from concerned departments.		
5	Equipment properly drained and depressurized / blinded/ disconnected/ closed/ isolated/ wedge opened			7	The checklist for excavation as per ROS: 63 prepared and complied with		
6	Equipment properly steamed/ purged/ water flushed			8	Roof top ladder provided (for fragile roof top work)		
7	Equipment electrically isolated and tagged vide permit No.:			D	**For Vehicle Entry**		
8	Iron sulfide removed/ kept wet			1	Spark Arrestor on the mobile equipment/ vehicle provided		
9	Gas test: HCs = %LEL			2	Entry route identified		

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Sl. No.	Item	Done	Not reqd.	Sl. No.	Item	Done	Not reqd.
	Toxic gas = ppm ,O2 =						
Items to be complied by the Receiver		**Done**	**Not reqd**	**E**	**For Hot work**		
B	**Radiography**			1	Earthing/return connection to the equipment being welded, provided.		
1	Precautions against public traffic taken			2	Shield provided against spark		
2	Area cordoned off and Precautionary tags/ Boards provided			3	Portable equipment / nozzles properly grounded		
3	Standby Personal provided from Radiography contractor			4	Running water hose/ Fire extinguisher provided		
C	**For Entry to confined Space/Working at height/working on top of fragile roof / Excavation works**			5	Sewers, manholes, CBD etc and hot surface nearby to be covered using fire retardant cloth		
1	Standby persons provided from Owner/Executing dept./ Contractor/F& S			6	Gas cylinders kept outside the confined space.		

SPECIAL PERMIT CONDITIONS: The activity has the following expected residual hazards (tick the relevant items):

Lack of Oxygen		H2S, Toxic Gases		Combustibles gases		Pyrophoric Iron	
Corrosive chemicals		Steam-condensate		Others (Please specify)			

Following PPE to be used in addition to standard PPE (**Helmet, Safety shoes, hand gloves, boiler suit):**

Face Shield		Apron		Goggles		Fresh Air Line mask		Welding suit		Dust Respirator		SCBA	
Airline		Lifeline		Full body harness		Film Badges/ dosimeter		Earmuff		Others:			

Additional precautions/ instructions, if any:

.....

.....

	Name	Badge/Pass No	Signature
Issuer Name			
Receiver Name			
Contractors supervisor Name			
Counter-signatory Dept./Section & Names (if countersignature is required)			

In case of FIRE/Emergency break the nearest Fire Alarm Point glass or call 101/1922.

In case of emergency, all work must be stopped immediately

ON COMPLETION OF THE WORK, THE PERMIT MUST BE CLOSED AND KEPT AS RECORD.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Clearance for Renewal

Date	Time		Gas Test values for HCs, Toxic, O_2 etc.	Additional precautions, if any; otherwise mention "NIL"	Issuer Badge No. & Signature	Receiver Badge No. & Signature	Counter-signer Badge No. (If required)	Signature of Authorised Supervisor of the Contractor
	From	To						

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Closing of the work permit

Remarks : .....

Permit No. ..... issued for continuation.

Receiver: Certified that the subject work has been completed/ stopped and area cleared.		
Name & Badge No.	Signature	Date & Time
Issuer: Verified that the job has been completed/ stopped; area cleared		
Name & Badge No.	Signature	Date & Time

General Instructions:

01. This work permit must be available at site all times.
02. The work permit shall be filled up carefully and accurately in clear handwriting ensuring that complete information is provided in all sections / subsections and none of column is left blank. Sketches should be provided wherever possible to avoid miscommunication.
03. Appropriate safe guards and required PPE shall be determined by a careful analysis of the potential hazards and the operations to be performed prior to starting the work.
04. Welding machines should be located in non-hazardous and ventilated areas.
05. Only permitted type of vehicle / engines/ electrical equipment and tools are allowed in operating areas.
06. No hot work should be permitted unless the explosive meter reading is Zero.
07. Confined space entry where no hot work is to be carried out, may be permitted if combustible gases are upto 5% of LEL. Entry with appropriate respiratory equipment may be permitted with LEL upto 50%. The Oxygen level should be at least 19.5% vol and the concentration of toxic gases below the TLV. When a person is entering confined space, the receiver must keep standby-designated persons at the manhole or entry point
08. Before box up of any vessel manhole cover, ensure that no men / materials are inside the vessel.
09. For renewal of work clearance, the issuer shall ensure that the conditions are satisfactory for the work to continue. If the conditions have changed it may be necessary to issue a new permit or amend the existing permit.
10. This clearance on the same permit can be renewed / extended up to a maximum of seven calendar days.
11. The items C2 of the checklist is applicable in case of hot work involving the claded/lined surfaces , and item F3 is applicable as a precaution against static electricity generation while using portable equipment and hose nozzles (e.g. nozzle of a shot blasting gun)

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Bharat Petroleum Kochi Refinery

Electrical Isolation/ Electrical Energisation
(In Triplicate)

Section B: Energisation Permit Sl.No.....

Request for energisation:

Issuing Dept/ Section	**Issue Date:**	**Issue Time**
Area/ Unit:	**Equipment No**	
Name of the equipment / circuit to be energized		

Work on the above mentioned equipment/ circuit has been completed and all the applicable permits closed. This equipment/ circuit may be energized.

Issuer Name	Badge No.	Issuer Signature	Name of Authorized Person	Badge No.	Signature

Certification of Energisation

Date.....Time.....

Certified that Equipment/ circuit No. ..... has been electrically energized and the danger tag removed from the supply panel. This is also recorded in the sub-station log book.

Name of Authorized Person from P&U Electrical	Badge No.	Signature

Checked at the field and found the equipment is energized.

Name of authorized person from owner department	Badge No.	Signature

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

.....

Section-A: Isolation Permit

Sl.No: .....

Request for Isolation:

Issuing Dept/ Section	**Issue Date:**	**Issue Time**
Area/ Unit:	**Equipment No**	
Name of the equipment / circuit to be energized		

The above mentioned equipment/ circuit shall be de-energised and isolated from all live conductors to carry out the maintenance work by ..... Section / for operational requirement.

Issuer Name	Badge No.	Issuer Signature	Name of Authorized Person	Badge No.	Signature

Certification of Isolation Date:..... Time.....

Certified that Equipment / Circuit No. ..... has been electrically isolated and the danger tag is put on the supply panel. Actions in respect of electrical isolation have been recorded in the sub-station log book.

Name of Authorized Person from P&U Electrical	Badge No.	Signature

Checked at the field and found the equipment is isolated

Name of authorized person from owner department	Badge No.	Signature

In case of Fire/Emergency break the glass of nearest fire alarm point or dial 101/1922

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Bharat Petroleum Kochi Refinery

EARTH WORK PERMIT

Sl.No.....

Issuing Dept/ Section: **POWER & UTILITY/ ELECTRICAL**

Work clearance from	Date:
	Time:
Issued to:	
Department/ Section	
Contractor	
Exact location of work Area/ Unit/Location	
Description of Job	

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Type of Excavation	Manual/ Mechanical	
Special Instructions, if any:		
Underground Power Cables present:	Yes/ No	
Clearance certificate from Instrument maintenance section and IS dept. attached.	Yes/ No	
Issuer: Authorized person of Electrical section:		
Name:	Badge No.:	Signature:
Name & Signature of Engineer in charge of sponsoring Department.		
Name & Signature of Contractor's authorized Supervisor:		

In case of Fire/Emergency break the glass of nearest fire alarm point or dial 101/1922

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Closing of the work permit

Receiver: Certified that the subject work has been completed/ stopped and area cleared		**Issuer:** Verified that the job has been completed and area cleared	
Date		**Date**	
Time		**Time**	
Name		**Name**	
Badge No.		**Badge No.**	
Signature		**Signature**	

Precautions/ Instructions to be observed while digging:

1. Pick axe and similar tools not to be used once excavation has reached the cable bed indicated by bricks/ tiles and sand strata.
2. During digging, once cable is spotted stop work and inform Electrical/ IS/ Instrument Maintenance people before proceeding with work .Prevent accidental damage that can be caused while processing further.
3. Do not give any load on cable like placing materials, Tools, walking on cables etc.
4. Careful digging is must once this permit is issued as one can expect cable at any depth even without sand, brick and tiles strata.
5. During digging, once cable is spotted stop work and inform Electrical/ IS/ Instrument Maintenance people before proceeding with work.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Bharat Petroleum Kochi Refinery

ELECTRICAL PERMIT

Serial No.: .....

Issuing Department/ Section: POWER & UTILITY (Electrical)

Issued to:					
Department/ Section:					
Contractor:					
Exact location of work					
Nature/ Description of work					
Hot work permit required:			**Yes/ No**		
PPE to be used:					
Special Instructions, if any					
Recorded the isolation details for the work in the log book.			Accept the responsibility for carrying out the work taking necessary safety precautions.		
Issuer Name	**Badge No.**	**Signature**	**Name of Authorized Person (Receiver)**	**Badge No.**	**Signature**
Signature of Contractor/ Authorized Supervisor:					

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Clearance renewal

Date	Time		Additional precautions, if any	Issuer Name, Badge No. & Signature	Receiver Name, Badge No. & Signature	Signature of the Contractor's authorized supervisor.
	From	To				

Closing of the work permit

Receiver: **Certified that all workmen withdrawn, temporary connections/ earth made by me removed.**		Issuer: **Verified that the job has been completed and area cleared**	
Date		**Date**	
Time		**Time**	
Name		**Name**	
Badge No.		**Badge No.**	

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Signature		Signature	

Anexure III

EXPLANATORY NOTES TO WORK PERMIT FORMS

The check-listed items in the work permit forms are elaborated below to amplify the underlying concepts and highlight their significance.

a. **Exact Location (Area/ Unit/ Equipment no):** Exact location of the area or the unit in which the work is to be carried out shall be written against it. For example; CDU 1 CP07A, Tank farm A Group, Tank No. etc.

b. **Description of work:** Precise description of the work to be performed shall be written. Sketches should be attached wherever possible to avoid miscommunication.

c. **Equipment/ Area inspected:** Equipment or area where work is to be conducted should be inspected to ensure that it is safe to carry out the work and assess other safety requirements/ stipulations. In case of equipment/ vessel box-up permit, it should be ensured that the work is complete, all personnel are out, no maintenance gear is left behind and debris removed.

d. **Surrounding area checked/ cleaned:** Unsafe conditions for performance of work may arise from surrounding area. It should be cleaned-up to remove flammable material such as oil, rags, grass etc.

e. **Sewers, Manholes, Closed Blow Down (CBD) etc. and Hot Surfaces covered:** Flammable gases may be released from nearby sewers. Hot un-insulated surfaces (equipment/ pipelines) may provide a source of ignition and therefore, these are to be properly covered to prevent fires.

f. **Hazard from other routine/ non-routine operations considered and persons alerted:** Other activities (routine/ non-routine) being carried out near-by, which can create conditions unsafe for performance of the permit work, should be taken into consideration and the concerned persons should be alerted accordingly.

g. **Equipment electrically isolated and tagged**: Before issuing a permit, it shall be ensured that electrical isolation has been done, switches are locked-out and cautionary tags duly signed with date and time are attached.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

h. **Running water hose/ Portable extinguisher provided/ Fire water system available**: Running water hose and portable fire extinguisher are required to flush/ dilute in case of release of any hazardous chemical or to quench sparks and to put out small fires immediately.

In order to meet any contingency, it should be ensured that the fire water system including firewater pumps, storage, network etc. is checked and kept ready for immediate use.

i. **Equipment blinded/ disconnected/ closed/ isolated/ wedge opened:** Equipment for which the work permit is being issued, should be isolated from the rest of the plant in order to ensure that there is no change in the work environment with respect to presence of toxic/ flammable gases, liquids, hazardous chemicals etc. in the course of the work.

Blinding is one of the most effective ways of isolation. Blinds should be installed as close to the equipment as possible. If lines cannot be blinded, these should be disconnected and the open ends should be made safe by installing pipe caps/ plugs, blind flanges etc

The blind list for isolation is to be prepared jointly by Fire & Safety Section, Owner department and the Executing department and to be approved by Senior Manager/ Chief Manager from Safety & Fire section, Owner department and Executing department.

j. **Equipment properly drained/ depressurised:** Equipment under pressure should be depressurised after isolation. This should be followed by draining/ purging/ water flushing etc. as the case may be.

There may be a possibility of overlooking of liquid collected in pockets or inaccessible areas such as level gauges, small nozzles/ bleeders on vessels, laterals in pipe work etc. All low point drains should be in unplugged condition.

k. **Equipment properly steamed/ purged:** Purging of equipment (tanks, vessels, pipelines etc.) is done to make them free of flammable hydrocarbon and toxic gases. Steam/ Inert Gas is used for gas freeing of vessels and pipes in refineries and other locations. Other means of purging is by displacement with water and final traces of gas removed by properly earthed air eductor. All high point vents should be unplugged while purging. It should be done in a systematic manner to cover the entire equipment/ plant and continued till the concentration of toxic/ flammable gas is lowered to allowable level.

l. **Equipment water flushed:** Water flushing is an effective means of cooling, cleaning and even gas freeing of equipment. It is also employed to remove traces of acids/ chemicals and for wetting pyrophoric materials.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

m. Gas/ Oxygen deficiency test done: Gas test includes measurement of:

a. Hydrocarbons by Explosive meter
b. Oxygen Deficiency by Oxygen Meter
c. Toxic gases like Hydrogen Sulphide, Carbon Monoxide, and Chlorine etc. by techniques like Multi Gas Detector, Indicator Tube method, Lead Acetate Paper etc.

Measurement of lead in air is required for entering tanks (which stored leaded gasoline earlier) and personal protective equipment shall be worn before entering the tank.

Gas tests are to be done for vessel entry including open excavation where depth is more than 1.2 meters from the ground level. The person carrying out the gas test must wear proper protective gear.

No hot work shall be permitted unless the explosive meter reading is zero.

Vessel entry where no hot work is to be carried out may be permitted if combustible gases are unto 5 % of LEL. Entry with an air supplied mask is permitted with LEL up to 50%.

The oxygen level should be at least 19.5 % volume and the concentration of the toxic gases within the threshold limits.

n. Shield against sparks provided: Hot works like welding, grinding etc generates sparks which can provide source of ignition to the surroundings. In order to protect operating area from the hazards of sparks generated, shields are to be provided to contain the sparks generated. The shield material should be non-flammable and should be kept wet with water.

o. Proper ventilation and lighting provided: Where natural ventilation is not available, fans/ air eductors are provided. These are also required for speedy dispersal of fumes generated by welding job.

Only approved reduced voltage extension lights (not exceeding 24 volts) are to be allowed for work inside vessels from consideration of personal safety.

p. Proper means of exit provided: Proper means of exit is required in case of emergencies developed on account of the work or otherwise. Availability of an alternate route of escape should be considered.

q. Area cordoned off and caution boards provided: To prevent any unwarranted entry in the work area and also to caution other personnel taking actions which may endanger people

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

working on the permit job, precautionary tags/ boards are to be provided with display like "No Entry" sign on roads or "Caution - Men at Work Inside" on the manhole of a vessel, "Danger - Radiography in Progress" etc.

r. **Portable equipment/ Hose nozzles properly grounded:** As a precaution against static electricity generation, portable equipment/ hose nozzles e.g. nozzle of a shot blasting gun, are to be grounded. Use of hydrocarbon lines for earthing should be avoided. 30 milli-amp circuit breaker shall be installed on electrical circuits/ cables feeding power supply to portable equipment.

s. **Standby person provided for entry to confined space:** Whenever a person is entering in a confined space, minimum two designated persons shall be kept at the manhole or entry point. The designated person shall be in constant communication with the persons inside the confined space.

t. **Standby personnel provided for fire watch from Process/ Maintenance Department/ Contractor/ Safety &Fire Section:** Depending on the criticality of the job, work permit issuer shall decide the type of standby to be provided i.e. from which department, of which level, how many and also additional fire fighting support facilities etc.

u. **Iron Sulphide removed/ kept wet:** Pyrophoric substances may be present in operating area/ equipment handling hydrocarbon. Iron Sulphide scale is the most common pyrophoric substance encountered. These should be either removed to safe locations or kept wet all the time to prevent their auto-ignition.

v. **Clearance obtained for excavation/ Road cutting/ dyke cutting etc:** For any excavation work which may affect underground sewers/ telephone lines/ cables/ pipelines etc., clearance shall be obtained from all the concerned sections. Markers should be put around the area where excavation is to be done and the depth to be indicated in the work permit.

Road cutting can hamper the movement of the fire vehicles; initial clearance should be obtained from Fire section and final approval from the higher designated authorities.

When the dyke is cut, any mishap in the tank farm can lead to a free flow of oil to outside the bund. A higher level authority should be designated for authorizing dyke cutting. Further, it should be ensured that dyke would be reconstructed in the shortest possible time.

w. **Checked spark arrestor on mobile equipment:** No vehicle/ engine without IS approved spark arrestor at the tip of the exhaust pipe, shall be permitted in operating areas.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

x. **Checked for oil/ gas trapped behind lining in equipment:** Before undertaking hot jobs, a check should be done for oil/ gas trapped behind lining in the equipment.

Annexure- IV

Bharat Petroleum	**BHARAT PETROLEUM CORPORATION LIMITED KOCHI REFINERY, AMBALAMUGAL**		
	JOB SAFETY PLAN	Doc No	
		Date	
Department/Section where the job is carried out			
Permit No:	Task:		
HAZARD IDENTIFICATION WHAT CAN GO WRONG?			
ASSESMENT HOW SERIOUS IS THE HAZARD?			
CONTROLS- WHAT IS NECESSARY TO PREVENT AN ACCIDENT			
CONTINGENCY- WHAT ACTION ARE NECESSARY IF AN UNSAFE SITUATION OCCURS?			

Signature:

Owner Department/ Originating Department/User Department Fire &Safety
CM/SM (Mfg/P&U/OM&S/)

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

Executing Department
CM/SM (Maint./Projects/E&C/P&U)

Advisory Services

Annexure-V

GUIDELINES FOR ISSUE OF WORK PERMIT FOR ROUTINE MAINTENANCE/HOUSEKEEPING JOBS

Sl. No	Nature of Job	Description	Remarks
01	Grass cutting	a. Benzne tankfarm and benzene handling area. b. All tank farms c. Battery limits of manufacturing units d. Battery limits of Utilities.	Executing department shall take the cold work permit from the respective owner department
02	Grass cutting	Along the road side, side of the pipe rack, along the compound wall, locations other then mentioned in item 22 of the area demarcation, security watch towers, and all other areas. (At the locations, where the hazard from the location is not effecting the job)	Executing department shall give the permit directly to the contractors (trained) supervisor.
03	Air conditioner servicing/repair	All control rooms situated in the operating area.	Executing department shall take the work permit from the respective owner department.
04	Air conditioner servicing/repair	AAQMS	Executing department shall take work permit from the owner department (E&E)
05	Area Cleaning	Inside operating areas	Executing department shall take the cold work permit from the respective owner department
06	Area Cleaning	Other areas like, materials warehouse, fire stations, along the road etc., (areas where the hazard from the area is not effecting the job.)	Executing department shall give the permit directly to the contractors (trained) supervisor.
07	Gardening	All gardens except the garden in	Respective owner department

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety

		administration building area.	shall give the permit directly to the contractors (trained) supervisor except the garden in administration building area.

DGM (E&AS) I/C	GM (HR)	GM (Tech)
GM (O)	GM (P)	
ED-KR		

Owner Dept: Fire & Safety 22/11/2010

OISD - GDN - 192

FOR RESTRICTED CIRCULATION ONLY

SAFETY PRACTICES DURING CONSTRUCTION

Engineers India Ltd

OISD-GDN-192
Second Edition, April, 2016
First Edition, July, 2000



Oil Industry Safety Directorate

Government of India
Ministry of Petroleum & Natural Gas
8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)

Website: www.oisd.gov.in

Tele: 0120-2593800, Fax: 0120-2593802

OISD - GDN - 192
Second Edition, April, 2016
First Edition, July, 2000

FOR RESTRICTED CIRCULATION ONLY

SAFETY PRACTICES DURING CONSTRUCTION

Prepared by

COMMITTEE ON
SAFETY PRACTICES DURING CONSTRUCTION

Engineers India Ltd

Oil Industry Safety Directorate

Government of India
Ministry of Petroleum & Natural Gas
8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)

Website: www.oisd.gov.in

Tele: 0120-2593800, Fax: 0120-2593802

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

Engineers India Ltd.

FOREWORD

At the time of development of this document, 113 OISD standards, recommended practices and guidelines are applicable to the Oil and Gas installations of Public sector Oil Companies in India. 11 of these standards have been adopted by Petroleum and Explosives Safety Organisation (PESO) in various rules administered by them and thus the provisions of these standards are mandatory for entire Oil & Gas sector to that extent.

A few serious accidents have occurred in the recent past in India and abroad including vapour cloud explosion and fire at Oil terminal near Jaipur emphasised the need for the industry to review the existing provisions of various guidelines and statutory requirements.

With the above in view the Government of India directed the Oil Industry Safety directorate to develop a comprehensive document covering all the facets of Safety in Design, Operation and Maintenance, of depots and terminals being run by marketing divisions of Oil companies with an objective to strengthen the existing system.

The present guideline on "Safety Practices During Construction" has been prepared by the functional committee based on, existing standards, guidelines & recommended practices of OISD, the recommendations arising out of recent major accidents and their analysis, the accumulated knowledge and experience of industry members in India and updation of National and International codes and practices.

The provisions of this document, if implemented objectively, may go a long way in enhancing overall safety standard and reduce accidents in Oil Installations.

Users are cautioned that no standard can be substitute to the "judgment and experience of Engineers"

This document will be reviewed periodically for improvements based on the new experiences and better understanding. Suggestions are also invited from the users after it is put into practice to improve the document further. Suggestions may be addressed to:

The Co-ordinator
Committee on "Safety Practices during Construction"

Oil Industry Safety Directorate

Government of India
Ministry of Petroleum & Natural Gas
8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)

Website: www.oisd.gov.in

Tele: 0120-2593800, Fax: 0120-2593802

This document in no way supersedes the statutory regulations of Chief Controller of Explosives (CCE), Factory Inspectorate or any other statutory body, which must be followed as applicable.

Engineers India Ltd

NOTE

Oil Industry Safety Directorate (OISD) publications are prepared for use in the Oil and Gas Industry under Ministry of Petroleum & natural Gas. These are the property of Ministry of Petroleum & Natural Gas and shall not be reproduced or copied and loaned or exhibited to others without written consent from OISD.

Though every effort has been made to assure the accuracy and reliability of the data contained in these documents, OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from their use.

These documents are intended to supplement rather than replace the prevailing statutory requirements.

Engineers India Ltd

SECOND FUNCTIONAL COMMITTEE ON CONTRACTOR SAFETY

LIST OF MEMBERS

Name	Organization	Status
S/Shri		
A K Gupta	DGM (HSE), IOCL	Leader
Dharmvir	Addl. Director, OISD	Member Coordinator
Ashok Dashputre	Vice President, RIL	Member
P K Agarwal	CM (HSE), IOCL	Member
D Jana	AGM-Construction, EIL	Member
Udoay Payyadi	Sr. Manager-Maintenance, HPCL	Member
Vijay Mohan	Addl. Director, CHT	Member
B K Rabha	Dy. CE(Instrumentation), OIL	Member
Sankar Raman V	CM-E&C, BPCL - Kochi Refineries Ltd.	Member
Yogesh J Nakhare	Manager-F&S, HPCL.	Member
Pushp Khetarpal	Sr. Vice President (O&M), Petronet LNG	Member
Upinder Kumar	Petronet LNG	Member
A K Arora	Addl. Director, OISD	Member

In addition to the above, several other experts from Industry contributed in the preparation, review and finalisation of this Guideline.

Engineers India Ltd

FIRST FUNCTIONAL COMMITTEE ON
SAFETY PRACTICES DURING CONSTRUCTION

	NAME	ORGANISATION
LEADER		
	Shri A.K. Tandon	EIL, New Delhi.
MEMBERS		
1.	Shri U.M. Rao	GAIL, Noida.
2.	Shri K.N. Ravindran	CRL, Cochin
3.	Shri P.K. Anand	ONGC, Mumbai.
4.	Shri H.N. Das	ONGCL, Nazaria.
5.	Shri Jagnandan Tyagi	IOC(PL) Nodia.
6.	Shri M.C Lohar	IBP Co. Ltd., Calcutta.
7.	Shri J.C. Agrawal	IOC, Mktg, New Delhi.
8.	Shri S.M. Ghotavadekar	HPCL, Mumbai.
9.	Shri Sanjoy Ghose	BPCL, Mumbai.
10.	Shri H. C Jha “Hari”	IOC-Panipat Refinery.
11.	Shri Suhas Kate	HPCL, Visakh.
Member-Coordinator		
	Shri A.K. Ranjan	OISD, New Delhi

Engineers India Ltd

CONTENTS

SECTION			Page No.
1.0	**Introduction**		**1**
2.0	**Scope**		**1**
3.0	**Definitions**		**1**
4.0	**General Duties**		**2**
	4.1	General Duties Of Execution Agencies	2
	4.2	General Duties Of Owners	4
5.0	**Safety Practices At Work Places**		**4**
	5.1	General Provisions	4
	5.2	Means Of Access And Egress	5
	5.3	Housekeeping	5
	5.4	Precautions against The Fall Of Materials and Persons and Collapse Of Structures	6
	5.5	Prevention Of Unauthorised Entry	6
	5.6	Fire Prevention And Fire Fighting	6
	5.7	Lighting	7
	5.8	Plant, Machinery, Equipment and Hand Tools	7
6.0	**Construction Activities**		**9**
	6.1	Excavation	10
	6.2	Scaffolding, Platforms & Ladders	12
	6.3	Structural Work, Laying of Reinforcement & Concreting	22
	6.4	Road Work	26
	6.5	Cutting/Welding	27
	6.6	Working in Confined Spaces	29
	6.7	Proof / Pressure Testing	31
	6.8	Working at Heights	31
	6.9	Handling and Lifting Equipment	34

Engineers India Ltd

	6.10	Vehicle Movement	39
	6.11	Electrical	40
	6.12	Offshore	43
	6.13	Demolition	48
	6.14	Radiography	49
	6.15	Sand/Shot Blasting / Spray Painting	50
	6.16	Work above Water	51
7.0	**Additional Safety Precaution for Units with Hydrocarbons**		**52**
8.0	**Environment Protection**		**53**
9.0	**Occupational Health**		**55**
10.0	**Documentation**		**56**
11.0	**Safety Awareness & Training**		**56**
12.0	**References**		**57**
	Annexure I		**58**

Engineers India Ltd

SAFETY PRACTICES DURING CONSTRUCTION

1.0 INTRODUCTION

Safety in Construction Management deserves utmost attention especially in the hydrocarbon industry, such as Exploration, Refineries, Pipelines and Marketing installations, Gas Processing units etc. Construction is widely recognised as one of the accident prone activities. Most of the accidents are caused by inadequate planning, failure during the construction process and/or because of design deficiencies. Besides property loss, accidents also result in injuries and fatalities to the personnel, damage to environment which needs to be prevented.

The reasons for accidents during construction activities are related to unique nature of the industry, human behaviour, difficult work-site conditions, extended odd duty hours, lack of training & awareness and inadequate safety management. Unsafe working methods, lack of proper JSA (Job Safety Analysis) and use of improper / inadequate PPEs, equipment failure and improper housekeeping also tend to increase the accident rate in construction.

Ensuring good quality of materials, equipment and competent supervision along with compliance of standard engineering practices shall go a long way to in built safety into the system.

The objective of this document is to provide practical guidance on technical and educational framework for health, safety and environment in construction with a view to:

(a) prevent accidents and harmful effects on the health of workers arising from employment in construction;
(b) ensure appropriate safety during implementation of construction;
(c) provide safety practice guidelines for appropriate measures of planning, control and enforcement.
(d) protect environment.

2.0 SCOPE

This document specifies broad guidelines on HEALTH, SAFETY AND ENVIRONMENT practices to be adhered to during construction activities including green field projects in oil industry. However, before commencing any job, specific hazards and its effects should be assessed and necessary corrective/preventive actions should be taken by all concerned. The document is intended only to supplement and not to replace or supersede the prevailing statutory requirements, which shall also be followed as applicable. For Personal Protective Equipment, OISD-STD-155 (Part I&II) shall be referred to. The scope of this document does not include the design aspects and quality checks during construction.

3.0 DEFINITIONS

Definitions of various terminology are given below:

- **Adequate, appropriate or suitable** are used to describe qualitatively or quantitatively the means or method used to protect the men, machinery, material, property and enviroment.

- **By hand:** The work is done without the help of a mechanised tool.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

Page 1116 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

- **Competent Authority:** A stautory agency having the power to issue regulations, orders or other instructions having the force of law.

- **Competent person:** A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill for the safe performance of the specific work. The competent authorities may define appropriate criteria for the designation of such persons and may determine the duties to be assigned to them.

- **Construction site:**

  A worksite involving new construction, modification or maintenance of existing facility, shutdown related activity, demolition, housekeeping etc.

- **Environment:**

  Environment includes water, air and land and the interrelationship which exists among and between water, air and land and human beings, other living creatures, plants, microorganisms and property.

- **Execution agency:**

  Any entity / person, having contractual obligation with the owner and who employs one or more workers on a construction site.

- **Hazard:** A condition or a set of conditions which has potential of causing injury to person, damage to property or environment.
- **Health:** Soundness of body covering Physical, Emotional, Psychological and Intellectual conditions of a worker which assists the attainment of the objectives.
- **Means of access or egress:** Passageways, corridors, stairs, platforms, ladders and any other means for entering or leaving the workplace or for escaping in case of danger.

- **Owner:** Any entity **/** person for whom construction job is carried out.

  It shall also include owner's designated representative/ consultant/ nominee/ agent, authorised from time to time to act for and on its behalf for supervising/ coordinating the activities of the execution agency.

- **Scaffold:** Any fixed, suspended or mobile temporary structure supporting workers and material or to gain access to any such structure and which is not a lifting appliance.
- **Safety :** Prevention & protection from exposure to Hazard.

- **Worker:** Any person engaged in construction activity.

- **Workplace:** Owner's designated premises where workers need to be present by virtue of their involvement in the construction activity**.**

4.0 GENERAL DUTIES

4.1 GENERAL DUTIES OF EXECUTION AGENCIES

4.1.1 Execution agency should:

i) provide means and organisation to comply with the Health, safety and environment protection measures required at the workplace.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

ii) provide and maintain workplaces, plant, equipment, tools and machinery and organise construction work so that, there is no risk of accident or injury to health of workers. In particular, construction work should be planned, prepared and undertaken so that:

(a) dangers liable to arise at the workplace, are prevented;
(b) excessively or unnecessarily strenuous work positions and movements are avoided;

- organisation of work takes into account the safety and health of workers and also environment protection;
- materials and products used are suitable from Health safety and environment protection point of view;

(c) working methods are adopted to safeguard workers against the harmful effects of chemical, physical and biological agents.

iii) establish committees with representatives of workers and management or make other arrangement for the participation of workers in ensuring safe working conditions.

iv) arrange for periodic safety inspections by competent persons of all buildings, plant, equipment, tools, machinery, workplaces and review of systems of work, regulations, standards or codes of practice. The competent person should examine and ascertain the safety of construction machinery and equipment.

v) provide such supervision to ensure that workers perform their work with due regard to safety and health of theirs as well as that of others.

vi) employ only those workers who are qualified, trained and suited by their age, physique, state of health and skill.

vii) satisfy themselves that all workers are informed and instructed in the hazards connected with their work and environment and trained in the precautions necessary to avoid accidents and injury to health.

viii) ensure that buildings, plant, equipment, tools, machinery or workplaces in which a dangerous defect has been found should not be used until the defect has been rectified.

ix) organise for and remain always prepared to take immediate steps to stop the operation and evacuate workers as appropriate, where there is an imminent danger to the safety of workers.

x) establish a checking system by which it can be ascertained that all the members of a shift, including operators of mobile equipment, have returned to the camp or base at the close of work on dispersed sites and where small groups of workers operate in isolation.

- provide appropriate first aid, training and welfare facilities to workers as per various statutes like the Factories Act 1948, Building & Construction Workers Regulation (BOCWR), etc. and, whenever collective measures are not feasible or are insufficient, provide and maintain personal protective equipment and clothing in line with the requirement as per OISD-STD-155 (Part I & II) on Personnel Protective

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

Equipment. They should also provide access to workers to occupational health services.

- educate workers about their right and the duty at any workplace to participate in ensuring safe working conditions to the extent of their control over the equipment and methods of work and to express views on working procedures adopted as may affect health, safety and environment.

xi) ensure that except in an emergency, workers unless duly authorised, should not interfere with, remove, alter or displace any safety device or other appliance furnished for their protection or the protection of others, or interfere with any method or process adopted with a view to avoiding accidents and injury to health.

xii) ensure that workers do not operate or interfere with plant and equipment that they have not been duly authorised to operate, maintain or use.

xiii) ensure that workers do not sleep, rest or cook etc in dangerous places such as scaffolds, railway tracks, garages, confined spaces or in the vicinity of fires, dangerous or toxic substances, machines or vehicles and heavy equipment etc.

xiv) obtain the necessary clearance/permits as required and specified by owner.

Arrangement for drinking water, toilet facilities, a creche and transport arrangement etc. to be provided as per statutory requirement.

xv) deploy a safety officer at site as per the requirement of Factory Act 1948/ Building & Construction Workers Regulation (BOCWR)/ Criticality of the job.

xvi) ensure that all employees/workmen undergo medical examination as required under the law or under the contract provision and keep a record of the same.

xvii) obtain the police verification of the workers/ supervisors arranged by him and the same is to be submitted to the owner.

xviii) not permit any employee/workmen/visitor to enter the work area under the influence of alcohol or any drugs.

4.2 GENERAL DUTIES OF OWNERS

4.2.1 Owners should:

i) co-ordinate or nominate a competent person to co-ordinate all activities relating to HEALTH, SAFETY AND ENVIRONMENT on their construction projects;

ii) inform all contractors on the work site / project of special risks to HEALTH, SAFETY AND ENVIRONMENT;

iii) ensure that executing agency is aware of the owner's requirements and the executing agency's responsibilities with respect to HEALTH, SAFETY AND ENVIRONMENT practices before starting the job.

5.0 SAFETY PRACTICES AT WORK PLACES

5.1. GENERAL PROVISIONS

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

Page 1119 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

5.1.1 All openings and other areas likely to pose danger to workers should be clearly indicated and accident prevention measures taken as required. The working area should be clearly de-marketed to keep the workers in that area only.

5.1.2 Workers & Supervisors should use the safety helmet and other requisite Personal Protective Equipment according to job & site requirement as per OISD-STD-155 (Part I & II). They should be trained to use personal protective equipment including their limitations.

5.1.3 Never use solvents, alkalis and other oils to clean the skin.

5.1.4 Lift the load with back straight and knees bent. The contractor shall ensure at his construction site, no worker lifts by hand or carries overhead or over his back or shoulders any material, article, tool or pipelines exceeding in weight as per The Factory Act 1948 / Rule 38 of Building & Construction Workers Regulation (BOCWR), unless aided by another worker or device.

5.1.5 Ensure the usage of correct and tested tools and tackles. Don't allow the make shift tools and tackles. Also the tools should be suitable for a particular job and rated accordingly.

5.1.6 No loose clothing should be allowed while at construction site.

5.1.7 Start work only after proper authorization viz Work permit etc.

5.1.8 Job safety analysis to be done for all critical works.

5.1.9 Hydra should not be used for transportation of hook loaded materials.

5.1.10 Rope ladders should not be used at construction sites.

5.2 MEANS OF ACCESS AND EGRESS

Adequate and safe means of access (atleast two, differently located) to and egress from all workplaces should be provided. Same should be displayed and maintained. Escape routes should be marked prominently in workers friendly language. The escape routes should not be blocked at any point of time and same to be made understand to the workers.

5.3 HOUSEKEEPING

5.3.1 General Housekeeping shall be carried out by the contractor and he will ensure;

i) proper storage of materials and equipment;

ii) removal of scrap, inflammable material, waste and debris at appropriate intervals including slippery materials. (construction sand on road, oil/ lubricants, resins, etc.).

iii) to provide containers for segregation of disposal of debris at required places and regular cleaning of the same.

5.3.2 Removal of loose materials, which are not required for use, to be ensured. Accumulation of these at the site can obstruct means of access to and egress from workplaces and passageways.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

5.3.3 Workplaces and passageways, that are slippery owing to oil, grease or other causes, should be cleaned up or strewn with sand, sawdust, ash etc.

5.3.4 All surplus earth and debris are removed/disposed off from the working areas to officially designated dumpsites. The debris like plastics, packing material, rubber items should not be allowed to burn. Trucks carrying sand, earth and any pulverized materials etc. in order to avoid dust or odour impact, shall be covered while moving.

5.4 PRECAUTIONS AGAINST THE FALL OF MATERIALS & PERSONS AND COLLAPSE OF STRUCTURES

5.4.1 Precautions should be taken such as the provision of fencing, look-out men or barriers to protect any person against injury by the fall of materials, or tools or equipment being raised or lowered.

5.4.2 Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or parts of structures that are being erected, maintained, repaired, dismantled or demolished.

5.4.3 All openings through which workers are liable to fall should be kept effectively covered or fenced and displayed prominently.

5.4.4 SOP of crane operation should be adhered to. The crane jacks/legs should be parked on compacted surface to avoid tilting.

5.5 PREVENTION OF UNAUTHORISED ENTRY

5.5.1 Construction sites located in built-up areas and alongside vehicular and pedestrian traffic routes should be fenced to prevent the entry of unauthorised persons.

5.5.2 Visitors should not be allowed access to site(s) unless accompanied by or authorised by a competent person. All authorized visitors should report at the site office. Contractor shall provide visitor's helmet (helmet with visitor sticker) and other PPEs like Safety Shoe, reflective jacket, respiratory protection etc. as per requirement of the site. All the workers to have photo IDs including the staff of vehicles used in the job.

5.6 FIRE PREVENTION AND FIRE FIGHTING

5.6.1 All necessary measures should be taken by the executing agency and owner to:

i) avoid the risk of fire;
ii) control quickly and efficiently any outbreak of fire;
iii) bring out a quick and safe evacuation of persons.
iv) Inform unit/fire station control room, where construction work is carried out within existing operating area.
v) DMP should be in place for the same.

5.6.2 Combustible materials such as packing materials, sawdust, greasy/oily waste and scrap wood or plastics should not be allowed to accumulate in workplaces but should be kept in closed metal containers in a safe place. To be disposed periodically away from site at designated place and assigned manner.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

5.6.3 Places where workers are employed on works prone to danger of fire should be provided with:

i) suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible;
ii) an adequate water supply at sufficient pressure meeting the requirements of various OISD standards.
iii) required PPEs.

5.6.4 To guard against danger at places having combustible material, workers should be trained in the action to be taken in the event of fire, including the use of means of escape.

5.6.5 At sites having combustible material, suitable visual sign boards should be provided to indicate clearly the direction of escape in case of fire.

5.6.6 Means of escape should be kept clear at all times. Escape routes should be frequently inspected and if possible marked in fluorescent colours particularly in high structures and where access is restricted.

5.7 LIGHTING

5.7.1 Where natural lighting is not adequate, working light fittings or portable hand-lamps should be provided at workplace on the construction site where a worker will do a job.

5.7.2 Emergency lighting should be provided for personnel safety during night time to facilitate standby lighting source, if normal system fails.

5.7.2 Artificial lighting should not produce glare or disturbing shadows.

5.7.3 Lamps should be protected by guards against accidental breakage.

5.7.4 The cables of portable electrical lighting equipment should be of adequate size & characteristics for the power requirements and of adequate mechanical strength to withstand severe conditions in construction operations.

5.7.5 For temporary lighting connection, mostly neutral and phases are connected and insulation tapes are provided. It is better to stagger the neutral and phase connection so that even if the tape gets removed from the joints, there will be no short circuit/ spark between neutral and phase due to staggering of neutral and phase.

5.7.6 All the temporary lighting/ machine connections are to be provided from a three core cable for better safety.

5.8 PLANT, MACHINERY, EQUIPMENT AND HAND TOOLS

5.8.1 General Provisions

i) Plant, machinery and equipment including hand tools, both manual and power driven, should:
   a) be of proper design and construction, taking into account health, Safety and ergonomic principles.
   b) be maintained in good working order;
   c) be used only for work for which they have been designed.
   d) be operated only by workers who have been authorised and given appropriate training.

Engineers India Ltd.

e) be provided with protective guards, shields or other devices as required.

ii) Adequate instructions for safe use should be provided.

iii) Standard operating procedures should be established and used for all plant, machinery and equipment.

iv) Operators of plant, machinery and equipment should not be distracted while work is in progress.

v) Plant, machinery and equipment should be switched off when not in use and isolated before any adjustment, clearing or maintenance is done.

vi) Where trailing cables or hose pipes are used they should be kept as short as practicable and not allowed to create a hazard.

vii) All moving parts of machinery and equipment should be enclosed or adequately guarded.

viii) Every power-driven machine and equipment should be provided with adequate means, immediately accessible and readily identifiable to the operator, of stopping it quickly and preventing it from being started again inadvertently.

ix) Operators of plant, machinery, equipment and tools should be provided with PPEs, including where necessary, suitable ear protection.

5.8.2 Hand tools

i) Hand tools should be repaired by competent persons.

ii) Heads of hammers and other shock tools should be dressed or ground to a suitable radius on the edge as soon as they begin to mushroom or crack.

iii) When not in use and while being carried or transported, sharp tools should be kept in sheaths, shields, chests or other suitable containers.

iv) Only insulated or non-conducting tools should be used on or near live electrical installations.

v) Only non-sparking tools should be used near or in the presence of flammable or explosive dusts or vapours.

5.8.3 Pneumatic Tools

i) Operating triggers on portable pneumatic tools should be:
   a) so placed as to minimise the risk of accidental starting of the machine.
   b) so arranged as to close the air inlet valve automatically when the pressure of the operator's hand is removed.

ii) Hose and hose connections for compressed air supply to portable pneumatic tools should be:

Engineers India Ltd.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

a) designed and tested for the pressure and service for which they are intended;
b) fastened securely on the pipe outlet and equipped with the safety chain, as appropriate.

iii) Pneumatic shock tools should be equipped with safety clips or retainers to prevent dies and tools from being accidentally expelled from the barrel.

iv) Pneumatic tools should be disconnected from power and the pressure in hose lines released before any adjustment or repair is made.

5.8.4 Electrical Tools

i) Low voltage portable electrical tools should generally be used.

ii) All electrical tools should be earthed, unless they are "all insulated" or "double insulated" tools which do not require earthing.

iii) All electrical tools should get inspected and maintained on a regular basis by a competent electrician and complete records kept.

iv) No temporary connected appliance shoud be left connected in the socket. Its plug should be immediately removed after use.

5.8.5 Engines

i) Engines should:

a) be installed so that they can be started safely and the maximum safe speed cannot be exceeded.
b) have controls for limiting speed.
c) have devices to stop them from a safe place in an emergency.
d) have their batteries top covered with insulating material.
e) have radiator fan covers in place.

ii) IC engines should not be run in confined spaces unless adequate exhaust ventilation is provided or the exhaust should be installed outside the confined place at suitable height.

iii) When IC engines are being fuelled:

a) the engine should be shut off.
b) care should be taken to avoid spilling fuel.
c) no person should smoke or have an naked light in the vicinity.
d) a fire extinguisher should be kept readily available.

iv) Secondary fuel reservoir should be placed outside the engine room.

6.0 CONSTRUCTION ACTIVITIES

The various common activities in construction are as under:

- Excavation
- Scaffolding, Platforms & Ladders
- Structural Work, Laying of Reinforcement & Concreting
- Road Work (Laying of roads)
- Cutting /Welding
- Working in Confined Space

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

Page 1124 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

- Proof/Pressure Testing
- Working at Heights
- Handling & Lifting Equipment
- Vehicle Movement
- Electrical
- Offshore
- Demolition
- Radiography
- Shot blasting/ spray painting
- Work above water

Work permit system as per requirement of OISD-STD-105 shall be followed for various construction activities. As regards the activities at work places including grass root project sites if not covered under OISD-STD-105, owner shall develop a suitable methodology for execution of various construction activities under work permit system for safe execution of the works.

The safe practices to be followed during the implementation of above construction activities are given below:

6.1 EXCAVATION

6.1.1 All excavation work should be planned and the method of excavation and the type of support work required should be decided considering the following:

i) the stability of the ground including the chances of seepage of water;
ii) the excavation will not affect adjoining buildings, structures or roadways;
iii) to prevent hazard, the Hydrocarbon lines, water, electrical and other above ground & underground public utilities should be shut off, re-routed or disconnected, if necessary; If such a presence is envisaged, clearance to be taken from respective competent authority/ person.
iv) the position of culvert/bridges, temporary roads and spoil heaps should be determined;
v) a signed rough sketch of the excavation site to be prepared and made the workers understand

6.1.2 Before digging begins on site, all excavation work should be planned and the method of excavation and the type of support work required should be decided based on good engineering practices and recorded.

6.1.3 All excavation work should be supervised by a competent person.

6.1.4 Sites of excavations should be thoroughly inspected:

i) daily, prior to each shift and after interruption in work of more than one day;
ii) after every blasting operation;
iii) after an unexpected fall of ground;
iv) after substantial damage to supports;
v) after a heavy rain, frost or snow;
vi) when boulder formations are encountered.
vii) for cracks in the nearby buildings or area as the excavation progresses and the same to be reviewed.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

6.1.5 Safe angle of repose while excavating trenches exceeding 1.5m depth upto 3.0m should be maintained. Based on site conditions, provide proper slope, usually 45^0,and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock or provide proper shoring and strutting to prevent cave-in or slides.

6.1.6 As far as possible, excavated earth should not be placed within one meter of the edge of the trench or depth of trench whichever is greater.

6.1.7 Don't allow vehicles to operate too close to excavated area. Maintain atleast 2m distance from edge of excavation or depth of trench whichever is greater. No load, plant or equipment should be placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endanger any person unless precautions such as the provision of shoring or piling are taken to prevent the sides from collapsing.

6.1.8 Adequately anchored stop blocks and barriers should be provided to prevent vehicles being driven into the excavation. Heavy vehicles should not be allowed near the excavation unless the support work has been specially designed to permit it.

6.1.9 If an excavation is likely to affect the stability of a structure on which persons are working, precautions should be taken to protect the structure from collapse.

6.1.10 Barricade at 1m height (with red & white band/self glowing caution board) should be provided for excavations beyond 1.0 m depth. Provide two entries/exits for such excavation through proper means. Lighting arrangements to be made to avoid any accidental fall in the excavated portion even when work is not in progress.

6.1.11 Necessary precautions should be taken for underground utility lines like cables, sewers etc. and necessary approvals/clearances from the concerned authorities shall be obtained before commencement of the excavation job.

6.1.12 Water shall be pumped/ bailed out, if any accumulates in the trench. Necessary precautions should be taken to prevent entry of surface water in trenches.

6.1.13 During / after rains, the soil becomes loose. Take additional precaution against collapse of side wall. During rains excavation should be avoided.

6.1.14 In hazardous areas, air should be tested to ascertain its quality. No one should be allowed entry till it is suitable for breathing.

6.1.15 In case of mechanised excavation, precaution shall be taken to not to allow anybody to come within one meter of extreme reach of the mechanical shovel. This area of reach of mechanical shovel should be marked / barricaded suitably. The mechanised excavator shall be operated by a well-trained experienced operator. When not in operation, the machine shall be kept on firm leveled ground with mechanical shovel resting on ground. Wheel or belt shall be suitably jammed to prevent any accidental movement of the machine. Suitable precautions as per manufacturer guidelines should be taken for dozers, graders and other heavy machines.

6.1.16 In case of blasting, follow strictly IS:4081-1986 & Indian Explosive Act and rules for storage, handling and carrying of explosive materials and execution of blasting operation.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

6.2 SCAFFOLDING, PLATFORMS & LADDERS

System of tagging shall be followed to indicate status of `Fit-for-Purpose' certification by a competent person for the scaffoldings. Green Tag shall indicate `Fit-for-Purpose' whereas Red Tag shall indicate `Unfit-for-purpose'. Accordingly only Red Tag shall be displayed during Erection & Dismantling.

All personnel engaged in erecting, using, dismantling scaffolds shall use full body safety harness with double lanyard with shock absorber connected with personal fall arrestor which should be secured to a properly designed anchor.

6.2.1 Scaffold related guidelines

General Requirements

Categories and Classification

Most scaffolds fall into one of the four primary categories:

- Tube and coupler scaffold
- System scaffolds e.g. Cup lock, Ring lock, H frame scaffold
- Suspension(or Suspended) scaffold
- Mobile scaffold
- Special scaffold

Scaffolds are classified according to their intended use as:

- Light duty
- Medium duty (General Purpose)
- Heavy duty

Type of Scaffolding	Load duty	Light		Medium	Heavy/Special		
	Maximum Safe load in Kg/m^2	75	150	225	300	450	600
Tubular with clamps	Max. bay length (distance between two verticals) in Meter	2.7	2.2	1.8	1.4	1.0	0.8
Cup / Ring lock		2.5	2.0	1.5	1.25	1.0	NA

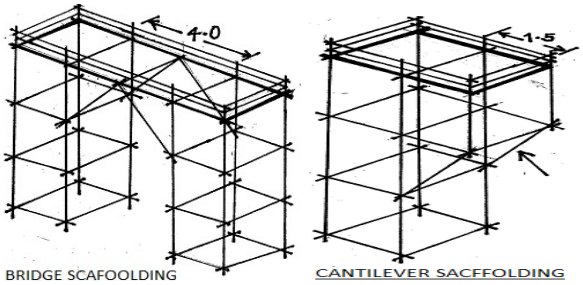
Conditions where special scaffolding procedure is required:

1. Height of the scaffolding is more than 30 meters.

2. Scaffolding is special in nature/ type: cantilever more than 1 .5 meters, bridge more than 4 meters, scaffolding for machine/ equipment maintenance requiring frequent modifications, offshore scaffold, hanging scaffold; wooden scaffold (for specific use e.g. cooling tower), etc.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."



BRIDGE SCAFOOLDING CANTILEVER SACFFOLDING

For all such cases, but not limited to, in addition to checklist, a plant specific procedure cum checklist based on additional risk is to be prepared & validated by a competent person (example: procedure for erection/ dismantling shall be prepared and followed. If need felt, help from Engineering Cell/Third Party may be taken for checking proposed scaffold in respect of design and load carrying capacity etc.).

Specifications of Scaffolds

Applicable to all Scaffolds

1. All elevated structures/ working platform areas should be guarded on all sides.

2. Railings and toe boards should be provided on the platform.

3. Scaffolds shall be designed to support at least 4 times the anticipated weight of Men, material and wind force.

4. Make certain that all scaffolds are in plumb and level at all times.

5. Scaffolds shall be secured from tipping when the scaffold height exceeds four times its minimum base dimension.

6. Scaffolds must be constructed at least **3** planks wide unless location makes this physically impossible.

7. Landing platform should be provided at every 9 meter of height or less.

8. The members of scaffolds should extend at least 6" on either ends but not more than 12". They should be fastened on both ends and laid tight by clamps.

9. All scaffoldings having height to base ratio more than 4 shall be secured firmly with permanent structure in X and Y direction at least every 6 meters.

10. Scaffold which spread to 20 meter or more should have two accesses preferably opposite side.

Engineers India Ltd.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

11. Plastic Checklist holder with red marked to be used as a “Not Fit-for-Purpose” warning signboard and Green colour combined checklist to be used as “Fit-for-Purpose” signboard.

12. Keep distance of at least 150mm between high temp Pipelines or equipment and scaffolding.

13. Safe distance from overhead electrical lines to be maintained as per Site electrical safety procedures.

Applicable to Tube-and-coupler scaffold

1. Tube and coupler scaffolds over 30 meter in height must be Designed by a competent professional engineer (who by extensive knowledge, training, and experience have successfully demonstrated his ability to carry out scaffold design and load calculations).
2. Maximum height of first horizontal member (Ledger) of scaffolds from the Ground shall be 2.2 meters. Lower lift can be considered for heavy loads depending upon the scaffold design. When scaffold is more than 6 meter height for carrying heavy load, kicker lift should be provided at a height of 150mm from ground.

3. The top rail shall be at height of 900-1200 mm and Mid rails must be installed approximately halfway between the top rail and the platform surface. Toe boards (150mm) should be securely attached to the working platform. Toe boards are generally applicable to working platform and not for landing platforms.

4. The bay length & width depends on the height and the load to be carried by the scaffold.

5. Bracings shall be fitted up to full height of scaffold.

6. Standards should be joined having overlap of min 600 mm using three equally spaced swivel clamps or end to end using sleeve/pin type coupler.

7. Ledgers should be joined having overlap of min 600 mm using three equally spaced swivel clamps or end to end using sleeve coupler.

8. Base plate 150 x 150 x 6mm shall be used to support all vertical pipes of Scaffolds.

9. Sole plate shall be used at all unpaved area to support base late.

10. Scaffolding platform Grating shall be tied with clamp at both ends, and scaffolding platform Grating shall not overhang more than 150 mm and shall be at least 150 mm away from hot surface.

11. Every scaffold shall be provided with certified ladder and extending its free end shall be above platform by 1000 mm/ four rungs.

Engineers India Ltd

“OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines.”

Applicable to Mobile scaffolds

1. Attach castors with plain stems to the panel or adjustment screw by pins or other suitable means.
2. Apply castor brakes/lock at all times when scaffolding is not being moved.
3. Do not ride rolling scaffoldings.
4. Remove all material and equipment from platform before moving scaffolding.
5. Do not try to move rolling scaffolding without sufficient help. Watch out for holes protrusions in the floor and for overhead obstructions.
6. Do not use brackets on rolling scaffoldings without first considering the overturning effect.

Design Criteria

- All types of scaffolds shall be strong enough of carrying and transmitting all types of loads to the ground. All scaffolds shall be adequately secured, stiffened, both longitudinally and transversely.
- Scaffolding determines as per the requirement and use of scaffold such as:
    - Purpose of scaffolding
    - Loading on scaffold platform
    - Required height
    - Sufficient work place
    - Surrounding environment

Storage and inspection of materials

- All scaffolding material shall be stored at designated location to protect them from adverse environment conditions such as corrosion, weather.
- Storage racks/ Locations/ areas shall be clearly identified.
- Storage facility of scaffold material shall be properly constructed for its stability and load bearing capability.
- Steel pipes and scaffolding platform Grating shall be stacked horizontally according to length. Fittings, Couplers shall be stored in separate bins.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

- Defective material shall be removed from site.
- Scaffolding material such as tubular, planks, clamps etc. shall be inspected annually for contractor owned material by contractor. The visual inspection shall cover 100% scaffold materials.

Transportation and handling of scaffolding material

- Make sure that scaffold pipe shifting done in vehicle of appropriate length.
- Special safety care to be taken while shifting or lifting pipes manually.
- Rope and pulley should be used to lift pipe from height.

Safety requirements

A risk assessment to access scaffold hazards through inspection and work method statement for relevant work activities shall be made before erecting, dismantling, moving, or modifying scaffold. Examples of hazards to be considered include the following:

- Working at/from heights.
- The presence of nearby electrical lines or process equipment (e.g. hot line, vents, drains, etc.). Necessary safety distances shall be maintained as specified in site level electrical safety procedure.
- Possible emergency scenario, escape routes and responses.
- The condition and loading of working surfaces /platform /scaffold pipes and other components or loose material such as clamps/ bolts on the working platforms.
- The presence and activity of other people and equipment in the vicinity of the work.
- The weather (Heavy rain, high wind velocity-more than 20 knots, etc).
- Erection during dark hours.
- Scaffold collapse.
- Manual task (Manual Material Handling).
- Access and egress during normal and emergency condition.
- The effect of heavy equipment movement in close vicinity such as within 4 meters to be considered for direct hit and sagging of land in case of unpaved area.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

This assessment is a part of the work permit process but should also be extended to the specific job planning of the crew performing the work. Appropriate actions shall be taken to mitigate the hazards identified during the assessment.

Fall protection when erecting, dismantling, and modifying scaffolds shall be under the direction of a competent person (Scaffold Supervisor). Scaffold erectors (Scaffolder) shall use personal fall-protection systems that provide continuous fall protection while erecting, dismantling or modifying scaffolds unless the determination is made by a competent person that fall protection is not feasible or it creates a greater hazard. Fall protection can be accomplished through the use of adequate anchorages that are independent of the scaffold or by using scaffold systems and components that are approved by the manufacturer as adequate anchorages. Employees/workmen shall use appropriate fall-arrest equipment.

The footing for supported scaffolds shall be sound, rigid, and capable of supporting the maximum intended load, including the weight of the scaffold.

Scaffold platform grating shall be fastened on both ends and laid tight by scaffold clamps/couplers.

Manufacturer's guidelines for proprietary scaffolds (e.g. Cup lock, ring lock, H frame, Insulating modular scaffolds) shall be followed unless a competent person approves the variance and provided the variance complies with applicable regulations and generally accepted scaffold engineering practices.

Proprietary/special scaffold manufacturer's guidelines for erection and inspection should be available with users, and with plant maintenance engineer for reference.

The following safe practices with respect to scaffolds shall be followed:

- There shall be firm foundation for all scaffoldings. All scaffolding shall be made of sound material. Scaffolding material shall be inspected and used, only if found in good condition. Avoid using equipment whose strength is not known.

- Provide adequate Base for scaffolding posts. Metal base plate is used under all upright or standard scaffoldings. Correct type of couplers shall be used for all connections. Use right angle couplers for joining vertical to horizontal members and swivel type couplers for joining bracing with ledgers. For joining vertical load bearing members (standards), "joint pin" type couplers can also be used. The couplers shall be of a structural metal, such as drop-forged steel, malleable iron, or structural grade aluminum (use of gray cast iron is prohibited).

- Plumb and level scaffoldings as erection proceeds, so that braces will fit without forcing. Fasten all braces securely.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

- Where scaffoldings are erected above walkways or work areas, the space between toe board and railing should be screened (e.g. Safety net, Metal sheets).

- Whenever work is being done over men who are working on scaffolding, overhead protection should be provided on the scaffolding.

- Restrain free-standing scaffolding towers from tipping by guying or other means.

- A safe and convenient means of access shall be provided to the platform level. Means of access may be a portable ladder, fixed ladder, ramp or runway or stairway. The ladder shall be so installed that there supporting member (pipe) is just below ladder rung. This is to avoid tripping hazard, especially while using the ladder.

- During erection, the ladder shall be installed as early as practicable, but not later than first two horizontal members (Ledgers). This is to facilitate Scaffolder while erecting the scaffold.

- During erection/ dismantling, scaffolder shall use 'T' steps to minimize risk of accidental fall/ slip.

- Ladder should be provided with tie rods/studs at top and bottom rungs and secured to scaffolding with ladder clamps, at least 2 locations for a ladder of length up to 4 m & at 3 locations for more than 4 m long ladder.

- The horizontal member/ ledger on which ladder is to be fixed, must be clamped to two subsequent standard using fixed clamps.

- Do not cantilever or extend putlogs / trusses as side brackets, without thoroughly considering the loads to be applied.

- Do not climb scaffold using cross braces.

- Do not use ladders or makeshift devices on top of scaffoldings to increase the height.

- Have at least 12" overlap and 6" extension beyond centerline of support or cleat at both ends to prevent sliding.

- Do not allow unsupported ends of planking to extend an unsafe distance beyond supports.

- Planks shall be non-greasy and free from defects.

- Access to working platform shall be suitably protected against inadvertent fall by providing swing members/ swing gate or chains.

- When scaffolding is no longer required, request for dismantling of scaffold shall be sent to scaffolding supervisor through work permit.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

- Scaffold shall be removed from top bracings. Ties, rackers etc. should not be removed from section lower than the one which is being dismantled.
- Do not throw or allow falling to ground any scaffold member, board or fittings.
- Dismantled scaffold material shall be neatly stacked, away from the site until whole of scaffold has been dismantled.

6.2.2 Metal as material of construction

i) A scaffold should be provided and maintained or other equally safe and suitable provision should be made where work cannot safely be done on or from the ground or from part of a building or other permanent structure.

ii) Scaffolds should be provided with safe means of access, such as stairs, ladders or ramps. Ladders should be secured against inadvertent movement.

iii) Every scaffold should be constructed, erected, properly secured/ tied and maintained so as to prevent collapse or accidental displacement during erection, while in use, in idle state or dismantling.

iv) Every scaffold and part thereof should be constructed :

(a) in such a way so as not to cause hazards for workers during erection and dismantling;
(b) in such a way so as guard rails and other protective devices, platforms, ladders, stairs or ramps can be easily put together;
(c) with sound material and of requisite size and strength for the purpose for which it is to be used and maintained in a proper condition.

v) Boards and planks used for scaffolds should be protected against splitting.

vi) Materials used in the construction of scaffolds should be stored under good conditions and apart from any material unsuitable for scaffolds.

vii) Couplers should not cause deformation in tubes. Couplers should be made of drop forged steel or equivalent material.

viii) Tubes should be free from cracks, splits and excessive corrosion and be straight to the eye, and tube ends cut cleanly square with the tube axis.

ix) Scaffolds should be designed for their maximum load as per relevant codes.

x) Scaffolds should be adequately braced.

xi) Scaffolds which are not designed to be independent should be rigidly connected to the building at designated vertical and horizontal places.

xii) A scaffold should never extend above the highest anchorage to an extent which might endanger its stability and strength.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

xiii) Loose bricks, drainpipes, chimney-pots or other unsuitable material should not be used for the construction or support of any part of a scaffold.

xiv) Scaffolds should be inspected and certified:

(a) before being taken into use;
(b) at periodic intervals thereafter as prescribed for different types of scaffolds;
(c) after any alteration, interruption in use, exposure to weather or seismic conditions or any other occurrence likely to have affected their strength or stability.

xv) Inspection should more particularly ascertain that:

(a) the scaffold is of suitable type and adequate for the job;
(b) materials used in its construction are sound and of sufficient strength;
(c) it is of sound construction and stable;
(d) that the required safeguards are in position.

xvi) A scaffold should not be erected, substantially altered or dismantled except by or under the supervision.

xvii) If out-rigger scaffolding is to be used, it should be specifically designed and inspected before putting in use.

6.2.3 Lifting appliances on scaffolds (CHAIN PULLEY BLOCKS, PULLERS)

i) When a lifting appliance is to be used on a scaffold:

(a) the parts of the scaffold should be carefully inspected to determine the additional strengthening and other safety measures required;
(b) any movement of the scaffold members should be prevented;
(c) if practicable, the uprights should be rigidly connected to a solid part of the building at the place where the lifting appliance is erected.

6.2.4 Prefabricated scaffolds

i) In the case of prefabricated scaffold systems, the instructions provided by the manufacturers or suppliers should be strictly adhered to. Prefabricated scaffolds should have adequate arrangements for fixing bracing.

ii) Frames of different types should not be intermingled in a single scaffold.

iii) Scaffolding shall be erected on firm and level ground. In case of loose or uneven terrain, care should be taken to see that the scaffolding is on firm footing by leveling / compacting or other means.

iv) All members of metal scaffolding shall be checked periodically to screen out defective / rusted members. All joints should be properly lubricated for easy tightening.

v) Entry to scaffolding should be restricted.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

vi) Erection, alteration and removal shall be done under supervision of experienced personnel.

vii) Use of barrels, boxes, loose bricks etc., for supporting scaffolds shall not be permitted.

viii) Each supporting member of platform shall be securely fastened and braced.

ix) Where planks are butt-joined, two parallel putlogs shall be used, not more than 100mm apart, to give support to each plank.

x) Platform plank shall not project beyond its end support to a distance exceeding 4 times the thickness of plank, unless it is effectively secured to prevent tipping. Cantilever planks should be avoided. If it is unavoidable overhang should be effectively secured to prevent tipping.

xi) The platform edges shall be provided with 150mm high toe board to eliminate hazards of tools or other objects falling from platform.

xii) Erect ladders in the “four up-one out position”

xiii) Ladder shall be properly secured with the structure.

xiv) Use non-slip devices, such as, rubber shoes or pointed steel ferules at the ladder foot, rubber wheels at ladder top, fixing wooden battens, cleats etc.

xv) When ladder is used for climbing over a platform, the ladder must be of sufficient length, to extend at least one meter above the platform, when erected against the platform in “four up-one out position.”

xvi) Portable ladders shall be used for heights not more than 4mt. Above 4mt flights, fixed ladders shall be provided with at least 600 mm landings at every 6mt or less.

xvii) The width of ladder shall not be less than 300mm and rungs shall be spaced not more than 300mm.

xviii) Every platform and means of access shall be kept free from obstruction.

xix) If grease, mud, gravel, mortar etc., fall on platform or scaffolds, these shall be removed immediately to avoid slippage.

xx) Workers shall not be allowed to work on scaffolds during storms or high wind. After heavy rain or storms, scaffolds shall be inspected before reuse.

xxi) Don't overload the scaffolding. Remove excess material and scrap immediately.

xxii) Dismantling of scaffolds shall be done in a pre-planned sequential manner.

6.2.5 Suspended scaffolds/ boatwain's chair

In addition to the requirements for scaffolds in general as regards soundness, stability and protection against the risk of falls, suspended scaffolds should meet the following specific requirements.

Engineers India Ltd

“OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines.”

(a) platforms should be designed and built with dimensions that are compatible with the stability of the structure as a whole, especially the length;
(b) the number or anchorage should be compatible with the dimensions of the platform;
(c) the safety of workers should be safeguarded by an extra rope having a point of attachment independent of the anchorage arrangements of the scaffold;
(d) the anchorage and other elements of support of the scaffold should be designed and built in such a way as to ensure sufficient strength;
(e) the ropes, winches, pulleys or pulley blocks should be designed, assembled, used and maintained according to the requirements established for lifting gear adapted to the lifting of persons according to national laws and regulations;
(f) before use, the whole structure should be checked by a competent person.

6.2.6 Bamboo Scaffolding

i) It should not be used in oil & gas installations and in the areas where hot work is to be done.

ii) For construction and maintenance of low rise residential and office buildings, situated outside explosive licensed area, bamboo scaffold, if unavoidable, should conform to provisions given in IS-3696 (Part 1)-1987.

6.3 STRUCTURAL WORK, LAYING OF REINFORCEMENT & CONCRETING

6.3.1 General provisions

i) The erection or dismantling of buildings, structures, civil engineering works, formwork, falsework and shoring should be carried out by trained workers only under the supervision of a competent person.

ii) Precautions should be taken to guard against danger to workers arising from any temporary state of weakness or instability of a structure.

iii) Formwork, falsework and shoring should be so designed, constructed and maintained that it will safely support all loads that may be imposed on it. Conformity with design during job execution shall be certified by the competent person and the relevant records shall be maintained.

iv) Formwork should be so designed and erected that working platforms, means of access, bracing and means of handling and stabilising are easily fixed to the formwork structure.

v) Proper methodology based on the design of the building / structure to be developed and approved by competent person before resorting to dismantling / modifications.

vi) All works / facilities should be certified for structural stabilities by a competent person and on statutory requirement completed before putting to use.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

6.3.2 Erection and dismantling of steel and prefabricated structures

i) The safety of workers employed on the erection and dismantling of steel and prefabricated structures should be ensured by appropriate means, such as provision and use of:

(a) ladders, gangways or fixed platforms;
(b) platforms, buckets, boatswain's chairs or other appropriate means suspended from lifting appliances;
(c) safety harnesses and lifelines supported on properly designed anchor, catch nets or catch platforms;
(d) Mechanical / Power-operated mobile working platforms;
(e) Proper Personal Protective Equipment.

ii) Steel and prefabricated structures should be so designed and made that they can be safely transported and erected. Route survey to be carried out from works to construction site route considering the load bearing capacity of the bridges, height of the bridges en-route and maximum width and length permissible without causing any hazard to public, the route and the equipment.

iii) In addition to the need for the stability of the part when erected, the design should explicitly take following into account:

(a) the conditions and methods of attachment in the operations of transport, storing and temporary support during erection or dismantling as applicable;
(b) Methods for the provision of safeguards such as railings and working platforms, and, when necessary, for mounting them easily on the structural steel or prefabricated parts.

iv) The hooks and other devices built in or provided on the structural steel or prefabricated parts that are required for lifting and transporting them should be so shaped, dimensioned and positioned as:

(a) to withstand with a sufficient margin the stresses to which they are subjected;
(b) Not to set up stresses in the part that could cause failures, or stresses in the structure itself not provided for in the plans, and be designed to permit easy release from the lifting appli-ance. Lifting points for floor and staircase units should be located (recessed if necessary) so that they do not protrude above the surface;
(c) To avoid imbalance or distortion of the lifted load.

v) Storeplaces should be so constructed that:

(a) there is no risk of structural steel or prefabricated parts falling or overturning;
(b) storage conditions generally ensure stability and avoid damage having regard to the method of storage and atmo-spheric conditions;
(c) racks are designed and secured on firm ground so that units cannot move accidentally.

vi) While they are being stored, transported, raised or set down, structural steel or prefabricated parts should not be subjected to stresses prejudicial to their stability.

vii) Every lifting appliance should:

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

(a) be suitable for the operations and not be capable of accidental disconnection;
(b) be approved or tested as per statutory requirement.

viii) Lifting hooks should have safety latch (self closing type).

ix) Lifting hooks, Tongs, clamps and other appliances for lifting structural steel and prefabricated parts should:

(a) be of such shape and dimensions as to ensure a secure grip without damaging the part;
(b) be marked with the maximum permissible load in the most unfavourable lifting conditions.
(c) be periodically inspected and certified to ensure further usage as per requirement of factory act / Building & Construction Workers Regulation (BOCWR).

x) Structural steel or prefabricated parts should be lifted only after rigging plan approved by competent person to prevent them from spinning, slipping or dropping accidentally.

xi) When necessary to prevent danger, before they are raised from the ground, structural steel or prefabricated parts should be provided with safety devices such as railings and working platforms to prevent falls of persons.

xii) While structural steel or prefabricated parts are being erected, the workers should be provided with appliances such as guiding ropes for guiding them as they are being lifted and set down, so as to avoid crushing of hands and to facilitate the operations. Use of such appliances should be ensured.

xiii) A raised structural steel or prefabricated part should be so secured and wall units so propped that their stability cannot be affected, even by external factors such as wind and passing loads before its release from the lifting appliance.

xiv) At work places, instruction should be given to the workers on the methods, arrangements and means required for the storage, transport, lifting and erection of structural steel or prefabricated parts, and, before erection starts, a meeting of all those responsible should be held to discuss and confirm the requirements for safe erection.

xv) During transportation within the construction area, attachments such as slings and straps mounted on structural steel or prefabricated parts should be securely fastened to the parts. Vehicle loading should be such that the vehicle and the load remain stable at all positions during transportation and unloading.

xvi) Structural steel or prefabricated parts should be so transported that the conditions do not affect the stability of the parts or the means of transport result in jolting, vibration or stresses due to blows, or loads of material or persons.

xvii) When the method of erection does not permit the provision of other means of protection against fall of persons, the workplaces should be protected by guardrails, and if appropriate by toe-boards.

xviii) When adverse weather conditions such as snow, hailstorm, rain and wind or reduced visibility, etc. entail risks of accidents, the rigging work should be interrupted after taking necessary safety precautions.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

xix) If necessary, to prevent danger, structural steel parts should be equipped with attachments for suspended scaffolds, lifelines or safety harnesses and other means of protection.

xx) The risks of falling, to which workers moving on high or sloping girders are exposed, should be limited by all means of adequate collective protection or, where this is impossible, by the use of a safety harness that is well secured to a properly designed support.

xxi) Structural steel parts that are to be erected at a height should as far as practicable be assembled on the ground.

xxii) When structural steel or prefabricated parts are being erected, a sufficiently extended area underneath the workplace should be barricaded or guarded

xxiii) Steel trusses that are being erected should be adequately shored, braced or guyed until they are permanently secured in position.

xxiv) Load-bearing structural member should not be dangerously weakened by cutting, holing or other means.

xxv) Structural members should not be forced into place by the hoisting machine while any worker is in such a position that he could be injured by the operation.

xxvi) Open-web steel joists that are hoisted singly should be directly placed in position and secured against dislodgment.

xxvii) All structures should be designed for either permanent anchors or provision for erection of anchors as and when required to support life line during any Maintenance work etc. during life of the structure. The point of provision of anchor should be indicated through suitable signage for ease of use as and when required.

6.3.3 Reinforcement

i) Ensure that workers use Personnel Protective equipment like safety helmet with chin straps, safety shoes, gloves, full body safety harness, safety goggles, etc.

ii) Don't place the hand below the rods for checking clear distance. Use measuring devices.

iii) Don't wear loose clothes while checking the rods.

iv) Don't stand unnecessarily on cantilever rods.

v) To carry out welding/cutting of rods, safety procedures/precautions as mentioned in Item No. 6.5 to be followed.

vi) For supplying of rods at heights, proper staging and/or bundling to be provided.

vii) Ensure barricading and staging for supplying and fixing of rods at height.

viii) For short distance carrying of materials on shoulders, suitable pads to be provided.

ix) While transporting material by trucks/trailers, the rods shall not protrude in front of or by the sides of driver's cabin. In case such protrusion cannot be avoided behind the deck, then it should not

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

extend 1/3rd of deck length or 1.5 Meters whichever is less and tied with red flags/lights.

x) Reinforcement rods, cut pieces etc. should be properly stored at identified locations and the scrap should be disposed off promptly on regular basis.

6.3.4 Concreting

i) Ensure stability of shuttering work before allowing concreting.

ii) Barricade the concreting area while pouring at height/depths.

iii) Keep vibrator hoses, pumping concrete accessories in healthy conditions and mechanically locked.

iv) Pipelines in concrete pumping system shall not be attached to temporary structures such as scaffolds and formwork support as the forces and movements may affect their integrity.

v) Check safety cages & guards around moving motors/parts etc. provided in concreting mixers.

vi) Use Personal Protective Equipment like gloves, safety shoes, full body safety harness, safety goggles, etc. while dealing with concrete and wear respirators for dealing with cement.

vii) Earthing of electrical mixers, vibrators, etc. should be done and verified.

viii) Cleaning of rotating drums of concrete mixers shall be done from outside. Lockout devices shall be provided where workers need to enter the drum for cleaning / inspection.

ix) Where concrete mixers are driven by internal combustion engine, exhaust points shall be located away from the worker's workstation so as to eliminate their exposure to obnoxious fumes.

x) Don't allow unauthorised person to stand under the concreting area.

xi) Ensure adequate lighting arrangements for carrying out concrete work during night.

xii) Don't allow the same workers to pour concrete round the clock. Insist on shift pattern.

xiii) During pouring, shuttering and its supports should be continuously watched for defects.

xiv) Never look into the drum mounted on truck (such as in case of Ready Mix Concrete).

6.4 ROAD WORK

6.4.1 Site shall be barricaded and provided with warning signs, including night warning lamps at appropriate locations for traffic diversion. This should be done sufficiently advance as a warning to the approaching drivers for the impending dander ahead.

6.4.2 Filled and empty bitumen drums shall be stacked separately at designated places.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

6.4.3 Mixing aggregate with bitumen shall preferably be done with the help of bitumen batch mixing plant, unless operationally non-feasible.

6.4.4 Road rollers, Bitumen sprayers, Pavement finishers shall be driven by experienced drivers with valid driving license.

6.4.5 Workers handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen with aggregate shall be provided with PVC hand gloves and rubber shoes with legging up to knee joints.

6.4.6 At the end of day's work, surplus hot bitumen in tar boiler shall be properly covered by a metal sheet, to prevent anything falling in it,

6.4.7 If bitumen accidentally falls on ground, it shall be immediately covered by sprinkling sand, to prevent anybody stepping on it. Then it shall be removed with the help of spade.

6.4.8 For cement concrete roads, besides site barricading and installation of warning signs for traffic diversion, safe practices mentioned in the chapter on "Concreting", shall also be applicable.

6.4.9 Any excavation for road work should be done only after surveying underground utilities and after taking suitable precautions. The underground utilities to be rerouted as required after approval of competent person / authority.

6.4.10 All the raw material for road construction/ maintenance to be stored on designated place which should be away from the running road. The running road should not be used for storing the sand, hot bitumen, etc..

6.4.11 Precaution should be taken that no construction material/ slab/ pre-fabricated object can come on the running road accidently or due to slipping. In such case, an erection plan should be designed and got approved from the competent authority.

6.5 CUTTING / WELDING

6.5.1 Common hazards involved in welding/cutting are sparks, molten metal, flying particles, harmful light rays, electric shocks , depletion in O_2 concentration due to generation of toxic gases, etc. Following precautions should be taken: -

i) A dry chemical powder (DCP) type fire extinguisher shall be made available in the work area.

ii) Adequate ventilation shall be ensured by opening manholes and fixing a shield or forced circulation of air etc, while doing a job in confined space.

iii) Ensure that only approved and well-maintained apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used. Also their regular calibration where ever necessary.

iv) All panels and covers shall be kept in place, when operating an electric Arc welding machine. 30mA rating ELCB shall be ensured in the power receptacle of the welding machine.

v) The work piece should be connected directly to Power supply, and not indirectly through pipelines/ structures/ equipment etc.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

vi) The welding receptacles shall be rated for 63 A suitable for 415V, 3-Phase system with a scraping earth. Receptacles shall have necessary mechanical interlocks and earthing facilities.

vii) All cables, including welding and ground cables shall be checked for any worn out or cracked insulation before starting the job and such cables shall not be used. Ground cable should be separate without any loose joints.

viii) Cable coiling shall be maintained at minimum level, if not avoidable. Criss-crossing of welding/electrical power supply cables & gas cutting hoses shall be avoided. Care to be taken against damage of gas cutting hoses.

ix) An energised electrode shall not be left unattended.

x) The power source shall be turned off at the end of job.

xi) All gas cylinders shall be properly secured in upright position.

xii) Acetylene cylinder shall be turned and kept in such a way that the valve outlet points away from oxygen cylinder.

xiii) Acetylene cylinder key for opening valve shall be kept on valve stem, while cylinder is in use, so that the acetylene cylinder could be quickly turned off in case of emergency. Use flash back arrestors to prevent back-fire in acetylene/oxygen cylinder.

xiv) When not in use, valves of all cylinders shall be kept closed.

xv) All types of cylinders, whether full or empty, shall be stored at cool, dry place under shed.

xvi) Forced opening of any cylinder valve should not be attempted.

xvii) Lighted gas torch shall never be left unattended.

xviii) Store acetylene and oxygen cylinders separately.

xix) Store full and empty cylinders separately.

xx) Avoid cylinders coming into contact with heat.

xxi) Cylinders that are heavy or difficult to carry by hand may be rolled on their bottom edge but never dragged.

xxii) If cylinders have to be moved, be sure that the cylinder valves are shut off.

xxiii) Before changing torches, shut off the gas at the pressure reducing regulators and not by crimping the hose.

xxiv) Do not use matches to light torches, use a friction lighter. Gas torch should be ignited with the lighter only. It should not be ignited by touching other hot surfaces.

xxv) Move out any leaking cylinder immediately and cap it. No hot work should be permitted in the vicinity of such leaked cylinders.

xxvi) Use trolleys for oxygen & acetylene cylinder and chain them.

xxvii) Always use Red hose for acetylene and other fuel gases and Black for oxygen, and ensure that both are in equal length.

xxviii) Ensure that hoses are free from burns, cuts and cracks and properly clamped.

xxix) Avoid dragging hoses over sharp edges and objects

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

xxx) Do not wrap hoses around cylinders when in use or stored.

xxxi) Protect hoses from flying sparks, hot slag, and other hot objects. Protect cylinders by covering welding blanket while hot work in the vicinity.

xxxii) Lubricants shall not be used on Ox-fuel gas equipment.

xxxiii) During cutting/welding, use required PPEs like hand gloves, full body clothing of fire retardant / suitable material, safety shoes, full body safety harness, mask, goggles / face shields, welding screen of required DIN glass as per approved Weld Preparation Scheme.

xxxiv) Hot work permit to be taken if working in hazardous area.

6.6 WORKING IN CONFINED SPACES

6.6.1 Following safety practices for working in confined space like towers, columns, tanks and other vessels should be followed in addition to the safety guidelines for specific jobs like scaffolding, cutting/welding etc.

i) Shut down, positively isolate, depressurise and purge the vessel as per laid down procedures.

ii) Entry inside the vessel to carry out any job shall be done after issuance of valid permit only in line with the requirement of OISD-STD-105.

iii) Ensure proper and accessible means of exit before entry inside a confined space.

iv) The number of persons allowed inside the vessel should be limited to avoid overcrowding. Record of entering person shall be maintained with in and out time.

v) When the work is going on in the confined space, there should always be two men standby at the nearby manway / manhole equipped with communication arrangement to contact seniors and to evacuate the worker inside confined space in case of emergency.

vi) Before entering inside the vessels underground or located at lower elevation, probability of dense vapours accumulating nearby should also be considered in addition to inside the vessel and corrective action should be ensured.

vii) Ensure requisite O_2 level before entry in the confined space and monitor level periodically or other wise use required respiratory devices.

viii) Check for no Hydrocarbon or toxic substances before entry and monitor level periodically or use requisite Personal Protective Equipment.

ix) Ensure adequate ventilation or use respiratory devices.

x) Depending upon need, necessary respirator system, gas masks and suit shall be worn by everyone entering confined space. In case of sewer, OWS or in the confined area where there is a possibility of toxic or inert gas, required respiratory device, shall be used by everyone while entering.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

xi) Barricade the confined spaces during hoisting, radiography, blasting, pressure testing etc.

xii) Use 24V flameproof lamp fittings only for illumination.

xiii) Use tools with air motors or electric tools with maximum voltage of 24V.

xiv) House keeping shall be well maintained.

xv) Required PPEs like Safety helmet, safety shoes and full body harness shall be worn by everyone entering the confined space.

xvi) Don't wear loose clothing while working in a confined space.

xvii) In case of the vessels which are likely to contain pyropheric substances (like Iron Sulphide), special care need to be taken before opening the vessel. Attempt should be made to remove the pyropheric substances. Otherwise, these should be always kept wet by suitable means.

xviii) The cutting torches should also be kept outside the vessel immediately after the cutting.

xix) The gas cylinders used for cutting/welding shall be kept outside. Care to be taken for the integrity of gas hoses and welding cables while work is in progress.

xx) All cables, hoses, welding equipment etc., shall be removed from confined space at end of each work day, even if the work is to be resumed in the same space the next day.

xxi) To the extent possible sludge shall be cleared and removed from outside before entering.

xxii) No naked light or flame or hot work such as welding, cutting and soldering should be permitted inside a confined space or area unless it has been made completely free of the flammable atmosphere, tested and found safe by a competent person. Only non-sparking tools and flameproof hand lamps protected with guard and safety torches should be used inside such confined space or area for initial inspection, cleaning or other work required to be done for making the area safe.

xxiii) Communication should be always maintained between the worker and the attendant.

xxiv) Inside the confined space spray painting should be avoided. If absolutely essential it should be done after ensuring adequate precautions including exhaust of paint vapours and continuous monitoring of concentration of oxygen and toxic gases.

xxv) Before issuing the vessel entry permit, it should be ensured that all the incoming and outgoing lines to and from the vessel are positively isolated. Where this is not applicable like dampers in HRSG system, Sufficient time is to be allowed to observe the leakage of hot gases from the dampers/ passing valves before taking any decision on vessel entry permit.

Engineers India Ltd.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

6.7 PROOF/PRESSURE TESTING

6.7.1 Review test procedure before allowing testing with water or air or any other fluid. Testing should be done only after proper Job Safety Analysis (JSA) and its approval.

6.7.2 Provide relief valves of adequate size while testing with air or other gases.

6.7.3 Ensure compliance of necessary precautions, step wise loading, tightening of fasteners, grouting etc. before and during testing.

6.7.4 Inform all concerned in advance of the testing.

6.7.5 Keep the vents open before opening any valve for filling/draining of liquid used for hydrotesting. The filling/draining should not exceed the designed rate for pressure testing.

6.7.6 Provide separate gauges of suitable range for pressurising pump and the equipment to be tested.

6.7.7 Provide gauges at designated locations for monitoring of pressures.

6.7.8 Check the calibration of all pressurising equipment and accessories and maintain records.

6.7.9 Take readings at pre-defined intervals.

6.7.10 Arrangement to be made to ensure that the pressurizing system i.e. motor-pump set is out of circuit so that the system under hydro testing is not re-pressurized by the contractor due to pressure drop before a pre-defined time.

6.8 WORKING AT HEIGHTS

6.8.1 General Provision

i) While working at a height of more than 2.2 meters, ISI approved full body harness shall be used.

ii) While working at a height of more than 2.2 meters, permit should be issued by competent person before commencement of the job.

iii) Worker should be well trained on usage of full body harness including its proper usage at the time of ascending/descending.

iv) All tools should be carried in tool bag/belt to avoid their falling.

v) If the job is on fragile/sloping roof, roof walk ladders shall be used.

vi) Provide lifeline properly designed, secured and anchored, wherever required. Mock Drill of use of lifeline at regular intervals to be carried out.

vii) Additional safety measures like providing Fall Arrestor type full body harness, safety net should be provided depending upon site conditions, job requirements.

viii) Keep working area neat and clean. Remove scrap material immediately.

ix) Don't throw or drop material/equipment from height.

x) Avoid jumping from one member to another. Use proper passageway.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

Page 1146 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

xi) Keep both hands free while climbing. Don't try to bypass the steps of the ladder. Same to be followed while climbing down. Further on climbing down, front of the body to be towards the ladder.

xii) Try to maintain calm at height. Avoid over exertion.

xiii) Avoid movements on any structural member without fall protection.

xiv) Elevated workplaces including roofs should be provided with safe means of access and egress such as stairs, ramps or ladders.

xv) Fall protection hierarchy to be followed as below:

(a) Elimination: Explore possibility whether job can be done avoiding work at height.

(b) Prevention: Prevent fall of a worker by providing appropriate fall prevention system.

(c) Fall arrest system: Arrest the fall using suitable fall arrest system. Ensure to have a strong suitably designed anchor point.

(d) Warning Lines: Use a warning line using a rope or wire barrier around roof to warn workers that they are getting close to the roof edge.

(e) Safety Monitoring: Use a safety monitor to warn the workers.

(f) Administration: Prepare a written administrative procedure to ensure workers are doing the best that they can.

6.8.2 Roof Work

i) All roof-work operations should be pre-planned and properly supervised.

ii) Roof work should only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.

iii) Work on roofs shouldn't be carried on in weather conditions that threaten the safety of workers.

iv) Crawling boards, walkways and roof ladders should be securely fastened to a firm structure.

v) Roofing brackets should fit the slope of the roof and be securely supported.

vi) Where it is necessary for a person to kneel or crouch near the edge of the roof, necessary precautions should be taken.

vii) On a large roof where work have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided.

viii) All covers for openings in roofs should be of substantial construction and be secured in position.

ix) Roofs with a pitch of more than 10 should be treated as sloping.

x) When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders should be provided and firmly secured in position.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

xi) During extensive work on the roof, strong barriers or guardrails and toe-boards should be provided to stop a person from falling off the roof.

xii) Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they should be provided with suitable roof ladders or crawling boards strong enough and when spanning across the supports for the roof covering to support those workers.

xiii) A minimum of two boards should be provided so that it is not necessary for a person to stand on a fragile roof to move a board or a ladder, or for any other reason.

6.8.3 Work on tall chimneys

i) For the erection and repair of tall chimneys, scaffolding should be provided. A safety net should be maintained at a suitable distance below the scaffold.

ii) The scaffold floor should always be at least 65 cm below the top of the chimney.

iii) Under the working floor of the scaffolding the next lower floor should be left in position as a catch platform.

iv) The distance between the inside edge of the scaffold and the wall of the chimney should not exceed 20 cm at any point.

v) Catch platforms should be erected over:

(a) the entrance to the chimney;
(b) Passageways and working places where workers could be endangered by falling objects.

vi) For climbing tall chimneys, access should be provided by:

(a) stairs or ladders;
(b) a column of iron rungs securely embedded in the chimney wall;
(c) Other appropriate means.

vii) When workers use the outside rungs to climb the chimney, a securely fastened steel core rope looped at the free end and hanging down at least 3 m should be provided at the top to help the workers to climb on to the chimney.

viii) While work is being done on independent chimneys the area surrounding the chimney should be enclosed by fencing at a safe distance.

ix) Workers employed on the construction, alteration, maintenance or repair of tall chimneys should not:

a) work on the outside without a safety harness attached by a lifeline to a rung, ring or other secure anchorage;
b) put tools between the safety harness and the body or in pockets not intended for the purpose;
c) haul heavy materials or equipment up and down by hand to or from the workplace on the chimney;
d) fasten pulleys or scaffolding to reinforcing rings without first verifying their stability;
e) work alone;

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

f) climb a chimney that is not provided with securely anchored ladders or rungs;
g) Work on chimneys in use unless the necessary precautions to avoid danger from smoke and gases have been taken. Ensure that the outside surface temperature of the chimney is at
h) room temperature before taking up any job after shut down of the (system) chimney.

x) Work on independent chimneys should not be carried on in high winds, icy conditions, fog or during electrical storms.

6.9 HANDLING AND LIFTING EQUIPMENT:

6.9.1 General Provisions

Following are the general guidelines to be followed with regard to all types of handling and lifting equipment in addition to the guidelines for specific type of equipments dealt later on.

i) There should be a well-planned safety programme to ensure that all the lifting appliances and lifting gear are selected, installed, examined, tested, maintained, operated and dismantled with a view to preventing the occurrence of any accident;

ii) All lifting appliances shall be examined by competent persons at frequencies as specified in "The Factories act".

iii) Check thoroughly quality, size and condition of all lifting tools like chain pulley blocks, slings, U-clamps, D-shackles etc. before putting them in use.

iv) Safe lifting capacity of all lifting & handling equipment, tools and shackles should be got verified and certificates obtained from competent authorities before its use. The safe working load shall be marked on them.

v) Check periodically the oil, brakes, gears, horns and tyre pressure, lighting fixtures of all moving equipments like cranes, forklifts, trailers, etc. as per manufacturer's recommendations.

vi) Check the weights to be lifted and accordingly decide about the crane capacity, boom length and angle of erection.

vii) Allow lifting slings as short as possible and check packing at the friction points.

viii) While lifting/placing of the load, no unauthorised person shall remain within the radius of the boom and underneath the load.

ix) While loading, unloading and stacking of pipes, proper wedges shall be placed to prevent rolling down of the pipes.

x) Control longer jobs being lifted up from both ends.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

xi) Only trained operators and riggers should carry out the job. While the crane is moving or lifting the load, the trained rigger should be there for keeping a vigil against hitting any other object.

xii) During high wind conditions and nights, lifting of heavy equipments should be avoided. If unavoidable to do erection in night, operator and rigger should be fully trained for night signaling. Also proper illumination should be there.

xiii) Allow crane to move on hard, firm and leveled ground. Ensure that all the crane pedestals/ hydraulic jacks taking weight of the crane and load are on a firm compacted surface.

xiv) When crane is in idle condition for long periods or unattended, crane boom should either be lowered or locked as per manufacturer's guidelines.

xv) Hook and load being lifted shall remain in full visibility of crane operators, while lifting, to the extent possible.

xvi) Don't allow booms or other parts of crane to come within 3 meters reach of overhead electrical cables.

xvii) No structural alterations or repairs should be made to any part of a lifting appliance, which may affect the safety of the appliance without the permission and supervision of the competent person.

6.9.2 Hoists

i) Hoist shafts should be enclosed with rigid panels or other adequate fencing at:

(a) ground level on all sides;
(b) all other levels at all points at which access is provided;
(c) all points at which persons are liable to be struck by any moving part.

ii) The enclosure of hoist shafts, except at approaches should extend where practicable at least 2 meters above the floor, platform or other place to which access is provided except where a lesser height is sufficient to prevent any person falling down the hoistway and there is no risk of any person coming into contact with any moving part of the hoist, but in no case should the enclosure be less than 1 meter in height.

iii) The guides of hoist platforms should offer sufficient resistance to bending and, in the case of jamming by a safety catch, to buckling.

iv) Where necessary to prevent danger, adequate covering should be provided above the top of hoist shafts to prevent material falling down them.

v) Outdoor hoist towers should be erected on firm foundations, and securely braced, guyed and anchored.

vi) A ladderway should extend from the bottom to the top of outdoor hoist towers, if no other ladderway exists within easy reach.

vii) Hoisting engines should be of ample capacity to control the heaviest load that they will have to move.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

viii) Hoists should be provided with devices that stop the hoisting engine as soon as the platform reaches its highest stopping place.

ix) Winches should be so constructed that the brake is applied when the control handle is not held in the operating position.

x) It should not be possible to set in motion from the platform a hoist, which is not designed for the conveyance of persons.

xi) Winches should not be fitted with pawl and ratchet gears on which the pawl must be disengaged before the platform is lowered.

xii) Hoist platforms should be capable of supporting the maximum load that they will have to carry with a safety factor.

xiii) Hoist platforms should be equipped with safety gear that will hold the platform with the maximum load if the hoisting rope breaks.

xiv) If workers have to enter the cage or go on the platform at landings there should be a locking arrangement preventing the cage or platform from moving while any worker is in or on it.

xv) On sides not used for loading and unloading, hoist platforms should be provided with toe-boards and enclosures of wire mesh or other suitable material to prevent the fall of parts of loads.

xvi) Where necessary to prevent danger from falling objects, hoist platforms should be provided with adequate covering.

xvii) Counterweights consisting of an assemblage of several parts should be made of specially constructed parts rigidly connected together.

xviii) Counterweights should run in guides.

xix) Platforms should be provided at all landings used by workers.

xx) Following notices should be posted up conspicuously and in very legible characters:

(a) on all hoists:

- on the platform: the carrying capacity in kilograms or other appropriate standard unit of weight;
- on the hoisting engine: the lifting capacity in kilograms or other appropriate standard unit of weight;

(b) on hoists authorised or certified for the conveyance of persons:

- on the platform or cage: the maximum number of persons to be carried at one time;

(c) on hoists for goods only:

- on every approach to the hoist and on the platform: prohibition of use by persons.

xxi) Hoists intended for the carriage of persons should be provided with a cage so constructed as to prevent any person from falling out or being trapped between the cage and any fixed part of the structure when the cage gate is shut, or from being struck by the counterbalance weight or by articles or materials tailing down the hoistway.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

Page 1151 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

xxii) On each side in which access is provided, the cage should have a gate fitted with devices which ensure that the gate cannot be opened except when the cage is at a landing and that the gate must be closed before the cage can move away from the landing.

xxiii) Every gate in the enclosure of the hoist shaft which gives access from a landing place to the cage should be fitted with devices to ensure that the gate cannot be opened except when the cage is at that landing place, and that the cage cannot be moved away from that landing place until the gate is closed.

6.9.3 Derricks

Stiff-leg derricks

i) Derricks should be erected on a firm base capable of taking the combined weight of the crane structure and maximum rated load.

ii) Devices should be used to prevent masts from lifting out of their seating.

iii) Electrically operated derricks should be effectively earthed from the sole plate or framework.

iv) Counterweights should be so arranged that they do not subject the backstays, sleepers or pivots to excessive strain.

v) When derricks are mounted on wheels:

a) a rigid member should be used to maintain the correct distance between the wheels;
b) they should be equipped with struts to prevent them from dropping if a wheel breaks or the derrick is derailed.

vi) The length of a derrick jib should not be altered without consulting the manufacturer.

vii) The jib of a scotch derrick crane should not be erected within the backstays of the crane.

Guy derricks

i) The restraint of the guy ropes should be ensured by fitting stirrups or anchor plates in concrete foundations.

ii) The mast of guy derricks should be supported by six top guys spaced approximately equally.

iii) The spread of the guys of a guy derrick crane from the mast should not be more than 45^0 from the horizontal.

iv) Guy ropes of derricks should be equipped with a stretching screw or turnbuckle or other device to regulate the tension.

v) Gudgeon pins, sheave pins and fool bearings should be lubricated frequently.

vi) When a derrick is not in use, the boom should be anchored to prevent it from swinging.

6.9.4 Gin poles

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

i) Gin poles should:

(a) be straight;
(b) consist of steel or other suitable metal;
(c) be adequately guyed and anchored;
(d) be vertical or raked slightly towards the load;
(e) be of adequate strength for the loads that they will be required to lift/move.

ii) Gin poles should not be spliced and if a gin pole is composed of different elements, they should be assembled in conformity with their intrinsic material strength.

iii) Gin poles should be fastened at their feet to prevent displacement in operation.

iv) Gin poles, which are moved from place to place and re-erected, should not be taken into use again before the pole, lifting ropes, guys, blocks and other parts have been inspected, and the whole appliance has been tested under load.

v) When platforms or skips are hoisted by gin poles, precautions should be taken to prevent them from spinning and to provide for proper landing.

6.9.5 Tower cranes

i) Where tower cranes have cabs at high level, persons, capable and trained to work at heights, should only be employed as crane operators.

ii) The characteristics of the various machines available should be considered against the operating requirements and the surroundings in which the crane will operate before a particular type of crane is selected.

iii) Care should be taken in the assessment of wind loads both during operations and out of service. Account should also be taken of the effects of high structures on wind forces in the vicinity of the crane.

iv) The ground on which the tower crane stands should have the requisite bearing capacity. Account should be taken of seasonal variations in ground conditions.

v) Bases for tower cranes and tracks for rail-mounted tower cranes should be firm and level. Tower cranes should only operate on gradients within limits specified by the manufacturer. Tower cranes should only be erected at a safe distance from excavations and ditches.

vi) Tower cranes should be sited where there is clear space available for erection, operation and dismantling. As far as possible, cranes should be sited so that loads do not have to be handled over occupied premises, over public thoroughfares, other construction works and railways or near power cables.

vii) Where two or more tower cranes are sited in positions where their jibs could touch any part of the other crane, there should be direct means of communication between them and a distinct warning system operated from the cab so that one driver may alert the other of impending danger.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

viii) The manufacturers' instructions on the methods and sequence of erection and dismantling should be followed. The crane should be tested before being taken into use.

ix) The climbing operation of climbing tower cranes should be carried out in accordance with manufacturers' instructions. The free-standing height of the tower crane should not extend beyond what is safe and permissible in the manufacturers' instructions.

x) When the tower crane is left unattended, loads should be removed from the hook, the hook raised, the power switched off and the boom brought to the horizontal. For longer periods or at times when adverse weather conditions are expected, out of service procedures should be followed. The main jib should be slewed to the side of the tower away from the wind, put into free slew and the crane immobilised.

xi) A windspeed measuring device should be provided at an elevated position on the tower crane with the indicator fitted in the drivers' cab.

xii) Devices should be provided to prevent loads being moved to a point where the corresponding safe working load of the crane would be exceeded. Name boards or other items liable to catch the wind should not be mounted on a tower crane other than in accordance with the manufacturers' instructions.

xiii) Tower cranes should not be used for magnet, or demolition ball service, piling operations or other duties, which could impose excessive loading on the crane structure.

6.9.6 Lifting ropes

i) Only ropes with a known safe working capacity should be used as lifting ropes.

ii) Lifting ropes should be installed, maintained and inspected in accordance with manufacturers' instructions.

iii) Repaired steel ropes should not be used on hoists.

iv) Where multiple independent ropes are used, for the purpose of stability, to lift a work platform, each rope should be capable of carrying the load independently.

6.10 VEHICLE MOVEMENT

6.10.1 Park vehicles only at designated places. Don't block roads to create hindrance for other vehicles.

6.10.2 Don't overload the vehicle.

6.10.3 Obey speed limits and traffic rules.

6.10.4 Always expect the unexpected and be a defensive driver.

6.10.5 Drive carefully during adverse weather and road conditions.

6.10.6 Read the road ahead and ride to the left.

6.10.7 Be extra cautious at nights. Keep wind screens clean and lights in working condition.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

6.10.8 All vehicles used for carrying workers and construction materials must undergo predictive/preventive maintenance and daily checks

6.10.9 Driver with proper valid driving license shall only be allowed to drive the vehicle

6.10.10 Routes shall be leveled marked and planned in such a way so as to avoid potential hazards such as overhead power lines and sloping ground etc.

6.10.11 While reversing the vehicles, help of another worker should be ensured at all times

6.10.12 An unattended vehicle should have the engine switched off

6.10.13 Wherever possible one-way system shall be followed

6.10.14 Barriers/fixed stops should be provided for excavation/openings to prevent fall of vehicle

6.10.15 Load should be properly secured

6.10.16 The body of the tipper lorry should always be lowered before driving the vehicle off.

6.10.17 Signs/signals/caution boards etc. should be provided on routes.

6.10.18 All vehicles in a running process plants to use spark arrester on the exhaust.

6.10.19 No material should be protruding outside the vehicle for the safety of the public. If necessary, same to be marked as per RTO regulations.

6.10.20 Proper caution tag should be available on the vehicle for hazardous material like oil,.LPG, explosives, nuclear material, toxic fluids etc and the vehicle staff should be well informed about the potential danger of the material being transported by them.

6.10.21 An earth chain for the discharge of static electricity generated during transportation of specific material with the vehicle to be provided.

6.10.22 Drunken driving should be prohibited.

6.11 ELECTRICAL

6.11.1 General Provisions

i) Only persons having valid licenses shall be allowed to work on electrical facilities as per prevailing IE Act and rules thereunder including CEA rules/regulations.

ii) No person should be allowed to work on live circuit. The same, if unavoidable, special care and written authorisation need to be taken.

iii) Treat all circuits as "LIVE" unless ensured otherwise.

iv) Electrical " Lock Out - Tag Out (LOTO)" procedure "MUST" be followed for work on electrical system.

v) Display voltage ratings prominently with "Danger" signs in local language also.

vi) Put caution/notice signs before starting the repair works.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

vii) All electrical equipment operating above 250V shall have two separate and distinct connections to earth grid.

viii) Proper grounding to be ensured for all switch boards and equipment including Portable ones prior to taking into service.

ix) Make sure that electrical switch boards, portable tools, equipment (like grinding machine etc.) don't get wet during their usage. If it happens, stop the main supply, make the tools dry, check for specified insulation value and then only use them. Check proper earthing.

All temporary switch boards/ KIOSKS put up at work site should be suitably protected from rain and the level of same should be high enough to avoid contact with water due to water logging.

x) Don't work wet on electrical system.

xi) Don't overload the electrical system.

xii) Use only proper rated HRC fuses / ELCB / MCB.

xiii) Only ISI marked or equivalent industrial type extension boards and Plug sockets are to be used.

xiv) ELCB for all temporary connections must be provided using 3 pin plug.

xv) All power supply cables should be laid properly and neatly so that they don't cause hindrance to persons working and no physical damage also takes place to the cables during various construction activities.

xvi) All Power cables to be properly terminated using glands and lugs of proper size, type and crimped.

xvii) Use electrical fittings in Hazard zones as per area classification under OISD-STD-113.

xviii) Ensure pipe sleeve / conduit to protect underground cables at crossings.

xix) Don't lay unarmored cable directly on ground, wall, roof or trees. All temporary cables should be laid at least 750 mm below ground and cable markers should be provided. Proper sleeves should be provided at road crossings. In case temporary cables are to be laid on wooden poles/steel poles, the minimum cable heights should be 4.5 M.

xx) Maintain safe overhead distance of HT transmission lines as per latest CEA Safety Regulation.

xxi) Don't use pipelines/structures for earthing.

xxii) Don't make any unsafe temporary connections, e.g. naked joints etc.

xxiii) Ensure that temporary cables are free from cuts, damaged insulation, kinks or improper insulated joints.

xxiv) Check at periodic intervals that pins of sockets and joints are not loose.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

xxv) Protect electrical wires/equipment from water and naked flames.

xxvi) Illuminate level in all the work areas should be in line with OISD-RP-149.

xxvii) All switchboards should be of MS structure only and incoming/outgoing feeders should be marked.

xxviii) Hand lamps/ Torch should not be of more than 24V rating, and E'x' type should be in line with hazardous area classification.

xxix) Fire extinguishers (DCP/CO_2/Sand buckets) should be kept near temporary switch boards being used for construction purposes. Don't use water for fighting electrical fires.

xxx) ISI marked Insulating mats shall be provided in the front and back end of switch boards.

xxxi) All parts of electrical installations should be so constructed, installed and maintained as to prevent danger of electric shock, fire and explosion.

Periodic checking of electrical safety appliances such as gloves, insulating mats, hoods etc. to be done/witnessed in line with OISD-STD-137, and records to be maintained duly endorsed by the concerned.

xxxii) A notice displaying following, should be kept exhibited at suitable places in local language also:

a) prohibiting unauthorized persons from entering electrical equipment rooms or from handling or interfering with electrical apparatus;
b) containing directions as to procedures in case of fire, rescue of persons in contact with live conductors and the restoration of persons suffering from electric shock;
c) specifying the person to be notified in case of electrical accident or dangerous occurrence, and indicating how to communicate with him.

xxxiii) No other cables/pipes to be laid in trench used for electrical cables.

xxxiv) Utmost care should be taken while excavating Earth from cable trench to avoid damage or any accident.

xxxv) Sub-station floor cut-outs meant for switch board installations to be covered wherever installation is incomplete.

xxxvi) Flameproofness integrity of all flameproof equipment / fittings/fixtures to be ensured at all times.

NOTE: A Residual Current Operated Circuit Breaker (RCCB) or Earth Leakage Circuit Breaker (ELCB), when installed, protects a human being to the widest extent. RCCB or ELCB should be provided as per latest CEA Safety Regulation.

6.11.2 Inspection and maintenance

i) All electrical equipment should be inspected before taking into use to ensure suitability for its proposed use.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

ii) At the beginning of every shift, the person using the electrical equipment should make a careful external examination of the equipment and conductors, especially the flexible cables.

iii) Apart from some exceptional cases subject to work permits, work on or near live parts of electrical equipment should be forbidden.

Before starting any work on conductors and/or equipment, it is to be ensured that: power supply should be isolated by an authorized person following the concept of LOTO;

iv) After work has been done on conductors and/or equipment, the power supply should only be switched on again after work permit is returned back, lock/tag on isolated feeder are removed and the workplace is reported safe.

v) Electricians should be provided with approved and tested tools and personal protective equipment such as rubber gloves, arc flash suit etc.

vi) All conductors and equipment should be considered to be live unless there is a proof of the contrary.

vii) When work has to be done in dangerous proximity to live parts the power supply should be cut off. If for operational reasons this is not possible, the live parts should be fenced off or enclosed by qualified staff from the sub-station concerned.

6.11.3. Testing

i) Electrical installations should be inspected and tested as per approved plan and the results recorded.

ii) Periodic testing for proper functioning of the earth leakage protective devices should be carried out.

iii) Particular attention should be paid to the earthing of apparatus, the continuity of protective conductors, polarity and insulation resistance, protection against mechanical damage and condition of connections at points of entry.

6.12 OFFSHORE

6.12.1 General

The isolated nature of offshore installations are hazardous. They call for greater need for health safety and survival at offshore. Safety at offshore is safety of installations and safety of personnel. Safety problems and accidents at offshore have high risks due to limited space, helicopter operation, sea transport etc. Following are the general health and safety guidelines to be followed in addition to the safety guidelines stipulated for specific jobs dealt later on:

i) Workers should be well trained to do their job independently with high degree of self-control and self-discipline.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

ii) On arrival at offshore, everyone should be briefed about the safety rules to be followed at offshore, evacuation system etc. All personnel should wear overall (dangri), helmet and shoes for personnel protection.

iii) In case of emergency, workers should follow instruction of Field Production Superintendent (F.P.S.). In certain cases instructions may be given to abandon the offshore installation and evacuate the persons to safe location.

iv) To overcome above problems, offshore personnel must receive training for using life saving appliances and other personal survival techniques.

v) Any person working at offshore should have one person as standby for any eventuality.

vi) Periodical health check-up of all personal on platforms shall be ensured and remedial measures shall be taken as per statutory and other requirements.

6.12.2 Drilling Rigs

i) Location of jack up rigs should not be less than 5 Kms from shipping route. Orientation of the rig, wind direction, etc. are required for safe landing of helicopter. Information w.r.t. sea currents, wind speed, Hi- Low tide, etc. are required for mooring of supply vessels.

ii) Sea bed condition at every location should be ensured for safety of rig.

iii) Radio and other communication facilities should be such to maintain contact with base all times.

iv) During toeing of rig, the rig deck should be clear of load, toeing lines should be in good condition and tensions in various toeing lines should be constantly monitored.

v) Few steps during toeing are:

a) crane booms should be secured to their vesta,
b) all hatches and water tight doors should be closed,
c) number of personnel on board should be restricted,
d) evacuate in case of emergency and operation should be completed preferably in day light.

6.12.3 Drilling

i) In view of CO_2 and H_2S gas cut from well, effective ventilation should be provided where drilling is in progress.

ii) Safety alarm shall be checked in advance in view of failure of ventilation system.

iii) Suitable sensors for H_2S and Methane should be function tested time to time and suitable colour code should be given.

iv) Working areas of the crane should be illuminated during night to avoid accident.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

v) Clear space should be available for despatch and receipt of load and, in particular, basket transfer of passengers. Persons engaged in loading/unloading of materials should be protected from falling into the sea.

vi) Signal light should be fitted at the top of the jib.

vii) Crane hook should be fitted with safety latches.

viii) Experienced person should be engaged in operation of specific equipment like winches, cranes etc.

ix) At least three cable turns shall always be there on the winch drum.

x) Adequate communication like walkie talkie, round robin phone should be available between the crane operator, supervisor and helper.

xi) Crane operation should be completely stopped during helicopter landing/ taking off.

xii) Except for helicopter landing deck, all decks, platforms, bridges, ladders should have rigid and fixed guard rails atleast one meter high and should have one intermediate rail midway between the handrail and 100 mm toe board.

xiii) Wooden ladders shall not be used at offshore.

xiv) Flow sensor in the flow line should be ensured for safe working and to avoid blow out.

xv) Hydrogen sulphuide gas In offshore is of great risk and at 10 ppm (0.001%) concentration in air, a person should not be exposed for more than 8 hours, If concentration is more, then breathing apparatus should be used. Corrosion of equipment is also caused by H_2S.

xvi) Portable H_2S gas detector should be continously used.

6.12.4 Production Platforms

i) In case hydrocarbon Is released due to overpressure, leak, overflow, gas blow etc., shut down process to stop flow *of* hydrocarbon. Prevent ignition of released hydrocarbon and in case of fire shut in the process complex and follow emergency contigency plan.

ii) Sub surface safetv valve (SSSV)) below the well head should be actuated during uncontrolled well -flow and they should be regularly checked.

iii) Surface safety valve or SDV should be checked for no gas leakage from bleed port / flange etc., in the well head area. It should not be in "mechanical override" or bypassed from panel.

iv) High pressure gas lift lines - blowdown system should be O.K.

* Auto actuation of SDVs in the inlet of pressure vessels should be O.K. and in "normal position" from shutdown panels. A record of status of switches normal/bypassed

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

in auto-con* panels (PSH, PSL, LSL, ILSL) should be maintained.

*Shut Down Panels

v) Welders rectifier set and electrical connections to it should be checked and approved by electrical-in- charge for proper electrical safely.

vi) "SCADA" telementry system if available should be operational for remote opening and closing of wells at unmanned platforms (through RPMC).

vii) Local ESD/FSD (near the work site) should be provided for jobs of very critical nature, so that the persons working can access it immediately in emergency for safety. Safety officer should judge the requirement & inform FPS for the same.

viii) Railings and Gratings etc. in and around work area should be O.K. and inspected to avoid slippage of man into sea.

ix) Emergency Shut Down (ESD) system is initiated when an abnormal condition is detected. ESD should be checked once in six months.

x) Platform should be manned round the clock.

xi) Welding and cutting work should be regulated by hot work permit.

xii) All detectors should be calibrated as per recommendation of the manufacturer.

xiii) No system should be by-passed which affects the system of platform.

xiv) In H_2S field platforms, due care shall be taken as per recommendations.

xv) Follow the instructions of F.P.S. during stay at platform

6.12.5 Fire Prevention And Control

i) Provision be made for safe handling and storage of dirty rags, trash, and waste oil. Flammable liquids and chemicals applied on platform should be immediately cleaned.

ii) Paint containers and hydrocarbon samples, gas cylinders for welding and cutting should be stored properly. Cylinders should be transported in hand-cart.

iii) Smoking should be restricted and no smoking area should be identified.

iv) Special attention should be given to crude oil pump seals; diesel and gas engines which are potential source of ignition in the event of failure.

v) Fire and smoke detectors i.e. ultraviolet heat, thermal and smoke detector should be function tested once in three months.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

vi) Fire is controlled in offshore by water spraying, Halon, CO_2 flooding, DCP and sprinkler system.

vii) Foaming agent is applied for controlling fire in liquid hydrocarbon. The system is not effective in gas fire.

viii) Light weight breathing system should be used.

ix) The fire control plan at offshore should reveal control station, fire alarms and fire detectors, deluge valves and sprinkler, fire extinguishing appliances, fireman outfit and ventilation system.

x) Fire fighting equipment should be maintained in ready to use condition.

6.12.6 Life Saving Appliances

i) Life boats with a speed of 6 knots and carrying capacity upto 50 persons are used in offshore.

ii) No. of life boats on one installation should have a capacity to accommodate twice the number of persons onboard installation.

iii) Launching appliances and life boat equipment should be checked every week.

iv) Boat landing areas should be adequately illuminated.

v) Life raft has no power and they rely on drift.

vi) Life jacket lifts the wearer after entering water.

vii) Life buoys are used to rescue persons if any person accidentally falls in the sea.

viii) All life saving appliances should be inspected by the MMD surveyor /sr. officials once a year.

ix) Every life boat shall be inspected once a week.

x) Every life boat and life raft should be serviced once a year by a competent authority.

6.12.7 Safety Precautions during Helicopter Transportation

i) Passenger briefing regarding safety rules while travelling in helicopter should be carried out before boarding the helicopter.

ii) Emergency procedure should be briefed to all the passengers in case helicopter is to ditch into the sea.

iii) Heli-pad should have a non-skid surface. Nylon rope net should be stretched on the deck.

iv) Proper drainage should be available on helideck.

v) There should be no obstruction on the helideck itself and within 3 meters of its perimeter. Closest super structure above the helideck should have red obstruction light.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

vi) While landing on helicopter, fire crew of two persons should be standby adjacent to helideck.

vii) Heli-deck should be properly illuminated for night landing.

viii) During switching off helicopter, persons should not be allowed to go out/ towards helicopter

6.13 DEMOLITION

6.13.1. General provisions

i) When the demolition of any building or structure might present danger to workers or to the public:

(a) necessary precautions, methods and procedures should be adopted, including those for the disposal of waste or residues;
(b) the work should be planned and undertaken only under the supervision of a competent person.

ii) Before demolition operations begin:

(a) structural details and builders' drawings should be obtained wherever possible;
(b) details of the previous use should be obtained to identify any possible contamination and hazards from chemicals, flammables, etc.;
(c) an initial survey should be carried out to identify any structural problems and risks associated with flammable substances and substances hazardous to health. The survey should note the type of ground on which the structure is erected, the condition of the roof trusses, the type of framing used in framed structures and the load-bearing walls;
(d) a method of demolition should be formulated after the survey and recorded in a method statement having taken all the various considerations into account and identifying the problems and their solutions;

iii) All electric, gas, water and steam service lines should be shut off and, as necessary, capped or otherwise controlled at or outside the construction site before work commences.

iv) If it is necessary to maintain any electric power, water or other services during demolition operations, they should be adequately protected against damage.

v) As far as practicable, the danger zone round the building should be adequately fenced off and sign posted. To protect the public a fence 2m high should be erected enclosing the demolition operations and the access gates should be secured outside working hours.

vi) The fabric of buildings contaminated with substances hazardous to health should be decontaminated. Protective clothing and respiratory devices should be provided and worn.

vii) Where plant has contained flammable materials, special precautions should be taken to avoid fire and explosion.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

viii) The plant to be demolished should be isolated from all other plant that may contain flammable materials. Any residual flammable material in the plant should be rendered safe by cleaning, purging or the application of an inert atmosphere as appropriate.

ix) Care should be taken not to demolish any parts, which would destroy the stability of other parts.

x) Demolition activities should not be continued under adverse climatic conditions such as high winds, which could cause the collapse of already weakened structures.

xi) To prevent hazards parts of structures should be adequately shored, braced or otherwise supported.

xii) Structures should not be left in a condition in which they could be brought down by wind pressure or vibration.

xiii) Where a deliberate controlled collapse technique is to be used, expert engineering advice should be obtained, and:

(a) it should only be used where the whole structure is to come down because it relies on the removal of key structural members to effect a total collapse;
(b) it should only be used on sites that are fairly level and where there is enough surrounding space for all operatives and equipment to be withdrawn to a safe distance.

xiv) When equipment such as power shovels and bulldozers are used for demolition, due consideration should be given to the nature of the building or structure, its dimensions, as well as to the power of the equipment being used.

xv) If a swinging weight is used for demolition, a safety zone having a width of at least one-and-a-half times the height of the building or structure should be maintained around the points of impact.

6.13.2. Demolition of structural steelwork

i) All precautions should be taken to prevent danger from any sudden twist, spring or collapse of steelwork, ironwork or reinforced concrete when it is cut or released.

ii) Steel construction should be demolished tier by tier.

iii) Structural steel parts should be lowered and not dropped from a height.

6.14 RADIOGRAPHY

6.14.1 All radiography jobs shall be carried out as per BARC Safety Regulations

6.14.2 During field radiography, nearby area around the radiation source should be cordoned off.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

6.14.3 If the field radiography is to be done at the same location repeatedly, it is advisable to provide either a wire fencing around or a temporary brick enclosure.

6.14.4 Special permission/permit should be taken for radiography from area-in-charge.

6.14.5 As far as possible, field radiography should be done only during night time when there is little or no occupancy there.

6.14.6 Radiation warning signals should be pasted all along the cordoned off area.

6.14.7 Entry into the restricted area by unauthorised persons should be strictly prohibited during exposure.

6.14.8 The radiation level alongwith the cordon should be monitored by a suitable and well-calibrated radiation survey meter.

6.14.9 All personnel working with radiography sources should wear appropriate protective equipment and film badges issued by BARC.

6.14.10 Protection facilities such as manipulator rod, remote handling tongs, lead pots, radiation hazard placards and means of cordon off shall be available at each site.

6.14.11 The radiography source shall never be touched or handled directly with hands.

6.14.12 The package containing radiography cameras and sources should never be carried by public transport like bus, train etc.

6.14.13 Radiography sources and cameras, when not in use, should be stored inside a source pit with lock and key arrangement as approved by BARC. The storage room should preferably be located in an isolated area of minimum occupancy and radiation level outside the storage room should not exceed 0.25 mR/hr as per BARC Regulations.

6.14.14 In case of an accident (due to loss or of damage to radiography source), action should be taken in line with BARC Safety Rules/Guidelines.

6.14.15 Technologically advance methods should be preferred for reduced radiation effect wherever safety so warrants.

6.15 GRIT SHOT/ SLAG BLASTING/ SPRAY PAINTING

6.15.1 Blasting for surface preparation should be used only after approval from competent person.

6.15.2 Air Compressor used for grit/shot/slag blasting/painting should have guard and positioned away from the work place.

6.15.3 Exhaust of the prime mover, if IC engine is used, should be fitted with PESO approved spark arrester (in case of work in hazardous area) and directed away from the work place.

6.15.4 In case of motor driven compressor, the body of the motor as well as the compressor to be properly earthed.

6.15.5 The hoses used for compressed air should be of proper quality, and health of the same to be ensured through regular check/ test.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

6.15.6 The operator of grit/shot/slag blasting/painting should wear suitable PPE's including mask and the area should be cordoned off.

6.15.7 Adequate measures to be taken to suppress dust/spray particle.

6.15.8 When these activities are done in confined places, adequate measure to be taken including monitoring Oxygen level and ensuring proper ventilation.

6.15.9 Proper fire fighting arrangements are to be made where spray painting is in progress.

6.15.10 Some paints and their supplements are toxic also and emit offensive smell. PPE to workers should be suitable to address this issue.

6.15.11 "No Smoking Zone" boards should be displayed prominantly in paints shop/ spray paint area.

6.16 WORK ABOVE WATER

6.16.1 General Provisions

i) Where work is done over or in close proximity to water & where possibility of drowning exists, provision should be made for:
   a) preventing workers from falling into water;
   b) the rescue of workers in danger of drowning;
   c) safe and sufficient transport.
   d) deputation of lifeguards/divers.
   e) preventing of persons suffering from hydrophobia on deputation to work above water.

ii) Provisions for the safe performance of work over or in close proximity to water should include, where appropriate, the provision and use of suitable and adequate:
   a) fencing, safety nets and safety harnesses;
   b) lifebuoys, life jackets and manned boats;
   c) protection against such hazards as reptiles bushes/ polluted water and other animals.
   d) deputation of lifeguards/divers.

iii) Gangways, pontoons, bridges, footbridges and other walkways or work places over water should:
   a) possess adequate strength and stability;
   b) be sufficiently wide to allow safe movement of workers;
   c) have level surfaces free from tripping hazards;
   d) be adequately lit when natural light is insufficient;
   e) where practicable and necessary, to prevent danger, be provided with toe-boards, guard rails, hand ropes etc.
   f) be secured to prevent dislodgment by rising water or high winds;
   g) if necessary, be equipped with ladders which should be sound, of sufficient strength and length and be securely lashed to prevent slipping.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

iv) All deck openings including those for buckets should be fenced.

v) All the employees (owner, contractor and contractor workers) working above and under the water should comply with the requirements of Standards of Training, Certification and Watchkeeping 95 (STCW 95).

6.16.2 Rescue & Emergency procedures

i) Persons who work over water should be provided with some form of buoyancy aid. Life jackets should be provided for sufficient freedom of movement, have sufficient buoyancy to bring persons to the surface and keep them afloat face upwards, be easily secured to the body, be readily visible by way of self luminous paint/strip.

ii) Nobody should work alone on or above water.

iii) Each worker should be trained in the procedure to be followed in the event of an emergency.

iv) Necessary rescue arrangements like divers, rescue boats etc to be in place.

v) Persons to be trained for CPR/ Artificial resuscitation as an first aid to the rescued person.

vi) Also for off shore operations. Speed of water current and water temperature to be considered.

7.0 ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS

In addition to general safety precautions as outlined above for the activities in Clause 6.0, following additional safety precautions need to be taken for the sites within the operating area or nearby, where presence of Hydrocarbons cannot be ruled out.

i) No job shall be carried out without a valid permit. Permit should be in line with OISD-STD-105 "Work Permit System".

ii) Smoking should be prohibited in all places containing readily combustible or flammable materials and "No Smoking" notices be prominently displayed.

iii) In confined spaces and other places where flammable gases, vapours or dusts can cause danger, following measures should be taken:

(a) only approved type electrical installations and equipment, including portable lamps, should be used;
(b) there should be no naked flames or source of ignition;
(c) oily rags, waste and clothes or other substances liable to spontaneous ignition should be removed without delay to a safe place;
(d) Air operated ventilation system should be provided.

iv) Regular inspections should be made of places where there are fire risks. These include the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations.

v) Welding, flame/gas cutting and other hot work should only be done after issuance of work permit in line with the requirement of OISD-STD-105

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

after appropriate precautions, as required, are taken to reduce the risk of fire. For carrying out other jobs also, OISD-STD-105 should be followed strictly.

vi) Fire-extinguishing equipment should be well maintained and inspected at suitable intervals by a competent person. Access to fire-extinguishing equipment such as hydrants, portable extinguishers and connections for hoses should be kept clear at all times.

vii) All supervisors and workers should be trained in the use of fire-extinguishing equipment, so that adequate trained personnel are readily available during all working periods.

viii) Audio means to give warning in case of fire should be provided where this is necessary to prevent danger. Such warning should be clearly audible in all parts of the site where persons are liable to work. There should be an effective evacuation plan so that all persons are evacuated.

ix) Notices should be posted at conspicuous places indicating:

(a) the nearest fire alarm;
(b) the telephone number and address of the nearest emergency services.

x) The work site shall be cleared of all combustible materials, as Sparks and molten metal coming from the welding job can easily ignite combustible materials near or below the welding site. If the combustible materials cannot be removed from the area, the same shall be properly shielded.

xi) A dry chemical type fire extinguisher (DCP) shall be made available in the work area. Also fire protection facilities like running hoses etc. as per permit should be complied with.

xii) Wherever required, welding screens shall be put up to protect other equipment in adjoining areas against flying sparks. Material used should be metal/ fire proof blanket/water curtain.

xiii) Welding or cutting of vessels/ equipments used in Hydrocarbon/ hazardous flammable chemicals shall be done after ensuring hydrocarbon free area and verifying the same with the suitable hydrocarbon detector.

xiv) The confined space/equipment shall be made gas free (hydrocarbon and toxic) and cleaned and shall be ensured, with the help of suitable gas detectors.

xv) Used and hot electrode stubs shall be discarded in a metal bucket.

xvi) Use PESO approved and certified spark arrestors for vehicles, wherever applicable.

xvii) Relevant work permit (hot work, cold work, vessel entry etc. as the case maybe) to be obtained, if construction work is carried out within existing operating area.

xviii) Precaution against pyrophoric material shall be ensured.

8.0 Environment Protection

8.1 Waste

The contractor is required to develop, institute and maintain a Waste Management Programme (WMP) during the construction of the project for his works and obtain approval of the owner. WMP may include: -

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

i) Identification of disposal sites.
ii) Identification of waste/surplus quantities to be disposed off.
iii) Identification of amounts intended to be stored temporarily on site location of such storage.
iv) Use of proper PPEs.
v) Identification of intended transport means and route.
vi) Obtaining permission, where required, for disposal.

Such a mechanism is intended to ensure that the designation of areas for the segregation and temporary storage of reusable and recyclable materials are incorporate into the WMP. The WMP should be prepared and submitted to the Engineer for approval.

The Contractor shall handle waste in a manner that ensures they are held securely without loss or leakage thus minimizing potential for pollution and fire. The Contractor shall maintain and clean waste storage areas regularly.

The Contractor shall make arrangement to stack the metal scrap at designated location and maintain the site free from obstruction. The scrap to be disposed as per owner instruction at regular interval.

8.2 Hazardous Waste Management

If encountered or generated as a result of Contractor's activity, then waste classified as hazardous under the "Hazardous Wastes (Management & Handling) Rules, 1989, and amendments thereunder time to time" shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.

Chemicals classified as hazardous chemicals under "Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 of Environment (Protection) Act, 1986 (latest) shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.

8.3 Air Quality

The Contractor shall take all necessary precautions to minimise fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste. He shall not allow emissions of fugitive dust from any transport, handling, construction or storage activity to remain visible in atmosphere beyond the property line of emission source for any prolonged period of time without notification to the Employer.

The Contractor shall use construction equipment designed and equipped to minimise or control air pollution. He shall maintain evidence of such design and equipment and make these available for inspection by Employer.

If after commencement of construction activity, Employer believes that the contractor's equipment or methods of working are causing unacceptable air pollution impacts then these shall be inspected and remedial proposals shall be drawn up by the Contractor, submitted for review to the Employer and implemented.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

The Contractor shall maintain the MSDS of the chemicals used / stacked at site and same shall be handled as per the standard prescribed procedure. The quantity shall be stored strictly as per the norms and emergency handling procedure shall be known and displayed prominently.

8.4 Noise

The Contractor shall consider noise as an environmental constraint in his design, planning and execution of the Works and provide demonstrable evidence of the same. The Contractor shall, take all appropriate measures to ensure that work carried out by the Contractor, whether on or off the Site, will not cause any unnecessary or excessive noise.

8.5 Occupational Noise

i) Protection against the effects of occupational noise exposure should be provided when the sound levels exceed the threshold values as prescribed.
ii) When employees are subjected to expose the sound levels beyond the prescribed limit, feasible administrative or engineering controls should be ensured.
iii) If such controls fail to reduce sound levels within the levels, personal protective equipment shall be provided and used to reduce sound levels within the prescribed limit.

9.0 OCCUPATIONAL HEALTH

9.1 Medical Examination

The contractor shall arrange a medical examination of all his employees before employing, after illness or injury, if it appears that the illness or injury might have affected his fitness and, thereafter, at periodicity stipulated under Factories Act / Building & Construction Workers Regulation (BOCWR).

The Contractor shall maintain the confidential records of medical examination by the physician authorized by the Employer.

9.2 Occupational Health Centre

The contractor shall ensure at a construction site an occupational health centre, mobile or static is provided and maintained in good order. Services and facilities as per the scale lay down under Factories Act / Building & Construction Workers Regulation (BOCWR). A construction medical officer appointed in an occupational health centre possess the qualification as laid down under Factories Act / Building & Construction Workers Regulation (BOCWR).

9.3 First Aid

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

Page 1170 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

First aid facilities should be provided in line with various statutory regulations like The Factory Act etc. However following care should be taken:

i) First aid, including the provision of trained personnel should be ensured at work sites. Arrangement should be made for ensuring the medical attention of the injured workers.

ii) Suitable rescue equipment, like stretchers should be kept readily available at the construction site.

iii) First-aid kits or boxes, as appropriate and as per statutory requirements, should be provided at workplaces and be protected against contamination by dust, moisture etc.

iv) First-aid kit or boxes should not contain anything besides material for first aid in emergencies.

v) First-aid kits and boxes should contain simple and clear instructions to be followed, be kept under the charge of a responsible person qualified to render the first aid and be regularly inspected and replenished.

vi) Where the work involves risk of drowning, asphyxiation or electric shock, first-aid personnel should be proficient in the use of resuscitation and other life saving techniques as specified in rescue procedures.

vii) Emergency telephone numbers of nearby Hospitals, Police, Fire Station and Administration should be prominently displayed.

10.0 DOCUMENTATION

The intention of keeping documentation of all types of accident(s) is to prevent recurrence of similar accident(s). All accidents should be reported as per OISD Guidelines and The Factories Act, 1948/ BOCWR.

All accidents (major, minor or near miss) should be investigated, analysed and recommendations should be documented along with implementation status.

All related data should be well-documented and further analysis highlighting the major cause(s) of accidents be done. This will help in identifying thrust areas and training needs for prevention of accidents.

11.0 SAFETY AWARENESS & TRAINING

Safety awareness to all section of personnel ranging from site-in-charge to workmen helps not only preventing the risk but also build up the confidence. Time and expenditures also get saved as a result.

Safety awareness basically seeks to persuade/inform people on safety besides supplementing skill also. Awareness programme may include followings:

i) **Poster:** Posters with safety slogan in humorous, gruesome demonstrating manner may be used to discourage bad habits attributable to accidents by appealing to the workers' pride, self-love, affection curiosity or human aspects. These should be displayed in prominent location(s).

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

ii) **Safety Sign Boards**: Different type of message of cautioning, attention, notice etc. should be displayed at the appropriate places for learning/ awareness of the workmen while working at site.

iii) **Films & Slides:** Film(s) narrating the accident case study including the causes and possible remedial ways of preventing the recurrence of a similar accident should be displayed at regular intervals. Slides consisting main points of the film show may also be shown to workers.

iv) **Talks, lectures & conferences:** The success of these events would depend much on audience's understandings of the speaker (s). The speakers are to be knowledgeable and good presenter. Speakers should know to hold the attention and to influence the audiences.

v) **Competitions:** Organise competition(s) between the different deptts/categories of workers. The sense of reward/recognition also will improve safety awareness and result in enhancing safety levels.

vi) **Exhibitions:** Exhibitions also make the workers acquainted with hazards and means of preventive measures.

vii) **Safety Publication:** Safety publications including pocket books dealing with ways of investigation and prevention in the field of safety and so on, may be distributed to workers to promote the safety awareness.

viii) **Safety Drives:** From time to time, an intensive safety drive by organising a safety day or a safety week etc. should be launched.

ix) **Training:** Training for covering the hazards for different trade should be imparted. Training should also include the specific hazards related to a job in addition to the general safety training as has been dealt in various chapters and should include all workers. Reference may be drawn from OISD-STD-154.

12.0 REFERRENCES

i) *Factory Act, 1948*

ii) *Indian Electricity Rules*

iii) *Safety & Health in Construction by ILO*

iv) *The Building & Other Construction Workers (Regulation, Employment and Conditions of Service) Act 1996 and Central Rules 1998*

v) CSB guidelines

vi) *IS 1161: 2006 or latest edition - Steel tubes for structural purposes — specification*

vii) *IS 2750: 1964 or latest edition - Specification for steel scaffolding.*

viii) *IS : 3696 (Part 1) – 1987 (Scaffolds) Safety code of scaffolds and ladders*

ix) *IS : 3696 (Part 2) – 1987 (Ladders)Safety code of scaffolds and ladders*

x) *IS 4014 Part I: 2006 or latest edition - Code of practice for steel tubular scaffolding - definitions and materials.*

xi) *IS 4014 Part II: 2005 or latest edition - Code of practice for Steel tubular scaffolding - Safety regulations for scaffolding.*

xii) *Building & Other Construction Workers(Regulation on employment &conditions of service) central rules, 1998 (Provision related to Scaffold).*

xiii) *OHSA Standard on Scaffold (CFR 1926.452)*

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

Page 1172 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

ANNEXURE I

LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF INDIAN STANDARDS

Sr.no	Code No.	Title
01.	IS : 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
02.	IS : 875	Code of practice for Structural safety of buildings: Masonry walls
03.	IS : 933	Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
04.	IS : 1179	Specification for Equipment for Eye and Face Protection during Welding – First Revision.
05.	IS : 1904	Code of practice for Structural safety of buildings: Shallow foundations
06.	IS : 1905	Code of practice for Structural safety of buildings: Masonry walls
07.	IS : 2171	Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision.
08.	IS : 2361	Specification for Building Grips – First Revision.
09.	IS : 2750	Specification for Steel Scaffoldings.
10.	IS : 2925	Specification for Industrial Safety Helmets – First Revision.
11.	IS : 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision.
12.	IS : 3521	Industrial safety belts and harnesses
13.	IS : 3696 – Part I	Safety Code for Scaffolds and Ladders : Part I – Scaffolds.
14.	IS : 3696 – Part II	Safety Code for Scaffolds and Ladders : Part II – Ladders.
15.	IS : 3764	Safety Code for Excavation Work.
16.	IS : 4014 -Part I & II	Code of practice for Steel tubular scaffolding
17.	IS : 4081	Safety Code for Blasting and Related Drilling Operations.
18.	IS : 4082	Recommendations on staking and storage of construction materials at site
19.	IS : 4130	Safety Code for Demolition of Buildings – First Revision.
20.	IS : 4138	Safety Code Working in Compressed Air-First Revision
21.	IS : 4756	Safety code for Tunneling works
22.	IS : 4912	Safety requirements for Floor and Wall Openings, Railings and toe Boards –First Revision.
23.	IS : 5121	Safety Code for Piling and other Deep Foundations.
24.	IS : 5916	Safety Code for Construction involving use of Hot Bituminous Materials.
25.	IS : 5983	Specification for Eye Protectors – First Revision.
26.	IS : 6922	Structures subject to underground blasts, criteria for safety and design of
27.	IS : 7155	Code of recommended practices for conveyor safety
28.	IS : 7205	Safety Code for Erection on Structural Steel Works.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

Sr.no	Code No.	Title
29.	IS : 7069	Safety Code for Handling and Storage of Building Materials.
30.	IS : 7293	Safety Code for Working with Construction Machinery.
31.	IS : 7323	Guidelines for operation of Reservoirs
32.	IS : 7969	Safety code for handling and storage of building material
33.	IS : 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals.
34.	IS : 8989	Safety Code for Erection of Concrete Framed Structures.
35.	IS : 9706	Code of Practices for construction of Arial ropeways for transportation of material
36.	IS : 9759	Guidelines for de-watering during construction
37.	IS : 9944	Recommendations on safe working load for natural and man-made fibre rope slings
38.	IS : 10291	Safety code for dress divers in civil engineering works
39.	IS :10386 – Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects.
40.	IS :10386 – Part II	Safety Code for Construction, Operation and Maintenance of River Valley Projects.
41.	IS : 11057	Code of practice for Industrial safety nets
42.	IS : 13415	Code of Practice on safety for Protective barriers in and around building
43.	IS : 13416	Recommendations for preventive measures against hazards at working places

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

OISD-GDN- 206
First Edition, September, 2001

Guidelines on Safety Management System

in Petroleum Industry

OISD-GDN- 206

Oil Industry Safety Directorate
Government of India
Ministry of Petroleum & Natural Gas

Engineers India Ltd

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

Engineers India Ltd

FOREWORD

The oil industry in India is over 100 years old. As such, various practices have been in vogue because of collaboration/association with different foreign companies and governments. 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 Ministry of Petroleum and Natural Gas in 1986 constituted a Safety Council assisted by the Oil Industry Safety Directorate (OISD), staffed from within the industry, 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.

OISD have brought out a number of documents on various topics like layouts of installations, design, engineering, maintenance and operations of various facilities / equipment etc.

In an economic environment of rising cost of various inputs to the industry, in the form of man, material , machine and increasing cost of health care, it is vital for an organisation to effectively manage occupational safety and health. Benefit may be derived from such management in the form of increased productivity and morale. These benefits are a direct consequence of the reduction in workplace accident, injuries and illness. If workmen are to remain productive, they must be protected from injuries and illness.

There is an obvious effort to protect our facilities including personnel and managing the issue of safety and health in totality. The present document outlines the areas, in the form of elements, which need to be given due attention with a view to enhance productivity, morale of personnel and image of the organisation.

This document will be reviewed periodically for improvements based on the experience and better understanding.

Suggestions from industry members may be addressed to :

The Coordinator,
Committee on " Safety Management System",

Oil Industry Safety Directorate

Government of India
Ministry of Petroleum & Natural Gas
8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)

Website: www.oisd.gov.in

Tele: 0120-2593800, Fax: 0120-2593802

Engineers India Ltd

NOTE

OISD publications are prepared for use in the oil and gas industry under Ministry of Petroleum & Natural Gas. These are the property of Ministry of Petroleum & Natural Gas and should not be reproduced or copied or loaned or exhibited to others without a written consent from OISD.

Though every effort has been made to assure the accuracy and reliability of the data contained in these documents, OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from their use.

These documents are intended to supplement rather than replace the prevailing statutory requirements.

Engineers India Ltd

COMMITTEE

ON

SAFETY MANAGEMENT SYSTEM

NAME	ORGANISATION
Leader	
A.A.Raichur	Hindustan Petroleum Corpn. Ltd. (R), Mumbai
Members	
C.S.Chakrabarti	Bharat Petroleum Corpon. Ltd. (R), Mumbai
T.S.Lamba	Oil & Natural Gas Corpon. Ltd, Kolkata
N.Rengaswamy	Engineers India Ltd. , New Delhi
S.Thangavelu	Chennai Petroleum Corpn. Ltd., Chennai
R.C.Pandey,	Bongaigaon Refinery & Petrochemicals Ltd., Bongaigaon
N.Dasgupta	Bharat Petroleum Corpon. Ltd. (M), Mumbai
T.K.Kumar	Indian Oil Corpon. Ltd. (PL), New Delhi
S.S.Maji	Indian Oil Corpon. Ltd. (R), New Delhi
Dr. D.Buragohain	Gas Authority of India Ltd., New Delhi
Member Co-ordinator	
Shri S.N.Mathur	Oil Industry Safety Directorate, New Delhi

(In addition to the above, several other experts from industry contributed in the preparation, review and finalisation of this document).

Engineers India Ltd

SAFETY MANAGEMENT SYSTEM

INDEX

S.No.	Content	Page No.
1.	Introduction	1
2.	Scope	1
3.	Definitions	1
4.	Safety Management System	2
4.1	Safety Organisation	3
4.2	Employees Participation	4
4.3	Process Safety Information	5
4.4	Process Hazard Analysis	8
4.5	Operating Procedures	12
4.6	Training	13
4.7	Contractors	15
4.8	Pre-start up Safety Review	16
4.9	Mechanical Integrity	16
4.10	Work Permit	23
4.11	Management of Change	23
4.12	Incident Investigation and Analysis	24
4.13	Emergency Planning and Response	28
4.14	Compliance Audit	31
4.15	Occupational Health	33
4.16	Off-the-job Safety	33
4.17	Customers and Products	34
4.18	Road Transportation	38
4.19	Trade Secrets	44
5.0	References	44

Engineers India Ltd

SAFETY MANAGEMENT SYSTEM

1.0 Introduction

An effective Safety Management System is required to prevent hazardous incidents and eliminate or mitigate their consequences. A number of catastrophic incidents in hazardous process industry have drawn attention to the safety of processes. Employees have been and continue to be exposed in their workplace to the hazards of chemicals which may be toxic, reactive, flammable or explosive. The present document emphasises the application of management controls for tackling the risks associated with handling / working with or near to hazardous substances in petroleum industry.

2.0 Scope

This document provides guidelines for development of detailed procedures for Safety Management System and covers the petroleum industry as a whole.

3.0 Definitions

Competent Person : A person duly designated / authorised by the management to carryout a specified job

Material Safety Data Sheet (MSDS): Data sheet incorporating safety information / properties of a chemical **/** product and useful for handling the material

Incident : An unplanned event (occurrence, condition or action) which did or could have resulted in personal injury or damage to the plant, community or environment.

Near-miss : An incident which does not result any injury or damage to property but has the potential to result in injury and / or property damage.

Process : Any activity involving a highly hazardous chemical including any use , storage, manufacturing, handling, or on the site movement of such chemicals , or combination of these activities.

For the purpose of this definition, any group of vessels which are interconnected or separate vessels which are located such that a highly hazardous chemical could be involved in potential release should be considered as single process.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

Catastrophic release : A major release involving one or more dangerous substances that leads to serious danger to persons as well as environment both within and outside the workplace and results from uncontrolled developments.

Critical equipment : refers to columns, vessels, machinery, piping, interlocks, and controls determined by management to be vital for preventing the occurrence of a catastrophic release.

Facility : Buildings, containers, piping and equipment that could reasonably be expected to participate in catastrophic release as a result of being physically interconnected or of their proximity and in which hazardous substances are used, stored , manufactured , handled or moved.

Process Hazard Analysis : Process Hazard Analysis (PHA), sometimes called process hazard evaluation, is an organised and systematic effort to identify and analyse the significance of potential hazards associated with the processing or handling of highly hazardous chemicals.

4.0 Safety Management System

System for managing safety intend to cover all aspects of plant and facilities like to control loss to personnel, equipment, material and environment. Objective of developing such a system is to standardise the procedures which should continue to be followed by one and all unless a change in the system is duly authorised by a competent person. Such a Safety Management System should comprise the following basic elements :

1. Safety Organisation
2. Employees Participation
3. Process Safety Information
4. Process Hazard Analysis
5. Operating Procedures
6. Training
7. Contractors
8. Pre-startup Safety Review
9. Mechanical Integrity
10. Work Permit
11. Management of Change
12. Incident Investigation and Analysis
13. Emergency Planning and Response
14. Compliance Audit
15. Occupational Health
16. Off-the job Safety

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

17. Customers and Products
18. Road Transportation
19. Trade Secrets

Each of the these elements should be taken care of as given below:

4.1 Safety Organisation

4.1.1 Safety Policy

Every organisation should have safety policy duly approved by the Board of Directors of the organisation. It should contain intentions and commitment from the top management. It should be made available to all employees in a language easily understood.

It should be displayed at various locations in the organisation.

Organisational set-up for implementation and monitoring of safety policy should be in place. Safety target and objectives for each position in the organisation should be set and pursued. It should be revised as and when required.

4.1.2 Safety Committees

Safety Committees should be formed in the organisation. The Committees should encourage employees participation.

It should meet at least once in a quarter and minutes of the meetings should be recorded.

Deliberations of safety reports, audits, incident enquiries should be a part of agenda of safety meetings.

For implementation of safety committee recommendations, time bound programme should be enforced.

4.1.3 Enforcement of Safety

In the organisation, Safety should be ensured through repeatedly highlighting it's utility in preventing loss of life and property and providing training / retraining to employees in safe working. Following modes should be followed for enforcing safety :

a) Work Permit System
b) Job safety analysis
c) Training of employees and contractors

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

d) Surprise checks
e) Drills
f) Operating manuals / Safety manual
g) Periodic MIS reports for monitoring by top management

4.1.4 Monitoring of Systems

Following systems should be monitored regularly for effective implementation :

a) Checking of safety interlocks
b) Internal audits of plants /facilities in line with OISD-STD-145
c) Management of change
d) Testing / Inspection of equipment
e) Checking of fire detection and protection system

4.1.5 Safety Promotion

Visuals play an important role in reminding personnel of safety information. Therefore, display of following information should be done in the premises:

(a) Safety precautions for critical operations at strategic locations
(b) Safety posters and slogans
(c) Safety records
(d) Do's and Don'ts at toxic chemicals handling/storage/operation areas
(e) Wearing helmet and other Personal Protective Equipment (PPEs)
(f) Labeling of chemicals
(g) Material Safety Data Sheet (MSDS)
(h) Safety manuals, Rules and Regulations
(i) Safety News Letters & bulletins
(j) Dissipation of incident information

4.2 Employees Participation

Following activities should be undertaken to involve employees in the working of the plants / facilities :

1. Company should develop a written action plan to implement the employees' participation.

2. Employees should be involved in Internal Safety Audits and Job Safety Analysis.

3. Employees should be explained about operation of the plant, including safety & health hazard associated with products & work environment.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

4. Employees should be trained on use of personal protective equipment (PPE).

5. Means & methods should be established to keep employees informed about relevant safety & health issues.

6. Safety & health committee at floor level should be formed with participation of employees & employer's representatives to review safety & health related issues of the plant. The committee should meet periodically to discuss the relevant issues & suggest and implement remedial measures.

7. Written information about process, chemicals including MSDS and equipment should be accessible to employees.

8. Critical procedures & instructions should be prepared in English and in a local language, understood by employees.

9. Employees should be involved in management of change related to process & equipment.

10. Safety quiz / suggestion schemes / competitions etc. should be conducted to enhance participation of employees.

4.3 Process Safety Information

Process safety is defined as the operation of facilities that handle, use, process or store hazardous materials in a manner free from episodic or catastrophic incidents. Knowledge of chemicals, process and plants is one of the prime asset. This knowledge is required for developing other modules of the management system like process hazard analysis, operating procedures, training, emergency preparedness plans etc.

4.3.1 Process Information

Complete and accurate written information should be compiled for the following three categories:

1) Process chemicals
2) Process technology
3) Process equipment

This information should represent current operation. All data sheets, drawings, specifications and other documents should be updated / revised based on the present condition of the process. Care should be taken for incorporation of all modifications. Field verification of drawings

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

to ensure consistency with the actual process equipment and arrangement may be made.

Information should be so located that it can be easily available at the time of need. Computerisation of the information is desirable. It facilitates easy up-dation and retrieval. It may be put on local network for easy accessibility by all concerned.

A master-index indicating the location of information and the medium in which it is available should be prepared.

4.3.2 Process Chemicals

Process chemicals should include all raw materials, intermediates / finished products and chemicals used in the process. Data pertaining to process chemicals should help in assessing fire and explosion characteristics, reactive hazards, safety and health hazards to workers and the corrosion and erosion effects on the process equipment. Complete inventory of the process chemicals should be prepared. For each process chemical, following information should be available wherever applicable:

(A) Physical properties:
Physical state, calorific value, heat of vapourisation, Boiling point, Vapour pressure, Melting / Freezing point, Vapour density & specific gravity

(B) Fire & explosion Hazards:
Flash point, Auto-ignition Temperature, Explosive limits, Burning rate

(C) Reactive Hazards :
The tendency of the material to react violently when subjected to heat or the presence of other process chemicals, water, air (oxygen) or other possible contaminants.

Hazardous combustion/decomposition products.

(D) Health Hazard Data:

Personnel exposure hazard properties (long term & short term)

Information of toxicity of the material and exposure limit values such as Threshold Limit Value (TLV), Short Term Exposure Limit (STEL), Permissible Exposure Limit (PEL), Lethal Dose 50 (LD 50) etc.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

(E) Corrosive properties of the chemical, runaway reaction and over-pressure hazards

(F) Information on fire fighting media, use of personal protective equipment (PPE), emergency treatment for exposure and release / spill containment.

Note:
Material Safety Data Sheet (MSDS) : OISD-STD-114 on 'Hazardous Chemicals and Their Handling' may be referred.

4.3.3 Process Technology

Process technology information should include the following:

a) Written process descriptions

b) Process chemistry

c) Process Flow Diagrams (PFD)

d) Safe operating limits of process parameters like pressure, temperature, flow rate etc. and the consequences or results of deviation that could occur if operating beyond the established process limits

e) Maximum inventory levels for process chemicals

f) Material and energy balances

A block flow diagram (BFD) showing major process equipment and pipelines is a preliminary tool for understanding about the process. Flow rates, pressures, temperatures and stream composition may be indicated for better clarity.

Process flow diagrams (PFD) are more elaborate than block flow diagrams. PFD should indicate all main streams including critical valves. Major process parameters like flow rate, temperature and pressure should be indicated at the ins and outs of major process equipment and at the control points. Whenever necessary, pump capacities, compressor power and other such relevant information may be mentioned. Major control loops and key utilities may be preferably shown in the PFDs.

Piping and instrument diagrams (P&ID) are the detailed representation of the plant. Each and every piece of equipment, pipelines, valves and

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

instrument along with their interconnection are shown and most appropriate to show relationship between equipment and instrument. Information mentioned under PFD and all the components of the control loops are depicted to enhance clarity.

P&IDs should be updated whenever any modification is carried out.

4.3.4 Process Equipment

Process equipment include columns, vessels, heat exchangers, reactors, pumps & compressors, valves, piping; drilling rigs & work-over rigs; cross country pipelines; tanks, loading & un-loading facilities and other equipment that contain process chemicals. Design data of process equipment should be documented and should include the following:

a) Materials of construction

b) Design specifications

c) Codes, standards and industry accepted engineering practices used for design and fabrication

d) Electrical classification

4.3.5 Design basis for the pressure relief system and arrangement of shut-down & interlock system should be documented.

4.3.6 For the existing plants where the codes used for design are no longer in general use, design and construction of such equipment should be documented. It should be ascertained that the equipment is still suitable for its intended use and testing/inspection carried out for this purpose should be documented.

4.3.7 When process technology requires departure from applicable codes, it should be documented that the equipment is suitable for the intended use.

4.4 Process Hazard Analysis

The purpose of Process Hazard Analysis (PHA)) is to minimise the likelihood of the occurrence and the consequences of a dangerous substance release by identifying, evaluating and controlling the events that could lead to the release.

A PHA provides information which assists in making decisions for improving safety and reducing the consequences of unwanted or unplanned releases of hazardous chemicals.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

The PHA of existing facilities should be performed in order of priority in terms of hazards of the process. A preliminary hazard analysis may be useful in determining the coverage of the process safety management standard. The factors like quantities, susceptibility to failure, mode of failure, proximity, severity, process complexity, operating history etc. should be considered while establishing priority.

In performing the PHA for a new process or facility , special consideration should be given to previous experience with the process and design circumstances , such as shorter- than - normal design periods or changes in the design team or the design itself after the project is under way.

4.4.1 Conducting Process Hazard Analysis (PHA)

Following considerations should be taken into account for conducting PHA :

1) A process hazard analysis should be performed for all facilities and processes.

2) The process hazard analysis should be appropriate to the complexity of the process.

3) The priority order of conducting process hazard analysis should be determined and documented based on a rationale which includes such considerations as extent of the process hazards, number of potentially affected employees , age of the process, and operating history of the process.

4) A PHA is directed toward analysing potential causes and consequences of fires, explosions, releases of toxic or flammable chemicals and major spills of hazardous chemicals.

5) The PHA focuses on equipment, instrumentation, utilities, human action (routine and non-routine), and external factors that might impact the process. These considerations assist in determining the hazards and potential failure points or failure modes in a process.

6) The process hazard analysis should also address to :
   a) Human factors
   b) A qualitative evaluation of a range of the possible safety and health effects of failure of controls on employees in the workplace.

Engineers India Ltd.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

4.4.2 Basic Steps

Steps to be incorporated in PHA should include :

a) Identification - Based on the process safety information, expertise and experience with similar facilities, failure scenarios that could result in catastrophic release should be identified.

b) Assessment - The likelihood and consequences of the failure scenarios should be assessed using qualitative or quantitative techniques judged to be appropriate.

c) Alternatives- Feasible changes to reduce the risk of occurrence and the consequences of the failure scenarios should be identified.

4.4.3 Methodology and Technique

The selection of PHA methodology or technique should be influenced by many factors including the amount of existing knowledge about the process, age of the process, operational experience of the process, changes, limitations and assumptions

The PHA should take an orderly , systematic approach. One or more of the following methodologies that are appropriate to identify, determine and evaluate the hazards of the process being analysed should be used. What if, checklist, Hazard and Operability Study
(HAZOP), Failure Mode and Effects Analysis, Fault Tree Analysis, an appropriate equivalent methodology.

The application of PHA may involve the use of different methodologies for various parts of the process. A process involving a series of unit operations of varying sizes, complexities, and ages may use different methodologies and team members for each operation. The conclusion can be integrated into one final study and evaluation.

When there is large continuous process which has several control rooms for different portions of the process such as for distillation tower and blending operation , each segment can be done separately and then integrate the final results.

4.4.4 The Team

The process hazard analysis should be performed by a team with expertise in engineering and process operations , and the team should include at least one employee who has experience and knowledge specific to the process being evaluated . Also, one member of the team

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

must be knowledgeable in the specific process hazard analysis methodology being used. Following aspects should be considered while constituting such teams :

a) The team conducting the PHA should understand the methodology being used.

b) The team should have intimate knowledge of the standards, codes, specifications, and regulations applicable to the process being studied.

c) The selected team members need to be compatible.

d) The PHA team can vary in size from two people to number of people with varied operational and technical back ground.

e) The team members should be fully knowledgeable in the proper implementation of PHA methodology that is to be used and should be impartial to the evaluation.

4.4.5 Frequency

The process hazard analysis should be updated and revalidated by a team, having requisite back ground, at least every 5 years after the completion of initial process hazard analysis.

The PHA for a new process or facility or modification in existing facility and recommendations resulting from the PHA should be completed before start-up.

4.4.6 Recommendations and Follow up

Following approach should be adopted once recommendations of Process Hazard Analysis are made available:

1. System to promptly address to the team's findings and recommendations should be established.

2. Recommendations should be resolved in a timely manner and resolution should be documented.

3. Written schedule should be drawn for completion of the recommendations and should be monitored.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

4. The actions taken should be communicated to the operating, maintenance and other employees who may be affected by the recommendations or the actions.

5. Process hazard analysis, updates or revalidation for each process as well as the documented resolutions of recommendations should be retained for the life of the process.

4.5 Operating Procedures

4.5.1 Operating procedures describe tasks to be performed, data to be recorded, operating conditions to be maintained, samples to be collected and safety & health precautions to be taken. Written down operating procedures should be available for all process plants for safe operation.

4.5.2 Operating procedures should be based on process safety information so that all known hazards are taken care of. Operating parameters should be consistent with the process safety information.

4.5.3 The operating procedures should provide specific instructions on what steps to be taken or followed while carrying out the following:

(a) Startup - including procedure for initial startup of the process or equipment as well as startup after normal and emergency shut downs.

(b) Normal operation - including limits of the "normal" operating ranges for parameters such as pressure, temperature and flow, the consequences of operating outside these limits, and the actions that should be taken to correct or avoid deviation from the normal ranges.

(c) Temporary operation - including special requirements while operating in the temporary mode and the acceptable duration of the temporary operating mode.

(d) Normal shut-down - including actions to be taken to safely shut down the process or equipment and conditions to be avoided.

(e) Emergency operation and shut-down - including the conditions under which an emergency shut-down is required. This should also include assignment of authority and responsibility to qualified operators to ensure that shutdown is executed in a safe and timely manner.

4.5.4 Operating instructions should be specific to the plant / facility.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

4.5.5 Operating manuals should contain hazards of exposure of the chemicals being handled. Preventive methods and control measures adopted for exposure protection should be clearly brought out. These information may be provided in a separate volume of the operating manual. MSDS provides majority of such information. Operation manuals should also describe the following:

I. Purpose and function of safety interlocks
II. Equipment handing over procedure
III. Work permit system
IV. Fire protection/fighting facilities

4.5.6 Manuals should be available to the employees. All operators must understand thoroughly and should be fully conversant with the operating manual. Training should be imparted to the operators on operating procedures and should be certified as competent.

4.5.7 Computerisied process control system has added a new dimension. Logic of the software and relationship between the equipment and the control system should be described.

4.5.8 Operating manuals should be updated as often as necessary. Every year, operating manuals must be certified as updated by competent person.

4.6 Training

Personnel in the plant / facilities should be trained and retrained for improving their understanding and up grading skill in their area of work based on identification of their training needs.

4.6.1 Initial Training

Each employee, before being involved in operating a newly assigned process, should be trained in an over view of the process and in the

a) operating procedures viz., initial startup, normal operations, temporary operations, emergency shutdowns including the conditions under which emergency shutdown is required, emergency operations, normal shutdown and startup following a turnaround or after an emergency shutdown.

b) Operating limits viz. consequences of deviation and steps required to correct or avoid deviation.

c) Safety and health considerations viz. properties of, and hazards presented by, the chemicals used in the process, precautions

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

necessary to prevent exposure, including engineering / administrative controls and PPEs.

d) control measures to be taken if exposed(physical, air borne), Quality control for raw materials and control of hazardous chemical inventory levels and special/unique hazards

e) Safety systems and their functions

f) Each employee should be given training on operating procedures & safe work practices, emergency preparedness or disaster management plan, safety procedures, work permit system and areas pertinent to process safety & health.

g) Each employee should be explained action to be taken in the event of unwanted release of hazardous chemicals.

The training should also include/reflect

I. current operating practice, changes that result from changes in process chemicals, equipment and facilities;

II. on safe work practices to provide for the control of hazards during operations such as lockout / tagout, confined space entry, opening process equipment and piping and maintenance.

4.6.2 Refresher Training

Refresher training should be provided at-least every three years and more often, if necessary to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process.

4.6.3 Training Documentation

Record should be prepared containing the identity of the employee, the date of training and the means used to verify that the employee understood the training.

Refer OISD-STD-154 for further information.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

4.7 Contractors

In petroleum industry where contractors are deployed to accomplish various types of jobs of different nature, it is very much essential to formulate an elaborate system for ensuring their safety at work place. Suitable space for contractors camp, if required, inside factory area for any construction activities to be made available at a safe distance from hazardous area. The camp should be dismantled on completion of the job. To meet the requirement, following measures should be incorporated in the system :

1) Management should ensure that contractor personnel are trained in the work practices necessary to perform their job safely.

2) Contractor should provide & maintain work places, plant, equipment, tools, machinery and so organise construction work that as far as reasonably practicable, there is no risk of accident or injury to workers.

3) Contract personnel are to be informed about the known potential fire, explosion or toxic release hazards related to their job & the process and in the applicable provisions of the emergency preparedness plan.

4) Contractor must ensure that each of their personnel has received and understood their roles in safe working practices by preparing a record and should verify the efficacy of dissemination of the safety information. He should also ensure use of PPEs at work place.

5) Contractor should ensure that each of their personnel follows the safety rules of the owner's facility including safe work practices.

6) Contractor should keep owner informed about any unique hazard presented by their personnel's work.

7) Management should ensure for regular safety inspection of its own as well as contractors' construction equipment / tools & tackles by competent person

8) Contractor should assign workers only that job for which they are suited by their age, physique, state of health and skill.

9) Contractor should be made responsible for application & enforcement of safety & health measures in respect of the workers at site and should maintain constant liaison with management.

10) Management, while selecting a contractor, should obtain information regarding their safety performance.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

4.8 Pre-startup Safety Review

One of the most critical period in an operation is the start up of the process. Before a new or modified unit is started, a systematic check should be made to ensure that the equipment has been installed properly, operating procedures have been reviewed , items needing attention from PHA's have been resolved and personnel have been trained. The main purpose of the review is to reduce chance of some item being overlooked that could create a hazard or introduce un-expected safety problem as process is brought to normal operating conditions.

The management should perform a pre startup safety audit for new facilities, for modified facilities when the modification is significant enough to require a change in the process safety information as well as for startup of existing facility / plant after turn around.

Pre startup safety review should confirm that construction is in accordance with design specifications, Safety, operating, maintenance and emergency procedures are in place and are adequate.

For new facilities, process hazard analysis is performed and recommendations have been resolved or implemented before start up and modified facilities meet the requirements contained in management of change

4.9 Mechanical Integrity

Mechanical integrity of the plant or the facility need to be ensured so as to perform intended activities without the chances of its failure. Following aspects should be taken into considerations:

1. Applicable requirements of the codes of practices should be met or exceeded & mechanical integrity should be maintained by use of clearly defined maintenance, inspection and corrosion control procedures.

2. Equipment used to process, store or handle hazardous materials should be designed, constructed, installed and maintained to minimise the risk of releases of such materials.

3. The overall maintenance plan should be drawn taking into consideration the safety, reliability and quality objectives.

4. Feedback from maintenance activities should be given to other elements of safety systems i.e. design & operations for up-dation of P&IDs and operating manuals as required.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

5. Safety aspects with regard to organising maintenance activities should be focused in the maintenance plan and prioritised as below :

   (a) Annual plan
   (b) Tasks and responsibilities
   (c) Manpower (number and type)
   (d) Contractors, if any
   (e) Equipment control and calibration
   (f) Control of spare parts
   (g) System of work permits, records
   (h) Recording of conditions of parts during use and replacement
   (i) Incident reporting

6. The procedures, methods and techniques should be so selected as to eliminate risk in carrying out maintenance activities.

4.9.1 Mechanical Integrity Program

Mechanical integrity program should be in place to assure continued integrity of process equipment. The appropriate working procedures, methods and techniques should used, which are considered most fit for the purpose and in line with the codes of practices.

Elements of mechanical integrity program should include:

(a) Identification and categorisation of equipment and instrumentation, inspection and tests, training of inspection personnel, testing and inspection frequencies, development of maintenance procedures, the establishment of criteria for acceptable test results, documentation of test and maintenance results, and documentation of manufacturer recommendations as to meantime to failure for equipment and instrumentation.

(b) The information pertaining to process equipment design should be documented as to what were the codes and standards relied on to establish good engineering practice.

(c) Documented system should be in place to confirm that equipment complies with recognised and generally accepted good engineering practices.

(d) For existing equipment designed and constructed in accordance with codes, standards or practices that are no longer in general use, it should be determined and documented that the equipment is designed, maintained, inspected, tested and operating in a safe manner.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

4.9.2 Equipment Data

Information should be documented covering following:

1. The list of process equipment and instrumentation should be compiled and categorised to be included in the mechanical integrity program. The list should include pressure vessels, storage tanks, process piping, relief and vent systems, fire protection system components, emergency shut down systems, and alarms and interlocks and pumps.

2. The list of equipment should be prioritised to determine which piece of equipment requires closer scrutiny than others.

3. Information pertaining to the equipment in the process should include material of construction, piping and instrumentation diagram, electrical classification, relief system design and design basis, ventilation system design, design codes and standards employed.

4.9.3 Inspection and Testing

This should consider the following :

1. Inspection and testing should be done on all process equipment.

2. Inspection and test procedures should follow recognised and generally accepted good engineering practices.

3. Each inspection and test done on equipment and its components should be documented.

4. The applicable national / inter-national codes and standards provide criteria for external and internal inspections including frequency and methodology which should be adhered to.

5. Procedures should be developed and be in place to ensure that tests and inspections are conducted properly and that consistency is maintained even where different employees are involved.

6. Internal inspections should cover items such as vessel shells, bottom and head, metallic linings, thickness measurement for vessels and piping, inspection for erosion, corrosion, cracking and bulge, internal equipment like trays , baffles, sensors and screens for erosion , corrosion, or cracking and other deficiencies.

7. The relevant OISD standard and guidelines should be used for developing inspection and maintenance systems.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

8. Frequency of testing / inspection should be based on following considerations :

   a) Meantime between failure of various instrumentation and equipment parts would be known from manufacturer's data or operating experience with the parts which will influence the inspection and testing frequency and associated procedures.

   b) Failure data from operating experience should be documented and analysed.

   c) The frequency and methodology of test of process equipment should be consistent with applicable manufacturer's recommendations, national/international codes,OISD standards / recommended practices / guidelines, good engineering practices. Such inspections/testing should be done more frequently if determined to be necessary by prior operating experiences.

4.9.4 Non-routine Work Authorisation

Following issues should be considered :

1. All non-routine jobs should be carried out in line with OISD-STD -105.

2. List of non-routine jobs should be prepared and procedures defined to carry out them.

3. Roles and responsibilities for work authorisation, issue/receipt of permit, handing over, taking over should be documented and implemented.

4. In case of any change in procedures and practices system of proper authorisation should be instituted.

4.9.5 Maintenance Procedures

The maintenance programs and schedules should be reviewed and analysed to see if there are areas where break down maintenance is used rather than an ongoing mechanical integrity program consisting predominantly of preventive & predictive maintenance.

1. The maintenance procedure should address to the safety aspects with regard to organisation of maintenance (system of work permit and non-routine work), determining whether execution should be on line/off-line, regulations to be followed, harmonising with operation, incident reporting system, maintenance analysis, do it one self or contract out.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

2. Use of personal protective equipment should be laid down for specific maintenance activities.

3. The task, role and responsibilities should be defined

4. Records of trend analysis of machine and equipment should be taken into consideration.

5. The risks associated with different phases of maintenance should be established.

6. All maintenance procedures should be duly authorised.

7. Maintenance manual should be formulated, regularly certified, updated and approved.

4.9.6 Inspection and Test Results

Inspection programme should cover the following :

a) Each inspection and test performed on the process equipment should be documented.

b) The list of process equipment, components, instruments should be made for inclusion in the mechanical integrity/maintenance program.

c) The documentation should identify the date of inspection or test , the name of the person who performed the inspection and test , the serial number or other identifier of the equipment on which the inspection and test was performed , a description of the inspection or test performed and the results of the inspection or test.

4.9.7 Criteria for Accepting Equipment after Maintenance

Following considerations should be taken into account while accepting equipment after maintenance :

1. Equipment that has been out of service for maintenance should be taken over after due testing and documentation.

2. Criteria for acceptable test results should be well defined taking into consideration codes of practices, manufacturer's recommendation, anticipated life and operating experience.

3. Any deviation accepted should be approved by competent person.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

4. Equipment deficiencies which are outside acceptable limits as defined by the process safety information should be corrected before further use or in safe and timely manner when necessary means are taken to assure safe operation.

5. Proper records for handing / taking over of equipment to be maintained.

4.9.8 Documentation of Manufacturer's Recommendations

Documentation should cover :

1. Manufacturer's recommendations for periodic inspection / testing / maintenance of equipment supplied by them should be documented

2. In case of any deviation from the inspection procedure as recommended by manufacturers reason for the same should be documented.

4.9.9 Training of Maintenance Personnel

Training aspects should consider :

1. Appropriate training is to be provided to maintenance personnel to ensure that they understand the preventive maintenance program procedures, safe practices, and the proper use and application of special equipment or unique tools that may be required.

2. Maintenance training should be integrated with overall training program and records should be documented

3. The frequency and contents should be in line with OISD -STD-154.

4.9.10 Line of Defence

Following aspects should be considered for safety of plant :

1. The first line of defence is to operate and maintain the plant and the process as designed and to keep the hazardous materials contained.

2. This line of defence is backed up by the next line of defence which is the controlled release of materials through venting to scrubbers or flares, or to surge or overflow tanks which are designed to prevent unwanted releases.

3. The above two are the primary line of defence or means to prevent unwanted releases. The secondary line of defence would include fixed fire protection system like sprinklers, water spray or deluge systems, monitors etc. Dykes, designed drainage systems and other systems

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

will control or mitigate hazardous chemicals once an unwanted release occurs.

4. The primary and secondary lines of defence should be protected by mechanical integrity program and strengthened where ever necessary.

4.9.11 Quality Assurance

The quality assurance program is an essential part of mechanical integrity program and will help to maintain the primary and secondary line of defence that have been designed into the process to prevent / control / mitigate unwanted chemical release. This require following :

1. In the construction of new plants and equipment, it should be ensured that equipment as it is fabricated is suitable for the process application for which they will be used.

2. Appropriate checks and inspections should be performed to ensure that the equipment is installed properly and consistent with design specifications and the manufacturer's recommendations.

3. The quality assurance system is needed to help that the proper materials of construction are used, that fabrication and inspection procedure are proper , and that installation procedures recognise field installation concerns.

4. The maintenance materials, spare parts and components should be suitable for the equipment for which they will be used.

5. 'As built' drawings, together with certifications of coded vessels and other equipment and materials of construction need to be verified and retained in the quality assurance documentation.
6. Equipment installation jobs should be properly inspected in the field for use of proper materials, and procedures and to assure that qualified craftsmen are used to do the job.

7. Use of appropriate gaskets, packing, bolts, valves, lubricants and welding rods should be verified in the field and documented.

8. The procedures for installation of safety devices should be verified such as torque on the bolts on rupture disc installations, uniform torque on flange bolts, proper installation of pump seals etc.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

9. If the quality of the parts is a problem, it may be appropriate to conduct audits of the equipment supplier's facilities to better assure purchase of required equipment which is suitable for intended use.

10. Any change in equipment that may become necessary will need to go through the management of change procedures.

11. Calibration / standardisation of all equipment required for fabrication.

4.10 Work Permit

In case work is required to be performed in the plant / facility by any person other than the operating personnel of that area, a duly authorised written permit should be obtained by the person / agency executing the work before commencement of the work.

Based on the nature, the work would be undertaken under different types of permits. For example, following jobs should be undertaken with the duly issued hot work permit :

Cutting, Welding, Excavation, Road/Dyke cutting, Electrical lock out / Energising, Confined space entry, Boxing up of a vessel, Working on fragile roof structures, Radiography, Material Handling in operational areas, Crane operation etc.

Refer OISD-STD-105 on Work Permit System for details.

4.11 Management of Change

Management of Change refers to implementing any change intended to bring in any of the inputs to the plant / facility.

Primarily, plants are modified or changed in order to achieve higher efficiency, improve operability and safety, reliability, to accommodate technical changes etc. Another objective of carrying out such modifications / changes may be to prevent mishaps, improve utilisation and optimisation of facilities, reduce downtime, reduce risk to public, enhance knowledge of plants and process activities.

The procedure for management of change should cover review of the specification of piping and equipment, process engineering, instrumentation, maintenance, relief, safety, health, environment etc. After implementation of the changes, the training of personnel in accordance with the changed process, updation of document, equipment history cards, data sheets etc. to be taken care of before commissioning of plant / facilities.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

The modifications may require changes in process / technologies, hardware, addition, alteration or removal of an equipment or a part of it from the plant, in piping system and process equipment, replacement of equipment or machinery that differs from the original equipment, change in metallurgy, change in instrument which may include pressure, temperatures, flow, set points, alarm points, speed, logic and control parameters.

The procedure should be established and documented for implementing a change covering all the stages like commissioning, operation, inspection, maintenance, review of performance of the plant / facility.

Refer OISD-GDN-178 "Guidelines for Management of Change" for details. This should be followed by all plants and facilities.

4.12 Incident Investigation and Analysis

For the management, an incident investigation is a critical feedback about the system of control of a hazard. Feedback control involves gathering information about an occurrence or completed activity, evaluating that information and taking steps to improve the situation in the future. This form of control is valuable as it helps prevent recurrence of the incident.

An incident is a failure in the control of any hazard that results in un-planned event like fire, explosion, run away reaction release of toxic or flammable material, injury or fatality. A workplace incident is an indication that prevention was ineffective and that prompt changes need to be made.
Feedback control gives management the capability to use information on past performance to improve upon future performance and to meet planned objectives and acceptable standards.

A nearmiss incident is a little better situation in that it is a warning given before actual injury. It gives an opportunity for concurrent control which has the advantage of permitting corrective action before an injury, illness, death or property loss.

Therefore, every incident and nearmiss incident must be recorded and thoroughly investigated.

4.12.1 When to investigate

Incident investigation should be initiated as promptly as possible but not later than 24 hours following the incident.

Engineers India Ltd.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

4.12.2 The Objectives of the Incident Investigation

The basic purpose of an incident investigation is to determine the cause of the incident and to formulate a system to prevent reoccurrence of such incidents.

4.12.3 Who Should Investigate

The immediate and first level investigation should be performed by the immediate supervisor of the effected area. The immediate supervisor is closest to the scene, knows the nature of the work, the employees who do the work, and the nature of the hazards associated with the work.

4.12.4 What should an Investigation Report Contain

A detailed investigation report, prepared at the conclusion of the investigation, should include at a minimum the date of incident, date that the investigation began, a description of the incident , the factors that contributed to the incident and recommendations resulting from the investigation. Refer OISD-STD-107 format for further details.

4.12.5 Review of the Initial Investigation

The results of the investigation should be presented to and reviewed with the next higher level supervisor.

4.12.6 The Role of the Safety Professional

A Safety professional should also be called in to review the investigation. An independent review and a second opinion in such situations will help.

If necessary, a second investigation should be performed. The safety professional can conduct a joint investigation with the primary investigation.

The primary safety responsibility still rests with the immediate line management. When the nature of the accident is complex and the causative factors are elusive, an outside expert can be engaged to provide additional knowledge. For accidents involving hazardous chemicals or exposure to toxic substances, the services of an industrial hygienist may prove valuable.

4.12.7 Investigation by the Committee

In case of major incident, management should establish multi-disciplinary team to enquire into the incident. Such safety Committee for an accident investigation has the advantages of bringing in a good mix of knowledge / viewpoints as also injects a new dose of objectivity into the investigation.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

In case of catastrophe or disaster where the losses are very large and the consequences are severe, a senior level of inquiry or investigation may be instituted and assigned with completing an independent investigation.

4.12.8 Salient Parameters for Incident Investigation

The incident investigator's job is to gather all available information to essentially explain how the accident happened and how the occurrence may be prevented.

The investigation should be open to input from all persons who were directly or indirectly involved in the accident. The primary thrust of the investigation should not be to cast blame but should be to prevent it's reoccurrence

The six key questions that should be asked and answered are who, what, where, when, how, and why as below :

(1) "Who" Questions

Who was injured? Who witnessed the accident? Who was involved in responding to the accident? Who contributed to causing the accident, if any? Who has immediate responsibility for safety and health of the work area?

(2) "What" Questions

What occurred (the complete sequence of events should be determined). What equipment, process, or facility was involved? What chemicals or energy was involved? What Safety controls failed to protect? What did the injured worker do or not do? What did others do or not do? What did management do or not do? What Safety factors did management fail to recognize and evaluate?

(3) "Where" Questions

Where did the incident happen? Where was the immediate supervisor / operating personnel at the time of the accident?

(4) "When" Questions

When did the incident happen? When did controls fail to protect? This question should not be answered by a simple hour, day, and month answer. The time of occurrence in relationship to the process cycle and equipment timing must be determined. So is the time in relationship to the work activities of other workers in vicinity / related functions.

(5) "How" Questions

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

How did the incident happen? How did all the physical conditions and human behavior come together and combine to cause the accident? How well did the safety controls (all types from engineering to administrative) work or fail? How was personal protective equipment used or not used?

(6) "Why" Questions

Why did the incident occur? Why the controls fail to protect? Why did the workers not recognize the hazard. Why did the worker fail to evaluate the hazard. Why was management unable to prevent the incident from taking place?

Some of the above questions overlap, but the investigation must be thorough. Regardless of the investigation is being done by the first line supervisor or by a Committee , the above questions should be raised and the best answers found. The accident can then be properly analyzed after getting the above questions answered.

4.12.9 Analysis of the Incident

After all the facts and data have been gathered, the information must be analyzed . The function of analysis is to organize the information and mentally synthesize the raw information into useful ones to arrive at conclusion.

4.12.10 Follow-up Questions

If necessary, after the initial facts have been collected and digested, a set of follow-up questions may be raised. Like a computer routine, the same Who, What, Where, When, How, and Why questions may be pursued except with greater accuracy. The basic idea is to fine-tune the inquiry until the sharpest picture of the accident has been obtained.

4.12.11 Findings Should be Put into a Written Report

A major accident or exposure will generate a significant amount of investigative work. The effectiveness of the investigation is enhanced by a well written report. A written report is a permanent record of the results of the investigation.

4.12.12 Communicating the Report

One of the basic purposes of the written report is to communicate the findings of the investigation within and outside the organization. Thus, careful thought must be expended to determine to whom the written report should be released. Additional thought must be given to the legal ramifi-cations of such records and documents.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

4.12.13 Legal Ramifications of the Accident Report

Every written report, document, and physical record have legal ramifications as they have legal significance. The most obvious is that they constitute evidence which may be used during a trial to prove or disprove a fact that is under dispute. For this reason alone, a report should be prepared with the realization that it can, one day, be used as evidence or proof in a legal proceeding.

4.12.14 Post Investigation Actions

A system should be established to promptly address and resolve the report findings and implement recommendations. Resolution and corrective actions should be documented.

The report should be reviewed with all affected personnel whose job tasks are relevant to the incident findings including contract employees when applicable.

Findings should be accessible to all departments and personnel concerned. Communication methods may be safety bulletins, newsletter, meetings, revision of procedures etc. It is important to prepare information in suitable form for the intended recipient.

There should be a system of maintaining an incident data base wherein information is properly recorded in a form suitable for easy use.

Trend analysis of causes of incidents is vital and help in setting priorities to reduce risk potential. Information gathered on various incidents provides immediate lessons. In long term, it useful in monitoring performance changes, building up a data base on plant history and trend analysis .

Incident investigation reports to be retained for minimum period of five years in order to determine if an incident pattern develops or exists.

4.13 Emergency Planning and Response

The basis for the Emergency Preparedness Plan should be derived from the hazard analysis and the consequences of identified Maximum Credible Accident scenario. The objective of the emergency plan is to provide a measures to contain and minimise the effects of such incidents.

4.13.1 On-site Emergency Plan should contain the following key elements :

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

Page 1208 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

a) Early warning/alarm system

Providing an early warning system is recommended as a standard procedure as it has an advantage of initiating basic action to control over the emergency situation. The warning system can be via telephone, fire sirens etc. Alarm system should have distinctive signal for fire & other emergencies.

b) Immediate response Procedures / Measures

It is essential to list down immediate action in case of an emergency and nominate people / positions to perform the initial task. The people and positions nominated for such task must be available round-thc-dock at the site. This goes long a way in mobilising further resources in controlling the emergency.

c) Manpower / Organogram and their responsibilities

The organogram should be drawn by appointing key personnel and defining their specific duties, which will be handy in case of an emergency. The number of coordinators at a location would depend on the manpower in location. The roles identified for the positions should be consistent with the normal day-to-day responsibilities of the personnel.

d) Emergency Control Room

The emergency control room location should be identified in the plan. The emergency control room should be set up at a safe location and marked on the site plan. The personnel manning the control rooms and their duties should be identified in the plan. The control room will be activated in case of an emergency to direct and coordinate the operations to handle the emergency. It should be furnished with external and internal telephone connections, PA / Paging / VHF etc.; list of essential telephone numbers; list of key personnel and their address; fire fighting system and site plan. Depending upon site requirements, additional control room can be considered.

e) Resource Mobilisation Plan (internal / external)

The emergency plan must contain resource mobilisation scheme so that key personnel will be able to activate the scheme to mobilise the internal & external resources within shortest time available. Such plan must contain identified resources needed and its availability, location and activation methods.

f) Mutual Aid

It is one of the major resources for fire fighting and emergency handling. Mutual aid arrangements are to be worked out in the

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

plan to facilitate additional help in the event of fire fighting or in rescue operation by way of rendering manpower, medical aid or fire fighting equipment etc.

g) Evacuation procedures / Assembly Points

In a major emergency, if it is essential to evacuate the non essential personnel from affected area it is advisable to have a plan for evacuation. There should be pre-designated areas where the personnel like workers, staff, contractor workers etc. not involved in emergency operations (as per Emergency Preparedness Plan) should assemble in case of an emergency. Depending on the location of the emergency, the assembly point can vary. For each potential hazardous zone, a specific assembly point(s) should be identified and marked on the zones/maps. During emergency, Pre-designated persons would take charge of this point and plan for necessary evacuation.

h) List of Attachments, Sketches

i) Layout showing various facilities, fire fighting system, hazardous zones and accompanying assembly point(s) and control room.

ii) Address and telephone numbers of Emergency coordinators and key persons in the location; Mutual aid members; Fire Brigade; Police and Hospitals; Higher officials at region / zone / HO; Government officials like District Collector, Inspector of Factories, Commissioner of Police; Local controller of Explosives.

iii) List of fire fighting & safely equipment available at location.

iv) List of Do's and Don'ts during emergency

v) Formats for reporting to Govt. Authorities, Local Agencies, Police and Hospitals.

vi) Material Safety Data Sheet (MSDS) for each hazardous product handled in the location.

4.13.2 Information to public

The safety measures to be taken in the event of an emergency should be made known to the general public who are likely to be affected.

4.13.3 Training / Drills and Updating of the On-site plan

Mock drills activating the Emergency Preparedness Plan should be conducted periodically for ensuring its efficacy during emergency as well

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

Page 1210 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

as for refinement and updation. The above drills based on the plan will help to achieve the following objectives :-

a) to familiarize emergency response personnel with their roles and duties to be performed.

b) to ensure the efficacy of the emergency response mechanism.

c) to check the coordination of reactions and response of emergency services.

d) to gain experience and confidence,

4.14 Compliance Audit

Safety Audits are the periodic examination of the functioning of safety system. It gives an idea about how effectively the safety system is implemented and how they are being accomplished. It is the feed back mechanism that provides management with the status and measurement of effectiveness of the various safety system elements and activities and leads to the appropriate control over these efforts.

Following three types of safety audits should be carried out:

1. Internal Safety Audit
2. External Safety Audit
3. Safety Management System Audit

4.14.1 Internal Safety Audit

Internal Safety Audit is important as it is carried out by the personnel who are deeply involved in the operation / maintenance of the facility, thus are aware of each and every aspect of it. Therefore, such audit can best bring out any shortcoming in the work area. Following methodology should be followed for such audits:

a) Processing, storage, handling and transportation facilities should be audited once in a year.

b) A calendar containing the area, names of auditors and period of audit should be prepared for every calendar year in advance and be circulated to all the departments and concerned area managers.

c) Areas to be audited should be logically grouped based on functions.

d) Audits should be carried out through a multi-disciplinary team.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

e) Detailed guidelines including checklists as given in OISD-GDN-145 on 'Internal Safety Audits' should be followed.

f) A time bound action plan should be prepared for implementing audit recommendations.

g) Implementation status of the recommendations should be reviewed in the Management Safety Committee Meetings.

4.14.2 External Safety Audit (ESA)

External Safety Audits are carried out by a team of experts. The duration of the audit may be two to five days. Location management should make a presentation for the audit team giving brief description of the process plants / other facilities and the safety management systems. The audit team should study the different manuals, technical documents, implementation status of recommendations of internal and external safety audits, risk analysis / HAZOP studies and enquiry committee recommendations of fires and incidents. The audit team should give more emphasis on system audit as safety survey is carried out by the internal safety audit team. Environment and occupational health aspects may also be included in ESA. Report of the audit team should be submitted within a reasonable time frame.

Time bound action plan should be prepared for implementation of the recommendations and the same should be closely monitored.

Board of Directors should be appraised about the implementation status of the recommendations twice in a year. Whenever, any recommendation cannot be implemented, specific approval should be obtained from the Board of Directors.

4.14.3 Safety Management System Audit

Compliance of the Safety Management System, as per this document, should be assessed by carrying out compliance audit once in 3 years. Companies should develop their own methodology for such audits. Care should be taken to select team member / members who have adequate experience and training for auditing safety management system. Such audit report should be reviewed at an appropriate level with a view to update the procedures.

4.15 Occupational Health

The successful implementation of management plans and polices greatly depend on its adaptability by the personnel (employees) and maintaining their health is vital for productivity and effectiveness. As such, their health should be strongly emphasised in the organisation's strategic plan.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

Promotion of health of employees in the widest sense, should, therefore, be a high priority, both a goal and a challenge for the organisation.

To meet the above objective, it is necessary to have a structured Occupational Health Monitoring so as to have a scientific basis for decisions aimed at protection of human health from any possible adverse consequences of exposure to the hazards in the occupational environment.

Necessary engineering / administrative controls should be exercised to prevent personnel from undue exposure to various hazards at the work place.

Refer OISD-GDN-166 "Guidelines for Occupational Health Monitoring in Oil and Gas Industry" for details.

4.16 Off-the job Safety

Off-the-job safety is a worthy goal in its own right. Analysis of the off-the-job injuries and rates normally shows that they are more costly than lost-time on-the-job injuries. Encouraging employees to be safe away from the work help to preserve skills that could be temporarily or permanently lost. It has added advantage of keeping the absenteeism low.

Further, being careful everywhere creates good mindset. Individual's concentration on the job is likely to be enhanced by ones concentration off-the-job and the plant or office is a healthier and safer environment because of it. The benefits also are widely shared throughout the plant or office communities. Following measures should be adopted to encourage off-the-job safety :

(a) The company should have policy to encourage covering off-the-job safety of the employees.

(b) The reporting and analysis of the off-the-job injuries to employees and their families should be encouraged.

(c) Findings of the analysis of the off-the-job injuries should be known to all the employees through news letters / bulletins

(d) There should be topics covering off-the-job safety incorporated in the news letters / magazines.

(e) Safety quiz, contests and competitions should be organised for the family members of employees to motivate them towards off-the-job safety.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

4.17 Customers and Products

Primary objective of the management should be to make available their customer the intended product without causing any harm to human and the environment.

It can further be elaborated as below:

4.17.1 Customer and Product Safety Goals

The product and customer safety goals of the organisation should be defined to ensure that every product is manufactured, transported, used and disposed off safely. It should cover the following :

(a) The potential safety, health, environmental and liability risks associated with every product sold , every service offered should be recognised and dealt with.

(b) The organisation policy and objectives should focus on long term commitment to continuously improve performance in health, safety and environmental quality.

(c) Product and customer safety should be managed as an integral part of the business and marketable feature of product and services.

(d) Demonstration to the public , government and customers of the organisation's intention to be socially responsible supplier of products and services

(e) All statutory guidelines with regard to health, safety and environmental aspects of products in their manufacture, processing, storage, transportation and marketing should be incorporated in the safety procedures and manuals and updated as and when there is a change.

(f) Intermediate custodians including transporters, dealers and distributors should understand and accept the safety policy and commitment to product and service safety of the organisation.

(g) Roles and responsibilities should be defined with appropriate procedure.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

4.17.2 Products Safety Procedures

Risk associated with the product should be analysed, defined, controlled and instructional material should be developed for the same. It should cover the following :

(i) New products

Assessment should be made for new products prior to marketing and distribution to identify health , safety and environmental hazards with normal use and foreseeable misuse.

(ii) Periodic reassessment of products

Periodic reassessment should be conducted for all manufactured, rebranded products and intermediate streams. This includes a review of adverse effects reported or experienced by those handling these products.

(iii) Existing products

New uses or markets for existing products should be evaluated to ensure that health, safety and environmental hazards and risks are identified and addressed.

(iv)Records and documentation

Records of assessment , background information and conclusions should be kept up to date through out the product's life and retained as appropriate.

(v) Product Information/ Material Safety Data Sheets

Up-to-date information on health, safety and environmental hazards and risks relating to use , storage , handling, transport and disposal of products should be available to the workforce , customers and community. The database on products should cover following aspects:

Synonyms of chemical names, target organs of chemicals, first aid requirements for skin, first aid requirements for eye, first aid requirements for swallowing, first aid requirements for breathing, symptoms of exposure, protective clothing requirements, washing instructions, clothing change requirements, clothing removable requirements, protective eye gear requirements. OISD-STD-155 on Personal Protective Equipment should be referred to.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

(vi) .Reporting adverse effects of product

System should be developed and in place to collect and review adverse effects reported or experienced by those handling the products. Causes for concern should be identified and actions should be taken.

(vii)Product quality certification:

Products should be properly classified, described, packaged, marked and labelled and should be in proper condition for transportation in accordance with the applicable regulations.

(viii)Environmental and Quality standards / systems:

Environmental and quality systems should be in place to assess hazards to employees, community and environment and to take corrective measures by defining compliance programs and commitment to these programs. The quality standards and system should be documented and updated.

4.17.3 Customer Service , Education & Awareness

The following system should be in place:

(a) Receiving and documenting customer complaint with regard to safety, health and environmental aspects of the products and services:

All customer complaint should be reviewed at appropriate level and action taken for manufacturing, distribution and inspection process to prevent its recurrence.

(b) Formal system for responding to the complaint to the satisfaction of the customer:

An effective recall system should be in place for products and services where defects could give rise to health, safety and environmental hazards.

Education should be imparted to the customer on the following:

1) Dissemination of product knowledge

2) Establishing effective method/channel/medium of communication

3) Safe use of product

4) Critical information to be furnished on the product / package

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

5) Emergency action and first aid

6) Identification of target/vulnerable customers

7) Inspection of product/ packaging on receipt by the customer

8) Information on crisis communication/emergency cells

9) Do's and Donot's in understandable fashion

10) Creating customer interest

11) Formation of customer council

4.17.4Activities related with Product and Customer Safety

Product safety management should be a line responsibility and aligned with the business goals. Activities should include :

a) System for disposal of product found not meeting laid down standard/ specifications should be in place.

b) Training tools and communications including labels and material safety data sheets should be prepared ,kept up-to-date and distributed.

c) Applicable environmental guidelines and other standards should be in place

d) All product safety records should be maintained.

e) System should be in place to respond on 24hr basis to emergency requests and calls. Emergency Cell for handling emergency involving products and services at customer premises should function round the clock

f) Excellence in product and service safety should be rewarded.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

4.17.5 Investigation of Incidents during Product Handling, Transportation and at Customer Premises

1) Establish accident investigation policy & procedures

2) Establish team, level, task and authority for accident investigation.

3) Set up check list, guide lines for identifying the immediate and under lying causes

4) Control coordination with others involved police, fire brigade, CCOE, insurance
5) Set up communication procedure and collect relevant information

6) Activate investigation as quickly as possible.

7) Support investigation/analysis by tests and checks of equipment and product.

8) Analyse all incidents for common causes- management system, installations, technical systems, materials , tools , procedures , tasks.

9) Implement preventive measures.

4.18 Road Transportation

Large volumes of petroleum products are transported through road in tank trucks. To ensure safety of product and human beings involve directly or indirectly, it is essential that such vehicles are designed as per standards and driven by competent personnel. To meet the objective, following aspects should be taken into considerations :

4.18.1 Vehicle

Design of the vehicle should be in accordance with Petroleum Rules, SMPV Rules 1989 and OISD standards.

Periodic Inspection of vehicles should cover the following :

1. Periodic statutory inspection in line with SMPV rules, petroleum rules should be carried out by competent person .

2. Inspection at the loading / unloading locations should be carried out and documented in line with the provisions of SMPV Rules, Petroleum Rules and OISD standard.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

3. System should be in place to correct the deviations observed during inspection of vehicles through the contractors with corrective actions for non- implementation.

The relevant provisions of Central Motor Vehicles Rules should be adhered to.

4.18.2Creating a Road Safety Culture

Following actions would help creating road safety culture :

(a) Motivation to improve road safety performance

(b) Assigning responsibility and accountability to improve road safety performance

(c) Participation and involvement at all levels i.e. transporter, crew, organisation.

(d) Prioritising road safety

4.18.3 Transport Safety System

Following aspects should be considered :

a) Develop activities in line with company HSE policies and strategies

b) Organisation with defined responsibilities.

c) Implementation of standard / specifications / practices, monitoring and corrective action

d) Raise awareness and standards

e) Accident analysis and corrective measures

f) Improving awareness of drivers to the risks of driving and how to reduce them.

g) Focussed training to the crews in line with CMV Rules 1989 and OISD standards

h) Inspection/audit, corrective action

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

4.18.4 Transport Safety Activities

This should cover the following :

I. Establish transportation safety standards, procedures and controls

II. Ensure compliance to standards/specifications for vehicle, accessories, fittings and spare parts

III. Prepare and implement procedure and schemes for inspection of vehicles and fittings

IV. Establish driver/helper competence requirements and responsibilities

V. Assess/review training needs of drivers based on performance and provide necessary training

VI. Develop performance indicators for the vehicle, drivers, contractors

VII. Establishment of road safety committees for identification and mitigation of risk in road transportation.

VIII. Select, assess, qualify, contract and periodically re-evaluate contractors

IX. Monitor contractor performance

X. Co-ordinate with contractors to improve safety performance.

XI. Discontinue use of poor performers

XII. Continuously survey the market to identify new contractors who can provide services with required quality and HSE standards.

XIII. Create movement schedules , monitor journey times and routes

XIV. Constitute road safety committees with company employees , contractors and crews.

XV. Set target and measure road safety performance for employee, crew and contractors.

XVI. Thorough investigation of all accidents and follow-up measures.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

XVII. Inspection/audit of transport operations and follow up on action items.

XVIII. Feed back from contractors on matters affecting their safety performance.

XIX. Prepare and ensure that relevant TREM cards are provided to transporters.

4.18.5 Defensive Driving

By exercising the defensive driving skills, the drivers maintain a safety zone around the vehicle. The defensive driving skill is intended to make allowance for the followings-

a) Handling characteristics of the vehicle

b) A lack of skill and knowledge or unpredictable actions on the part of other drivers

c) Vulnerability and unpredictable behaviour of pedestrians and cyclists

d) Unpredictable behaviour of animals

e) Hazardous climate conditions

The skill and art of defensive driving should be inculcated with the drivers by management through -

(i) Improving awareness

(ii) Sharpening the skill of observation, perceptions and anticipation

(iii) Providing time for the driver to correctly assess and respond to a developing situation.

(iv) Educating on Hazardous road features, e.g. curves, hills, narrow roads, bridges, absence of signs, or signals and obstructions.

(v) System of assessment of driver training program in line with OISD-STD- 154 should be in place.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

4.18.6 Safe Driving Assurance

(I) Competence profile of drivers transporting hazardous products should be as follows **:**

(a) Defensive driving skills should be identified

(b) Knowledge and understanding of road safety legislation /rules / regulations.

(c) Emergency response including fire fighting.

(d) General vehicle operations and mechanics of the vehicle.

(e) Vehicle inspection

(f) First aid

(g) Product safety knowledge

(II) Management should ensure the following :

a) Legal requirements

b) Emergency response and crisis management

c) The main causes of road accidents

d) Product knowledge

e) Evaluation of contractor's performance

f) Safety inspections of vehicles and drivers

g) Accident investigation techniques and analysis

h) Scheduling ,routing ,and journey management

(III)Assessment of driving skill should include :

(a) Use of controls - Accelerator, clutch, brakes, gears, steering, mirrors

(b) Reversing - Control, accuracy, observations

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

(c) Road procedure - Move off/stop, signalling, positioning and cornering, use of speed, lane discipline, overtaking.

(d) Reaction to - Signs, hazards, traffic lights

(e) Judgement - Distance, length/width

(f) General - maintenance of progress, temperament, observation, vehicle sympathy, concentration, attitude.

(g) Attitude - tendency to over speed,overtaking, positive/negative

(h) Documentation/records- Available, up to date, authentic

4.18.7 Performance Measurement

Following indicators should be pursued for performance measurement :

a) Number of potential incidents reported

b) Setting targets for transport safety activities and its realisation

c) Implementation of audit recommendations

d) Reported near misses

e) Follow up of non-conformances found in inspections related to vehicle / fittings during loading, unloading operations, non- standard items / maintenance

f) Cases of speed violations/over taking resulting into accidents

4.18.8 Emergency Rescue Operations

This should cover the following :

(a) Each loading/unloading location should develop emergency rescue plan in line with the OISD standard.

(b) Such plan should broadly include limits of individual plants, emergency response preparedness, communication linkages, emergency organisation structure for transportation, emergency action plan action to handle specific scenarios.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

(c) Mutually agreeable emergency action plan for road transportation should be drawn in consultation with the neighbouring oil industry and should be implemented.

(d) Mock drill on emergency handling in road transportation should be carried out once a year.

4.19 Trade Secrets

Trade secrets means any confidential formula, pattern, process, device, information or compilation of information that is used in the business and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it.

The information needed about a process or chemicals must be made available in such a way that both employee and contractor personnel will understand any hazard that may be present and what precautions are necessary to protect them from exposure to these hazards. Such information is required for compiling process safety information , developing PHAs, developing operating procedures, incident investigations, emergency planing and response etc. If required, confidentiality agreement may be made with the supplier.

Its objective is to prevent casual access to critical technical information about a process by limiting the access to certain proprietary data.

5.0 References

I. OISD-STD-105 "Work Permit System"
II. OISD-STD-107 "Format for Incident Reporting"
III. OISD-STD-114 "Hazardous Chemical Data"
IV. OISD-STD-154 "Safety Aspects in Functional Training"
V. OISD-GDN-145 "Guidelines on Internal Safety Audits"
VI. OISD-STD-155 "Personal Protective Equipment"
VII. OISD-GDN-166 "Guidelines on Occupational Health Monitoring"
VIII. OISD-GDN-178 "Guidelines on Management of Change"
IX. 29 CFR Part 1910 OSHA Rules, Process Safety Management of Highly Hazardous Chemicals
X. AIChE Guidelines on Technical Management of Chemical Process Safety, 1995

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

OISD – GDN – 207

FOR RESTRICTED CIRCULATION ONLY

CONTRACTOR SAFETY

OISD – GUIDELINES – 207

Second Edition, April, 2016
First Edition, October, 2002

Oil Industry Safety Directorate
Government of India
Ministry of Petroleum & Natural Gas
8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)

Website: www.oisd.gov.in

Tele: 0120-2593800, Fax: 0120-2593802

Engineers India Ltd

OISD – GDN – 207
Second Edition, April, 2016
First Edition, October, 2002

FOR RESTRICTED
CIRCULATION ONLY

CONTRACTOR SAFETY

Prepared by

FUNCTIONAL COMMITTEE ON CONTRACTOR SAFETY

Engineers India Ltd

OIL INDUSTRY SAFETY DIRECTORATE
8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)
Website: www.oisd.gov.in
Tele: 0120-2593800, Fax: 0120-2593802

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

Engineers India Ltd

FOREWORD

At the time of development of this document, 113 OISD standards, recommended practices and guidelines are applicable to the Oil and Gas installations of Public sector Oil Companies in India. 11 of these standards have been adopted by Petroleum and Explosives Safety Organisation (PESO) in various rules administered by them and thus the provisions of these standards are mandatory for entire Oil & Gas sector to that extent.

A few serious accidents have occurred in the recent past in India and abroad including vapour cloud explosion and fire at Oil terminal near Jaipur emphasised the need for the industry to review the existing provisions of various guidelines and statutory requirements.

With the above in view the Government of India directed the Oil Industry Safety directorate to develop a comprehensive document covering all the facets of Safety in Design, Operation and Maintenance, of depots and terminals being run by marketing divisions of Oil companies with an objective to strengthen the existing system.

The present guideline on "Contractor Safety" has been prepared by the functional committee based on, existing standards, guidelines & recommended practices of OISD, the recommendations arising out of recent major accidents and their analysis, the accumulated knowledge and experience of industry members in India and updation of National and International codes and practices.

The provisions of this document, if implemented objectively, may go a long way in enhancing overall safety standard and reduce accidents in Oil Installations.

Users are cautioned that no standard can be substitute to the "judgement and experience of Engineers"

This document will be reviewed periodically for improvements based on the new experiences and better understanding. Suggestions are also invited from the users after it is put into practice to improve the document further. Suggestions may be addressed to:

The Coordinator
Committee on "Contractor Safety"
Oil Industry Safety Directorate
8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)

Website: www.oisd.gov.in

Tele: 0120-2593800, Fax: 0120-2593802

This guideline in no way supercedes the statutory regulations of Chief Controller of Explosives (CCE), Factory Inspectorate or any other statutory body, which shall be followed as applicable.

Engineers India Ltd.

NOTE

OISD (Oil Industry Safety Directorate) publications are prepared for use in the Oil and Gas Industry under Ministry of Petroleum & Natural Gas. These are the property of Ministry of Petroleum & Natural Gas and shall not be reproduced or copied and loaned or exhibited to others without written consent from OISD.

Though every effort has been made to assure the accuracy and reliability of the data contained in these documents, OISD hereby expressedly disclaims any liability or responsibility for loss or damage resulting from their use.

These documents are intended to supplement rather than replace the prevailing statutory requirements.

Engineers India Ltd.

SECOND FUNCTIONAL COMMITTEE ON CONTRACTOR SAFETY

LIST OF MEMBERS

Name	Organization	Status
S/Shri		
Ashok Dashputre	Vice President, RIL	Leader
Dharmvir	Addl. Director, OISD	Member Coordinator
A K Gupta	DGM (HSE), IOCL	Member
P K Agarwal	CM (HSE), IOCL	Member
S Mukharjee	DGM (C), EIL	Member
Udoay Payyadi	Sr. Manager-Maintenance, HPCL	Member
Vijay Mohan	Addl. Director, CHT	Member
Manish Pandey	Sr. Manager (Mech), BORL	Member
B K Rabha	Dy. CE(Instrumentation), OIL	Member
Bimal Raj V L	Manager (F&S), BPCL – KR	Member
Yogesh J Nakhre	Manager-F&S, HPCL.	Member
Upinder Kumar	Petronet LNG	Member
A K Arora	Addl. Director, OISD	Member

In addition to the above, several other experts from Industry contributed in the preparation, review and finalisation of this Guideline.

Engineers India Ltd

FIRST FUNCTIONAL COMMITTEE ON CONTRACTOR SAFETY

LIST OF MEMBERS

Name	Organization	Status
S/Shri		
R N Biswas	Indian Oil Corporation Ltd.	Leader
S K Bag	Indian Oil Corporation Ltd.	Member
K Prakash	Bharat Petroleum Corporation Ltd.	Member
A Tilwankar	Bharat Petroleum Corporation Ltd.	Member
A D Ghorpade	Hindustan Petroleum Corporation Ltd.	Member
Thomas Chacko	Kochi Refineries Ltd.	Member
R Chakravarty	Numaligarh Refineries Ltd.	Member
N R Adsul	Bharat Petroleum Corporation Ltd.	Member
M P Jain	Engineers India Ltd.	Member
C M Sharma	Oil Industry Safety Directorate	Member
A K Ranjan	Oil Industry Safety Directorate	Member Coordinator

In addition to the above, several other experts from Industry contributed in the preparation, review and finalisation of this Guideline.

Engineers India Ltd

CONTRACTOR SAFETY

CONTENTS

SECTION	DESCRIPTION	PAGE NO.
1.0	**INTRODUCTION**	**1**
2.0	**SCOPE**	**1**
3.0	**DEFINITIONS**	**1**
4.0	**DUTIES / RESPONSIBILITIES**	**2**
4.1	Owner	2
4.2	Contractor	5
4.3	Consultant	8
4.4	Designer	9
5.0	**SAFETY MANAGEMENT**	**9**
5.1	Job Safety Analysis (JSA)	9
5.2	Criteria of a Selection of a Contractor	9
5.3	Site Planning and Layout	10
5.4	Gate Entry Procedure	11
5.5	Training	13
5.6	Inspection / Audit	17
5.7	Penalties for non-compliance	17
5.8	Incident Reporting and Investigation System	20
5.9	Safety Committee Meetings	20
5.10	Safety Equipment / Personnel Protective Equipment	23
6.0	**REFERENCES**	**24**
	ANNEXURE I List of BIS codes / Statutory Regulations	**25**
	ANNEXURE II Checklist for Safety Inspection / Audit	**28**

Engineers India Ltd

CONTRACTOR SAFETY

1.0 INTRODUCTION

Oil and Gas operations like Drilling, Production, Refining, Storage**,** Transportation and Distribution, etc. are inherently hazardous. A large number of contractor workforce is deployed to carry out construction, maintenance and other jobs. The analysis of the incidents in the Petroleum Sector indicates that a large number of incidents involved contractor workforce and have resulted in either casualty or injury besides leading to property damage and operational interruptions and environmental degradation.

In order to improve the safety levels of hydrocarbon installations, the contractor safety is of utmost importance and there is a need to institute a good contractor safety system.

2.0 SCOPE

This document covers broadly the guidelines on the HSE management system for enhancing the safety levels of the contractor workforce deployed in construction, maintenance and operation activities in the hydrocarbon industry.

The safety precautions to be taken while carrying out different activities during construction / maintenance have separately been covered in OISD-GDN-192 on "Safety Practices during Construction".

3.0 DEFINITIONS

Work station / Work site

A place / unit where the job is carried out by contractor/executing agency in specified manner with safety, during construction phase or in operation phase.

Owner
Any physical or legal person/entity for whom prescribed job is carried out.

It shall also include owner's designated representative / consultant /nominee / agent, authorised from time to time to act for and on its behalf, for supervising / co-ordinating the activities of the contractor/execution agency.

Contractor / Executing Agency

A physical or legal person/entity having contractual obligation with the owner, and who deploys one or more worker on the site.

Contractor Worker

It covers all workmen who are either self-employed or employed through contractor, the casual workers and includes contractor's supervisor, working at a location / site employed directly by Owner or through their contractor.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

Incident

An incident is an unplanned, uncontrolled, unintended or unforeseen event, caused by unsafe acts and / or unsafe conditions, resulting in or having the potential to result in personal injury and/or property damage.

Consultant

Consultant is a physical or legal person/entity engaged by owner to provide the consultancy services to owner for management of the contract on their behalf or as specified.

Designer

Designer is a physical or legal person / entity engaged by owner to provide design services of a work site.

Owner's Representative / Engineer In Charge

The Owner's representative/Engineer-in-charge is the one, who has been designated by the owner to manage the contract.

Owner's Safety Officer

A properly trained person designated by owner who ensures safety at work site.

4.0 DUTIES/ RESPONSIBILITIES

4.1 OWNER

4.1.1 Owner's Management

The commitment to safety has to be emphasized by the owner by practice by its own management and employees at all levels. The duties and responsibilities of owner should include:

i) To institute a mechanism for identification and compliance of all applicable statutory rules & regulations (Refer Annexure I for a list of few important Bureau of Indian Standards & statutory regulations).

ii) To provide specific information to contractors and make workers aware on the hazards associated with job assigned.

iii) To provide information about Risk Mitigation measures available at the place of work.

iv) To provide the contractor with information on Owners Safety Plan & Regulations, Emergency Management Plan, lockout / tag out procedure, confined space entry, work permit system, excavation / trench permit system etc.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

v) To specify rules (e.g. for security including access arrangements) and safety rules such as fire protection, first aid arrangements, Work Permit systems etc.

vi) To provide comprehensive list of statutory regulations / standards and specification, to be complied with during execution of contract, in the tender document itself.

vii) To ensure training of the contractor workforce, medical examination, and proper usage of safety equipment.

viii) To specify the requirements of Health, Safety and Environment (HSE) (commensurate with the nature of job) in Pre- Qualification criteria.

ix) To designate Engineer-in-charge and safety officer.

x) To arrange for a multi-disciplinary safety audit team to conduct surprise / regular safety audits and monitor the implementation of the recommendations.

xi) To introduce suitable schemes for motivation of the contractor worker to adhere to safety guidelines.

xii) To review safety practices & their implementation through periodic surprise visit of the work sites and monthly review meeting.

xiii) To develop the HSE plans and incorporate the same in the tender document.

xiv) To liaise with external agencies like press, public etc and with law enforcement, regulatory, statutory agencies etc.

xv) To report to statutory agencies on safety compliance and accidents, if any.

4.1.2 Owner's Representative/Engineer-in-charge

The duties & responsibilities of engineer-in-charge should include:

i) To ensure that all Contract requirements including Health, Safety, Environment & Security are complied with.

ii) To ensure that contractor workforce deployed is adequately qualified, trained and in state of health to commensurate with the requirements of the job.

iii) To ensure that the Tools / Tackles and Machinery being used are properly tested and are in sound working conditions and necessary resources proposed for providing safe place of work and necessary PPE are being used.

iv) To take the required necessary corrective action immediately upon noticing or receipt of a report on noncompliance or any such condition which poses a threat to health, safety or environment. If during the course of execution of the contract, any situation of non-compliance with the contractor's safety and health plan are noticed / reported, the same will be taken up with the contractor for correction. In the event of repeated non compliance, suitable action to be initiated as per the contract.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

v) To ensure that the incidents are reported to all concerned within stipulated time frame.

vi) To ensure submission of a plan for safe working (Method Statement) from contractor and approval of the same by competent person / department.

vii) To ensure that Work Permit System in line with OISD-STD-105 is adhered to.

viii) To ensure availability of all the documentation needed for the execution of contract.

ix) To ensure that the quality controls have been maintained during fabrication/erection and all jobs required for safe commissioning have been carried out.

x) To ensure safe dismantling of all temporary facilities/connections put up by the contractor, after completion of work.

xi) To compile a report on the safety performance (at the conclusion of each contract or periodically such as annually for renewable and long-term contracts), which is to be considered in future when selecting contractors.

xii) To ensure that the Consultant, contractor and sub-contractor employ / designate qualified & trained Safety Engineer / Officer commensurate with requirement of the job.

xiii) To comply with all applicable safety and health standards, rules, regulations and orders issued by competent authority pertaining to the assigned activities.

4.1.3 Owner's Safety Officer

The duties & responsibilities of the Owner's Safety Officer should include:

i) To assess the hazards associated with jobs in consultation with all concerned and establish safe working procedure including identification of the escape routes.

ii) To establish a written record of factors which can cause injuries and illnesses and maintain statistical information for use in analysing all types of incidents and events involving contract personnel.

iii) To undertake routine/surprise inspections of all work sites and identify unsafe conditions & practices, if any. Check for compliance of the safety practices being followed with approved HSE Plan.

iv) To investigate promptly the incidents (including near-miss) in order to advise corrective and/or preventive action and assist management for its compliance.

v) To ensure periodic internal audits, review meetings, monitor and analyse HSE performance, nonconformities and suggest its corrective & preventive action.

vi) To encourage contractor and contract workers for reporting requirements ~~for~~ of occupational injuries and illnesses.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

vii) To advise whether the proposed working arrangements are safe and satisfactory, particularly at the interface between the contractor's planned work and owner's existing facilities.

viii) To communicate to the Contractor the imposed restrictions which may affect the work/personnel such as the temporary closure of a corridor or electrical isolation of equipment.

ix) To review and monitor the contractor's adherence to approved HSE plan and compliance thereof.

x) To design and conduct either independently or in collaboration with the training department, suitable HSE training programme for the prevention of personal injuries to Consultant, Contractor's Managers, Supervisors and workmen at all levels

xi) To identify areas of operations where specialized training is required to deal with potential dangers.

xii) To document and to bring to the attention of the Owner's Supervisor and Contractor any non-compliance/violation of the safety norms against approved safety and health plan or safety and health requirements and also raise these issues in the Safety Committee Meetings.

xiii) To take part in Tool Box Meetings at random and to ensure maintenance of records.

I. Establish, implement, maintain and review HSE objectives and programs including responsibility, authority, means & time frame at all relevant functions and levels.
II. Apprise the management about HSE status & help formulate appropriate policies for continual improvement.
III. Standardize PPE & Safety Devices, identify and develop approved vendors wherever required.

To organise campaigns, competitions, contests and other activities in association with the concerned departments, which will develop and maintain the interest of the contractor and contractor workers in establishing and maintaining safe conditions of work and procedures;

4.2 CONTRACTOR

4.2.1 Contractor's Management

Duties & responsibilities of the contractor should include the following:

i) To implement safe methods and practices, deploy appropriate machinery, tools & tackles, experienced supervisory personnel and skilled work force etc. required for execution.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

ii) To prepare a comprehensive and documented plan for implementation, monitoring and reporting of Health, Safety and Environment (HSE) and implement the same after its approval.

iii) To nominate qualified & trained Safety Engineers / Officers reporting to the Site in charge, for supervision, co-ordination and, liaison for the implementation of the safety plan.

Similar HSE Plan should be implemented at the sub- contractor's or supplier's site /office. However the compliance with the HSE Plan is to be the sole responsibility of the Contractor.

iv) To arrange facilities at suitable location in liaison with the owner for drinking water, toilets, lighting, canteen, lunch shelter, crèche etc. as applicable as per Laws/ Legislation at site and also arrange for workmen compensation insurance, third party liability insurance, registration under ESI / PF act etc as applicable.

v) To arrange for fire protection equipment as per the advice of owner.

vi) To ensure that its employees have completed appropriate health and safety training as required by the statute / regulation and also as per requirements of the Owner / Consultant. The documentation of such training imparted to all its employees should be maintained and produced for verification as required.

vii) To comply with all the security arrangements of owner.

viii) To ensure that the plant and equipment used on-site by contractor / employees is correctly registered, controlled and maintained in sound working condition.

ix) To ensure availability of First Aid boxes and First Aid trained attendant and other facilities as per requirement of factory Act / Building & Construction Workers Regulation (BOCWR).

x) To ensure that all incidents including near misses are reported immediately. Investigated with corrective and preventive action and learning are shared with all workers and all concerned at the earliest.

xi) To have HSE policy

xii) Maintain HSE performance data on yearly basis and submit to owner for evaluation

In construction projects where sub-contractors are engaged, the contractor should set out the responsibilities, duties and safety measures that are expected of the sub-contractor's workforce. These measures should include the provision and use of specific safety equipment, methods of carrying out specific tasks on safety and the inspection and appropriate use of tools.

The responsibilities indicated separately under contractor's Supervisor, Safety Officer and contract worker are contractually that of the Contractor and legally binding on the

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Contractor only. However the specific detailing as above has been given separately for guidance and operational convenience.

The selection of sub contractors, if employed, should be approved by the owner. Sub-contractor should comply fully with all safety rules and conditions applicable to the main contractor.

4.2.2 Contractor's Supervisor / Safety Officer

Duties & responsibilities of the Contractor's supervisor/Safety Officer should include the following:

i) To ensure strict compliance with work permit system by carrying out work only with appropriate work permits and after ensuring that all safety precautions / conditions in the permit are complied with and closing the same after job completion.

ii) To ensure that required guards and standard personal protective equipment are provided, used, and properly maintained including contingency requirement.

iii) To ensure inspection, tested, certification and maintenance of all tools and ensure removal of defective tools.

iv) To plan the workload and assign workers to jobs in commensuration with their qualification, experience and state of health.

v) To ensure that all the preventive measures for identified hazards (e.g. Job Safety Analysis, Job Hazard Analysis, HIRA, etc.) are in place and communicated to workers

vi) To take immediate corrective action against the violation of safety rules observed or reported.

vii) To ensure that the workers likely to be exposed to hazardous chemicals/materials have access to appropriate Material Safety Data Sheets (MSDS), and provide necessary mitigation measures.

viii) To ensure that appropriate warning signboards or tags are displayed.

ix) To ensure that all workers have proper training for their job assignments, including use of appropriate PPE, first aid and fire fighting equipment.

x) To ensure that only medically fit person shall be engaged in work and also ensure that sick / or injured workers during course of work should receive timely and appropriate first aid and/or medical attention.

xiii) To report each incident and/or injury in accordance with established procedures and assist in investigation.

I. Maintain Daily HSE observation log book at site
II. Conduct Tool Box talks along with Site Engineers/ supervisors.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

Maintain the published HSE literature, HSE regulations, codes and other communications. Advise management of compliance and conditions requiring attention.

A fulltime / dedicated Safety Officer should be assigned, where more than 100 workers are employed at site. For smaller jobs, the supervisor should assume the role of the safety officer also.

4.2.3 Contract workers

The duties & responsibilities of the contractor worker should include the following:

i) To perform work safely as per the job requirement and instructions.

ii) To inform all concerned regarding unsafe conditions / and unsafe acts.

iii) To wear PPE as stipulated and necessary for the job.

iv) To inform promptly to their supervisor regarding all work related incidents resulting in personal injury, illness and/or property damage.

v) To take all necessary and appropriate safety precautions to protect themselves, other personnel and the environment.

4.3 CONSULTANT

The activities and responsibilities covered under the scope of the Owner may be delegated to the consultant in those cases as applicable, based on the respective contract conditions. The primary responsibility of Consultant is to ensure compliance with agreed HSE plan for the contract by the Contractor. However those responsibilities conferred on Owner as Principal employer cannot be delegated to consultant.

Where the consultant's scope involves Engineering and Design, those factors under Designer (Para 4.4) should also be applicable.

In all cases, the Consultant's scope should include submission of latest HSE plans for work under his and Contractor's purview and implementing the same till job completion. It should conform to owner's overall HSE plan. This should include Guidelines and Implementation and Reporting Methodology to be followed with required report formats.

Adequate number of Safety Officers shall be provided by the Consultant with necessary skills required for the work to be performed.

The Consultant shall review the documents submitted by the contractor and advise owner on acceptance as well as advise suitability and number of Contractor's safety officers / supervisors.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

4.4 DESIGNER

The Process Designer should identify all hazards and risks likely to be encountered during fabrication, erection including dismantling, Pre-commissioning, commissioning and Performance run to meet the Guarantees and advise the risk mitigation measures.

All the hazards and safety measures to be adopted while handling Dangerous chemicals and Catalysts should be detailed by the Process Licensor and the same should be again included in the scope of the suppliers. Specific write ups/MSDS should be obtained from Patented single source suppliers also.

Designs should recognize, include and apply safe practice during preparation, construction and subsequent operational use and maintenance after completion of the Project.

All documents including drawings and calculations are to be originated, checked and approved in accordance with latest international codes, standards, specifications and design basis philosophy.

Use of low risk materials, non hazardous substances, use of low noise and dust-suppressed equipment etc. should be encouraged.

5.0 SAFETY MANAGEMENT

5.1 JOB SAFETY ANALYSIS (JSA)

Job safety analysis (JSA) provides a mechanism by which the contractor / owner, safety officer(s) and job supervisor(s) take a detailed look at how an individual task is performed , and its inherent hazards and preventive measures. This procedure helps in integrating accepted safety and health principles and practices into a particular operation. In a JSA, each step of the job is examined to identify potential hazards and to determine the safest way to do the job.

A job safety analysis includes five steps as below:

- Select a job
- Break the job down into a sequence of steps
- Identify the hazards against each of these steps (based on knowledge of accident, causes of injuries and personal experience) and determine the preventive measures to overcome these hazards
- Apply the controls to the hazards
- Evaluate the controls measures and revisit JSA if necessary

5.2 CRITERIA OF SELECTION OF A CONTRACTOR & SAFETY PERFORMANCE REVIEW

“Contractor Safety” can be ensured to a large extent if competent agency for execution of assignment or job, based on HSE system agreed upon by owner, is selected. It is necessary to assess his capabilities and competencies to perform work safely.

Engineers India Ltd

“OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines.”

A databank should be developed for all the contractors for their past performance on HSE aspects. An attempt should also be made to get similar data from other similar industries.

The data required will depend upon complexity involved in the job and type / size of resources required. Format needs to be suitably developed depending upon size, nature of the job & hazard associated therein. The format designed should also take care of the skill required to carry out the job.

Performance review is essential for all type of contractors. It helps in recording actual performance/experience with contractors while the contract is in progress. It is essential that resources agreed as per the contract are reviewed at mobilization stage for ensuring compliance from the day one and thorough effective supervision / monitoring system are at place.

This activity also helps in taking timely action in case of unsatisfactory performance to correct the situation and ensure safe work during execution period and deciding about suitability of the contractor for future jobs.

The periodicity of such performance review will depend upon size/type/complexity of contract. However, the performance should be reviewed periodically from mobilisation stage till the demobilization stage. Appropriate corrective action should be ensured.

5.3 SITE PLANNING AND LAYOUT

Before starting the construction/maintenance job at existing workplace in operation or green field locations, following should be ensured: -

i) Details regarding location of workshop/ fabrication yard, site office, stores, laboratory, electrical installations, placement of construction machinery, medical and welfare facilities, lighting underground and above ground piping route, cable route etc. should be decided prior to commencement of the work in consultation with owner / Consultants and implementation should be ensured. Layout should be displayed at strategic locations.

ii) The resources required to meet any emergency situations like fire fighting, first aid etc. should be planned and mobilized as per the job requirement.

iii) The sequence or order in which work to be done and any hazardous operations or processes should be identified.

iv) Free access to site shall be provided with clear roads, passage, gangways, staircases etc. Access to construction site should be leveled, open and free from any obstructions like construction material or scrap/waste, exposure to hazards such as falling materials, material handling equipment and vehicles. Any pit or ditch shall be covered or barricaded.

v) Arrangements should be made to maintain good housekeeping at site. Scrap and debris generated out of construction work should be removed/disposed off at a regular interval as directed. Emergency exit should be provided in case of blockade of primary exit.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd.

vi) Suitable warning notices and also the routes to and from welfare facilities should be displayed prominently.

vii) Pedestrian pathways and routes for vehicular traffic (light/heavy vehicles including material handling equipment) should be earmarked.

viii) Artificial lighting to be provided at places where work continues or workers pass by after sunset or in case natural light is insufficient like confined spaces.

ix) Keep all equipment /machines under cover to prevent them from dust, rain/flood water, heat etc. and follow storage instructions as applicable for each of them.

5.4 GATE ENTRY PROCEDURE

Gate entry at any site / workplace / unit is to be restricted to ensure entry of only authorised persons / vehicles.

5.4.1 Entry procedure for all contractor workers should be as follows:

A. Issuance of Pass

i) The passes are to be issued after the owner's representative/engineer-in-charge forwards the application of the contractor providing complete details of the workers being engaged. The contractor should be asked to submit Character & Antecedents (C&A) verification of individual worker from concerned authorities.

ii) The actual deployment of the workers at the construction site should be done after imparting the necessary safety induction training.

iii) With regard to issuance of passes for all vehicles including material handling equipment, owner's representative / engineer-in-charge should forward the application only after ensuring that all documents pertaining to the fitness of the vehicle/equipment and valid driving license of the driver**,** PUC of the vehicle, insurance of vehicle, etc. are available.

iv) The passes should be serially numbered with address, contractor name, identification mark, signature of the worker etc.

v) Special colour code for passes should be used for persons entering different areas like Administrative Block, Unit area, Project Area (wherever applicable).

vi) Contractor workers engaged on routine basis for long periods should be provided with monthly photo pass.

vii) Special permit is required separately for working beyond normal working hours and holidays.

B. Gate Entry

i) Entry of the contractor's employees should be permitted with valid gate passes only.

Engineers India Ltd.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

ii) Entry of contractor's workers should be allowed in presence of authorized representative of contractor.

iii) Records of persons at the time of entry/exit should be maintained.

iv) At the entry gate of the location, a physical checking for non-carrying of lighter, matchboxes, explosives etc. should be carried out.

v) Gate passes/Identity Cards should be displayed on persons at all the times.

vi) For Mega-projects at existing / operating installations, it is preferable to have a separate gate for entry of contractor workers and also the project areas should be segregated fencing from operational area by fencing / other physical means.

vii) No vehicle should be allowed to enter in an operational area without proper flame arrestor.

viii) Awareness on Safety through training / posters etc. highlighting Do's and Don'ts should be spread within entire contractor workforce. Video/Audio tapes on Safety Topics should be played preferably.

ix) For occasionally engaged workers such as for material handling etc., spot photograph should preferably take with two copies (one for preparing the pass and other for attachment with gate register). Specific advice and recommendation of User Department should be given due cognizance. Relevant details are to be written. The pass should be collected back at the gate after day's work.

5.4.2 Tank Truck Loading (TTL) Operation :

At the loading / unloading location, a large no. of Tank Trucks of petroleum products enter the installation. Crew members are generally not regular entrants. The procedure should be as follows:

i) The gate pass should be issued to the individual crew members on written request of the transporter mentioning TT registration nos., License and certificate of training as per MV rule 9.

ii) Character & Antecedent (C & A) verification of the TTL crew through local police is to be done preferably and record maintained.

iii) For loading/unloading purpose, register entry at security gate is made before allowing entry into the premises with recording of names of crew members, time of entry, pass Sr. No., TT no. etc.

iv) For loading/unloading, crew is allowed entry alongwith TT only, after checking of TT from explosive/security point of view.

v) Out time, invoice no., Destination etc., are recorded while TTs go out of the security gate.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

5.5 TRAINING

Training is to educate contractor workforce on various hazards associated with the job/workplace and on the respective preventive / mitigation measures to avoid untoward incidents.

i) Workers should be adequately and suitably:

(a) informed of potential safety and health hazards to which they may be exposed to at their workplace;

(b) instructed and trained in the measures available for the prevention, control and protection against those hazards.

ii) No person should be employed in any work at a workplace unless that person has received the necessary information, instruction and training so as to be able to do the work competently and safely. The competent authority should, in collaboration with employers, promote training programs to enable all the workers to read and understand the information / instructions related to safety and health matters.

iii) The information, instruction and training should be given in a language understood by the worker and written, Oral, visual and participative approaches should be used to ensure that the worker has assimilated the information.

iv) Every worker should receive instruction and training regarding the general safety and health measures common to the workplace. This should include:

(a) general rights and duties of workers at the workplace;

(b) means of access and egress both during normal working and in an emergency;

(c) measures for good housekeeping;

(d) location and proper use of welfare amenities and first aid facilities provided;

(e) proper use and care of the items of personnel protective equipment and protective clothing provided to the worker;

(f) general measures for personal hygiene and health protection;

(g) fire precautions to be taken;

(h) action to be taken in case of an emergency;

(i) requirements of relevant safety and health rules and regulations.

(j) training on hazards and mitigation measures for specific area where worker is assigned to work shall be given as part of entry procedure

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

(k) Job specific training / refresher course shall also be given at regular intervals.

(l) It is also expected that behaviour based safety culture shall be encouraged and all the workers will be involved.

Copies of the relevant safety and health rules, regulations and procedures should be available to workers upon the commencement of and upon any change of employment.

5.5.1 Training Techniques

a) Lectures

This technique should be applied when it is required to transfer information in local language to a large contractor workforce with controlled content and time.

b) Case Study

This is an effective technique based on the presentation of case of real events by Trainer to highlight probable causes like Human Error, ignorance about the job etc.

c) Videos

Videos, an effective technique of communication, should be used to display the right techniques of performing a task in a safe manner and hazards associated with a job.

d) Demonstration at site

Right way to do a job should invariably be demonstrated to workers at the site itself. The right way is also a safe way. Hazards due to wrong procedures, short cuts and their adverse effects etc. should also be highlighted.

5.5.2 Training/Awareness Module and Frequency

A. General Safety Training to all categories of contractor employees should be imparted before induction and annually thereafter. No person should be allowed to enter the installation without undergoing this training. This training program should cover:

i) Mandatory uses of PPE like Cotton clothes, Helmet, Safety Shoes, Full Body Safety harness, dust masks, safety goggles, etc.

ii) Probable Hazards related to industry

iii) Job specific hazards

iv) Important Telephone No / Escape route

v) First Aid

vi) Use of Fire extinguisher

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

vii) Location of assembly points

viii) Procedure of calling fire crew in case of any emergency

ix) Wind direction

The contractor workers, if engaged in operation of the plants/facilities, should be trained in line with Clause No. 4.6 of OISD-GDN-206 on "Safety Management System". For other categories of contractor workers, training modules for different category employees are as follows:

B. Contractor Supervisor

Contractor Supervisor should be trained in accordance with the provision of clause no. 5.1.1.2, 5.2.7, 5.3.10, 5.6.12 and 5.7.8 of OISD-STD-154 on 'Safety Aspects in Functional Training'

C. Contractor Worker

Yearly training programme should be carried out for contractor worker and the records should be maintained. The training programme should cover at least the following:

i) Worker responsibility for safety of himself and work area.

ii) Associated hazards with the job and job area including electrical shock hazards.

iii) Importance of First Aid fire fighting equipment, their use & operations

iv) Communication system at the installation

v) Fire / Accident Reporting procedure

vi) General Safety rules

vii) Safety Measures during execution of job such as:

- Welding / Cutting / Grinding
- Working at height
- Confined space entry
- X ray / radiation
- Erection / Dismantling of scaffolding
- Tank construction and repairs
- Handling of chemicals etc.
- Hydrojetting
- Leak testing of pipelines and equipment (hydro and pneumatic testing)
- Grit / other methods of blasting for surface preparation blasting etc.
- Chemical cleaning & pickling
- Catalyst loading & storage
- ELCB

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

viii) Importance & use of PPE

ix) Emergency Routes

x) Assembly Points

xi) Job Specific Training

D. Consultant / Contractor

Awareness program should be carried out for demarketed Consultant / Contractor at the time of induction. This program should cover at least the following:

i) Responsibility of contractor for safety of their personnel and work area

ii) Hazardous property of Petroleum products and chemical used

iii) Communication system

iv) Fire / Accident Reporting procedure

v) Medical facility available

vi) Statutory requirements

vii) Importance of First Aid equipment and required at the site

viii) Work Permit system

ix) Direct/ Indirect losses due to accident

x) Safety Measures while executing the jobs such as:

- Welding / Cutting / Grinding
- Working at height
- Confined space entry
- X ray / radiation
- Erection / Dismantling of scaffolding
- Tank construction and repairs
- Handling of chemicals etc.
- electrical jobs
- Hydrojetting
- Leak testing of pipelines and equipment (hydro and pneumatic testing)
- Grit / other methods of blasting for surface preparation blasting etc.
- Chemical cleaning & pickling
- Catalyst loading & storage
- ELCB

xi) Safety training needs of their supervisors and workers

xii) Importance & Use of PPE at the site

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

xiii) General Safety rules at the installation –

General points:

Workers should not be allowed to take meals or take rest inside the construction / plant area.

E Security Personnel

Training program should be carried out for Security personnel at the time of induction and annually thereafter and the records should be maintained. The training program should cover at least the following:

i) Layout of Plant and Facilities
ii) Vulnerable locations
iii) Safety regulations (Statutory and in company)
iv) Fire Protection Facilities and Locations
v) Role in case of Fire / Disaster
vi) Emergency Procedure and Drills
vii) Industrial First Aid
viii) Use of Personnel Protective Equipment
ix) Disaster Management Plan

5.6 INSPECTION / AUDIT

Inspection / Audit is a tool to evaluate compliance of all safety requirements. Most of the information could be gathered through site inspection using ready-made check lists to ensure that contractors / agencies abide by the safety rules and norms while working at operating / construction sites.

A checklist, while carrying out different type of jobs, should be developed based on hazards associated with the job being performed and requirements as per OISD-GDN-192 on "Safety Practices during Construction". Typical format is enclosed at Annexure II, which should be modified to suit the requirement of the site / job to be done.

Before starting the work and at regular intervals thereafter, Contractor's Supervisor/safety Officer and Owner's representative / Engineer-in charge/safety Officer should inspect as per the checklist so prepared to ensure that contractor has prepared to start the work with all safety precaution required for safe execution of job.

5.7 FINANCIAL DETERRENTS FOR NON-COMPLIANCE OF SAFETY RULES/ PROCEDURES

Financial or other type of penalties like seizure of gate passes, stoppage of work for a limited period etc. should be levied on the contractors or their workers for non-compliance of safety rules. A provision of suitable accident severity based penalty clause for contractor should be incorporated to ensure adherence of systems and procedures.

The financial deterrent clauses shall be included in the general terms and conditions of the contract. The violators of the clauses shall be suitably punished. Following list shall be taken as a guide while preparing the financial deterrent clauses but need not be limited to these conditions only.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

A few of the usual non-compliance are as follows:

I. Working without valid work permit/ Violation of any of the conditions specified in the permit.

II. Throwing up/down any material from height or not making proper provision to bring down material safely from height

III. Non standard/unsafe platform/ladder, Non standard/unsafe Scaffolding

IV. Non-usage of PPEs like Safety helmet / Safety shoes / Safety goggles / Welding Shield / Respiratory protection etc. by the contractor personnel

V. Non use of ELCB , using poor joints of cable, using naked wire without top plug into the socket, laying wire/cables on the roads without sleeve.

VI. Carrying out electrical jobs by un-authorised person

VII. Non deployment of the licensed electricians for electrical job.

VIII. Unsatisfactory fencing / barricading of excavated areas, Not providing proper shoring /strutting /proper slope and Not keeping the excavated earth at least one meter away from excavated area

IX. Over speeding of vehicles, rash driving, wrong side parking & parking in front of any fire-fighting equipment.

X. Riding on material handling vehicles or trolleys or hydra.

XI. Non-deployment of safety supervisor / supervisor responsible for safety at work site

XII. Failure to maintain safety register and record by Contractor Safety Supervisor or Supervisor responsible for safety.

XIII. Acting in contravention to any of the provision mentioned in Factories Act 1948 and/or the rules framed there under including all amendments thereto.

XIV. Failure to furnish a first information report (FIR) as per prescribed Pro-Forma within 4 hours of the incident.

XV. Keep and maintain proper records of all incidents occurred at work site.

XVI. Working beyond statutory limits by contractor's workers.

XVII. Deployment of child or adolescent labour.

XVIII. Use of untested and uncertified pressure vessel. Use of untested and uncertified lifting tools/tackle.

XIX. Unsafe handling of compressed gas cylinders No trolley or jubilee clips or double gauge regulator or flash back arrestor on both gas lines & both ends or improper storage / handling or cylinders without caps when not in

Engineers India Ltd

use/damaged hoses). Keeping compressed gas cylinders in horizontal position.

XX. Transporting metallic items below overhead lines, without isolation.

XXI. Damage to fire equipment like hydrant & monitors, fire extinguishers including non return of fire equipment

XXII. Horseplay at work site.

XXIII. Non-provision of basic safety requirement such as 24 V lamp for working in confined space, uncertified / non standard lifting tools, earth leakage protection & earthing connections for electrical appliances as per Indian Electricity Rules, emergency isolation switches etc.

XXIV. Keeping gas cylinders inside the confined spaces.

XXV. Non-usage of the full body safety harness and fall back arrester with life line properly anchored by the workers while working at height

XXVI. Violation of Safety Permit conditions like Firefighting equipment.

XXVII. Non-barricading of area while rigging, digging etc.

XXVIII. Working without valid work permit.

XXIX. Un-authorised road closure/blockage.

XXX. Not clearing the work site on regular basis.

XXXI. Leaving contractor owned leftover material at site at the time of demobilization.

5.7.1 REWARDS AND RECOGNITIONS

The contract employees should be suitably rewarded as per a scheme, with monetary benefits/ prizes for timely reporting of the Near miss incidents/ Unsafe conditions/ Unsafe Acts based on the accident potential if it could have occurred.

The compliance to safety procedures by the contractors shall be evaluated annually as per the scheme based on different leading and lagging indicators and shall be awarded during the safety week celebrations.

The best safety conscious worker as recommended by the safety officers of different contractors during short term jobs such as the turnaround maintenance activities shall be suitably rewarded for motivating the workers to comply with safety requirements.

The best safety officer/supervisors of the contractor shall be recognized and shall be suitably rewarded during the safety week celebrations.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

5.8 INCIDENT REPORTING AND INVESTIGATION SYSTEM

All the incidents including near-miss should be reported immediately by contractor's Supervisor to Contractor and owner's Supervisor / Engineer-in-charge, who should inform to Owner's Safety Officer and owner's Management. Owner's Safety Department will be required for onward reporting as per OISD, Statutory requirements.

All accidents regardless of the extent of injury or damage should be investigated in order to find probable causes, lessons learnt thereof and remedial measures required to prevent its recurrence.

The incident investigation should be done as per provision of clause no. 4.12 of OISD-GDN-206 on 'Safety Management System'.

All the recommendations of investigation / Enquiry Report need to be monitored closely for its implementation. A proper record should be maintained to ensure implementation of all the recommendations and same should be reviewed from time to time.

5.9 SAFETY COMMITTEE MEETINGS

Following three type of safety committee meetings should be held aiming at raising the level of safety consciousness at the site:

5.9.1 Toolbox meeting

To maintain awareness, update training and convey important safety and health information, contractor supervisors should conduct tool box meetings at least weekly and also prior to start of any work. All the contractor workers should attend this meeting. The owner's supervisor/Engineer-in-charge and safety officers should also attend these meetings on random basis. Tool box meeting should be conducted more frequently depending upon circumstances. Record of the same can be maintained in the following typical format.

TOOL BOX MEETING FORM

A Toolbox Talk is a safety meeting allowing open environment for discussion with the work force. It focuses on safety topics related to the specific job, such as workplace hazards and safe work practices. It is aimed to refresh workers' knowledge, cover last minute safety checks, to raise workers' awareness of specific problems on site. Toolbox Talks are also intended to facilitate health and safety discussions on the job site and promote safety culture. It also helps to remind workers that health and safety are an important part of the working day.

Toolbox talk should be short in duration and conducted at the job site prior to the commencement of a new job or work shift. Toolbox Talks can be used for post-accident communications / accident case study, re-enforcement of safe work practice and pre-task planning etc.

Contractor supervisors should conduct tool box meetings at least weekly and also prior to start of any work. All the contractor workers should attend this meeting. The owner's supervisor/Engineer-in-charge and safety officers should also attend these meetings on

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

random basis. Tool box meeting should be conducted more frequently depending upon circumstances.

A toolbox talk should cover following topics;

- Review of the hazards related to job being done. What safety equipment and PPEs should be used? What procedures should be followed?
- Review and analyse recent safety violations— What was the violation? What hazard did it create? What injury could have occurred?
- Review and analyse recent injuries— What happened? Why did it happen? What should have been done?
- Ergonomics and behaviour related tips.
- Importance of PPEs and proper tool for specific jobs.
- Housekeeping

Records of such talks should be maintained. Following information should be included when completing a Toolbox Talk Form:

- Names and signatures of all persons present,
- Topics discussed,

Any job specific training or instructions that have been given in the meeting and who raised the issue or added to the discussion, to show that there has been active consultation with all persons attending the meeting and that all parties have had a chance to raise issues.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

TOOL BOX TALK RECORD

DATE_____ **TIME:**_____ **LOCATION:**_____
DELIVERED BY:_____**WITNESSED B Y:** _____
JOB DISCRIPTION:_____
NAME OF THE CONTRACTOR:_____

Toolbox Talk – Topics / Issues discussed
Other points or issues raised by attendees

NAME	SIGNATURE	NAME	SIGNATURE

5.9.2 Site Safety Committee Meeting

Primary purpose of this safety committee is to enable owner, contractor and workers to work together to monitor the site safety and health plan so as to prevent accidents and improve working condition on site. Its size and membership will depend on the size and nature of job.

The safety committee should include representatives of owner, consultant, contractor identified as safety officer / supervisor. It should be headed by Engineer-in-charge.

The safety committee should have regular and frequent meetings, atleast fortnightly, to discuss the safety and health program on site and to make suggestions for improvement. The meetings should be documented with a time bound action plan. The functions carried out by safety committee should include:

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

i) Review compliance of pending items of last Safety meetings. All critical items should be identified and their compliance ensured.

ii) Consideration of the reports of safety personnel.

iii) Discussion of accident/near-miss and illness reports in order to make appropriate recommendation for prevention.

iv) Examination/evaluation of suggestions made by workers.

v) Dissemination of acquired knowledge through training programs and information sharing sessions.

vi) Discussion & review of Fire Prevention & Disaster Management Plan.

vii) To send recommendation to Apex Body for consideration / approvals.

5.9.3 Safety Review Meeting by Location Head

This meeting should be headed by the Location head and attended by Owner's Supervisor / Engineer-in-charge, owner's safety Officer and all concerned department heads. Prime purpose of this review is to ensure that all the recommendations of various committees are being complied with and to take decisions on critical points raised. This meeting should take place at least once in every quarter. All the investigation reports / audit findings with status of implementation of recommendations should be discussed.

5.10 SAFETY EQUIPMENT / PERSONNEL PROTECTIVE EQUIPMENT

The type of safety equipment to be used is decided based on the job requirement. Selection should be made based on OISD-GDN-192, OISD-STD-155 (Part I & II) and the job requirement. Safety equipment / Personnel Protective Equipment (PPE) shall be of approved make. Contractor shall provide necessary training to each employee regarding proper usage and upkeep of PPE including its limitation.

A register showing stock and issue of PPE should be maintained by the contractor at site and must be available for inspection. 10 to 20 % of PPE in excess of actual requirement to meet contingency requirement should be maintained at site.

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

REFERENCES

1) OISD-GDN-206 on “Safety Management System”

2) OISD-GDN-192 on “Safety During Construction”

3) OISD-STD-155 Part (I & II) on “Personnel Protective Equipment”

4) Building & Other Construction workers (Regulation of Employment & Condition of Service) Act 1996 & Rules thereof

Engineers India Ltd

“OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines.”

ANNEXURE I

LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF INDIAN STANDARDS

Sl.no.	Code No.	Title
1	IS: 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
2	IS: 875	Code of practice for Structural safety of buildings: Masonry walls
3	IS: 933	Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
4	IS: 1179	Specification for Equipment for Eye and Face Protection during Welding – First Revision
5	IS: 1904	Code of practice for Structural safety of buildings: Shallow foundations
6	IS: 1905	Code of practice for Structural safety of buildings: Masonry walls
7	IS: 1989 – Part II	Leather Safety Boots and shoes for heavy metal industry
8	IS: 2171	Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision
9	IS: 2361	Specification of Building Grips – First Revision
10	IS: 2750	Specification for Steel Scaffoldings
11	IS: 2925	Specification for Industrial Safety Helmets – First Revision
12	IS: 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision
13	IS: 3521	Industrial Safety Belts and harnesses
14	IS: 3696 – Part I	Safety Code for Scaffolds and Ladders: Part I – Scaffolds
15	IS: 3696 – Part II	Safety Code for Scaffolds and Ladders: Part II – Ladders
16	IS: 3764	Safety Code for Excavation Work
17	IS: 4014 – Part I & II	Code of Practice for Steel Tubular Scaffolding
18	IS: 4081	Safety Code for Blasting and Related Drilling Operations
19	IS: 4082	Recommendations on stacking and storage of construction materials at site

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

20	IS: 4130	Safety Code for Demolition of Buildings – First Revision
21	IS: 4138	Safety Code for working in compressed air – First Revision
22	IS: 4756	Safety Code for Tunneling works
23	IS: 4912	Safety requirements for Floor and Wall openings, Railings and toe boards – First Revision
24	IS: 5216 – Part I & II	Recommendations on safety procedures and practices in electrical work
25	IS: 5121	Safety code for piling and other deep foundations
26	IS: 5916	Safety Code for Construction involving use of Hot Bituminous materials
27	IS: 6994 – Part I	Specifications for safety gloves: Part I – Leather and Cotton gloves
28	IS: 5983	Specification for Eye Protectors – First Revision
29	IS: 6922	Criteria for safety and design of structures subject to underground blasts
30	IS: 7155	Code of recommended practices for conveyor safety
31	IS: 7205	Safety Code for Erection on Structural Steel Works
32	IS: 7069	Safety Code for Handling and Storage of Building Materials
33	IS: 7293	Safety Code for Working with Construction Machinery
34	IS: 7323	Guidelines for operation of Reservoirs
35	IS: 7969	Safety Code for handling and storage of building materials
36	IS: 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals
37	IS: 8989	Safety Code for Erection of Concrete Framed Structures
38	IS: 9706	Code of Practices for construction of Arial ropeways for transportation of material
39	IS: 9759	Guidelines for de-watering during construction
40	IS: 9944	Recommendations on safe working load for natural and manmade fibre rope slings
41	IS: 10667	Guide for selection of industrial safety equipment for protection foot and leg

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

42	IS: 10291	Safety Code for dress divers in civil engineering works
43	IS: 10386 – Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects
44	IS: 10386 – Part II	Safety Code for Construction, Operation and Maintenance for River Valley Projects
45	IS: 11057	Code of Practice for Industrial Safety Nets
46	IS: 13415	Code of Practice on safety for Protective barriers in and around building
47	IS: 13416	Recommendations for preventive measures against hazards at working places

Statutory Regulations

Latest Statutory Acts and Rules, as given below, should be referred:-

1. The Petroleum Acts 1934 and Petroleum Rules 2002
2. The Factory Act, 1948 (As amended by Factory Amendment Act 1987) and concerned Factory Rules
3. The Water (Prevention and Control of Pollution) Act 1974 & Rules 1975
4. The Environment (Protection) Act 1986 and rules thereunder
5. The Manufacturing, Storage and Import of Hazardous Rules 1989
6. The Hazardous Wastes Management (Management & Handling) Rules 1989
7. The Indian Electricity Act 1901 and Rules 1956
8. The Indian Explosive Acts, 1884 & The Indian Explosive Rules 1983
9. The Gas Cylinder Rules 1981and the static & Mobile Pressure Vessels (Unfired) Rules 1981
10. The Indian Boiler Act 1923 and Regulations 1950
11. The Public Liability Act 1991 as amended in 1992
12. The Motor Vehicle act 1988 and Central Motor Vehicle rules 1989
13. Building & Other Construction workers (Regulation of Employment & Condition of Service) Act 1996

In addition to above, various other statutory acts like EPF, ESIS, Minimum wage act and other local statutory requirements shall also be complied with.

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

Engineers India Ltd

ANNEXURE II

CHECK LIST FOR SAFETY INSPECTION / AUDIT

Job _____ Location _____ Date of Audit_____Frequency _____

Inspected by _____ Contractor (s) _____

Sl.no.	ITEM	YES	NO	NA	REMARKS / ACTION
1.0	**PERSONNEL PROTECTIVE EQUIPMENT (PPE):** Are following PPEs being used as per the job requirements?				
A.	**Minimum mandatory PPEs**				
A1	Safety Helmets (with chin strap)				
A2	Safety Shoes				
A3	Safety Goggles				
A4	Safety hand gloves				
B.	**Job specific PPEs**				
	Whether need of specialised safety PPE identified and documented?				
B1	Full body safety harness with double lanyard				
B2	Fall arrester				
B3	Ear Plug / Ear Muff				
B4	Gum Boots				
B5	Face shield				
B6	Shot/Grit/Slag blasting hood				
B7	Breathing Apparatus				
B8	Gas Filter Mask / Dust Mask				
B9	Hand Gloves (Chemical/ Welding/ Electrical/ anti-vibration/ High temperature/ cold burn etc.)				
B10	Boiler Suit / Fire-retardant suit / Electrical flash fire retardant suit /High pressure water cleaning (Hydrojetting-Turtle) suit /				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	Chemical suit / Low temperature suit etc.				
B11	Others				
C.	Whether workers are trained / briefed to use the PPEs?				
D.	Whether system of checking the quality / quantity of PPEs provided by contractor exists and in practice?				
E.	Whether as per contract the contractor is obliged to arrange the required PPEs to its workmen and the same is being complied with ?				
2.0	**HOUSE KEEPING**				
2.1	Whether Standards of housekeeping are defined in contract and housekeeping is being maintained accordingly?				
2.2	Whether areas are identified and marked for stacking of material like scrap, pipes, plates, cement, sand, loose excavated material etc.?				
2.3	Whether surplus excavated material, debris and scrap material is being removed and disposed on regular basis as per contract?				
2.4	Whether path ways, roads, stairs etc. in the vicinity of work place are maintained free from obstructions?				
2.5	Whether appropriate actions are taken to avoid the slippery area due to water logging / oil spillage?				
2.6	Whether system for collecting and disposal of small size scraps like welding buds, small size metal pieces, insulation material in place.				
2.7	Whether area is maintained free from vegetation, garbage etc. and the work place is kept clean and free of any hazard?				
2.8	Others				
3.0	**EXCAVATION**				
3.1	Whether detailed plan of excavation including soil stability is made and approved by competent authority?				
3.2	Whether excavation hot work permit is taken?				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

3.3	Whether the workplace is thoroughly inspected before issuance of work permit, as stipulated in OISD-STD-105?				
3.4	Whether special conditions mentioned in the permit are clearly explained to the supervisor and in turn to the contractor workers and documented?				
3.5	Whether proper shoring for the excavation is provided to prevent cave-in for side of slope more than the safe angle of repose (generally around 45 degrees) of the soil being excavated?				
3.6	Whether proper precautions have been taken if the excavation is adjoining to heavy structure like building, street and roadways?				
3.7	While excavating whether proper slope usually 45^0 & suitable benches of 0.5 m width at each 1.5 m depth are provided?				
3.8	Whether barricading of 1m height with glowing caution board is provided for excavation beyond 1.5m depth?				
3.9	Whether excavating earth is placed beyond 1m or depth of the excavation whichever is more, from the edge of the trench?				
3.10	Whether heavy vehicle movement is restricted to come too close (minimum 2 M from the edge of excavation) to the excavating area?				
3.11	Whether adequately anchored stop blocks and barriers are provided to prevent vehicles being driven into the excavation? Heavy vehicles should not be allowed near the excavation unless the support work has been specially designed to permit it.				
3.12	Whether necessary precaution is taken for underground pipes, sewers, cables by contractors?				
3.13	Whether extra precaution is taken for bailing out water properly while excavating?				
3.14	During rains whether the excavation is				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	done with extra precaution to prevent caving in?				
3.15	Whether two separate entry/ exit points with necessary ladders / steps, as per requirement, have been provided?				
3.16	Whether required no. of persons are available (as per OISD-STD-105) at all the time to communicate any hazards noticed with workers working in deep trenches or excavation?				
3.17	Whether necessary precautions like regular gas testing are being taken in areas having hydrocarbons and toxic gases so that no gas accumulation takes place in the trenches.				
3.18	Whether IS: 4081-1986 & Indian Explosive act & rules for storage, handling & carrying of explosive material and execution of blasting operation is followed?				
3.19	Whether in case of mechanised excavation, caution board is provided for do's and don'ts like 'Nobody to enter' within one meter of the extreme reach?				
3.20	Whether the following observations are being documented during excavation work and corrective actions taken :- a) Boulder formation encountered b) Collapsing / development of cracks of sides c) Marked damage to support d) Unexpected fall of ground e) Inspection of site after each blast. f) Water logging g) Unexpected utility/cabling				
3.21	Others				
4.0	**PERMITS**				
4.1	Whether valid work permit is issued in compliance to OISD-STD-105 to start any work?				
4.2	Whether before issuing the permit, JSA carried out and mitigation measures made				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	part of work permit?				
4.3	Whether personnel working at site were given tool box talk about the hazards and emergency procedure with important do's and don'ts and record maintained?				
4.4	Whether all conditions of the permit are fulfilled before starting the job?				
4.5	As noted in the permit, whether compliance of all the recommendations are ensured during entire duration of the job?				
4.6	Whether permits are available at work site all the times?				
4.7	Whether hot work permit registered in fire station / designated safety officer?				
4.8	Whether permits are being closed after the completion of job?				
4.9	Others				
5.0	**SAFETY IN CUTTING / WELDING/GRINDING**				
5.1	Whether LPG / Oxygen / Acetylene/ Gas cylinders are kept outside only while working in confined space?				
5.2	Are Acetylene/ O_2 / LPG cylinders kept in upright position with required valve cap and secured at designated places under shed – wet fire retardant clothes ~~gunny bags~~ wrapped around it if the same is under sun at designated place?				
5.3	Check cylinder and cylinder valves for approved quality & any kind of damage?				
5.4	Whether protective valve ~~s~~ caps are kept on cylinders while not in use?				
5.5	Whether proper means and method for transportation of cylinders to avoid dropping and rolling are being adopted / followed?				
5.6	Whether gas cylinders, regulators are				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	kept away from combustible materials and ~~/~~free from oil and grease?				
5.7	Whether all hoses are of approved quality and found to be free of any damage or crack?				
5.8	Whether oxygen and acetylene cylinders are stored separately at a distance of at least 5 feet from each other and kept under shade as per Gas Cylinder rules 2002?				
5.9	Whether gas cylinders are kept at safe location particularly in case job is being done at different elevations while in use?				
5.10	Whether color coding is being used for easy identification of different type of cylinders and hoses?				
5.11	Whether cylinder keys are available near the cylinder?				
5.12	Whether gas torches with flash back arrestors of approved make are only being used?				
5.13	Whether pressure gauges are in working condition and checked from time to time?				
5.14	Whether welding shields are used while welding?				
5.15	Whether proper earthing for welding machines are provided?				
5.16	Whether power is taken from approved sources (welding receptacles)?				
5.17	Whether welding receptacles are properly grounded?				
5.18	Whether welding cables are maintained in good condition and without any joints/ cuts?				
5.19	Whether to avoid short circuit, welding machines are protected against rain?				
5.20	Whether earth connectors are securely connected to the job and not to the				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	adjoining pipeline or structure?				
5.21	Whether flame arrestor of DG set is of approved make and quality?				
5.22	Whether 30mA rating ELCB is provided on power supply.				
5.23	Whether separate power supply arrangement is provided for portable oven?				
5.24	Others				
6.0	**ABRASIVE (SHOT/GRIT/SLAG) BLASTING**				
6.1	Whether abrasive blasting is used only after getting approval from competent authority / work permit?				
6.2	Whether air compressor used for abrasive blasting are positioned away from work place?				
6.3	Whether exhaust of the prime mover is directed away from the work place?				
6.4	Whether in case of motor driven compressor, the body of the motor as well as the compressor is properly earthed?				
6.5	Whether line operator of abrasive blasting wear suitable PPEs including mask?				
6.6	Whether adequate measures are adopted to confine dust / flying particles?				
6.7	Whether adequate measures are taken for proper ventilation while the work is done in confined space?				
6.8	Whether the Air receiver vessel of the compressor is pressure tested.				
6.9	Others				
7.0	**SAFETY WHILE WORKING AT HEIGHTS / SCAFFOLDING / LADDERS**				
7.1	Whether work permit is obtained to take up work at height above 2.2 meters?				
7.2	Whether steel pipes scaffoldings are used in unit/off site areas?				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

7.3	Whether provision for suitable platform with all scaffoldings are made? Whether its construction is as per specification with toe board and railing?				
7.4	Whether the area below working at height is cordoned?				
7.5	Whether ISI approved quality and good condition full body safety harness with shock absorber are used while working at heights?				
7.6	Whether life line of full body safety harness with shock absorber is anchored to an independent secured support capable of withstanding load of a falling person?				
7.7	Whether the area around the scaffold is cordoned off to prohibit the entry of unauthorized person?				
7.8	Whether lifeline ropes used are of good condition and adequate strength free of defects?				
7.9	Whether ladder is placed at secured and leveled surface?				
7.10	Whether it is extended 1.0 Meters above the landing point?				
7.11	Whether ladder used are of adequate length and tying short ladder is avoided?				
7.12	Whether metallic ladders are placed away from electrical system?				
7.13	Whether tools or materials are removed after completion of the day's job at heights?				
7.14	Whether a valid permit is obtained before taking up work on asbestos or fragile roof?				
7.15	Whether sufficient precaution like roof ladders, nets, lifeline, full body harness, etc. is taken while working on fragile roof?				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

7.16	Whether provision is made to arrange duck ladder, crawling board for working at fragile roof?				
7.17	Whether scaffolding has been erected on rigid / firm / leveled surfaces only?				
7.18	Whether scaffold has been inspected by competent person & tagged accordingly prior to being put in use?				
7.19	Whether the scaffolding has been designed for the load to be borne?				
7.20	Whether the erection and dismantling of the scaffolding is being done only by trained persons and under competent supervision?				
7.21	Whether safety net with proper working arrangement and life line has been provided?				
7.22	Others				
8.0	**SAFETY IN CONFINED SPACE**				
8.1	Whether positive isolation is done as per approved blind list and crossed checked by competent person?				
8.2	Whether a permit is obtained to enter a confined space?				
8.3	Whether gas test for hydrocarbon, toxic gas, oxygen level is checked for acceptable limits before entering any confined space and recorded? If levels are beyond permissible limit, whether required PPE like BA, Gas Mask are used.				
8.4	Whether adequate oxygen level is ensured in confined space before entering? If not, whether all precaution like using of Breathing Apparatus set is ensured?				
8.5	In case of chance of ingress of hydrocarbon gases / toxic gases, whether Personnel Monitoring System (PMS) is used ?				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

8.6	Whether only in presence of a supervisor, worker enters in confined space?				
8.7	Whether provision of sufficient means of entry and exit is available?				
8.8	Whether provision of ventilation to remove welding fumes, dust, exhaust gases are made?				
8.9	Whether provision of 24V (Hand lamps with cage as per OISD-STD-155) light for working inside space is made?				
8.10	Is it strictly ensured that stand-by trained persons (2 nos.) are standing outside before a person enters a confined space and communication is being maintained all the time with workers working inside?				
8.11	Whether life belt with one end under control of stand-by person outside is kept while working in confined space?				
8.12	Whether Personnel protective Equipment as specified in the permit are in good condition?				
8.13	Whether boxing up is done only as per the approved procedures and under the supervision of competent persons?				
8.14	Whether all the safety precautions listed in OISD-GDN-192 are taken while working in sewers, OWS etc.?				
8.15	Whether proper house keeping is being maintained inside the confined space?				
8.16	Whether training has been provided to workers working in the confined space and the workers only of sound health are being asked to work in the confined space?				
8.17	Others				
9.0	**SAFETY IN MATERIAL HANDLING**				
9.1	Whether all lifting tools, tackles, machines, chains, ropes etc. are of sound construction, made of sound material and				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	maintained in good condition?				
9.2	Whether lifting tools & tackles are tested as per norms and safe working load, date of testing visibly marked/painted on the equipment?				
9.3	Whether lifting tools, tackles are of adequate strength for the load to be handled?				
9.4	Whether all parts including the working gears fixed or movable of every lifting machine, chain, rope, tackles specify the following condition: a) Thoroughly examined by competent person at least once a year or such interval as required by statutory authority. b) Document of such examination are maintained and produced to owner supervisor before use of particular equipment?				
9.5	Whether chain blocks and cables are inspected before each use to assure their sound condition?				
9.6	Whether hoist and lift, if used are: a) Properly maintained and thoroughly examined by competent authority at least once in every year. b) A register to be maintained to record particulars of such examination in prescribed forms and shall be produced to the owner supervisor before use.				
9.7	Whether area below the movement of boom of crane is cleared to avoid injury from falling objects?				
9.8	In crane handling area whether it is ensured that crew of truck, leave the truck before starting loading / unloading?				
9.9	Whether transporting material from one place to another is done by suitable				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	means?				
9.10	Whether carrier with sufficient capacity without projecting parts is used for transporting materials?				
9.11	Whether riggers engaged are well trained and conversant with signaling procedures including night signaling if required?				
9.12	Whether permission of authorized person is obtained before working on or near an overhead crane?				
9.13	Whether trained riggers are available all the time along with crane?				
9.14	Whether barricading has been done to ensure no unauthorised person enters in the working area of the crane?				
9.15	Whether lifting (rigging) plan has been prepared and approved before start of the work?				
9.16	Whether route of crane movement has been planned before the crane moves out of the garage?				
9.17	Whether it has been ensured that no electrical cable comes within 3 meters or safe distance from the boom of the crane?				
9.18	Whether boom is being kept in the horizontal position or locked while idling?				
9.19	Whether material is being stacked / destacked in trucks with the help of wedges to ensure no slippage while loading / unloading takes place?				
9.20	Whether the forklift / crane is being operated only by trained / authorized person?				
9.21	Others				
10.0	**ELECTRICAL SAFETY**				
10.1	Has the Electrical Line Clearance				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	procedure been followed involving electrical and other concerned Dept. and filling of formats?				
	Whether the "LOTO" system is defined properly and all personnel are aware with the procedure?				
	Whether "LOTO" system is being used in all electrical isolation jobs, by all departments?				
10.2	Have Danger Signs with Voltage rating/ Men at work signboards been displayed at both Sub Station as well as the work site?				
10.3	Has the contractor worker understood the electrical circuit on which he is going to work with probable electrical hazards and mitigation measures to be adopted?				
10.4	Whether contractor has engaged electrician (s) having valid electrical license in line with provisions in Indian Electricity Rules?				
10.5	Have all checks prior to switching operation been carried out and authorisation of owner/ user section obtained subsequently?				
10.6	Have all earthing links on electrical conductors removed before charging the line/ apparatus?				
10.7	Are PPE as prescribed under Indian Electricity Rules available, kept healthy and being used?				
10.8	Are earthing and bonding arrangement of non-current carrying metallic parts in line with provisions of Indian Electricity Rules – 1956 amended time to time as IS: 3043?				
10.9	Have electrical part of OISD-GDN-192 and Clause No. 9.0 for Temporary installations in OISD-STD-173 been understood and followed wherever applicable?				
10.10	Are flexible wires having voltage of 240 volts above earth potential taken through				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	PVC conduits?				
10.11	Whether portable hand lamps with a voltage rating of not more than 24 volts used with flameproof enclosures in confined spaces within columns, vessels etc?				
10.12	Have the Switches, MCBs, fuses etc. been inspected for proper ratings?				
10.13	Has Earth Leakage Circuit Breaker (ELCB) been used on the incoming side to protect against leakage of current? Is the device tested every time the work is started?				
10.14	Whether all portable appliances are provided with insulated Three pin plugs and socket arrangement?				
10.15	Whether industrial type extension boards and plug sockets are used?				
10.16	Has the electrical equipment brought to site by contractor been inspected by owner's supervisor/ safety officer for damage/cuts/abrasion etc? Is record of Insulation Resistance, wherever required being kept?				
10.17	Have standard practices for termination of conductors/ cables been followed (e.g. use of proper lugs, crimping tool, cable glands etc)? Is cable armour in continuity from feeding point to load?				
10.18	Are the Contractor supervisor and workmen well acquainted with first aid for electrical shock?				
10.19	Are the wires/ cables identifiable along their route towards the load by using colour coding and/or markers?				
10.20	Others				
11.0	**ROAD WORK**				
11.1	Whether site is barricaded and provided with warning signs including night warning lamps/ self glowing markers at appropriate location for diversion of traffic?				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

11.2	Whether mixing aggregates with bitumen is done with the help of batch mixing plants? If no, whether adequate precautions have been taken?				
11.3	Whether road rollers, bitumen sprayers, pavement finishers are driven by experienced drivers with valid driving licenses?				
11.4	Whether the worker handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen with aggregate are provided with PVC hood, hand gloves rubber shoes (gum boot) with pegging upto knee joints?				
11.5	Others				
12.0	**FORM WORK, REINFORCEMENT**				
12.1	Whether form work, shuttering, shoring etc. are adequately designed and provided to erect the structure and to support the expected load?				
12.2	Whether staging (support) for shuttering is designed for loads like worker movement, impact load and other incidental loads during construction?				
12.3	Whether workers use PPEs at work site like safety shoes, gloves, helmet with chin strap, goggles and dust masks etc.?				
12.4	Whether all safety procedures are adopted while cutting rod?				
12.5	Whether proper staging and bundling is provided for supplying rods at height?				
12.6	Whether sufficient cross bracings are provided for high staging works as per design requirement?				
12.7	Others				
13.0	**CONCRETING**				
13.1	Whether the concreting area is barricaded?				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

13.2	Whether vibrator hoses, pumping concrete accessories are in healthy condition and mechanically strong?				
13.3	Whether it is ensured that no pipe line in concrete pumping system is attached to any temporary strut such as scaffolds etc.?				
13.4	Whether it is checked that safety guards around moving parts are provided in concrete mixer/ machines?				
13.5	Whether earthing of electrical mixers, vibrator etc. are provided?				
13.6	Whether entry of unauthorised person in the concreting area is restricted?				
13.7	Whether adequate lighting arrangement is made in the concreting area if working during night?				
13.8	Whether PPEs like gum boots, gloves, helmet with chin strap, goggles and dust masks etc. are being used?				
13.9	For overhead or underground work, whether form work and shuttering have been checked with respect to design?				
13.10	Whether boom placers are properly secured?				
13.11	Others				
14.0	**DEMOLISHING (DEMOLISHING BY BLAST NOT CONSIDERED)**				
14.1	Whether an initial survey carried out to identify any structural problems and risks associated with flammable substances and substances hazardous to health?				
14.2	Whether sequence of demolition is formulated and approved by competent person after the survey and recorded in a method statement having taken all the various considerations into account and identifying the problems and their solutions?				
14.3	Are non-sparking tools being used, if required?				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

14.4	Is intermittent clearing operation being done to keep the area reasonably tidy and clean?				
14.5	Whether effective barricading has been provided?				
14.6	Whether Electrical and other facilities like water, oil, gas pipelines, etc. have been isolated / protected?				
14.7	Whether required PPEs like helmet with chin strap, goggles, ear plug/muff, hand gloves, safety shoes, dust mask, etc. used?				
14.8	Others				
15.0	**RADIOGRAPHY**				
15.1	Are safety precautions for handling of source as per guidelines of BARC being followed?				
15.2	Is the potency of the source being used within acceptable limits as per the BARC regulations?				
15.3	Is the area being cordoned with proper signs during radiography as per guidelines of BARC?				
15.4	Does proper place exist as per BARC regulations for storage of source / Personnel safety equipment?				
15.5	Does the radiographer have valid certificate of radiography from competent authority (BARC)?				
15.6	Is radiographer using Exposure Meter / Dosi Meter?				
15.7	Whether minimum occupancy of the premises / workplace is being ensured while radiography is in progress?				
15.8	Is permit system being followed?				
15.9	Whether Radiation Safety Officer is				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	available at site?				
15.10	Others				
16.0	**ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS**				
16.1	Are jobs being carried out with a valid work permit only as per OISD-STD-105 "Work Permit System".				
16.2	Is smoking prohibited in all places containing combustible or flammable materials and "No Smoking" notices prominently displayed?				
16.3	Are only approved type electrical installations and equipment, including portable lamps, being used?				
16.4	Are oily rags, waste, wooden materials and clothes or other substances liable to spontaneous ignition being removed?				
16.5	Are the combustible materials properly shielded in case same cannot be removed from the area?				
16.6	Has welding screens (like metal/ fire retardant cloth/ water curtain) been put up to protect other equipment / facilities/ OWS cement ceiling/ drains in adjoining areas against flying sparks, as may be required?				
16.7	Is Gas-testing being done with the means of a calibrated Gas detection Meter prior to start of Hot work and being done subsequently at regular intervals as per the requirement and recorded?				
16.8	Are regular inspections being done of places where there are fire risks like in the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations?				
16.9	Are fire-extinguishing equipment being placed at strategic locations and are kept well maintained and inspected at suitable intervals by a competent person?				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

16.10	Are accesses to fire - extinguishing equipment such as hydrants, portable extinguishers and connections for hoses kept clear at all times?				
16.11	Are all supervisors and a sufficient number of workers trained in the use of fire-extinguishing equipment?				
16.12	Are audio means, to give warning in case of fire provided, audible in all parts of the site where persons are liable to work?				
16.13	Is there an effective evacuation plan in place so that all persons are evacuated speedily without panic?				
16.14	Others				
17.0	**EMERGENCY PROCEDURES**				
17.1	Is signaling / siren system effective?				
17.2	Is arrangement for rescuing affected person adequate?				
17.3	Are signs showing emergency exit route installed?				
17.4	Is emergency exit route clear of obstacles?				
17.5	Is communication system adequate?				
17.6	Whether emergency vehicle with driver has been provided to meet any emergency situation?				
17.7	Does any tie-up with hospitals or local doctors exist?				
17.8	Has the assembly point for workers in case of emergency been identified and earmarked?				
17.9	Has training been provided to a few workers for First Aid?				
17.10	Emergency procedure and telephone numbers are known to all and same are prominently displayed at site? (Sample				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

	compliance check)				
17.11	Whether emergency mock drills are being regularly done?				
17.12	Others				
18.0	**WELFARE FACILITIES**				
18.1	Are hygienic conditions prevailing at labour camps?				
18.2	Are First Aid facilities available?				
18.3	Does proper sanitation exist at site office and labour camps?				
18.4	Does any arrangement of medical facilities like tie ups with nearby hospital exist?				
18.5	Is proper drinking water facility available for workmen & staff?				
18.6	Are crèches provided for children (if applicable)?				
18.7	Is any proper place/canteen/restroom provided for eating food and taking rest?				
18.8	Is any place earmarked for storing / keeping clothing?				
18.9	Is adequate washing facility available?				
18.10	Does proper ventilation at working place exist?				
18.11	Others				
19.0	**GENERAL**				
19.1	Are illumination levels at workplace and passages adequate?				
19.2	Is communication system adequate?				
19.3	Are display and caution boards provided at strategic locations?				
19.4	Are road barriers being used for blocking any roads/passage?				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

19.5	Has the structure been adequately secured against storm/high winds during construction/ erection?				
19.6	Are the equipment properly earthed?				
19.7	Are vehicles being checked like brakes, oil, lights etc. on regular basis?				
19.8	Is compressed air being used only for its intended purpose and not for any other purpose?				
19.9	Are only proper clothes and not loose clothes being used while working around machinery?				
19.10	Are nails or other sharp objects being removed or bent?				
19.11	Are machine guards over moving parts of machinery such as coupling, pulley, wheel etc. installed?				
19.12	Whether after maintenance of machinery the guards are securely fitted before putting into operation?				
19.13	Are working platforms / gangways provided with hand rails & toe guards?				
19.14	Are swing platforms provided with chains & secured adequately when not in use?				
19.15	Are the approaches to work sites being maintained & kept clear of obstacles?				
19.16	Whether engines of equipment entering into the operating area have exhaust and muffler system with approved spark arrestor?				
19.17	Whether vehicles/engine driven equipment, electrical equipment and tools used are certified?				
19.18	Whether contractors inform his workers about hazards and safe procedures?				

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

19.19	Whether sufficient care is taken so that spark do not go outside working enclosure & falls below?				
19.20	Whether contractor's qualified / trained supervisor is present?				
19.21	Whether all exhausts of engines are provided with approved type of flame arrestors and exhaust is not facing toward the place where the workers are working?				
19.22	Others				

Signature of the Auditor

Engineers India Ltd

"OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD Standards/Guidelines."

ANNEXURE - XII
TO
SPECIAL CONDITIONS OF CONTRACT

[LAND, POWER, WATER AND OTHER FACILITIES]

LAND, POWER, WATER AND OTHER FACILITIES:

Construction Water and Construction Power supply shall be as per the below modifications of Clause Nos. 2.3 of General Conditions of Contract (GCC) and modified to the following extent as detailed below:

1. Construction Water

Owner shall provide construction water free of cost on a single point basis. Construction water tap off location will be 500 meters away from the lab proposed site.
Further distribution shall be in the scope of the contractor at his own cost. However, in case of interruption of water due to unforeseen reasons, contractor shall make alternate arrangement to meet the contingency. This cannot be considered as reasons for extension of completion time/extra claim.

Therefore, the CONTRACTOR shall, within the quoted price, make alternate arrangement to cope with such eventuality.

2. Construction Power

Construction power may be provided to the CONTRACTOR free of cost, from feeders of maximum capacity 400A, from power source identified by BPCL/EIL. Further distribution shall be in contractor scope at his own cost and responsibility. All the works related to laying of cable / distribution panel etc. for construction power shall be arranged by CONTRACTOR at his own cost.
Construction power will be made available to contractor subject to no restriction/disturbances in the main power system, and no extension of time or compensation shall be payable on this account. Therefore, the CONTRACTOR shall, within the quoted price, make alternate arrangement to cope with such eventuality. Additional power, if required, to meet the contractual requirements, shall be arranged by the CONTRACTOR at his own cost. Non-availability of power cannot be considered as reason for extension of completion time / extra claim.

3. Land For CONTRACTOR's Field, Godown and Workshop

a. PROVISION OF FABRICATION YARD

Area upto 2000 sqm for storage space and Site Office nearby to existing Lab Building shall be provided to the Contractor free of cost. Any relocation of the pipeline if required shall be under the scope of the contractor.

Additional land (if required by Contractor) over and above the allocated land shall have to be arranged by the Contractor at their own cost.
No land shall be provided for accommodation purposes to the Contractor, or the purposes of any Contractor's personnel.

The Contractor shall remove all temporary buildings/ facilities etc. immediately after completion of works in all respects.

b. PROVISION OF PROPER WAREHOUSING

In line with requirements specified in GCC and specifications, materials shall be properly stored by CONTRACTOR in his warehouse to enable easy traceability, handling and preservation with all materials having proper identification marks, colour coding etc. In case CONTRACTOR fails to follow the specified requirements, next payment due to him shall not be released till he complies with all the requirements to the satisfaction of Engineer-In-Charge.

4. Drinking Water

Drinking water will be provided free of cost at single source for area provided by Owner for works.

5. Utilities for Commissioning/PGTR

Client shall provide the following utilities 'Free of Cost' basis for Commissioning/ PGTR purpose (if applicable): • Water • Air (Plant Air & Instrument Air) • Power These utilities shall be provided to Contractor at one specified location. Contractor to make their own arrangement for distribution of these utilities from the specified location, at their own cost. Contractor shall not use these utilities for any purpose other than intended herein i.e. Commissioning/PGTR activities. Additional utilities, if required, to meet the contractual requirements, shall be arranged by the CONTRACTOR at his own cost.

6. Utilities for Pre-Commissioning

Following utilities will be provided by BPCL 'Free of Cost' basis for pre commissioning activities • Water • Power For pre-commissioning activities, Contractor shall make their own arrangement for Compressed/Plant Air.

ANNEXURE - XIII
TO
SPECIAL CONDITIONS OF CONTRACT

[QUALITY MANAGEMENT SYSTEM]

बोलीकर्ता से गुणवत्ता प्रबंधन प्रणाली अपेक्षाओं हेतु विनिर्देश

SPECIFICATION FOR QUALITY MANAGEMENT SYSTEM REQUIREMENTS FROM BIDDERS

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convener	Standards Bureau Chairman
					Approved by	
2	12.06.20	General Revision	QMS Standards Committee	QMS Standards Committee	SKB	SKS
1	12.03.15	General Revision	QMS Standards Committee	QMS Standards Committee	MPJ	SC
0	04.06.09	Issued as Standard Specification	QMS Standards Committee	QMS Standards Committee	SCT	ND

Copyright EIL – All rights reserved

Abbreviations:

ISO	-	International Organization for Standardization
MR	-	Material Requisition
PO	-	Purchase Order
PR	-	Purchase Requisition
QMS	-	Quality Management System

QMS Standards Committee

Convener: Mr. S.K. Badlani

Members: Mr. Sanjay Mazumdar (Engg.)
Mr. R.K. Singh (SCM)
Mr. B. Biswas (SCM)
Mr. Ravindra Kumar (Const.)
Mr. Vinod Kumar (CQA)
Mr. Swapnil Vaishnav (Projects)

Copyright EIL – All rights reserved

CONTENTS

Clause No.	Title	Page
1.0	SCOPE	4
2.0	DEFINITIONS	4
3.0	REFERENCE DOCUMENTS	4
4.0	QUALITY MANAGEMENT SYSTEM – GENERAL	4
5.0	QUALITY SYSTEM REQUIREMENTS	4
6.0	AUDITS	7
7.0	DOCUMENTATION REQUIREMENTS	7

Copyright EIL – All rights reserved

1.0 SCOPE

This specification establishes the Quality Management System requirements to be met by BIDDER for following purpose:

- QMS requirements to be met by suppliers / contractors after award of work / during contract execution.

2.0 DEFINITIONS

2.1 Bidder

For the purpose of this specification, the word "BIDDER" means the person(s), firm, company or organization who is under the process of being contracted by EIL / Owner for delivery of some products (including service). The word is considered synonymous to supplier, contractor or vendor.

2.2 Project Quality Plan

Document tailored from Standard Quality Management System Manual of BIDDER, specifying how the quality requirements of the project will be met.

2.3 Owner

Owner means the owner of the project for which services / products are being purchased and includes their representatives, successors and assignees.

3.0 REFERENCE DOCUMENTS

6-78-0002	Specification for Documentation Requirements from Contractors
6-78-0003	Specification for Documentation Requirements from Suppliers

4.0 QUALITY MANAGEMENT SYSTEM – GENERAL

Unless otherwise agreed with EIL / Owner, the BIDDER proposed quality system shall fully satisfy all relevant requirements of ISO 9001 "Quality Management Systems – Requirements." Evidence of compliance shall be current certificate of quality system registration to ISO 9001 or a recent compliance audit recommending registration from a certification agency. The quality system shall provide the planned and systematic control of all quality related activities for execution of contract. Implementation of the system shall be in accordance with BIDDER'S Quality Manual and PROJECT specific Quality Plan.

5.0 QUALITY SYSTEM REQUIREMENTS

5.1 BIDDER shall prepare and submit for review / record, Project Quality Plan / Quality Assurance Plan for contracted scope / job. The BIDDER'S Quality Plan shall address all of the applicable elements of ISO 9001, identify responsible parties within BIDDER'S organization, for the implementation / control of each area, reference the applicable procedures used to control / assure each area, and verify the documents produced for each area. The Project Quality Plan shall necessarily define control or make reference to the relevant procedures, for design and engineering, purchase, documentation, record control, bid evaluation, inspection, production / manufacturing, preservation, packaging and storage, quality control at construction site, pre-commissioning, commissioning and handing over (as applicable) in line with contract requirement and scope of work.

Copyright EIL – All rights reserved

5.2 BIDDER shall identify all specified or implied statutory and regulatory requirements and communicate the same to all concerned in his organization and his sub contractor's organization for compliance.

5.3 BIDDER shall deploy competent and trained personnel for various activities for fulfillment of PO / contract. BIDDER shall arrange adequate infrastructure and work environment to ensure that the specification and quality of the deliverable are maintained.

5.4 BIDDER shall do the quality planning for all activities involved in delivery of order. The quality planning shall cover as minimum the following:

- Resources
- Product / deliverable characteristics to be controlled.
- Process characteristics to ensure the identified product characteristics are realized
- Identification of any measurement requirements, acceptance criteria
- Records to be generated
- Need for any documented procedure

The quality planning shall result into the quality assurance plan, inspection and test plans (ITPs) and job procedures for the project activities in the scope of bidder. These documents shall be submitted to EIL / Owner for review / approval, before commencement of work.

5.5 Requirements for sub-ordering of outsourced items / sub-contracting / purchasing of services specified in MR / contract / tender shall be adhered to. In general all outsourced items will be from approved vendors of EIL. Wherever requirements are not specified, or approved sub vendors do not exist, the sub-contractor shall establish and maintain a system for purchasing / sub-contracting to ensure that purchased product / service conforms to specified requirements in concurrence with EIL / Owner. Criteria for selection of sub-contractor, evaluation, re-evaluation, maintenance of purchasing data and verification of purchased product (sub-contractor services), constitute important components of this requirement.

5.6 BIDDER shall plan and carry production and service provision under controlled conditions. Controlled conditions shall include, as applicable

a) the availability of information that describes the characteristics of the product
b) the availability of work instructions
c) the use of suitable equipment
d) the availability and use of monitoring and measuring devices
e) the implementation of monitoring and measurement
f) the implementation of release, delivery and post-delivery activities

5.7 BIDDER shall validate any processes for production and service provision where resulting output cannot be verified by subsequent monitoring and measurement. This includes any process where deficiencies become apparent only after the product is in use or service has been delivered.

5.8 BIDDER shall establish a system for identification and traceability of product / deliverable throughout product realization. Product status with respect to inspection and testing requirements shall be identified.

Copyright EIL – All rights reserved

5.9 BIDDER shall identify, verify, protect and safeguard EIL / Owner property (material / document) provided for use or incorporation into the product. If any Owner / EIL property is lost, damaged or otherwise found to be unsuitable for use, this shall be reported to the EIL / Owner.

5.10 BIDDER shall ensure the conformity of product / deliverable during internal processing and delivery to the intended destination. Requirements mentioned in the MR/ tender shall be adhered to.

5.11 BIDDER shall establish system to ensure that inspection and testing activities are carried out in line with requirements. Where necessary, measuring equipment shall be calibrated at specified frequency, against national or international measurement standards; where no such standard exists, the basis used for calibration shall be recorded. The measuring equipment shall be protected from damage during handling, maintenance and storage.

5.12 BIDDER shall ensure effective monitoring, using suitable methods, of the processes involved in production and other related processes for delivery of the scope of contract.

5.13 BIDDER shall monitor and measure the characteristics of the product / deliverable to verify that product requirement has been met. The inspection (stage as well as final) by BIDDER and EIL / Owner personnel shall be carried out strictly as per the approved ITPs or ITPs forming part of the contract. Product release or service delivery shall not proceed until the planned arrangements have been satisfactorily completed, unless otherwise approved by relevant authority and where applicable by Owner / EIL.

5.14 BIDDER shall establish and maintain a documented procedure to ensure that the product which does not conform to requirements is identified and controlled to prevent its unintended use or delivery

5.15 All non-conformities (NCs) / deficiencies found by the BIDDER'S inspection / surveillance staff shall be duly recorded, including their disposal action shall be recorded and resolved suitably. Effective corrective actions shall be implemented by the BIDDER so that similar NCs including deficiencies do not recur. The BIDDER shall take appropriate actions to address the Risks and Opportunities in the project.

5.16 All deficiencies noticed and reported by EIL / Owner shall be analyzed by the BIDDER and appropriate corrective actions shall be implemented. BIDDER shall intimate EIL / Owner of all such corrective action implemented by him.

5.17 BIDDER should follow the standards, specifications and approved drawings. Concessions / Deviations shall be allowed only in case of unavoidable circumstances. In such situations Concession / deviation request must be made by the BIDDER through online system of EIL eDMS. URL of EIL eDMS is http://edocx.eil.co.in/vportal.

5.18 BIDDER shall have documented procedure for control of documents.

5.19 All project records shall be carefully kept, maintained and protected for any damage or loss until the project completion, then handed over to EIL / Owner as per contract requirement (Refer Specification Nos. 6-78-0002 - Specification for Documentation Requirements from Contractors and 6-78-0003 - Specification for Documentation Requirements from Suppliers), or disposed as per relevant project procedure.

Copyright EIL – All rights reserved

6.0 AUDITS

BIDDER shall plan and carry out the QMS audit for the job. Quality audit programme shall cover design, procurement, construction management and commissioning as applicable including activities carried out by sub-vendors and sub-contractors. This shall be additional to the certification body surveillance audits carried out under BIDDER'S own ISO 9001 certification scheme.

The audit programmes and audit reports shall be available with bidder for scrutiny by EIL / Owner. EIL or Owner's representative reserves the right to attend, as a witness, any audit conducted during the execution of the WORKS.

In addition to above, EIL, Owner and third party appointed by EIL / Owner may also perform Quality and Technical compliance audits. BIDDER shall provide assistance and access to their systems and sub-contractor / vendor systems as required for this purpose. Any deficiencies noted shall be immediately rectified by BIDDER.

7.0 DOCUMENTATION REQUIREMENTS

BIDDER shall submit following QMS documents immediately after award of work (Within one week) for record / review by EIL / Owner/ TPIA, as applicable.

- Organization chart (for complete organization structure and for the project)
- Project Quality Plan / Quality Assurance Plan
- Job specific Inspection Test Plans, if not attached with PR
- Job Procedures
- Inspection / Test Formats

In addition to above QMS documents, following documentation shall be maintained by the BIDDER for submission to EIL / Owner on demand at any point of time during execution of the project.

- Quality Manual
- Certificate of approval for compliance to ISO: 9001 standard
- Procedure for Control of Non-conforming Product
- Procedure for Control of Documents
- Sample audit report of the QMS internal and external audits conducted during last one year
- Customer satisfaction reports from at least 2 customers,
- Project QMS audit report
- Technical audit reports for the project
- Corrective action report on the audits

Documents as specified above are minimum requirements. BIDDER shall submit any other document / data required for completion of the job as per EIL / Owner instructions.

Copyright EIL – All rights reserved

ANNEXURE - XIV
TO
SPECIAL CONDITIONS OF CONTRACT

[ENERGY POLICY]

Bharat Petroleum

Energy Policy

We at Bharat Petroleum Corporation Limited, Bina Refinery (BPCL-BR) are committed to continual improvement in Energy performance and Energy Management System, which shall be demonstrated by:

- **Proactively** anticipate & assess risks and opportunities, address them through short and long-term objectives and implement mitigation plans.
- **Ensuring** effective Management of Energy, Information and Resources to achieve Objectives & Targets and Complying with all applicable legislation and other requirements.
- **Strengthening** purchase of energy efficient products & services by utilizing latest technology to improve our energy performance.
- **Monitoring** & Controlling energy consumption through well-structured reviews.
- **Attaining** participative culture of energy conservation by creating awareness through training.

Date : 1st July 2023

Place : Bina

Chacko M Jose

Executive Director - BR

ANNEXURE - XV
TO
SPECIAL CONDITIONS OF CONTRACT

[LABOUR COMPLIANCE]

LABOUR COMPLIANCE

1. On the award of a contract, the contractor shall contact BPCL HR department to understand the requirements for onward process/ procedure for BPCL HR related activities and submit details/ contact number(s)/ email id(s) of their point of contact and authorization letter (for signing any BPCL HR related compliance document) of the person named so.

2. The scope of obligations of the contractors underlined also includes those of its subcontractor(s) and the contractor shall have the sole ownership and accountability for the same.

3. **Adherence to Statutes, Regulations, Schemes, Rules, BPCL's rules and procedures**: The contractor shall undertake to ensure due and complete compliance with respect to all Statutes, Regulations, Schemes, Rules, BPCL's rules and procedures etc. (which may be amended from time to time) whether of Central Govt. or State Govt. or any other competent authority applicable to the contractor and or employees employed or whose services are otherwise availed of by contractor or sub-contractor appointed by such contractor. Such laws shall also include Minimum Wages Act, 1948, Contract Labour (Regulation and Abolition) Act,1970, Employees State Insurance Act, 1948. Employees' Compensation Act, 1923, Payment of Gratuity Act, 1972, Provident Fund & Miscellaneous Provisions Act, 1952, Payment of Bonus Act, 1965, Apprentices Act,1961 and all other applicable Act, laws, rules, regulations and orders as may be in force from time to time. The Contractor must ensure strict compliance with respect to all applicable Acts.

4. The Gate Passes for Contract Employees are processed through Contract Worker Management System (CWMS) online portal/ Online portal as applicable. The contractor shall fill in details pertinent to the LOI/ LOA/ PO, Labour license (if applicable), accidental insurance (Employees State Insurance Act, 1948/ Employees Compensation Act, 1923 policy details) and personal details of contractors' employees in CWMS through its login credential. The contractor shall contact BPCL HR department to understand the requirements and process.

5. Documents related to the contractor's employees to be submitted to BPCL and or uploaded in CWMS:
   5.1. Character certificate (Police verification)
   5.2. Medical fitness certificate
   5.3. Insurance policy (Pehchan Card under ESIC/EC policy/Group Personal Accident (GPA) as applicable)
   5.4. Photo Id (preferably Aadhar)
   5.5. Education/ Experience certificate (as required)
   5.6. Bank account, mobile number and UAN details; if not available, after the first month of the running of the contract
   5.7. Any additional requirement will be communicated and shall be required to be complied

6. Medical examination and Medical Fitness of the employees is to be carried out by Contractor at their own expenses.

7. BPCL has the sole proprietorship of the Gate Passes issued to the contractors' employees and the contractor is obligated to return all the gate passes issued to the contractor. In case of non-submission of the Gate passes / lost Gate passes / damaged Gate passes suitable amount per gate pass will be deducted by BPCL. Also, the case of non-submission of the Gate passes / lost Gate passes shall require the contractor to lodge complaint at the local Police

Thana and submit a copy of the same to BPCL Security.

8. **Confirmation to BPCL HR department of Compliance under various Act applicable:** It shall be the responsibility of the Contractor to confirm to BPCL HR of conformance to statutory compliances under various Acts applicable and submit the required documents to BPCL HR in CMMS through its log in credentials, on monthly basis. The contractor is required to contact BPCL HR department to understand the requirements and process.

   8.1. Contractor shall ensure timely payment to employees, remittance of PF & Pension & ESIC contributions and maintain statutory documents & registers under various applicable Acts.
   8.2. The checklist of the documents and formats etc. to be maintained and submitted to BPCL can be obtained from the BPCL HR department after the award of contract.
   8.3. On submission of the aforementioned documents, BPCL HR will inspect and issue 'HR Clearance Certificate'. Clearance of invoices shall be subject to completion of all labour compliances and getting HR Clearance Certificate from BPCL HR.

9. **Inspections/ Audits:** The contractor shall maintain and keep a copy of statutory documents at site and shall present itself at the designated time and venue with the required documents as when demanded by the BPCL and or any statutory authorities.

ANNEXURE - XVI
TO
SPECIAL CONDITIONS OF CONTRACT

[SOCIAL MEDIA POLICY FOR BUSINESS PARTNER]

BHARAT PETROLEUM CORPORATION LIMITED
SOCIAL MEDIA POLICY FOR BUSINESS PARTNERS

Page 1299 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Contents

1. OBJECTIVE 3

1.1. **Social Media** 3

1.2. **Scope and Applicability** 4

1.3. **Relevant Documents** 4

2. CONTENT GUIDELINES 4

3. ACCEPTABLE USAGE OF SOCIAL MEDIA 7

4. ENFORCEABILITY AND COMPLIANCE 10

ANNEXURE I 11

ANNEXURE II 12

ANNEXURE III 13

Page 1300 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

TERMS AND CONDITIONS FOR ACCEPTABLE USE OF SOCIAL MEDIA BY BUSINESS PARTNERS

1. OBJECTIVE

Social media has become part of everyday life and a means of communication and sharing information with others. Every organization recognises the benefits that social media tools can provide, and also reckons the challenges it brings.

These terms and conditions ("**Social Media T&Cs**") seek to provide clear guidance on acceptable standards of conduct and practices to be followed by the Business Partners (*as defined below*) of Bharat Petroleum Corporation Limited ("**Corporation**"), in the usage of social media tools during and post their association with the Corporation. These terms and conditions are intended to protect and safeguard *inter alia* the interests and reputation of the Corporation, in the access, use of or participation on Social Media (*as defined below*) platforms by such constituents.

It is important to maintain the highest degree of professional standard that is associated with the Corporation's name, brand and reputation. Constituents must constantly be aware of the risk of damaging the Corporation's name or reputation in public forums. These terms and conditions should be adhered to by each constituent at all times and should be read harmoniously and in conjunction with the terms of their engagement with the Corporation, as well as other applicable policies and directions issued by Corporation, from time to time, including the Relevant Documents (*as defined below*).

1.1. Social Media

Social Media includes any web or mobile based platform that enables an individual or agency to communicate interactively and enables exchange of user generated content. The term "**Social Media**" describes internet-based technologies and practices that people use to share opinions, insights, experiences and perspectives. It may be internal (housed within the Constituent's technology infrastructure and open for use only by the Constituents) or public (widely available to the population of internet users).

These terms and conditions are applicable equally to a wide range of websites and mobile phone / tablet applications, including the following:

(a) Social Networking sites, for example - Facebook, Twitter, and LinkedIn.
(b) Media Sharing sites, for example - Instagram, Snapchat, YouTube
(c) Discussion forums, for example - Reddit, Quora, Digg, Glassdoor
(d) Content Curation network, for example - Pinterest, Flipboard

Page 1301 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

(e) Blogging and Publishing sites, for example - WordPress, Tumblr, Medium including blogs
(f) Interest-based network, for example - Goodreads, Houzz
(g) Information sharing sites, such as Wikipedia
(h) Opinion sites (e.g. Yahoo! Answers)
(i) Any other social media platform/s

1.2. Scope and Applicability

These Social Media T&Cs are applicable to all Business Partners (*as defined below*), including any prospective partners of the Corporation (the "**Constituents**").

The Social Media T&Cs provides a framework for the usage of Social Media by the Constituents and non-conformance with these Social Media T&Cs or any other applicable policy or directions issued by the Corporation as may be relevant to the Constituents, may result in penalties ranging from financial to legal liabilities, as set out under the respective contractual understanding between each Business Partner and the Corporation.

1.3. Relevant Documents

These Social Media T&Cs have been formulated in line with the Framework & Guidelines for Use of Social Media for Government Organizations, issued by the Department of Electronics and Information Technology, Ministry of Communications & Information Technology, Government of India.

In addition, these Social Media T&Cs must be read in conjunction with the underlying contract documents including the following documents (collectively, the "**Relevant Documents**"), as may be applicable to each Constituent:

(a) General Conditions of Contract for vendors (relevant clauses are placed at Annexure I);

(b) Transportation Contract Agreement Bulk LPG Transportation Contract By Road (relevant clauses are placed at Annexure II);

(c) PCVO, Retail and Lubes Transport guidelines.

2. CONTENT GUIDELINES

This section seeks to set out the guidelines for content management as well as administration rights of all official Business Partner Social Media accounts and ensure accountability of the authorised representatives of such Business Partner.

The following guidelines on content sharing ("**Content Guidelines**") must be followed, in relation to all content created, posted or shared on Social Media:

Page 1302 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

(a) All post and other content shared via Social Media shall abide by applicable laws, including the Information Technology Act, 2000 and rules made thereunder, as amended.

(b) The content posted or shared though official Social Media accounts, shall be relevant, engaging and in line with the Corporation's brand and communication strategy, whether in the form of text, images, gifs, videos, etc.

(c) The Constituents shall be mindful of content and the tone associated with it. A negative tonality, sarcasm, dry humour, pun, memes, etc. should be avoided to steer clear from any controversy.

(d) The Constituents shall be careful and ensure that any content posted or shared through the official Social Media accounts does not bring disrepute to the Corporation. Opinion or comments on political observations, religious beliefs, gender biases, etc. must be avoided while operating official Social Media accounts. In the use of official Social Media accounts, the Constituents shall refrain from forwarding or sharing any videos or images or messages, which are considered inappropriate or any content that is considered offensive, obscene or derogatory in nature.

(e) The Constituents shall be cognizant of concerns regarding confidentiality and disclosure requirements, and must at all times, adhere to the Relevant Documents as well as these terms and conditions, to understand what shall be disclosed on a public platform. For instance any communication marked as "privileged" or "restricted" or "confidential" or "not for circulation" should not be shared on Social Media. The Constituents are absolutely prohibited from disclosing commercially sensitive, anticompetitive, private or confidential information. If unsure whether the information that is proposed to be shared falls within one of these categories, authorised representatives of the Constituent may discuss with the concerned official as designated by the Corporation.

(f) The Constituents shall ensure that any references to the Corporation or its employees, or other customers, partners and vendors do not contravene any non-disclosure agreements. The Constituents shall avoid disclosure of any information pertaining to any employee / vendor / customer or individual associated with the Corporation, without their prior consent.

(g) The Constituents shall be vigilant about tagging, mentions and conversations around the Corporation. If it notices any customer complaint, dealer/ distributor/ vendor grievances, media story etc., the same may be flagged to the official channels of the Corporation and will be responded to by authorized personnel within the Corporation.

(h) In the operation of official Social Media accounts, the Constituents shall be cognizant of maintaining professional etiquette for all interactions and shall not initiate or engage in discussions which may be characterised as showcasing a personal opinion such as political or religious beliefs. In

addition, official Social Media accounts should not share any content or comment that may be viewed as colouring the relations between the Corporation and the Government of India or any Ministry / Department of the Central or State Governments.

(i) The Constituents, particularly in the use of official Social Media accounts, shall only post original content, which is free of any copyright infringement or plagiarism. To ensure the reputation and principles of the Corporation are safeguarded, all Constituents must avoid posting content that violates the law, infringes the intellectual property rights of the Corporation and its group companies or of any individual or organization. Any inadvertent posts, which violates these principles, must be removed / deleted immediately upon becoming aware of the implications as set out in these guidelines.

As responsible business partners of the Corporation, the following points must be strictly observed and followed by the Constituents:

(i) Text, photos, images, musical work in any form, video clips, movie clips, or any other content for which the Constituent does not own copyright, must not be used in any form, and in particular for official purposes to promote any activities related to the Corporation, without obtaining consent from the copyright owner. If the copyright owner for such work cannot be identified or if the consent for use of such work is not provided by the copyright owner, the work must not be used by the Constituent.

(ii) Capturing photographs and/or videos of the Corporation's offices, facilities, and other establishments (within or outside) or customer sites is strictly prohibited. Any such illegal images and/or videos of the Corporation's establishments, offices, facilities and factories or other sites and whether directly emailing or otherwise circulating such content via Social Media posts on the Internet, shall attract legal consequences. Official visual materials may be availed from the Corporation and can be requested through email, to the relevant State / Territory team.

(iii) Creation, sharing and/or distribution of videos which make use of unlicensed music is strictly prohibited.

(iv) Unauthorized videos of any events hosted by the Corporation, whether within or outside the Corporation's premises that may be captured by Constituents shall not be shared/distributed on Social Media.

(v) All Constituents must take due care to protect the Corporation's copyright and intellectual property within and outside the organization.

Page 1304 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

(j) The authorised personnel operating official Social Media accounts of respective Business Partner shall not post unverified news, or news from dubious 'sources', that may project the Corporation in a negative light.

(k) The admins operating official Social Media accounts shall clearly state the source and give due disclaimers while quoting any third-party content through such Social Media accounts.

(l) Additionally, content on official Business Partner Social Media Accounts shall be limited to the coverage of activities related to the business only. However, these accounts can re-share / retweet the posts of Corporation's official Social Media accounts, subject to the veracity of such accounts.

3. ACCEPTABLE USAGE OF SOCIAL MEDIA BY BUSINESS PARTNERS

The following guidelines are applicable to vendors, suppliers and other contractors of the Corporation ("**Business Partners**"), and these are intended to supplement, and do not to replace the terms and conditions or any other agreement or guidelines (including the applicable provisions set out under Annexure I or II of these Social Media T&Cs), which are currently in place to regulate the conduct of such Business Partners:

(a) Business Partners have the discretion to decide whether their Social Media accounts will be used for personal or professional purposes. However, in any event, whether such Social Media accounts are used for official purposes or personal purposes, to the extent that they declare their affiliation with the Corporation in any way, it is deemed that they will abide by these terms and conditions read with the applicable contractual provisions and the Framework & Guidelines for Use of Social Media for Government Organizations, issued by the Department of Electronics and Information Technology, Ministry of Communications & Information Technology, Government of India.

(b) Only official Business Partners accounts are eligible to declare their association with the Corporation or using any content owned by or belonging to the Corporation, including logo, product specifications, product pictures, product catalogues, etc. Such accounts may only post content that are official in nature and reasonably expected to promote the activities specific to its business. Such official Business Partner Social Media account shall be akin to a professional page to promote business interactions and shall not post any content which may showcase the account as expressing opinion on ancillary matters which are not in furtherance of the objective set out under the Relevant Documents, such as posts related to entertainment industry, or political views etc. However, such affiliation or use of Corporation's content, such as logo, product pictures etc. is only limited to use by official Social Media accounts of such Business Partner, and will not, at any time, be used by any authorised or other personnel of such Business Partner, in the operation of a personal Social Media account.

Page 1305 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

(c) Every Business Partner's official or personal (individual) Social Media account is prohibited from posting / circulating any official communication / document or disclosing any business-related or other confidential information, pertaining to the Corporation, in accordance with the Relevant Documents.

(d) Each Business Partner Social Media account, particularly those accounts which have been permitted to acknowledge their association with the Corporation, has an obligation to exercise caution in the posting or sharing of content on Social Media, and shall undertake adequate diligence prior to posting any content. In particular, such accounts shall be fully cognizant of posting or providing traction to any 'fake news' and shall refrain from posting or sharing unlawful, controversial or unverified news, or news from dubious 'sources', particularly in relation to the Corporation and the Central / State Governments.

(e) The Business Partner Social Media account which are maintained for official purposes, shall refrain from engaging in unlawful or inappropriate posts or sharing any content that may be defamatory or may have the effect of downplaying the Corporation's business or competitors. In addition, such account should also not post or share content using derogatory language or is likely to demean sentiments of anyone with whom they engage in any public communication using Social Media.

(f) Business Partners using Social Media for official purposes and especially those accounts that have been approved by the Corporation, shall maintain professional and proper etiquette in online interaction via Social Media and shall not engage in inappropriate behaviour. Such inappropriate behaviour includes but may not be limited to posting, sharing or endorsing in any form, any content which may be considered as:

(i) Divisive, unethical or unlawful at the workplace;

(ii) False, or derogatory, or amounting to bullying, trolling, intimidating, or harassing including using offensive, defamatory, threatening, discriminating, obscene or insulting language;

(iii) A misrepresentation of the Corporation, such as creating any unofficial groups or networks (whether intentional or unintentional) using the Corporation's name, logo, or email address;

(iv) Compromising the confidentiality (of the Constituents and/or the Corporation's information), or creating a conflict of interest;

(v) Disclosing commercially sensitive, anticompetitive, or information which is marked as restricted for internal circulation within the Corporation;

(vi) Misleading and misrepresentative, such as creating or endorsing any video channel / account representing the Corporation or any specific Business Unit, or otherwise posting or sharing any content owned by the

Page 1306 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

Corporation, unless such content has been posted on verifiable official Social Media accounts of the Corporation;

(vii) Amounting to pornographic material (that is, writing, pictures, films and video clips of a sexually explicit nature) or content that could be considered as offensive, obscene or criminal; or

(viii) Creating or likely to create any liability (whether criminal or civil, for the Corporation).

Where evidence of misuse or inappropriate behaviour is brought to the notice of the Corporation, the Corporation may undertake a more detailed investigation in accordance with its procedures, which may involve the examination and disclosure of records by those nominated to undertake the investigation and any witnesses involved in the investigation. If necessary, action may be taken against such Business Partner under the respective contractual agreement and in case required, such information may be handed to authorities in connection with the investigation.

(g) Any violation of these Social Media T&Cs shall be treated as violation of General Conditions of Contract of the Corporation and may invite action by the Corporation as deemed fit, based on the sole discretion of the Corporation.

(h) The Corporation has a zero-tolerance policy for any complaints that may be brought to its notice via Business Partner Social Media accounts. In the event the Business Partner or its associates *etc.* are dissatisfied with the Corporation, or have any unresolved query or grievance against the Corporation or any individual who is in the employment or association of the Corporation, the Business Partner or such person associated with it must reach out to the designated official and follow the hierarchy established within the Corporation. All such communication must follow the formal processes that are available as per contractual agreement with the Corporation. In the event the Business Partner, whether by itself or its employee or associate publishes any such information on Social Media or discloses details of any complaint or dispute with the Corporation on a public forum through Social Media, it will be in breach of the terms of these T&Cs and its agreement with the Corporation, and the Corporation will have the right to pursue such legal remedies as may be appropriate and available under law.

(i) Upon termination or expiry of the Relevant Document / underlying contractual agreement between the Corporation and the Business Partner, the Business Partner shall ensure that all references and posts which disclose any affiliation with the Corporation has been scrubbed from the Business Partner's Social Media account and a formal written declaration to this effect must be provided to the Corporation, within 7 days of such termination or expiry.

4. ENFORCEABILITY AND COMPLIANCE

4.1. These Social Media T&Cs are construed to be a part of the Relevant Documents and form an integral part of the contractual understanding between the Corporation and the Business Partner.

4.2. Any violation of the Social Media T&Cs shall be treated as violation of respective contractual understanding between the Corporation and the Business Partner, and may invite appropriate action by the Corporation as deemed fit.

4.3. The Business Partner agrees and understands that all activities of the Business Partner's official Social Media Account is subject to monitoring and periodic audits by the Corporation, if required.

4.4. The Business Partner will provide its written acknowledgement to these Social Media T&Cs, in the form set out in Annexure III, failing which the Corporation may take such action as may be necessary to ensure compliance with these terms and conditions.

4.5. The concerned official of the Corporation shall be responsible for reviewing the compliance of these Social Media T&Cs as may be required to ensure that it meets legal requirements and reflects best practice.

Page 1308 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

ANNEXURE I

GENERAL CONDITIONS OF CONTRACT FOR VENDORS

Clause 34: Contractor's Subordinate Staff and Their Conducts:

34.2 If and whenever any of the Contractor's or sub-contractor's agents, sub-agents, assistants supervisor or other employees shall in the opinion of Engineer-in-Charge be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties or that in the opinion of the owner or Engineer-in-Charge, it is undesirable for administrative or any other reason for such person or persons to be employed in the works, the contractor, if so directed by the Engineer-in- Charge, shall at once remove such person or persons from employment thereon. Any person or persons so removed from the works shall not again be employed in connection with the works without the written permission of the Engineer-in-Charge. Any person so removed from the works shall be immediately replaced at the expense of the contractor by a qualified and competent substitute. Should the contractor be requested to repatriate any person removed from the works he shall do so and shall bear all costs in connection herewith.

34.3 The contractor shall be responsible for the proper behaviour of all the staff, supervisor, workmen and others and shall exercise a proper degree of control over them and in particular, and without prejudice to the said generality, the contractor shall be bound to prohibit and prevent any employees from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neighbourhood and in the event of such employee so trespassing, the contractor shall be responsible therefore and relieve the Owner of all consequent claims or actions for damages or injury or any other grounds whatsoever. The decision of the Engineer-in-Charge upon any matter arising under this clause shall be final. Contractor shall ensure that none of their employees are ever engaged in any anti-national activities.

Clause 44: Liens

44.2 Contractor will not disclose details of the work to any person or persons except those engaged in its performance, and only to the extent required for the particular portion of the work being done. Contractor will not give any items concerning details of the work to the press or a news disseminating agency without prior written approval from Engineer-in-Charge. Contractor shall not take any pictures on site without written approval of Engineer-in-Charge.

Page 1309 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

ANNEXURE II

TRANSPORTATION CONTRACT AGREEMENT FOR BULK LPG TRANSPORTATION CONTRACT BY ROAD

Clause 28:

(a) The Transporter shall remain at all times liable to the Corporation for any loss or damage caused to any building, plant machinery or the property of the Corporation due to careless, negligent, inexperienced act or default of the Transporter, their agents, representative or employees. The Corporation shall be entitled to deduct from the amounts payable to the Transporter under this Agreement or otherwise the loss or damages so suffered.

(b) The Transporter will be liable for any loss and/or injury to Corporation's employee due to careless, negligent, wrongful act or default of the Transporter, his/their representatives or employees in carrying out the job under this contract.

Clause 38:

All terms & conditions stipulated in the Guidelines for Bidders, Tender Terms & Conditions, Declarations, Agreement, Industry Bulk LPG Transport Discipline Guidelines and other documents furnished with the Tender and related correspondence shall form part of the contract. The Corporations are entitled to frame and implement the Policy(ies) applicable to Transporters, and to modify and amend the same from time to time, and that the Policy(ies) as framed, amended and modified would be binding on the Transporters, immediately upon being communicated to them.

Clauses from Transportation Agreement of Retail and MAK Lubricants

---

Page 1310 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

ANNEUXRE III

FORMAT OF ACKNOWLEDGEMENT

To,
[*insert details to whom such acknowledgement may be addressed***]**

[*in the case of an individual or sole proprietorship*] I am _____ , an inhabitant of _____ and carrying on business of _____

OR

We are [*insert names of all partners of firm*] carrying on business at _____ in partnership under the firm name and style of M/s. _____

OR

[*insert name of Limited Company or a Co-operative Society / Trust Co-operative*] incorporated under the laws of India and having its Registered Office at _____
_____

I / We have entered into a [insert name of agreement] dated [*insert date*] ("**Agreement**") for the [*insert purpose*], with Bharat Petroleum Corporation Limited ("**BPCL**").

In furtherance thereof, we have been provided with a copy of the Terms and Conditions for Acceptable Use of Social Media by Business Partners, issued by the Corporation.

I / We have read and understood BPCL's Terms and Conditions for Acceptable Use of Social Media by Business Partners and agree to abide by it.

I / We understand that any violation of the above conditions may result in disciplinary action, or termination or revocation of the Agreement.

In acknowledgement thereof, please see below our acceptance of the Terms and Conditions for Acceptable Use of Social Media by Business Partners, issued by the Corporation, duly signed and acknowledged by [*insert name*], in the capacity of our authorised representative.

A copy of such authorisation is also attached for your record.

_____
(Signature & seal)

Name:
Designation: Date:

Page 1311 of 4087 : B895-TENDER DOC-B895-999-85-41-EP-T-9802 : Rev. A

ANNEXURE -XVII
TO
SPECIAL CONDITIONS OF CONTRACT

INSURANCE POLICY

Erection All Risk Policy

SCHEDULE

EAR Policy No.: 5011/R/383323657/00/000	Issued At: Mumbai Date: 28/02/2025 UIN: IRDAN115CP0052V01201920
A) Name and Address of the Insured	i BHARAT PETROLEUM CORPORATION LTD. Bharat Bhavan, 4 And 6, Currinbhoy Road, Ballard Estate, Mumbai, 400001, Maharashtra GST No. : 27AAACB2902M2ZS ii BPCL's Parents, their subsidiary and/or associated and/or affiliated companies and / or any owned, companies or corporation as now or may hereinafter be constituted as their respective rights and interest may appear iii Contractors and their subcontractors of any tier iv Any lessor, lessee, lender or other party as required under the terms and conditions of any lease or contract or agreement entered into by the first named Insured v Any other party having an insurable interest (and not mentioned above) to the extent that the Original Insured is required by contract or agreement to provide insurance to such party (ies). vi All for their respective rights and interest Together with their respective successors in title and assigns, for their respective rights and interest in the project.
B) Name and Address of the Principal	Bharat Petroleum Corporation Limited Bharat Bhavan 4 & 6, Currimbhoy Road, Ballard Estate, P.B.No. 688, Mumbai 400001, Maharashtra.
C) Name and Address of the Contractor	**Additional Insureds** i Project Management Consultants and/or Engineering Contractors and/or Construction Contractors and/or Licensor and any other company, firm, person or party (including but not limited to Contractors and SubContractors of any tier) with whom the Named Insured(s) above, or in this paragraph have, or in the past had, entered into written agreement(s) in connection with the Project, and/or any works activities, and preparations connected therewith. ii Coverage for manufacturers, suppliers, vendors, architects and consulting engineers being limited to their on-site activities only. iii Coverage under this section to apply for the Principal Insureds only together with their respective successors in title and assigns, for their respective rights and interests in the Project. iv Project Financers and/or Lenders as required.
D) Site of Erection/ Storage	Location of site where the Plant is to be erected: BPCL Kochi Refinery, Kerala.
E) Period of Insurance	From 18 February 2025 to 17 Jan 2028 (both days inclusive) including testing period of 06 months which Includes integrated testing. 6 months of non-consecutive days of testing period to be considered (35 months including 6 months testing) Schedule Date of Commencement of Commercial Operation being 18 January 2028. Maintenance period of 18 months from the date of mechanical completion or 12 months from the date of commissioning whichever is later. Extended maintenance period coinciding with defect liability period for each individual contract as applicable.
F) Nature of Project	**Petrochemical Plants Involving Hydro-carbon processing** Bharat Petroleum Corporation Ltd. (BPCL) - Kochi Refinery, (hereinafter referred to as "BPCL-KR"), plans to set up a Polypropylene unit based on Polymer grade Propylene feedstock. BPCL-KR intends to set up facilities for production of Polypropylene and its associated facilities for production

	of various grades of Homo Polypropylene, based on 400 KTPA of Polymer grade Propylene. The facilities are proposed to be located within Refinery and on the newly acquired land adjacent to the existing refinery. It is envisaged to fully integrate the new facilities with the refinery. It is proposed to install a new Polypropylene (PP) Unit, utilities & offsite facilities required for PP Unit.
G) Hypothecation	NA
H) Premium EAR	INR 5,65,98,208 (inclusive of taxes applicable)
Intermediary Details Agency/Broker Code Agency/Broker Name Agent's/Broker's Mobile No. Agent's/Broker's Email ID	NA

Block1: Sum Insured Details (Currency INR)

Section I Material Damage 1.Plant & Equipments to be erected (Brief Details) : 2.Landed Cost of Imported machinery as at Factory site at exchange Rate 1.00(sub divided as under) (I)Invoice Cost (II)Freight Insurance, handling, clearing & forwarding charges upto factory site (III)Customs Duty 3.On machinery fabricated or manufactured in India (sub divided as under) (I) Invoice Cost including insurance, handling clearing and transport upto factory site (II) Freight 4.On Cost of Erection including salaries of all Foreign and Indian Technicians and Wages of all skilled and unskilled labour employed at Factory Site during erection 5.On Building in which the above Plant and Machinery is to be erected (I) Permanent Civil Engineering Works (II) Temporary Works 6.Free issue materials, services and labour supplied by the Principal **Total for Section I**	Sum Insured Details (Currency INR) INR 3289,00,00,000 Free Issue Material value of Catalyst forms part of the scheduled declared value - INR 6,45,00,00,000
Section II - Third Party Liability Limit of Indemnity a) For any one accident b) For all accidents during the period **Total for Section II**	 INR 25,00,00,000

I) Deductibles for Section I and II -,

Section I	
a) For Storage & Erection Claims	5% of the claim amount subject to a minimum of INR 15,00,000 eel;
b) For Testing Period/Maintenance Period Claims	5% of the claim amount subject to a minimum of INR 75,00,000 eel;
c) For Fire/Explosion Claims	5% of the claim amount subject to a minimum of INR 15,00,000 eel;
d) For Acts of God claims	10% of the claim amount subject to a minimum of INR 75,00,000 eel subject to a maximum of INR 5 crores;
e) Design Defect claims	10% of the claim amount subject to a minimum of INR 375,00,000;
f) For Other Add-Ons	5% of the claim amount subject to a minimum of INR 15,00,000 eel;
Section II	
g) Third Party Liability	
Death/Bodily Injury Claims	NIL
Property Damage Claims	INR 500,000.00 eel

I) Additional Covers:

S No	Description	Limit of Indemnity	Deductible
1	Earthquake Cover (No Specific Limit)	3289,00,00,000.00	Applicable as per Section I
2	Offsite Storage Fabrication	50,00,00,000.00	Applicable as per Section I
3	Free Automatic Reinstatement Cover	822,25,00,000.00	
4	Escalation Cover	986,70,00,000.00	Applicable as per Section I
5	Professional Fees	10% of admissible loss each and every loss	Applicable as per Section I
6	Loss Minimization Expenses	50,00,00,000.00	
7	Third Party Liability Cover	250,000,000.00	Applicable as per Section II
8	Surrounding Property of Insured	328,90,00,000.00	Applicable as per Section I
9	Additional Custom Duty (each and every loss)	500,000,000 or 10% of the assessable value whichever is higher each and every loss	Applicable as per Section I

K) Co insurance Clause:

S. No.	Company Name	Share %age
1	ICICI LOMBARD GENERAL INSURANCE COMPANY LTD.	60%
2	THE NEW INDIA ASSURANCE COMPANY LTD.	40%

L) Clauses:

1. Subject to End 110 Concerning storage attached herewith.
2. Subject to End 124 Earthquake inclusion attached herewith
3. Subject to End 29 Increased customs duty attached herewith
4. Subject to End 8/b 50:50 Clause attached herewith.
5. Subject to End 4/c 72 hours Clause attached herewith.
6. Subject to End 10/e Loss Minimization Expenses attached herewith.
7. Subject to End 5/g Professional Fees attached herewith.
8. Subject to End 120 Waiver of contribution Clause attached herewith.
9. Subject to End 101 Civil Engineering Works attached herewith
10. Subject to End 111 Safety Measures attached herewith
11. Subject to End 112 Crop, forests, cultivated areas attached herewith
12. Subject to End 133 Expediting cost upto 30% of net claim amount attached herewith.
13. Subject to End 136 Safety measures with respect to precipitation flood and inundation attached herewith
14. Subject to End 11/aa Owners surrounding property with FLEXA attached herewith.
15. Subject to End 105 Air Freight attached herewith
16. Subject to End 119 Third Party Liability attached herewith.
17. Subject to End 12/d Free automatic reinstatement clause attached herewith
18. Subject to End 7/f Clearance and removal of debris attached herewith.
19. Subject to End 6/k Escalation clause attached herewith.
20. Subject to End 14/i - Waiver of Subrogation attached herewith
21. Subject to End 117 - Valuable Documents attached herewith
22. Subject to End 13/i - Cross Liability attached herewith
23. Subject to Cover for offsite storage at fabricators premises attached herewith.
24. Subject to End 18 - Exclusion of loss of stabilizing fluids attached herewith
25. Subject to End 25 - Temporary access roads attached herewith
26. Subject to End 129 - Contractors plant and machinery attached herewith
27. Subject to End 8 - Design Defect DE3 attached herewith
28. Subject to End 20 - Piling Construction attached herewith
29. Subject to End 21 - Abandonment of shafts attached herewith
30. Subject to End 29 - Increased customs duty attached herewith
31. Subject to End 37- Designation of Property attached herewith
32. Subject to End 6/k - Escalation clause attached herewith
33. Subject to End 118 - DE 4 cover attached herewith
34. Cyber Risk Exclusion Clause LMA 5410 (amended)
35. Sanctions and Limitations Exclusion Clause
36. Design Defect DE3 for Civil Works and DE4 for Electromechanical Works as per MR wordings
37. Subject to End 123 - Terrorism Damage Exclusion attached herewith
38. Subject to End 114 Existing underground cables attached herewith
39. Special Conditions for open trenches during laying of pipelines, ducts & cables It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the policy or endorsed thereon, the insurers will indemnify the insured for any loss or damage due to storm, rain, flood, inundation such as sanding, silting up, mudding up, erosion, collapse and floating up of pipes, ducts or cables, sustained by completely or partly excavated open trenches and/or items laid therein upto a maximum length of 3 km open trench any one loss event and 5 kms in respect of HDPE pipelines. The insured shall make sure that plugging facilities are available near the pipe ends for emergency purposes and pipe ends exposed to flooding are plugged before any interruption during idle periods such as nights and holidays.
40. Arbitration Clause: The parties to the contract may mutually agree and enter into a separate Arbitration Agreement to settle any and all disputes in relation to this policy. Arbitration shall be conducted under and in accordance with the provisions of the Arbitration and Conciliation Act, 1996.
41. Communicable Disease Exclusion Clause
42. Subject to End 28 - Removal of debris from landslides attached herewith

M) Special Conditions:

1) Earthquake (Fire and Shock) covered upto full Sum Insured.
2) STFI (Storm Tempest Flood Inundation) perils upto full Sum Insured.
3) MRE 205 Hydrocarbon Processing Industries 2 (Catalyst during hot testing) including other testing materials at Actuals (limited to sum insured).
4) MRE 119 Damage to Existing Property of BPCL (Owners/ Principal) upto 10% of the Project Sum Insured in aggregate.
5) Temporary works including roads, camps for workers, material storage place, Buildings/sheds/site offices/support structures porta-cabins upto INR 250,000,000 in aggregate.
6) 50:50 Clause
7) 72 Hours clause
8) Automatic Reinstatement of Sum Insured Up to 25% of sum insured.
9) Basis of Claim Settlement on Reinstatement Value basis.
10) Local Authority Clause at actuals (limited to sum insured).
11) Clearance and removal of debris including slush removal, dewatering and external/ foreign debris, desilting and or likes
12) Upto INR 500,000,000 in aggregate.
13) Continuity of Cover during operational phase for Unit /Plant tested but awaiting integral testing. (Along with other Units/Plants) as per EAR tariff wordings upto 6 months within project period.
14) Coverage for storage in open by the Principal/ Contractor at project site upto Full Sum Insured.
15) Customs & Duty clause including Duty on returnable Cargo per occurrence upto INR 500,000,000 or 10% of the assessable value whichever is higher each and every loss.
16) Sound/Undamaged Property Destruction upto INR 250,000,000 in aggregate.
17) Escalation upto 30% of Sum Insured.
18) Firefighting expenses upto INR 250,000,000 in aggregate.
19) Goods held in Trust Clause at any time and/or Property belonging to or held in the care, custody or control of the insured/ Properties Under Consignment, Care, Custody And Control as per MR 119 wordings upto INR 500,000,000 in aggregate.
20) Immediate repairs reasonably and necessarily incurred as part of loss minimization expenses payable upto INR 250,000,000 in aggregate.
21) Inflation on incomplete works as per ILGIC wordings of Inflation protection clause/Additional Cost of completion upto INR 100,000,000 in aggregate.
22) Intermittent Testing as per ILGIC wordings of Amendment in Suspension of testing period – 7 days.
23) Leased Equipment Rental Costs upto INR 100,000,000 in aggregate covered if part of loss minimization Expenses.
24) DE-4 upto full sum insured of plant and machinery.
25) Loss Minimization expenses upto INR 500,000,000 AOA & in aggregate.
26) Riot Strike Malicious Damage upto full sum insured.
27) MRE 004 Extended Maintenance cover 18 months from the date of Mechanical completion or 12 months from the date of commissioning whichever is later.
28) Cover of Extra Charges for Overtime, Night Work, Work on Public Holidays, Express Freight incurred for expediting repairs, replacement or rectification upto 30% of Net Claim amount as per MR 006.
29) Cover of Extra Charges for Airfreight upto 30% of Net Claim amount as per MR 007.
30) MRE 1202 Contract Works Taken over or put into Service upto 6 months within project period.
31) MRE 206 Offsite Storage / Fabricators Premises / Workshops (within India) – each and every loss upto INR 500,000,000.
32) MRE 220 Unlimited Inland transit (including movement to/from offsite storage spanning over public road in between, including loading/unloading risks and SRCC) upto INR 500,000,000 per conveyance.
33) MRE 218 Leak Search Costs when Laying Pipelines upto INR 250,000,000 in aggregate.
34) Munitions of War upto INR 500,000,000 in aggregate.
35) Plans & Documents upto INR 100,000,000 in aggregate.
36) Preventive Measures upto INR 250,000,000 in aggregate covered if forming part of Loss minimization Expenses.
37) Professional fees upto 10% of admissible loss each and every loss.
38) Removal to place of safety at actuals covered if forming part of Loss minimization Expenses.
39) Repeat Tests, Trials: The policy is extended to provide indemnity for the cost of any repeated and/or subsequent tests and/or trials necessarily carried out as a result of Damage to the Insured Property as per ILGIC wordings of Repeat Tests/Extra tests at actuals (limited to sum insured).
40) Stand Still Period covered as per Insurer's wordings of Cessation of work upto 180 days per occurrence and in aggregate during the policy period.
41) Temporary repairs are covered upto INR 100,000,000 in aggregate as per Insurer's wordings.
42) Unintentional Errors and Omissions as per Insurer's wordings of Alteration in material fact/project Amendments upto INR 100,000,000 in aggregate.
43) Utilities commissioned and pending integral testing/commissioning of respective projects are covered until handover of individual units.
44) MRE 200 Manufacturers' Risk covered for plant and machinery.
45) Start Up Expenses covered upto INR 5 crores in aggregate.
46) Basis of Loss settlement: Replacement cost valuation - RIV basis.
47) Claims preparation clause - INR 50,000,000 in aggregate.
48) Designation of Property Clause.
49) Multiple Insured Clause as per Insurer's wordings.
50) Nominated Loss Adjusters Clause (Surveyour list to be finalized in consultation with Insurer's Claims team).
51) On account payment of claims clause subject to recommendation of Lead surveyor/ Interim Payment clause upto 75%.
52) Premium adjustment clause as per EAR policy wordings.
53) Highest Single Deductible as per Insurer's wordings.
54) Primary Insurance Clause as per waiver of Contribution (between principal and Contractor).
55) Non-Cancellation clause as per EAR policy wordings.
56) Waiver of contribution (Between Principal and Contractor).
57) Waiver of subrogation against Insured Parties and those parties for which subrogation has been waived as a result of a contractual requirement.
58) Fraudulent claims not covered.
59) Other Interests covered for their on-site activities and subject to their scope of work is included in the overall project sum insured.
60) Increase in Sum Insured during the policy period at the originally agreed policy rate for the full project period rate since inception.
61) With respect to the deductibles claim means the final payable amount as per the assessment.
62) Section 2 Third party liability any one occurrence & in aggregate including during maintenance period upto INR 250,000,000. (including Cross liability as per MRE 002 and Vibration Removal and weakening support as per MRE 120).
63) MRE 002 Cross Liability upto INR 250,000,000 per occurrence and in aggregate.

64) Environmental Clean-up costs and Sudden and accidental Pollution covered as per NMA 1685 upto INR 250,000,000 per occurrence and in aggregate.
65) Seat of Arbitration Mumbai

N) Warranties:

Clauses/ Warranties

Sabotage and Terrorism Damage exclusion
Policy shall stand canceled ab intio in the event of nonrealization of the premium
In the event of total loss claim being honored, the claimed amount will be paid after deducting the unpaid premium installments
Warranted that any type of second hand/used machines stands as excluded from scope of cover
Any type of Demolishment, Dismantling, Destruction is excluded from the scope of cover
Warranted that there are no claims/losses till the inception of Coverage.
No Cover for losses prior to inception of risk with insurer.
Exclusion of Tunnelling Risk.
The scope of cover will be limited to – Petrochemical plants involving hydrocarbon processing.
Industries, Seepage, Pollution and Contamination Exclusion Clause (NMA 1685).

Subject otherwise to terms and conditions of Erection All Risks Insurance Policy

The stamp duty of Rs. 0.50/- (Fifty Paise Only) paid in cash or by demand draft or by pay order,vide Receipt/Challan No.CSD10520244764 dated. 01st February 2025.
Signed for and on behalf of ICICI Lombard General Insurance Company Limited, at Mumbai on this date February 28, 2025.

Gaurav Arora
Authorised Signatory

GSTIN Reg. No : 27AAACI7904G1ZN
IL GIC GSTIN Address: Ground, First and Second Floor, ICICI Lombard House, 414 Veer Savarkar Marg, Prabhadevi, Mumbai 400025 Maharashtra
Description of services: General Insurance Business
HSN/SAC : 9971
Policy shall stand cancelled ab initio in the event of non-realization of the premium."

PEP Declaration:

• Are you or any of the proposed applicants a PEP* or a close relative of a PEP* - **NO**
If yes, please give details: *Politically Exposed Persons (PEPs) are individuals who are or have been entrusted with prominent public functions in a foreign country, e.g., Heads of States/Governments, senior politicians, senior government/judicial/military officers, senior ex-ecutives of state-owned corporations, important political party officials, etc

• I/We hereby give my/our consent to the Company to verify and obtain my/our identity/address proof through Central KYC Registry or UIDAI or through any other modes for the purpose of undertaking KYC. – **YES**

• I/We hereby declare and confirm that the premium has been paid out of legally acquired sources of income and the subsequent premiums if any, will continue to be paid out of legally declared and assessed source of income. – **YES**

Erection All Risk Policy

Annexure Attached to and Forming Part of EAR Policy No.: 5011/R/383323657/00/000

Special Condition 1 for Hydrocarbon Processing Industries

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, the following shall apply to this insurance:

As from the introduction of any hydrocarbons into the plant

1. a deductible of for Section 1 of the Policy is applicable, which shall also apply in case of fire and explosion damage,
2. the Insurers shall not be liable for loss of or damage to a. catalysts unless included by endorsement,
b. reforming units due to overheating or cracking of any tubes,
c. the insured plant due to overheating or cracking following an exothermic reaction,
d. the insured plant due to the prescribed techniques not being followed on purpose or due to the cutting out of safety devices, as well as for any liability resulting therefrom.

Special Condition 2 for Hydrocarbon Processing Industries Cover of Catalysts

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and subject to the Insured having paid the agreed extra premium, lit a of para 2 under Special Condition 1 for Hydrocarbon Processing Industries shall be replaced by the following wording:

"catalysts unless such loss or damage is caused by an indemnifiable loss of or damage to the insured plant and/or apparatus,"

Existing property or property belonging to or held in care, custody or control by the insured

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and subject to the Insured having paid the agreed extra premium, Section 1 of this Policy shall be extended to cover loss of or damage to the existing property or property belonging to or held in care, custody or control by the Insured caused by or arising
out of the construction or erection of the items insured under Section 1.

Sum insured: As specified in the schedule.

The Insurers shall only indemnify the Insured for loss of or damage to the insured property provided that prior to the commencement of construction its condition is sound and the necessary safety measures have been taken.

In respect of loss or damage caused by vibration or by the removal or weakening of support Insurers shall only indemnify the Insured for loss or damage as a result of a total or partial collapse of the insured property, and not for superficial damage which neither impairs the stability of the insured property nor endangers its users.

The Insurers shall not indemnify the Insured for
– loss or damage which is foreseeable having regard to the nature of the construction work or the manner of its execution,
– the costs of loss prevention or minimization measures which become necessary during the period of insurance.

Deductible: As specified in the schedule.

Inflation Protection Clause/Additional Cost of Completion

It is hereby understood and agreed that in the event of delay in completion of the insured construction operations or part thereof, being incurred solely by reason of loss of or damage to the property insured covered under Section 1, cover by this Policy shall, notwithstanding anything contrary to the terms, conditions and exclusions under the Policy, extend to indemnify the Insured (in addition to the Sum insured under the Policy or any endorsed thereupon) in respect of the amount by which the ultimate cost of construction of those parts of the property insured not suffering such loss of or damage and being unbuilt or incomplete at the date of loss or damage should exceed the cost of construction had no such loss or damage or consequent delay occurred.

Provided always that:-
(a) the indemnity provided by this clause shall apply to the net increase in costs caused by the inflationary effect of escalation in the costs of labour, material and services which the Insured shall prove to be a direct result of the delay consequent upon indemnifiable loss or damage;
(b) no indemnity is given under this clause in respect of increased construction costs incurred:
(i) in consequence of any other delay not referred to in this clause;
(ii) by reason of any improvement or change in methods of working or construction;
(iii) in re-designing the property insured or incurred as a result of such re-design;
(iv) for the acceleration of the progress of the works or to expedite repairs or to construct the works at a faster rate than previously achieved;
(c) no indemnity is provided in respect of the payment of penalties or liquidated damages, nor in respect of costs incurred to avoid such payment.
The indemnity provided herein shall be subject to the limit of indemnity as specified below:

Limit of indemnity: As specified in the schedule.

Amendment in Suspension of testing period

It is hereby understood and agreed, subject otherwise to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, that if the testing is suspended following a fortuitous accident at the site of erection, the period of suspension of testing shall be treated as erection period if the period of suspension exceeds 7 days.

Endorsement 004 Extended Maintenance Cover

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and subject to the Insured having paid the agreed extra premium, this insurance shall be extended for the maintenance period specified hereunder to cover loss or damage to the contract works
- caused by the insured contractor(s) in the course of the operations carried out for the purpose of complying with the obligations under the maintenance provisions of the contract,
- occurring during the maintenance period provided such loss or damage was caused on the site during the erection period before the certificate of completion for the lost or damaged section was issued.
Maintenance cover As specified in the Schedule.

Property insured taken into use or operation

This endorsement forms part of section 1 and is subject otherwise to the terms, provisions, conditions and exclusions contained in the *policy of insurance* or endorsed thereon

1. Indemnification

1.1. The *insurer* shall indemnify the *insured* in respect of loss of or damage to *property insured* specified below which

1.1.1. after the expiry of the *testing period* has been taken into use or operation.

2. Expiry

2.1. This special insurance cover expires on the date specified below.

Property insured **to be taken into use:** As specified in the Schedule.

Expiry Date: As specified in the Schedule or policy end date whichever is earlier.

Endorsement 206 Special Conditions Concerning Fire-Fighting Facilities

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, the Insurers shall only indemnify the Insured for loss or
damage resulting directly or indirectly from fire and/or explosion if the following requirements are fulfilled:

1. Adequate fire-fighting equipment and extinguishing agents of sufficient capacity must always be available at the site and ready for immediate use.
2. A sufficient number of workmen must be fully trained in the use of such equipment and must be available for immediate intervention at all times.
3. If storage of material for the construction or erection of the contract works is necessary, storage must be subdivided into storage units not exceeding the equivalent value of as specified in the Schedule per storage unit.

The individual storage units must either be at least 50 m apart or separated by fire-proof walls.
All inflammable material (such as shuttering material not fitted for concreting, litter, etc) and especially all inflammable liquids and gases must be stored at a sufficiently large distance from the property
under construction or erection and any hot work.
4. Welding, soldering or the use of an open flame in the vicinity of combustible material is only permitted if at least one workman suitably equipped with extinguishers and well trained in fire-fighting
is present.
5. At the beginning of testing all fire-fighting facilities designed for the operation of the plant must be installed and serviceable.

Endorsement 220 Inland Transit

It is agreed and understood that, otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and subject to the insured having paid the agreed extra premium, Section I of this insurance shall be extended to cover loss of or damage to locally supplied property insured.

- whilst in transit to the contract site other than on waterway or by air within the territorial limits of
- caused as a result of collision, impact, flood, earthquake, inundation, landslide or rockslide, subsidence, burglary or fire,
- provided that the insured property is suitably packed and/or prepared for transit which shall also be deemed to include stowage,
- and provided that the maximum amount payable under this Endorsement shall not exceed per conveyance.

If offsite storage, however, is necessary, Endorsements 206 and 207 shall be applied additionally.

Total value of locally supplied property: As specified in the Schedule.
Deductible: As specified in the Schedule.

Endorsement 218 Cover of Leak Search Costs when Laying Pipelines

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, the Insurers shall indemnify the Insured also for the following items under this Policy:

a. Leak search costs following a hydrostatic test (including the cost of leasing special apparatus, cost of operation and transport of such apparatus);
b. Earthwork on a trench not damaged in itself, such earthwork becoming necessary in the search for and repair of leaks, eg excavation, uncovering of the pipeline, backfilling;

provided that
-the leak has been caused by an indemnifiable event or is attributable to faulty execution on the site, and
- 100 % of the welding seams have been X-rayed and any deficiencies discovered thereby have been removed properly.

Indemnity shall be limited in the aggregate to:
per testing section As specified in the Schedule.
during one policy period As specified in the Schedule.
Costs caused by faulty repair of welding seams shall be excluded from the cover.

Munitions of War upto INR 500,000,000 in aggregate.

General Exclusion 1 War and Kindred Risks shall not apply to Damage to Insured Property from or occasioned by the detonation of munitions of war or parts thereof in or about the site of the Contract Works provided that the presence of such munitions does not result from a state of war current at the time of such Damage.

Repeat Tests/Extra tests

It is hereby understood and agreed, subject otherwise to the terms, exclusions, provisions and conditions contained herein the Policy or endorsed thereon, and subject to the Insured having paid the agreed additional premium, that if as a result of an insured peril hereunder, it becomes necessary to repeat any test and /or trial or to carry out subsequent test(s) and/or trial(s) the Company will bear the cost of any such repeated and/or subsequent test(s) or trial(s).
The indemnity provided herein shall be subject to the limit of indemnity and deductible as specified in the Schedule.

Temporary Repairs

It is hereby understood and agreed that subject otherwise to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and subject to the Insured having paid the agreed additional premium, the cost of any provisional repairs shall be borne by the Company even if such repairs do not constitute part of the final repairs and do increase the total cost of repairs.
The indemnity provided herein shall be subject to the limit of indemnity and deductible as specified in the Schedule.

Alteration in material fact/project Amendments

It is hereby understood and agreed, subject otherwise to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, that this insurance shall also cover any alteration in any material fact or otherwise regarding construction methods or procedures or any other information contained in or omitted from any underwriting information supplied to the Company shall not prejudice this Policy which shall be held covered subject to immediate notification to the Company but not later than 3 days as soon as the alteration or omission becomes known to the Insured, and then subject to any variation in the terms and conditions which may be mutually agreed between the Insured and the Company.

Endorsement 200 Cover of Manufacturer's Risk

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and subject to the Insured having paid the agreed extra premium, lit 4 under "Exclusions to Section I" shall be replaced by the following wording:
"4 all costs related to repair and/or replacement of parts and/or items directly affected by faulty design, defective material or casting, bad workmanship other than faults in erection, which the Insured would have incurred for rectifying the original fault had such fault been discovered before the loss occurred;"

This Endorsement does, however, not apply to parts and items of civil engineering sections.

Start Up Expenses

It is hereby understood and agreed, subject otherwise to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and subject to the Insured having paid the additional premium, that on the occurrence of an event which leads to a damage or loss covered under Sections I during testing, this extension covers actual loss sustained due to specified start-up costs for power and utilities such as electricity, water, steam, gas as well as feedstock, fuels or combustibles and stocks in process excluding finished stocks to re-establish the plant in the operational state it was at the time of the damage in a normal start-up procedure and subject to the Limit of Liability as entered below.
Start-up costs will not be recoverable under normal or emergency shut down operations.

The indemnity provided herein shall be subject to the limit of indemnity and deductible as specified in the schedule.

Cost of Claims Preparation

It is hereby understood and agreed that subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and subject to the Insured having paid the additional premium that costs and expenses necessarily and reasonably incurred by the Insured following loss or damage to the Property Insured to extract and compile information required by the Company from the Insured's own records for the purpose of preparing a claim under the Policy but excluding legal, investigation and research fees/expenses incurred for the purpose of contesting any issue over the Company's liability under the Policy.
Provided always that no amount shall be recoverable under this clause if subsequent to the incurrence of any expenses, the Company shall deny liability for any claim in respect of which the expenses had been incurred (with or without consent of the Company).
The indemnity provided herein shall be subject to the limit of indemnity and deductible as specified in the Schedule.

Property Designation Clause

It is hereby understood and agreed, otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, that for the purpose of determining, where necessary, the item under which any property is insured, the Company agree to accept the designation under which the property has been entered in the insured's books.

Multiple Insured Clause

It is hereby understood and agreed that, otherwise subject to the terms, exclusions, provisions and conditions contained in the policy or endorsed thereon,
1. if the Insured described in the schedule comprises more than one insured party, each operating as a separate and distinct entity then the cover hereunder shall apply in the same manner and to the same extent as if individual policies had been issued to each insured party provided that the total liability of the Company to all of the insured parties collectively shall not exceed the sums insured and limits of indemnity including any inner limits set by memorandum or endorsements stated in the policy.

2. any payment or payments by the Company to any one or more such insured parties shall reduce pro-tanto the Company's liability to all such parties arising from anyone event giving rise to a claim under this policy and in aggregate.

3. the insured parties will at all times preserve and enforce the various contractual agreements entered into by the insured parties and the contractual agreements remedies of such parties in the event of any loss or damage.

4. the Company shall be entitled to avoid liability to or (as may be appropriate) claim damages from any of the insured parties in circumstances of fraud, misrepresentation, non-disclosure or breach of any warranty or condition of this policy each referred to in this clause as a Vitiating Act.

5. Vitiating Act committed by one insured party shall not prejudice the right to indemnity of any other insured party who has an insurable interest and who has not committed a Vitiating Act.

6. The Company hereby agrees to waive all rights of subrogation that they may have or acquire against any insured party except where the rights of subrogation or recourse are acquired in consequence or otherwise following a Vitiating Act in which circumstances the Company may enforce such rights notwithstanding the continuing or former status of the vitiating party as an Insured.

7. The lenders to the project hereby insured shall not be entitled to any indemnity under this policy for or arising from loss or damage in respect of which the Company by reason of a Vitiating Act is no longer liable to indemnify any one or more other insured party.

Highest Single Deductible

It is hereby understood and agreed that subject otherwise to the terms, exclusions, provisions and conditions contained herein the Policy or endorsed thereon:
No claim or series of claims under this Policy arising out of the same event shall be subject to more than one deductible or time excess, as the case may be.
In the event of any claim or series of claims falling under more than one sections of this Policy, only the highest of deductibles or time excess applicable shall apply to the exclusion of all others.

Endorsement 002 Cover for cross liability

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and subject to the Insured having paid the agreed extra premium, the third party liability cover of the Policy shall apply to the insured parties named in the Schedule as if a separate policy had been issued to each party, provided that the Insurers shall not
indemnify the Insured under this Endorsement in respect of liability for

– loss of or damage to items insured or insurable under Section 1 of the Policy, even if not recoverable due to an excess or any limit,
– fatal or non-fatal injury or illness of employees or workmen who are or could have been insured under workmen's compensation and/or employers' liability insurance.

The Insurers' total liability in respect of the insured parties shall not however exceed in the aggregate for any one accident or series of accidents arising out of one event the limit of indemnity stated in the Schedule.

Endorsement 120 Vibration, removal or weakening of support

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and subject to the Insured having paid the agreed extra premium, Section 2 of this insurance shall be extended to cover liability consequent upon loss or damage caused by vibration or by the removal or weakening of support.

Provided always that
the Insurers indemnify the Insured in respect of liability for loss or damage to any property or land or building only if such loss or damage results in the total or partial collapse,

– the Insurers indemnify the Insured in respect of liability for loss or damage to any property or land or building only if prior to the commencement of construction its condition is sound and the necessary loss prevention measures have been taken,
– if required, the Insured, before commencement of construction and at his own expense, prepares a report on the condition of any endangered property or land or building.

The Insurers shall not indemnify the Insured in respect of liability for
– loss or damage which is foreseeable having regard to the nature of the construction work or the manner of its execution,
– superficial damage which neither impairs the stability of the property, land or buildings nor endangers their users,
– the costs of loss prevention or minimization measures which become necessary during the period of insurance.

Limit of indemnity (any one occurrence): As specified in the Schedule.
Total limit of indemnity: As specified in the Schedule.

Deductible: As specified in the Schedule.

Industries, Seepage, Pollution and Contamination Exclusion Clause (NMA 1685)

This Insurance does not cover any liability for:

(1) Personal Injury or Bodily Injury or loss of, damage to, or loss of use of property directly or indirectly caused by seepage, pollution or contamination, provided always that this paragraph (1) shall not apply to liability for Personal Injury or Bodily Injury or loss of physical damage to or destruction of tangible property, or loss of use of such property damaged or destroyed, where such seepage, pollution or contamination is caused by a sudden, unintended and unexpected happening during the period of this Insurance

(2) The cost of removing, nullifying or cleaning-up seeping, polluting or contaminating substances unless the seepage, pollution or contamination is caused by a sudden, unintended and unexpected happening during the period of this Insurance

(3) Fines, penalties, punitive or exemplary damages

This Clause shall not extend this Insurance to cover any liability which would not have been covered under this Insurance had this Clause not been attached.

22/1/70

NMA 1685

Cyber Loss Limited Exclusion Clause – LMA 5410 (amended)

1 Notwithstanding any provision to the contrary within this insurance agreement or any endorsement thereto, this insurance agreement excludes all loss, damage, liability, cost or expense of whatsoever nature directly or indirectly caused by, contributed to by, resulting from, arising out of or in connection with:

1.1 any loss of, alteration of, or damage to or a reduction in the functionality, availability or operation of a Computer System, unless subject to the provisions of paragraph 2;

1.2 any loss of use, reduction in functionality, repair, replacement, restoration or reproduction of any Data, including any amount pertaining to the value of such Data.

2 Subject to the other terms, conditions and exclusions contained in this insurance agreement, this insurance agreement will cover physical damage to property insured under the original policies and any Time Element Loss directly resulting therefrom where such physical damage is directly occasioned by any of the following perils:

- Fire
- Explosion

Definitions

- Computer System means any computer, hardware, software, communications system, electronic device (including, but not limited to, smart phone, laptop, tablet, wearable device), server, cloud or microcontroller including any similar system or any configuration of the aforementioned and including any associated input, output, data storage device, networking equipment or back up facility.

- Data means information, facts, concepts, code or any other information of any kind that is recorded or transmitted in a form to be used, accessed, processed, transmitted or stored by a Computer System.

- Time Element Loss means business interruption, contingent business interruption or any other consequential losses.

Communicable Disease Exclusion Clause

1. Notwithstanding any provision, clause or term of this insurance Contract to the contrary, this insurance Contract excludes any loss, cost, damage, liability, claim, fines, penalty or expense or any other amount of whatsoever nature, whether directly or indirectly and/or in whole or in part, related to, caused by, contributed to by, resulting from, as a result of, as a consequence of, attributable to, arising out of, arising under, in connection with, or in any way involving (this includes all other terms commonly used and/or understood to reflect or describe nexus and/or connection from one thing to another whether direct or indirect):

1.1 a Communicable Disease and/or the fear or threat (whether actual or perceived) of a Communicable Disease and/or the actual or alleged transmission of a Communicable Disease regardless of any other cause or event contributing and/ or occurring concurrently or in any sequence thereto, and

1.2 a pandemic or epidemic, as declared by the World Health Organisation or any governmental authority.

2. As used herein, Communicable Disease means: any infectious, contagious or communicable substance or agent and/or any infectious, contagious or communicable disease which can be caused and/or transmitted by means of substance or agent where:

2.1 the disease includes, but is not limited an illness, sickness, condition or an interruption or disorder of body functions, systems or organs, and

2.2 the substance or agent includes, but is not limited to, a virus, bacterium, parasite, other organism or other micro-organism (whether asymptomatic or not); including any variation or mutation thereof, whether deemed living or not, and

2.3 the method of transmission, whether direct or indirect, includes but not limited to, airborne transmission, bodily fluid transmission, transmission through contact with human fluids, waste or the like, transmission from or to any surface or object, solid, liquid or gas or between organisms including between humans, animals, or from any animal to any human or from any human to any animal, and

2.4 the disease, substance or agent is such:

2.4.1 that causes or threatens damage or can cause or threaten damage to human health or human welfare, or

2.4.2 that causes or threatens damage to or can cause or threaten damage to, deterioration to, contamination of, loss of value of, loss of marketability of or loss of use or usefulness of, tangible or intangible property.

For avoidance of doubt, Communicable Disease includes but is not limited to Coronavirus Disease 2019 (Covid -19) and any variation or mutation thereof.

3. For further avoidance of doubt, any contingent or other business interruption loss, cost, damage, loss of income, loss of use, increased cost of working and/or extra expense arising out of or attributable to:

3.1 any partial or complete closure of and/or slowdown in, including but not limited to any closure by or under the advisories of public, military, government or civil authorities, or any denial of access to reinsured premises, or customer and or supplier premises (including service / utility providers), or

3.2 change in consumer behaviour, or

3.3 an absence of infected employees or employees suspected of being infected shall not be covered by this insurance Contract.

4. For still further avoidance of doubt, loss, cost, damage, liability, claim, fines, penalty or expense or any other amount excluded hereby, includes but is not limited to any cost to identify, clean-up, detoxify, disinfect, decontaminate, mitigate, remove, evacuate, repair, replace, monitor, sanitize or test: (1) for a Communicable Disease or (2) any tangible or intangible property covered by this insurance Contract that is affected by such Communicable Disease.

5. It is clarified that (1) no other prior, concurrent or subsequent provision, clause, term or exception of this insurance Contract (including (but not limited to) any prior, concurrent or subsequent endorsement and/or any provision, clause, term, buy back or exception that operates, or is intended to operate, to extend the coverage of, or protections provided by, this insurance Contract by whatever name called like any coverage extension, additional coverage, global extension, exception to any exclusion); (2) no change in the law, clause or similar provision; (3) no follow the fortunes clause or similar provision; and/or (4) no change in the law or any regulation (to the extent permitted by applicable law), shall operate to provide any insurance, coverage or protection under this insurance Contract that would otherwise be excluded through the exclusion set forth in this Clause.

6. If the insurer alleges that by reason of this Clause any amount is not covered by this insurance Contract the burden of proving the contrary shall rest in the insured.

Erection All Risk Policy

ENDORSEMENT END-110 CONCERNING STORAGE

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the policy or endorsed thereon, the Insurers shall only indemnify the Insured for loss of or damage to the Insured items during storage upto a value per storage unit not exceeding the equivalent of the limit as specified in the schedule.

The individual storage units shall be either at least 50 m apart or separated by fireproof walls.

END-124 EARTHQUAKE

In consideration of the payment of additional premium by the Insured to the Company, it is hereby agreed and declared that notwithstanding anything stated in the printed exclusions of this policy to the contrary, this Insurance is extended to cover loss or damage (including loss or damage by fire) to any of the property Insured by this policy occasioned by or through or in consequence of earthquake including flood or overflow of the sea, lakes, reservoirs and rivers and/or Landslide / Rockslide resulting therefrom.

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, the Insurers shall only indemnify the Insured for loss, damage or liability arising out of earthquake if the Insured proves that the earthquake risk was taken into account in design according to the official building codes valid for the site and that the qualities of material and workmanship and the dimensions on which the calculations were based were adhered to.

END-2/q SPECIAL CONDITIONS CONCERNING FIRE FIGHTING FACILITIES

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, the Insurers shall only indemnify the Insured for loss or damage resulting directly or indirectly from fire and/or explosion if the following requirements are fulfilled:-

- Adequate fire-fighting equipment and extinguishing agents of sufficient capacity must always be available at the site and ready for immediate use.
- Sufficient number of workmen must be fully trained in the use of such equipment and must be available for immediate intervention at all times.
- If storage of material for the construction or erection of the contract works is necessary at site or any other location within India, storage must be subdivided into storage units not exceeding the equivalent value of limit as specified in the schedule per storage unit. The individual storage units must either be at least 10 meters apart or separated by fire-proof walls.
- All inflammable materials (such as shuttering material not fitted for concreting, litter, etc.) and especially all inflammable liquids and gases must be stored at a sufficiently large distance from the property under construction or erection and any hot work like welding etc.

Provided further that in respect of storages of Indian sourced materials at locations other than the site, the amount payable shall not exceed Rs. 10 Crores at any one location.

- Welding, soldering or the use of an open flame in the vicinity of combustible material is permitted only if at least one workman suitably equipped with extinguishers and well trained in fire-fighting is present.
- At the beginning of testing all fire-fighting facilities designed for the operation of the plant must be installed and serviceable.

END-29 INCREASED CUSTOMS DUTY

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, this insurance shall be extended to cover the increased Customs Duty rate payable on the replacement supplies over and above the Customs Duty taken into account while arriving at the sum insured of the affected item.

Provided always that such additional duty is incurred in connection with any loss or damage to the insured items recoverable under the policy and provided further that the amount payable hereunder shall not exceed Rs the limit as specified in the policy schedule. . in the aggregate.

Each and every claim payable under this extension shall be subject to an excess of 5% of the Additional Customs Duty incurred over and above the excess normally applicable.

END-8/b 50:50 CLAUSE

In respect of the subject matter Insured hereunder consigned from outside India:

The Insured hereby undertakes to inspect each item of the subject matter Insured upon arrival at the contract site for possible damage sustained during transit.

In the case of packed items which are to be left in their packaging until a later date the packaging is to be visually inspected for signs of possible damage and where such damage is visible the items are to be unpacked and inspected and any damage discovered reported to the Marine Insurers.

Where the packaging of an item shows no visible signs of damage to such item having been sustained during transit any subsequent damage discovered upon unpacking will be dealt with by the Marine Insurers or the EAR Insurers according to whether it can be clearly established that such damage was caused before or after arrival at the contract site.

Where it is not possible to clearly establish whether the damage to an item was caused before or after arrival at the contract site it is hereby agreed that the cost of such damage shall be shared equally between the Marine Insurers and the EAR Insurers, provided such a clause is included in the Marine Policy also.

END-4/c 72 HOURS CLAUSE

It is agreed that any loss of or damage to the Insured Property arising during any one period of seventy two (72) consecutive hours, caused by storm, tempest, flood or earthquake shall be deemed as a single event and therefore to constitute one occurrence with regard to the Excesses provided for herein. For the purpose of the foregoing the commencement of any such seventy two (72) hours period shall be decided at the discretion of the Insured it being

understood and agreed, however, that there shall be no overlapping in any two or more such seventy two (72) hours periods in the event of damage occurring over a more extended period of time.

END10/e LOSS MINIMISATION EXPENSES

If upon the happening of any peril hereby insured resulting in actual damage to the Insured Property the Insured shall take all steps to minimise further loss or damage arising from that occurrence or accident, expenses necessarily and reasonably incurred by or on behalf of the Insured in an attempt to prevent or minimise such further loss or damage will be indemnified upto a limit of 30% of the net claim amount per any one occurrence and the limit of indemnity as specified in the schedule in the aggregate.

END5/g PROFESSIONAL FEES CLAUSE

The Indemnity provided by this Policy is extended to include Architects, Surveyors and Consulting Engineers or other Professional Fees necessarily incurred in the reinstatement of the Insured Property consequent upon loss or damage but not for preparing any claim, it being understood that the amount payable for such fees shall not exceed those authorized under the scale of the appropriate Professional Body.

The liability of the insurers under this endorsement shall in no case exceed 10% of the loss amount per any one occurrence and the limit of indemnity as specified in the policy schedule in the aggregate

END120 WAIVER OF CONTRIBUTION CLAUSE

It is hereby declared and agreed that the cover provided under this policy is a primary cover without any right of contribution from any other insurance

END-101 CIVIL ENGINEERING WORKS

It is hereby declared and agreed, subject to the exceptions contained herein, or endorsed hereon, that this Policy is extended to cover the risks of loss or damage to property brought on to the Site of Erection for the performance of the erection contract, details of which are stated as under a) All permanent Civil Engineering Works such as buildings, foundations earthwork including materials for the constructions thereon, b) All temporary works such as buildings, sheds (if specifically declared under the schedule)

PROVIDED that the following exclusions shall apply i)

I. loss or damage directly caused by defective workmanship material, or design or wear and tear,

II. loss or damage directly caused by mechanical breakdown or derangement,

III. loss or damage directly caused by deterioration due to lack of use or obsolescence,

IV. any loss of property either by disappearance or by shortage if such disappearance or shortage alone is revealed during and after an inventory is made,

V. Cessation of work whether total or partial,

VI. loss, destruction or damage of accounts, bills, currency stamps, deeds, evidence of debt, money, notes or securities.

The exclusions of loss or damage caused by (i), (ii) and (iii) above shall be limited to the machine structure or work immediately affected and shall not extend to other work or the property lost or damaged in consequence of the defect, wear & tear, breakdown, derangement or deterioration, subject to the Condition that:

The Insured shall take all reasonable precautions in the selection of labour and to maintain in efficient condition all tools and equipments used in connection with performance of this erection contract. Provided that all the conditions of this Policy shall apply in all respects to the

Insurance granted by this extension save in so far as the same are expressly varied hereby and any reference to loss or damage in the conditions of the Policy shall be deemed to include the perils hereby insured against.

END121 CONTINUITY OF COVER DURING OPERATIONAL PHASE

Cover for equipment which have completed test run and awaiting integral testing

It is hereby agreed and declared that not withstanding anything stated in the printed exclusions of this policy to the contrary, this insurance is extended to cover loss or damage to any of the equipment insured by this policy occasioned by any accidental cause other than those listed below:

a) i) faulty or defective design materials or workmanship inherent vice latent defect gradual deterioration deformation or distortion or wear and tear

ii) interruption of the water supply gas electricity or fuel systems or failure of the effluent disposal systems to and from the premise unless Damage by a cause not excluded in the policy ensues and then the Insurer shall be liable only for such ensuing Damage.

b) i) collapse or cracking of buildings

ii) corrosion rust extremes or changes in temperature dampness dryness wet or dry rot fungus shrinkage evaporation loss of weight pollution contamination change in colour flavour texture or finish action of light vermin insects marring or scratching unless such loss is caused directly by Damage to the property insured or to premises containing such property by a cause not excluded in the policy

c) i) larceny ii) acts of fraud or dishonesty

iii) disappearance unexplained or inventory shortage misfiling or misplacing of information shortage in supply or delivery of materials or shortage due to clerical or accounting error

d) i) coastal or river erosion ii) normal settlement or bedding down of new structures

2) Damage caused by or arising from :

a) any willful act or willful negligence on the part of the Insured or any person acting on his behalf

b) cessation of work delay or loss of market or any other consequential or indirect loss of any kind or description whatsoever

3) Damage occasioned directly or indirectly by or through or in consequence of any of the following occurrences, namely:

a) war invasion act of foreign enemy hostilities or warlike operations (whether war be declared or not) civil war

b) mutiny civil commotion assuming the proportions of or amounting to a popular rising military rising insurrection rebellion revolution military or usurped power

4) i) permanent or temporary dispossession resulting from nationalisation commandeering or requisition by any lawfully constituted authority ii) permanent or temporary dispossession of any building resulting from the unlawful occupation of such building by any person provided that the Insurers are not relieved of any liability to the Insured in respect of Damage to the property insured occurring before dispossession or during temporary dispossession which is otherwise insured by this Policy iii) the destruction of property by order of any public authority

In any action, suit or other proceeding where the Insurer alleges that by reason of the provisions of Exclusions A3 (a) and (b) above any loss destruction or damage is not covered by this insurance the burden of proving that such loss destruction or damage is covered shall be upon the Insured.

5) Damage directly or indirectly caused by or arising from or in consequence of or contributed confiscation to by :

a) nuclear weapons material

b) ionising radiations or contamination by radioactivity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel. Solely for the purpose of this Exclusion Combustion shall include any selfsustaining process of nuclear fission.

6) Loss of earnings, loss by delay, loss of market or other consequential or indirect loss or damage of any kind or description whatsoever.

7) loss or damage due to electrical or Mechanical breakdown, failure, breakage or derangement, freezing of coolant or other fluid, defective lubrication or lack of oil or coolant,

The cover for the equipment will cease from the time integral testing commences or from the date specified in this endorsement whichever is earlier. All other terms and conditions of the policy remain unaltered. Period: As specified in the schedule

END-14/I WAIVER OF SUBROGATION

It is hereby agreed and understood that otherwise subject to the terms exclusions, provisions and conditions contained in the Policy or endorsed thereon, the Insurers shall waive all their rights of subrogation or action which they may have or acquire against the assured and any person, firm or corporation having an association or affiliation at the time of loss with the assured through ownership or management subject to having been insured under this Policy.

END-117 VALUABLE DOCUMENTS

Subject otherwise to terms, exclusions, provisions and conditions contained in the Policy, the indemnity granted by Section 1 of this Policy shall, in addition extend to indemnify the insured in respect of costs necessarily and reasonably incurred in rewriting or redrawing Plans or Specifications of the contract work insured hereunder, when such Plans or Specifications are lost or damaged by any cause not excluded by this section and the Insured needs to have them redrawn or rewritten in order to complete the project or to enable payment to be made for works already carried out.

The liability of the Insurers shall not exceed in the aggregate during the Policy period the Sum Insured set forth in the Schedule.

END-111 SAFETY MEASURES

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the policy or endorsed thereon, the Insurers shall only indemnify the Insured for loss, damage or liability directly or indirectly caused by flood and inundation if adequate safety measures have been taken during planning and execution of the project.

Adequate safety measures in this context shall mean that the average monthly rainfall, flood and inundation hazard as known from statistics of the competent meteorological offices for the respective month and location has been taken into account.

END-112 DAMAGE TO CROPS, FORESTS ETC.

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the policy or endorsed thereon, the Insurers shall not indemnify the Insured for loss, damage or liability directly or indirectly caused to crops, forests and/or any cultures during the execution of the contract works.

END-136 SAFETY MEASURES WITH RESPECT TO PRECIPITATION, FLOOD AND INUNDATION

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the policy or endorsed thereon, the Insurers shall indemnify the Insured for loss, damage or liability caused directly or indirectly by precipitation only if adequate precautions have been taken in designing and executing the project involved.

In this context, adequate precautions shall mean that allowance is made for precipitation, flood and inundation up to a return period of 10 years for the location insured and the entire policy period on the basis of statistics prepared by the Meteorological agencies. Loss, damage or liability resulting from the Insured's not immediately removing obstruction (e.g. sand, trees) from watercourses, whether carrying water or not, in order to maintain free water flow shall not be idemnifiable.

END-118 DEFECTIVE PART EXCLUSION DE4 (1995)

This Policy excludes loss of or damage to any of the cost necessary to replace, repair or rectify

(a) Any component part or individual item of the Property Insured which is defective in design plan specification materials or workmanship. (b) Property Insured lost or damage to enable the replacement repair or rectification of Property Insured excluded by (a) above Exclusion (a) above shall not apply to other parts or items of Property Insured which are free from defect but are damaged in consequence thereof.

For the purpose of the Policy and not merely this Exclusion the Property Insured shall not be regarded as lost or damaged solely by virtue of the existence of any defect in design plan specification materials or workmanship in the Property Insured or any part thereof.

END-133 EXPEDITING COST INCLUDING AIR FREIGHT AND EXPRESS FREIGHT UP TO 30% OF NET CLAIM AMOUNT

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, the Insurer shall indemnify the insured, extra charges for Overtime, Night Work, work on Public Holidays and Express freight (including Air Freight).

Provided always that such extra charges are incurred in connection with any loss of or damage to the insured items recoverable under the Policy.

If the sum(s) insured of the damaged item(s) is/are less than the amount(s) required to be insured, the amount payable under this Endorsement for such extra charges shall be reduced in the same proportion.

Provided always that payable shall not exceed 30% of net claim amount per any one occurrence and that the indemnity in respect of Air Freight shall be subject to an additional excess of 5% of the Air Freight incurred per claim.

END-13/i CROSS LIABILITY COVER

The following endorsement should be used for the purpose -

'It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the policy or endorsed thereon and subject to the insured having paid the agreed extra premium, the Third party Liability Cover of the policy shall apply to the insured parties named in the Schedule as if a separate policy had been issued to each party, provided the Company shall not indemnify the insured under the Endorsement in respect of liability for -

i) loss of or damage to items insured or insurable under Section 1 of the policy even if not recoverable due to excess or any limit, ii) fatal or non-fatal injury or illness of employees or workmen who are or could have been insured under workmen's compensation and / or employer's liability insurance. iii) The Insurer's total liability in respect of the insured parties shall not however exceed in the aggregate for any one accident or series of accidents arising out of one event the limit of indemnity stated in the Schedule'.

END102 FIRE/EXPLOSION CLAIMS AND FIRE FIGHTING-1

I) Applicable for all risks including hydro carbon processing risks. [Complying with only minimum Requirements of i.e. 11A I (I to XII)Rules for Fire Protection for Construction / Erection Sites applicable to all risks irrespective of Sum Insured].

Notwithstanding the conditions, provisions and other endorsements of the Policy, it is agreed and understood that the company shall indemnify the Insured in respect of any loss or damage caused by Fire/Explosion only if the following requirements are fulfilled. i) One portable fire extinguisher of Soda Acid or water type for every
300sq. m of storage/erection site area or small bore hose reels as per Section 4 of F.P. Manual shall be provided. The location of fire extinguishers shall be conspicuously marked by clearly visible signs. Checking and maintenances at regular intervals shall be recorded. ii) Trained fire fighting squad shall be maintained for the site. iii) Watch and Ward facility shall be provided round the clock at the site. iv) One fire engine of 400 GPM x 100 PSI shall always be stationed at site.

Note Not applicable to policy with Sum Insured upto Rs.50 Crores.

v) Materials and equipments stored in buildings (sheds) or in open area shall be divided into subunits with the value, which shall not exceed 10% of the sum insured or Rs. 50 Crores whichever is less. Wherever value of a single equipment stored exceeds this limit, its value, shall be taken as the limit. The subunits in open area shall be separated from each other by a distance of atleast 15 meters.

In case of storage buildings, firewalls of 9" thickness carried upto roof shall be erected without any wall openings between the subunits.

vi) Packing materials, scaffolding etc. combustible materials and liquids and explosive substances should be stored at a 30m safe distance from other buildings, plants and stores. vii) Utmost attention should be paid to good house keeping such as i) Orderly storage;

ii) Periodic removal of combustible packing material, either by burning on site at a safe distance of 100 M away or removal from the site; iii) Clean up of site atleast once a week. vii) Open flame work (welding, cutting etc.) requires utmost caution.All combustible materials lying about must be removed or covered.

viii) Grass and/or any other vegetation in and around the site are regularly removed.

ix) 'No smoking' rules must be enforced in areas exposed to fire (stores etc.) and in the vicinity of hazardous operations. x) Living quarters should be well separated (100 M away) from construction site.

It is further agreed and understood that the company shall not be liable for deductible as mentioned in the schedule for each and every claim on account of Fire/Explosion.

END102 FIRE/EXPLOSION CLAIMS AND FIRE FIGHTING-2

II) Applicable for all risks including hydro carbon processing risks

i) Notwithstanding the conditions, provisions and other endorsements of this Policy, it is agreed and understood that the company shall indemnify the Insured in respect of any loss or damage caused by Fire/Explosion only if the following requirements are fulfilled.

ii) One portable fire extinguisher of Soda Acid or water type for every 300 sq. m storage/erection site area or small bore hose reels as per Section 4 of F.P. Manual shall be provided. The location of fire extinguishers shall be conspicuously marked by clearly visible signs. Checking and maintenance at regular intervals shall be recorded.

iii) One fire engine or two trailer pumps of 400 GPM x 100 PSI shall be provided for every 10,000 sq. m of largest storage site with maximum of two fire engines or 4 trailer pumps. In case of Trailer pumps vehicular arrangements shall be available for towing them.

iv) Static water tanks of atleast 10,000 gallons capacity shall be provided, which shall be so placed that no part of storage/erection site lies beyond 100 M of atleast 2 tanks (50 M in case of storeyed structures).

OR

Alternatively a temporary hydrant system with atleast 4" dia. hydrant shall be laid which shall always be pressurized to 1.0 KSC from where Fire Engines/Trailer pumps can draw their supply from a double hydrant (DH). Each DH may be taken as equivalent to a static water tank described above. Pumping capacity of the general water supply shall not be less than the aggregate pumping capacity of trailer pumps and/or fire engine. Storage of general water supply shall be in excess of 1,00,000 litres.

v) 36 hoses, 15 M long and 18 nozzles shall be provided to ensure that all parts of the contract works can be reached with water.

vi) Trained fighting squad consisting of atleast 8 persons per shift shall be maintained at the site.

vii) Plans giving detailed proposal shall be submitted for prior approval of the committee. The risk shall be inspected by TAC Engineers before sanctioning of above discount. viii) Watch and Ward facility shall be provided round the clock at the site.

ix) Materials and equipments stored in buildings (sheds) in open area shall be divided into subunits with the value, which shall not exceed 10% of the sum insured or Rs. 50 Crores whichever is less. Wherever value of a single equipment stored exceeds this limit, its value, shall be taken as the limit. The subunits in open area shall be separated from each other by a distance of atleast 15 metres.

In case of storage buildings, firewalls of 9" thickness carried upto roof shall be erected without any wall openings between the subunits.

x) Packing materials, scaffolding etc. combustible materials and liquids and explosive substances should be stored at a 30 M safe distance from other buildings, plants and stores.

xi) Utmost attention should be paid to good house keeping such as i) Orderly storage; ii) Periodic removal of combustible packing material, either by burning on site at a safe distance of 100 M away or removal from the site; iii) Clean up of site atleast once a week. xii) Open flame work (welding, cutting etc.) requires utmost caution. All combustible materials lying around must be removed or covered.

xiii) Grass and/or any other vegetation in and around the site are regularly removed.

xiv) 'No smoking' rules must be enforced in areas exposed to fire (stores etc.) and in the vicinity of hazardous operations.

xv) Living quarters should be well separated (100 M away) from construction site.

It is further agreed and understood that the company shall not be liable for the deductible as mentioned in the schedule for each and every claim on account of Fire/Explosion.

END115 SPECIAL CONDITIONS FOR OPEN TRENCHES DURING LAYING OF PIPELINES DUCTS AND CABLES

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the policy or endorsed thereon, the Insurers will indemnify the Insured for any loss or damage due to storm, rainfall, flood, inundation such as sanding, silting up, mudding up, erosion, collapse and floating up of pipes, ducts or cables, sustained by completely or partly excavated open trenches and/or items laid therein, upto a maximum length of 3 kms open trench only one loss event unless otherwise stated in the schedule.
The Insured shall make sure that plugging facilities are available near the pipe ends for emergency purposes and that pipe ends exposed to flooding are plugged before any interruption during idle work periods such as nights and holidays.

END11/aa OWNERS SURROUNDING PROPERTY WITH FLEXA

It is hereby declared and agreed that the insured having paid the extra premium the policy extends to cover loss of or damage to property located on or adjacent to the Project Site and belonging to or held in care, custody or control of the Principal(s) or the Contractor (s) shall only be covered if occurring directly due to the erection, construction or testing of the items insured under Section I and happening during the period of cover. This cover does not apply to Construction / Erection Machinery, Plant and Equipment, Temporary Buildings and Temporary site installations.

Limit of indemnity shall be as specified in the policy schedule

END-105 AIR FREIGHT

The Endorsement wording for covering the Air Freight will be as under -

'It is hereby declared and agreed that the policy shall also indemnify towards Air Freight incurred by the Insured in connection with the idemnifiable loss under the Policy.

Limit of indemnity shall be as specified in the policy schedule during currency of the Policy.

Each and every claim shall be subject to a minimum Excess of 5 % of the admissible Air Freight incurred over and above the excess as applicable under the Policy.

Subject otherwise to terms, conditions and exceptions of the policy'.

END-119 THIRD PARTY LIABILITY

The company will indemnify the insured against -

a) legal liability for accidental loss or damage caused to property of other persons including property held in trust by or under custody of the Insured for which he is responsible excluding any such property used in connection with construction thereon.

b) legal liability (liability under contract excepted) for fatal or non-fatal injury to any persons other than the Insured's own employees or workmen or employees of the owner of the works or premises or other firms connected with any other construction work thereon, or members of the

Insured's family or of any of the aforesaid; directly consequent upon or solely due to the construction of any property described in the Schedule.

Provided that the total liability of the Company during the period of Insurance under this cause shall not exceed the limits of Indemnity set opposite thereto in the Schedule.

In respect of a claim for compensation to which the indemnity provided herein applies, the Company will, in addition, indemnify the Insured against -

a) all costs and expenses of litigation recovered by any claimant from the Insured,

b) all costs and expenses incurred with the written consent of the Company.

The exclusion contained in paragraphs (d), (f) & (g) in Section I of this Policy shall apply also to this Section.

EXCLUSIONS-

The Company will not indemnify the Insured in respect of -

1. The Excess stated in the Schedule to be borne by the Insured in any one occurrence related to property damage.
2. Expenditure incurred in doing or redoing or making good or repairing or replacing anything covered or coverable under Section I of this Policy;
3. Liability consequent upon -

a) bodily injury to or illness of employees or workmen of the Contractor(s) or the Principal(s) or any other firm connected with the project which or part of which is insured under Section I, or members of their families;

b) Loss of or damage to property belonging to or held in care custody or control of the Contractor(s), the Principal(s) or any other firm connected with the project which or part of which is insured under Section I, or an employee or workman of one of the aforesaid; c) any accident caused by vehicles licensed for general road use or by waterborne vessels or aircraft;

d) any agreement by the Insured to pay any sum by way of indemnity or otherwise unless such liability would have attached also in the absence of such agreement.

CONDITIONS-

1. No admission, offer, promise, payment or indemnity shall be made or given by or on behalf of the Insured without the written consent of the Company who shall be entitled, if they so desire, to take over and conduct in the name of the Insured the defence or settlement of any claim or to prosecute for their own benefit in the name of the Insured any claim for indemnity or damage or otherwise and shall have full discretion in the conduct of any proceeding or in the settlement of any claim and the Insured shall give all such information and assistance as the Company may require.

2. The company may, so far as any accident is concerned, pay to the Insured the limit of indemnity for anyone accident/ anyone period, but deducting therefrom in such case any sum/s already paid as compensation in respect thereof or any lesser sum for which the claim or claims arising from such accident can be settled and the company shall thereafter be under no further liability in respect of such accident under this section.

END-12/d AUTOMATIC REINSTATEMENT

It is hereby declared and agreed that the insured having paid the extra premium the amount insured are always to remain at risk and shall not be reduced, so long as the aggregate of the sum paid and/or payable does not exceed the limit of indemnity as specified in the policy schedule.

END7/f CLEARANCE AND REMOVAL OF DEBRIS

This Policy extends to cover costs and expenses necessarily incurred by the Insured with the consent of the Insurers in demolishing or removing debris of portions of the property insured by Section I destroyed or damaged by any peril hereby insured against upto an amount not exceeding 5% of the claim amount subject to a maximum of limit of indemnity as specified in the policy schedule per any one occurrence and the limit of indemnity as specified in the policy schedule in the aggregate.

END6/k ESCALATION CLAUSE

It is hereby declared and agreed that the insured having paid the agreed extra premium, Company shall provide for escalation in Sum Insured under items of Section I of the Schedule attached to the policy upto as specified on the policy schedule of the original Site Value, the basis of claim settlement shall be the original site value of affected equipment/ property as insured plus increase in cost of replacement/ reconstruction, if any provided that the increase in the value of such equipment/ property does not exceed as specified on the policy schedule of the original site value as insured. It is also hereby declared and agreed that in the event of a claim the Insured would be considered as fully insured upto the Sum Insured inclusive of as specified on the policy schedule increase as per selected escalation and underinsurance would apply only in the event of the cost of replacement / reconstruction of the affected equipment/property exceeding the original value as insured inclusive of selected as specified on the policy schedule towards escalation. It is however understood and agreed that the premium collected against escalation provision shall not be subject to refund of premium as provided in the premium adjustment clause. It is further understood and agreed that in case of additional premium chargeable during final adjustment, additional escalation premium will be charged to the insured but in case of any premium refundable during final adjustment no refund shall be allowed against the escalation premium already charged to the Insured.

END-16/n EXTENDED MAINTENANCE COVER

It is agreed and understood that otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon and Insured having paid the agreed extra premium this insurance shall be extended for the maintenance period specified hereunder to cover loss of or damage to the contract works.

Caused by the insured contractor(s) in the course of the operations carried out for the purpose of complying with the obligations under the maintenance provisions of the contract.

Occurring during the maintenance period, provided such loss or damage was caused on the site during the erection period before the certificate of completion for the lost or damaged section was issued. Maintenance Period as as specified in the policy schedule.

END-18 EXCLUSION OF LOSS OF STABILIZING FLUID

Notwithstanding the conditions, provisions and other endorsements of the policy, it is agreed and understood that the Insurers shall not be liable to indemnify the Insured in respect of loss of bentonite or other stabilising fluid even if the quantity of losses originally expected is exceeded.

END-20 PILING CONSTRUCTION

Notwithstanding the conditions, provisions and other endorsements of the Policy, it is agreed and understood that the Insurers shall not be liable to indemnify the Insured in respect of -

a) Loss of or damage to piles and/or casings due to misplacement, jamming and/or extraction thereof.

b) Costs incurred in case of abandoned piling work, for any reasons not related to accidental loss or damage and mainly due to unforeseen ground conditions when piles cannot be driven to the required depth.

END21 ABANDONMENT OF SHAFTS

It is hereby agreed and declared that, notwithstanding anything contained in the contrary, this endorsement excludes any loss or damage resulting as a consequence of shaft being abandoned due to any reason whatsoever.

END-24 CONTRACT WORKS TIME SCHEDULE

Notwithstanding the conditions, provisions and other endorsements of the Policy it is understood and agreed that -

a) The contract works time schedule together with plans, documents and specifications supplied and any other statements made by the Insured with respect of works programme is deemed to be incorporated herein.

b) The Insurers shall not indemnify the Insured in respect of loss or damage caused by, or arising out of, or aggravated by deviations from the contract works time schedule exceeding four weeks, unless the Insurers had agreed in writing to such a deviation before a loss occurred.

END-25 TEMPORARY ACCESS ROADS

Irrespective of the periods of Insurance specified in the Policy, the Insurer will indemnify the Insured only for unforeseen accidental loss or damage to temporary access roads insured under the Policy if such loss or damage occurs prior to such roads being completed or taken into use for their purpose by the contractors, whichever takes place first.

END-35 AGREED BANK CLAUSE

It is hereby declared and agreed, subject otherwise to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, that upon any monies becoming payable under this policy the same shall be paid by the Company to the Bank and such part of any monies so paid as may relate to the interests of other parties insured hereunder shall be received by the Bank as Agents for such other parties.

That the receipts of the Bank shall be complete discharge of the Company there-off and shall be binding on all the parties insured hereunder. N.B: The Bank shall mean the first named Financial Institution/ Bank named in the policy.

That if and whenever any notice shall be required to be given or other communication shall be required to be made by the Company to the insured or any of them in any manner arising under or in connection with this policy such notice or other communication shall be deemed to have been sufficiently given or made if given or made to the Bank.

That any adjustment, settlement, compromise or reference to arbitration in connection with any dispute between the Company and the insured or any of them arising under or in connection with this policy if made by the Bank shall be valid and binding on all parties insured hereunder but not so as to impair rights of the Bank to recover the full amount of any claim it may have on other parties insured hereunder.

That this insurance so far only as it relates to the interest of the Bank therein shall not cease to attach to any of the insured property by reason of operation of condition 3 of the Policy except where a breach of the condition has been committed by the Bank or its duly authorized agents or servants and this insurance shall not be invalidated by any act or omission on the part of any other party insured hereunder whereby the risk is increased or by anything being done to upon or any building hereby insured or any building in which the goods insured under the policy are stored without the knowledge of the Bank provided always that the Bank shall notify the Company of any change of ownership or alterations or increase of hazards not permitted by this insurance as soon as the same shall come to its knowledge and shall on demand pay to the Company necessary additional premium from the time when such increase of risks first took place and

It is further agreed that whenever the Company shall pay the Bank any sum in respect of loss or damage under this policy and shall claim that as to the Mortgagor or owner no liability therefore existed, the Company shall become legally subrogated to all the rights of the Bank to the extent of such payments but not so as to impair the right of the Bank to recover the full amount of any claim it may have on such Mortgagor or Owner or any other party or parties insured hereunder or from any securities or funds available.

N.B: In cases where the name of any Central Government or State Government owned and / or sponsored Industrial Financing or

Rehabilitation Financing Corporations and /or Unit Trust of India or General Insurance Corporation of India and/or its subsidiaries or LIC of India/ any Financial Institution is included in the title of the Fire Policy as mortgagees, the above Agreed Bank Clause may be incorporated in the Policy substituting the name of such institution in place of the word 'Bank' in the said clause.

END-37 DESIGNATION OF PROPERTY

It is hereby understood and agreed, otherwise subject to the terms, exclusions, provisions and conditions contained in the Policy or endorsed thereon, that for the purpose of determining, where necessary, the item under which any property is insured, the Company agree to accept the designation under which the property has been entered in the insured's books

END-39 CONTRACTORS PLANT AND MACHINERY

a) Insurance is extended to indemnify the Insured in respect of Loss occurring on the project site to the Insured's mobile and stationary constructional plant, machinery, equipment, tools, temporary buildings and their contents, hereinafter called Constructional Plant and Equipment, always provided all items of Constructional Plant and Equipment shall be stated below and any not mentioned items shall not be covered. b) The Sum Insured as stated below shall represent:

(i) for mobile and stationary constructional plant, machinery, equipment and tools the new replacement value of items of the same type and capacity when delivered to the Project Site;

(ii) for temporary buildings and their contents: the actual market value.

c) The condition, 'Basis of Indemnity' as per policy wordings shall not apply to constructional plant and equipment. In the event of Loss, the basis of indemnity shall be as follows:

(i) in respect of Loss which can be repaired, the cost of repairs necessary to restore the item to its condition immediately before the occurrence of the Loss, less the value of any salvage;

(ii) in respect of total Loss, the actual cash value, less the value of any salvage.

If the anticipated cost of repairs equals or exceeds the actual cash value, the indemnity shall be as described in (ii) above.

d) Company shall not indemnify the Insured for loss or damage due to mechanical and/or electrical breakdown, freezing of coolant or other liquids, defective lubrication, lack of oil or coolant, but this exclusion shall be limited to the parts immediately affected.

Sanction Limitation and Exclusion Clause

No (Re) Insurer Shall be deemed to provide cover and no (Re) insurer shall be liable to pay any claim and provide any benefit hereunder to the extent that the provision of such cover, payment of such claim or provision of such benefit would expose that (Re) Insurer to any sanction, prohibition or restriction under United Nations resolutions or the trade or economic sanctions, laws or regulations of the European Union, United Kingdom or United States of America.

ERECTION ALL RISKS INSURANCE POLICY

Whereas the Insured named in the Schedule hereto had made to ICICI Lombard General Insurance Company Limited, (hereinafter called "the Company") a written proposal by completing a Proposal Form which together with any other statements made in writing by the Insured for the purpose of this Policy, is deemed to be incorporated herein. Now this policy of insurance witnesseth

that subject to and in consideration of the Insured having paid to the Company, the premium mentioned in the said Schedule and subject to the terms, exclusions, provisions and conditions contained herein or endorsed hereon, the Company will indemnify the Insured against sudden and unforseen physical loss of or damage to the property insured, in the manner and to the extent hereinafter provided.

GENERAL EXCLUSIONS

The Company will not indemnify the Insured in respect of loss, damage or liability directly or indirectly caused by or arising out of or aggravated by -

1. War, invasion, act of foreign enemy, hostilities or war like operations (whether war be declared or not), civil war, rebellion, revolution, insurrection, mutiny, civil commotion, military or usurped power, martial law, conspiracy, confiscation, commandeering a group of malicious persons or persons acting on behalf of or in connection with any political organisation, requisition or destruction or damage by order of any government dejure or de facto or by any public, municipal or local authority
2. Nuclear reaction, nuclear radiation or radioactive contamination.
3. Wilful act or wilful negligence of the Insured or of his responsible representative.
4. Cessation of work, whether total or partial.
5. Terrorism Damage Exclusion Warranty:

Notwithstanding any provision to the contrary within this insurance, it is agreed that this insurance excludes loss, damage, cost or expense of whatsoever nature directly or indirectly caused by, resulting from or in connection with any act of terrorism regardless of any other cause or event contributing concurrently or in any other sequence to the loss.

For the purpose of this warranty, an act of terrorism means an act, including but not limited to the use of force or violence and / or the threat thereof, of any person or group(s) of persons whether acting alone or on behalf of or in connection with any organisation(s) or government(s), committed for political, religious, ideological or similar purpose including the intention to influence any government and/or to put the public, or any section of the public in fear.

The warranty also excludes loss, damage, cost or expenses of whatsoever nature directly or indirectly caused by, resulting from or in connection with any action taken in controlling, preventing, suppressing or in any way relating to action taken in respect of any act of terrorism.

If the Company alleges that by reason of this exclusion, any loss, damage, cost or expense is not covered by this insurance, the burden of proving the contrary shall be upon the insured.

In the event any portion of this endorsement is found to be invalid or unenforceable, the remainder shall remain in full force and effect.

In any action, suit or other proceedings where the Company alleges that by reason of the provisions of Exclusion (a) above any loss, destruction, damage or liability is not covered by this insurance, the burden of proving that such loss, destruction, damage or liability is covered shall be upon the Insured.

Terrorism Damage Exclusion Warranty:

Notwithstanding any provision to the contrary within this insurance, it is agreed that this insurance excludes loss, damage, cost or expense of whatsoever nature directly or indirectly caused by, resulting from or in connection with any act of terrorism regardless of any other cause or event contributing concurrently or in any other sequence to the loss.

For the purpose of this endorsement, an act of terrorism means an act, including but not limited to the use of force or violence and / or the threat thereof, of any person or group(s) of persons whether acting alone or on behalf of or in connection with any organisation(s) or government(s), committed for political, religious, ideological or similar purpose including the intention to influence any government and/or to put the public, or any section of the public in fear.

The warranty also excludes loss, damage, cost or expenses of whatsoever nature directly or indirectly caused by, resulting from or in connection with any action taken in controlling, preventing, suppressing or in any way relating to action taken in respect of any act of terrorism.

If the Company alleges that by reason of this exclusion, any loss, damage, cost or expense is not covered by this insurance, the burden of proving the contrary shall be upon the insured.

In the event any portion of this endorsement is found to be invalid or unenforceable, the remainder shall remain in full force and effect.

PERIOD OF COVER

The liability of the Company shall commence, (notwithstanding any date to the contrary specified in the Schedule) only from the time after the unloading of the property specified in the Schedule from any conveyance at the site specified in the schedule and shall continue until immediately after the first test operation or test loading is concluded (whichever is earlier) but in no case beyond four weeks from the day on which after completion of erection, a trial running is made and/ or readiness for work is declared by the erectors/contractors, whichever is earlier. If however, a part of a plant or one or several machine/ s is/ are tested and put into operation, the cover and consequently the liability of the Company for that particular part of the plant or machine ceases, whereas it continues for the remaining parts which are not yet ready.

If actual construction period is shorter than the period indicated in the Schedule, no refund of premium shall be allowed unless specifically allowed by the Insurers.

In case after the expiry of four weeks of trial running, approval of the plant or any part thereof is not given by the concerned Authorities, the cover for the extended period of further trial running can be covered at extra premium to be arranged before hand.

If the actual erection period is shorter than the period indicated in the Schedule, no refund of premium shall be allowed, unless specifically allowed by Insurers. In the case of second-hand /used property, the insurance hereunder shall however, cease immediately on the commencement of the testing

At the latest, the insurance shall expire on the date specified in the Schedule but if the work of erection and test operations included in the insurance is not completed within the time specified hereunder, the Company may extend the period of Insurance but the Insured shall pay to the Company additional premium at agreed rates.

GENERAL CONDITIONS

1. The due observance and fulfillment of the terms of this Policy, in so far as they relate to anything to be done or complied with by the Insured and the truth of the statements and answers in the questionnaire and proposal made by the Insured, shall be a condition precedent to any liability of the Company.
2. The Schedule and the Section(s) shall be deemed to be incorporated in and form part of this policy and the expression 'this Policy' wherever used in this contract shall be read as including the Schedule and the Section(s). Any word or expression to which a specific meaning has been attached in any part of this Policy or of the Schedule or of the Section(s) shall bear such meaning wherever it may appear.
3. The Insured shall at his own expense take all reasonable precautions and comply with all reasonable recommendations of the Company to prevent loss, damage or liability and comply with statutory requirements and manufacturers' recommendations.
4. a) Representatives of the Company shall at any reasonable time have the right to inspect and examine the risk and the Insured shall provide the representatives of the Company with all details and information necessary for the assessment of the risk.

   b) The Insured shall immediately notify the Company by telegram and in writing of any material change in the risk and cause at his own expense such additional precautions to be taken as circumstances may require and the scope of cover and/ or premium shall, if necessary, be adjusted accordingly. No material alteration shall be made or admitted by the Insured whereby the risk is increased, unless the continuance of the Insurance be confirmed in writing by the Company.
5. In the event of any occurrence which might give rise to a claim under this Policy, the Insured shall:

1. immediately notify the Company by telephone or telegram as well as in writing giving an indication as to the nature and extent of loss or damage.
2. take all steps within his power to minimize the extent of the loss or damage.
3. preserve the parts affected and make them available for inspection by a representative of the Company or surveyor deputed by the Company.
4. furnish all such information and documentary evidence as the Company may require.
5. inform the police authorities in case of loss or damage due to theft or burglary.

   The Company shall not in any case be liable for loss, damage or liability, of which no notice has been received by the Company within 14 days of its detection.

   Upon notification being given to the Company under this condition, the Insured may carry out the repair or replacement of any minor damage not exceeding Rs.7,500; in all other cases a representative of the Company shall have the opportunity of inspecting the loss or damage before any repairs or alterations are effected. If a representative of the Company does not carry out the inspection within a period of time, which could be considered as adequate under the circumstances, the Insured is entitled to proceed with the repairs or replacement.

   The liability of the Company under this Policy in respect of any item sustaining damage shall cease, if said item is not repaired properly without delay.

6. The Insured shall, at the expense of the Company, do and concur in doing and permit to be done all such acts and things as may be necessary or required by the Company in the interest of any rights or remedies, or of obtaining relief or indemnity from parties (other than those insured under

this Policy) to which the company shall be or would become entitled or subrogated upon their paying for or making good any loss or damage under this Policy, whether such acts and things shall be or become necessary or required before or after the Insured's indemnification by the Company.

7. If any difference shall arise as to the quantum to be paid under this Policy, (liability being otherwise admitted) such difference shall, independently of all other questions, be referred to the decision of a sole arbitrator, to be appointed in writing by the parties to the dispute or difference or, if they cannot agree upon a single arbitrator within 30 days of any party invoking Arbitration, the same shall be referred to a panel of three Arbitrators comprising of two Arbitrators – one to be appointed by each of the parties to the dispute/difference, and the third Arbitrator to be appointed by such two Arbitrators and arbitration shall be conducted under and in accordance with the provisions of the Arbitration and Conciliation Act 1996.

   It is clearly agreed and understood that no difference or dispute shall be referable to arbitration as hereinbefore provided, if the Company has disputed or not accepted liability under or in respect of this Policy.

   It is clearly agreed and understood that no difference or dispute shall be referable to arbitration as hereinbefore provided, if the Company has disputed or not accepted liability under or in respect of this policy.

   It is hereby expressly stipulated and declared that it shall be a condition precedent to any right of action or suit upon this policy that the award by such arbitrator/ arbitrators of the amount of the loss or damage shall be first obtained.

8. If a claim is in any respect fraudulent, or if any false declaration is made or used in support thereof, or if any fraudulent means or devices are used by the Insured or anyone acting on his behalf to obtain any benefit under this Policy, or if a claim is made and rejected and no action or suit is commenced within three months after such rejection or in case of arbitration taking place as provided therein, within three months after the Arbitrator or Arbitrators or Umpire have made their award, all benefits under this Policy shall be forfeited.

9. If, at the time any claim arises under this Policy, there be any other insurance covering the same loss, damage or liability, the Company shall not be liable to pay or contribute more than their rateable proportion of any claim for such loss, damage or liability.

10. This insurance may be terminated at the request of the Insured at any time, in which case, the Insurers will refund appropriate premium amount subject to the following conditions.

i. Claims experience under the policy as on date of cancellation should be less than 60% of reworked premium.

ii. The unexpired period is not less than 3 months or 25% of the policy period, whichever is less.

iii. Testing period should not have commenced.

The insurance may also at any time be terminated at the option of the Insurer by 15 days notice to that effect being given to the Insured, in which case, the Insurers shall be liable to repay on demand a rateable proportion of the premium for the unexpired term from the date of cancellation.

SECTION - I MATERIAL DAMAGE

The Company hereby agrees with the Insured (subject to the exclusions and conditions contained herein or endorsed hereon) that if, at any time during the period of insurance stated in the said Schedule, or during any further period of extension thereof, the property (except packing materials of any kind) or any part thereof described in the said Schedule be lost, damaged or destroyed by any cause, other than those specifically excluded hereunder, in a manner necessitating replacement or repair, the Company will pay or make good all such loss or damage up to an amount not exceeding in respect of each of the items specified in the

Schedule, the sum set opposite thereto and not exceeding in the whole the total sum insured hereby

The Company will also reimburse the Insured for the cost of clearance and removal of debris following upon any event giving rise to an admissible claim under this policy but not exceeding in all the sum (if any) set opposite thereto in the Schedule.

EXCLUSIONS TO SECTION - I

The Company shall not, however, be liable for:

1. the first amount of the loss arising out of each and every occurrence shown as Excess in the Schedule;

2. loss discovered only at the time of taking an inventory;

3. normal wear and tear, gradual deterioration due to atmospheric conditions or otherwise, rust, scratching of painted or polished surfaces or breakage of glass;

4. loss or damage due to faulty design, defective material or casting, bad workmanship other than faults in erection.

   This exclusion shall be limited to the item immediately affected and shall not be deemed to exclude loss or damage to other insured items resulting from such excluded perils;

5. the cost necessary for rectification or correction of any error during erection, unless resulting in physical loss or damage;

6. loss of or damage to files, drawings, accounts, bills, currency, stamps, deeds, evidence of debt, notes, securities, cheques, packing materials such as cases, boxes, crates;

7. any damage or penalties on account of the Insured's non-fulfilment of the terms of delivery or completion under his Contract of Erection or any obligations assumed thereunder, including consequential loss of any kind or description or for any aesthetic defects or operational deficiencies.

PROVISIONS APPLYING TO SECTION - I Memo 1. SUM INSURED

It is a requirement of this insurance that the Sum of Insurance stated in the Schedule shall not be less than the completely erected value of the property inclusive of freights, customs duty, erection cost and the Insured undertakes to increase or decrease the amount of insurance, in the event of any material fluctuation in the level of wages or prices. Provided always that such increase or decrease shall take effect only after the same has been recorded on the Policy by the Company.

If, in the event of the occurrence of a loss or damage, it is found that the Sum Insured representing the completely erected value of the property and/or of particular items involved is less than the amount required to be insured, the amount recoverable by the Insured under the Policy shall be reduced in such proportion as the Sum Insured bears to the amount required to be insured.

Memo 2 - PREMIUM ADJUSTMENT

The sum insured under the Policy representing the completely erected value of the plant and machinery/project shall be adjustable at completion of erection, on the basis of the actual values to be declared by the Insured in respect of freight and handling charges, customs dues and costs of erection and the difference in premium shall be met with by payment, at the rate agreed to or by the Insured as the case may be. Any increase or decrease in prime cost of Plant and Equipment shall not be the subject matter of premium adjustment.

Memo 3 - BASIS OF LOSS SETTLEMENT

In the event of any loss or damage, the basis of any settlement under this Policy shall be

1. in the case of damage which can be repaired, the cost of repairs necessary to restore the items to their condition immediately before the occurrence of the damage less salvage, or,
2. in the case of a total loss, the actual value of the items immediately before the occurrence of the loss less salvage; however, only to the extent the costs claimed have to be borne by the Insured and to the extent they are included in the Sum Insured and provided always that the provisions and conditions have been complied with.

All damages which can be repaired shall be repaired, but if the cost of repairing any damage equals or exceeds the value of the items immediately before the occurrence of the damage, the settlement shall be made on the basis provided for in (b) above.

The cost of any provisional repairs will be borne by the Company if such repairs constitute part of the final repairs and do not increase the total repair expenses. The cost of any alterations, additions and/or improvements shall not be recoverable under this Policy.

Extension of Cover

Any extra charges incurred for overtime, work on holidays, express freight (including air freight), are not covered by this insurance, unless agreed upon at an additional premium.

In the event of loss or damage, the insurance shall notwithstanding be maintained in force during the period of insurance for the sum insured, the Insured undertaking to pay a pro-rata additional premium of the full amount of each claim for the loss or damage, from the date of such loss to the expiry of the period of insurance.

Memo 4 - CONSTRUCTION PLANT AND MACHINERY

Loss of or damage to Construction Plant and Machinery excludes loss or damage directly caused by its own explosion or its own mechanical or electrical breakdown or derangement.

Memo 5 - SURROUNDING PROPERTY

Loss or damage to property located on or adjacent to the site and belonging to or held in care, custody or control of the Principal(s) or the Contractor(s) shall only be covered if occurring directly due to the erection, construction or testing of the items insured under Section I and happening during the period of cover, and provided that a separate Sum therefor has been entered in the Schedule under Section I, Item 5 for Principal's surrounding property. This cover does not apply to construction/erection machinery, plants and equipment.

Memo 6 - MAJOR PERILS/ACTS OF GOD CLAIMS

The Major Perils/ Acts of God Claims shall mean the claims arising out of:

1. earthquake - fire & shock
2. landslide/ rockslide/ subsidence,
3. flood/ inundation,
4. storm/ tempest/ hurricane/ typhoon/ cyclone/ lightning or other atmospheric disturbances.

SECTION II - THIRD PARTY LIABILITY:

The Company will indemnify the Insured against:-

1. Legal liability for accidental loss or damage caused to property of other persons including property held in trust by or under custody of the Insured, for which he is responsible, excluding any such property used in connection with erection thereon;
2. Legal liability (liability under contract excepted) for fatal or non-fatal injury to any person other than the Insured's own employees or workman or employees of the owner of the works or premises or other firms connected with any other erection work thereon, or members of the Insured's family or of any of the aforesaid; directly consequent upon or solely due to the erection of any property described in the Schedule.

Provided that the total liability of the Company during the period of Insurance under this clause shall not exceed the limits of Indemnity set opposite thereto in the Schedule.

In respect of a claim for compensation, to which the indemnity provided herein applies, the Company will, in addition, indemnify the Insured against i. all cost and expenses of litigation recovered by any claimant from the Insured, and ii. all costs and expenses incurred with the written consent of the Company.

The exclusion contained in paragraphs (d), (f) and (g) in Section I of this Policy shall apply to this Section also.

EXCLUSIONS TO SECTION II

The Company will not indemnify the Insured in respect of

1. The Excess stated in the Schedule to be borne by the Insured in any one occurrence related to property damage
2. Expenditure incurred in doing or redoing or making good or repairing or replacing anything covered or coverable under Section I of this Policy; 3. Liability consequent upon

1 bodily injury to or illness of employees or workmen of the Contractor(s) or the Principal(s) or any other firm connected with the project, which or part of which Is insured under Section I, or members of their families;

2 loss of or damage to property belonging to or held in care, custody or control of the Contractor(s), the Principal(s) or any other firm connected with the project, which or part of which is insured under Section I, or an employee or workman of one of the aforesaid;

3 any accident caused by vehicles licensed for general road use or by waterborne vessels or aircraft;

4 any agreement by the Insured to pay any sum by way of indemnity or otherwise, unless such liability would have attached also in the absence of such agreement.

CONDITIONS APPLYING TO SECTION II

1. No admission, offer, promise, payment or indemnity shall be made or given by or on behalf of the Insured without the written consent of the Company, who shall be entitled if they so desire, to take over and conduct in the name of the Insured, the defence or settlement of any claim or to prosecute for their own benefit in the name of the Insured any claim for indemnity or damage or otherwise and shall have full discretion in the conduct of any proceedings or in the settlement of any claim and the Insured shall give all such information and assistance as the Company may require.
2. The Company may, so far as any accident is concerned, pay to the Insured the limit of indemnity for any one accident, any one period, but deducting therefrom in such case, any sum/s already paid as compensation in respect thereof or any lesser sum for which the claim arising from such accident can be settled and the company shall thereafter be under no further liability in respect of such accident under this section.

Notices

Any notice, direction or instruction given under this Policy shall be in writing and delivered by hand, post, to – In your case, at the last known address specified in the Schedule In Our case:
ICICI Lombard General Insurance Company Limited
ICICI Lombard House
414, Veer Savarkar Marg
Near Siddhi Vinayak Temple,
Prabhadevi, Mumbai 400 025

Notice and instructions will be deemed served 7 days after posting or immediately upon receipt in the case of hand delivery, facsimile or email.

Customer Service

If at any time, You require any clarification or assistance, You may contact any of Our offices at the address specified, during normal business hours.

Claim Clause/ Settlement of Claim:

Claim Intimation: Connect with us via: Toll-free no.: 1800 2666, Email ID: customersupport@icicilombard.com, on our website:

https://coclaims.icicilombard.com/claimstracker/CommercialClaims/ccplandingpage.aspx Register the claim and submit claim related documents along with claim form. You will receive a claim reference number as your reference point for future correspondence.

2) File an FIR: In case of third-party property damage/bodily injury, fire etc. if applicable as per policy terms and conditions.

3) Surveyor Appointment: Your Claims Manager (CSM) will contact you and appoint a licensed surveyor basis claim eligibility within 24 hours of reporting the claim.

4) Documents: submit documents to the assigned CSM/Surveyor.

List of documents which are necessary and relevant to the claim are as below:

1. Claim bill / Claim Form duly filled up.
2. Photographs / Video of damaged property/item under claim.
3. Document/s in support of admissibility of the claim, for instance, Service Engineer's Report, Fire Brigade Report, etc.
4. FIR / Final Police investigation report wherever applicable.
5. For items which are to be repaired or reinstated, repair/ replacement quotation, invoice and payment proofs for each and every item as claimed.
6. For items which are under claim & not to be repaired or reinstated, documents substantiating the quantum & value of the items under claim.
7. Offer for retention of salvage, if any.
8. KYC / NEFT Details as per AML guidelines.
9. Invoice copy / Goods Receipt Note / Monetary Claim on carrier / Damage Certificate.
10. Any other document which may be specified by the surveyor post completion of initial survey.

5) Assessment Approval: Repair/Replacement details submitted in support of the claim will be assessed and approved by CSM/surveyor.

6) Salvage: The amount that is assessed which the damaged asset will fetch in the open market (wherever applicable).

7) Turnaround Time (TAT): Assessment sheet /Survey report will be furnished within 15 days of receipt of claim form and documents. Claim will be decided within 7 days of receipt of the assessment sheet / survey report (This condition will not apply in case of policies issued on the property/building on reinstatement value basis) (Applicable to Retail policyholder).

Grievance Clause

For resolution of any query or grievance, Insured may contact the respective branch office of the Company or may call toll free no.1800-2666 or may approach us at the sub section "Grievance Redressal" on our website www.icicilombard.com (Customer Support section). However, if the resolution provided by us is not satisfactory you may approach Insurance Regulatory and Development Authority of India (IRDAI) through the Bima Bharosa Portal https://bimabharosa.irdai.gov.in/ or IRDAI Grievance Call Centre (IGCC) at their toll free no. 1800 4254 732 / 155255.

You may also approach Insurance Ombudsman, subject to vested jurisdiction, for the redressal of grievance. Details of Insurance Ombudsman offices are available at IRDAI website: www.irdaindia.org, or on the Company's website at www.icicilombard.com.

The details of Insurance Ombudsman are available below:-

S no.	Name of office of insurance Ombudsman	Territorial Area of jurisdiction
1	AHMEDABAD Shri Kuldip Singh, Office of the Insurance Ombudsman, Jeevan Prakash Building, 6th floor, Tilak Marg, Relief Road, Ahmedabad – 380 001. Tel.: 079 - 25501201/02/05/06 Email: bimalokpal.ahmedabad@cioins.co.in	Gujarat, Dadra & Nagar Haveli, Daman and Diu.
2	BENGALURU Mr. Vipin Anand, Office of the Insurance Ombudsman, Jeevan Soudha Building,PID No. 57-27- N-19 Ground Floor, 19/19, 24th Main Road, JP Nagar, Ist Phase, Bengaluru – 560 078. Tel.: 080 - 26652048 / 26652049 Email: bimalokpal.bengaluru@cioins.co.in	Karnataka
3	BHOPAL Shri R. M. Singh Office of the Insurance Ombudsman, Janak Vihar Complex, 2nd Floor, 6, Malviya Nagar, Opp. Airtel Office, Near New Market, Bhopal – 462 003. Tel.: 0755 - 2769201 / 2769202 Fax: 0755 - 2769203 Email: bimalokpal.bhopal@cioins.co.in	Madhya Pradesh, Chattisgarh.
4	BHUBANESHWAR Shri Suresh Chandra Panda, Office of the Insurance Ombudsman, 62, Forest park, Bhubneshwar – 751 009. Tel.: 0674 - 2596461 /2596455 Fax: 0674 - 2596429 Email: bimalokpal.bhubaneswar@cioins.co.in	Odisha.
5	CHANDIGARH Mr. Atul Jerath, Office of the Insurance Ombudsman, S.C.O. No. 101, 102 & 103, 2nd Floor, Batra Building, Sector 17 – D, Chandigarh – 160 017. Tel.: 0172 - 2706196 / 2706468 Fax: 0172 - 2708274 Email: bimalokpal.chandigarh@cioins.co.in	Punjab, Haryana (excluding Gurugram, Faridabad, Sonepat and Bahadurgarh), Himachal Pradesh, Union Territory of Jammu & Kashmir, Ladakh & Chandigarh.
6	CHENNAI Shri Segar Sampathkumar, Office of the Insurance Ombudsman, Fatima Akhtar Court, 4th Floor, 453, Anna Salai, Teynampet, CHENNAI – 600 018. Tel.: 044 - 24333668 / 24335284 Fax: 044 - 24333664 Email: bimalokpal.chennai@cioins.co.in	Tamil Nadu, Pondicherry Town and Karaikal (which are part of Pondicherry).
7	DELHI Shri Sudhir Krishna, Office of the Insurance Ombudsman, 2/2 A, Universal Insurance Building, Asaf Ali Road, New Delhi – 110 002. Tel.: 011 - 23232481/23213504 Email: bimalokpal.delhi@cioins.co.in	Delhi & following District of Haryana – Gurugram, Faridabad, Sonepat and Bahadurgarh

8	ERNAKULAM Shri G Radhakrishnan Office of the Insurance Ombudsman, 2nd Floor, Pulinat Bldg., Opp. Cochin Shipyard, M. G. Road, Ernakulam - 682 015. Tel.: 0484 - 2358759 / 2359338 Fax: 0484 - 2359336 Email: bimalokpal.ernakulam@cioins.co.in	Kerala, Lakshadweep, Mahe-a part of Puducherry.
9	GUWAHATI Shri Somnath Ghosh, Office of the Insurance Ombudsman, Jeevan Nivesh, 5th Floor, Nr. Panbazar over bridge, S.S. Road, Guwahati – 781001(ASSAM). Tel.: 0361 - 2632204 / 2602205 Email: bimalokpal.guwahati@cioins.co.in	Assam, Meghalaya, Manipur, Mizoram, Arunachal Pradesh, Nagaland and Tripura.
10	HYDERABAD Shri N Sankaran Office of the Insurance Ombudsman, 6-2-46, 1st floor, "Moin Court", Lane Opp. Saleem Function Palace, A. C. Guards, Lakdi-Ka-Pool, Hyderabad - 500 004. Tel.: 040 - 67504123 / 23312122 Fax: 040 – 23376599 Email: bimalokpal.hyderabad@cioins.co.in	Andhra Pradesh, Telangana, Yanam and Part of Territory of Puducherry.
11	JAIPUR Shri Rajiv Dutt Sharma, Office of the Insurance Ombudsman, Jeevan Nidhi – II Bldg., Gr. Floor, Bhawani Singh Marg, Jaipur - 302 005. Tel.: 0141 - 2740363 Email: Bimalokpal.jaipur@cioins.co.in	Rajasthan.
12	KOLKATA Shri P K Rath, Office of the Insurance Ombudsman, Hindustan Bldg. Annexe, 4th Floor, 4, C.R. Avenue, KOLKATA - 700 072. Tel.: 033 - 22124339 / 22124340 Fax : 033 - 22124341 Email: bimalokpal.kolkata@cioins.co.in	West Bengal, Sikkim, Andaman & Nicobar Islands.
13	LUCKNOW Office of the Insurance Ombudsman, 6th Floor, Jeevan Bhawan, Phase-II, Nawal Kishore Road, Hazratganj, Lucknow - 226 001. Tel.: 0522 - 2231330 / 2231331 Fax: 0522 - 2231310 Email: bimalokpal.lucknow@cioins.co.in	Districts of Uttar Pradesh : Laitpur, Jhansi, Mahoba, Hamirpur, Banda, Chitrakoot, Allahabad, Mirzapur, Sonbhabdra, Fatehpur, Pratapgarh, Jaunpur,Varanasi, Gazipur, Jalaun, Kanpur, Lucknow, Unnao, Sitapur, Lakhimpur, Bahraich, Barabanki, Raebareli, Sravasti, Gonda, Faizabad, Amethi, Kaushambi, Balrampur, Basti, Ambedkarnagar, Sultanpur, Maharajgang, Santkabirnagar, Azamgarh, Kushinagar, Gorkhpur, Deoria, Mau, Ghazipur, Chandauli, Ballia, Sidharathnagar.
14	MUMBAI Shri Bharatkumar S. Pandya Office of the Insurance Ombudsman, 3rd Floor, Jeevan Seva Annexe, S. V. Road, Santacruz (W), Mumbai - 400 054. Tel.: 022 - 26106552 / 26106960 Fax: 022 - 26106052 Email: bimalokpal.mumbai@cioins.co.in	Goa, Mumbai Metropolitan Region Excluding (Navi Mumbai & Thane).

15	NOIDA Shri Chandra Shekhar Prasad, Office of the Insurance Ombudsman, Bhagwan Sahai Palace 4th Floor, Main Road, Naya Bans, Sector 15, Distt: Gautam Buddh Nagar, U.P- 201301.	State of Uttaranchal and the following Districts of Uttar Pradesh: Agra, Aligarh, Bagpat, Bareilly, Bijnor, Budaun, Bulandshehar, Etah, Kanooj, Mainpuri, Mathura, Meerut, Moradabad, Muzaffarnagar, Oraiyya, Pilibhit, Etawah, Farrukhabad, Firozbad, Gautambodhanagar,
	Tel.: 2514252 / 2514253 Email: bimalokpal.noida@cioins.co.in	Ghaziabad, Hardoi, Shahjahanpur
16	PATNA Shri N. K Singh Office of the Insurance Ombudsman, 1st Floor,Kalpana Arcade Building,, Bazar Samiti Road, Bahadurpur, Patna 800 006. Tel.: 0612-2680952 Email: bimalokpal.patna@cioins.co.in	Bihar, Jharkhand.
17	PUNE Shri Vinay Sah Office of the Insurance Ombudsman, Jeevan Darshan Bldg., 3rd Floor, C.T.S. No.s. 195 to 198, N.C. Kelkar Road, Narayan Peth, Pune – 411 030. Tel.: 020-41312555 Email: bimalokpal.pune@cioins.co.in	Maharashtra, Area of Navi Mumbai and Thane (excluding Mumbai Metropolitan Region).

The updated details of Insurance Ombudsman are available on IRDAI website: www.irdaindia.org, on the website of General Insurance Council: www.generalinsurancecouncil.org.in, website of the Company www.icicilombard.com or from any of the offices of the Company

Note In case of renewal of the policy, policy benefit and terms & conditions of policy including premium may be subject to change.

COMPANY CONTACT DETAILS:

ICICI Lombard General Insurance Company Limited

Mailing Address: Interface Building No.16, 601/602, 6th Floor, New Link Road Malad (W), Mumbai - 400 064. Registered Office Address: ICICI Lombard House, 414, Veer Savarkar Marg, Near Siddhi Vinayak Temple, Prabhadevi, Mumbai 400 025.

Visit us at www.icicilombard.com

Mail us at customersupport@icicilombard.com

Toll Free No.: 1800 2666

Chargeable No.: +91 86552 22666

Insurance is the subject matter of solicitation. IRDA Reg. No. 115.

CIN: L67200MH2000PLC129408.

ICICI Lombard General Insurance Company Limited

IRDA Reg. No. 115
Mailing Address:
601 & 602, 6th Floor, Interface 16,
New Linking Road, Malad (West),
Mumbai 400 064.

CIN: L67200MH2000PLC129408
Registered Office:
ICICI Lombard House, 414, Veer Savarkar Marg,
Near Siddhi Vinayak Temple, Prabhadevi,
Mumbai 400 025.

Toll free No. : 1800 2666
Alternate No. : +91 8655 222 666 (chargeable)
Email : customersupport@icicilombard.com
Website : www.icicilombard.com

ANNEXURE-XVIII
TO
SPECIAL CONDITIONS OF CONTRACT

WORK PERMIT SYSTEM OISD-STD105

OIL INDUSTRY SAFETY DIRECTORATE

वर्क परमिट सिस्टम

ओआईएसडी - मानक - 105

WORK PERMIT SYSTEM

OISD-STD-105

Bharat Petroleum Corporation Limited

First Edition	February 1998
First Amendment	July 1998
First Revision	September 2004
Second Revision	August 2023

FOR RESTRICTED CIRULATION ONLY

OIL INDUSTRY SAFETY DIRECTORATE
Government of India
Ministry of Petroleum & Natural Gas
8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)
Website: https://www.oisd.gov.in Tele: 0120-2593833

Bharat Petroleum Corporation Limited

This page is intentionally left blank.

PREFACE

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 return of these national assets and resources including sustainability.

To ensure proper implementation of the various aspects of safety in the oil & gas industry, the Government of India, vide Resolution No. R-13013/4/84-OR-1 dated 10th January 1986 set up a Safety Council at the apex, under the administrative control of the Ministry of Petroleum & Natural Gas (MoP&NG). To assist the Safety Council, a technical directorate, namely the Oil Industry Safety Directorate (OISD) under the aegis of MoP&NG, has been entrusted with the responsibility of formulating standards, overseeing its implementation through safety audits to enhance safety level in the oil & gas industry.

OISD has developed a rigorous, multi-layer, iterative and participative approach for development of standards. OISD develops and revises Standards, Guidelines & Recommended Practices for the oil and gas sector through a participative process involving all the stakeholders (including the public at large), drawing inputs from international standards and adapting them to Indian conditions by leveraging the experience of the constituents. These standards cover inbuilt design safety, asset integrity and best operating practices in the field of production, processing, storage and transport of petroleum.

The participative process followed in standard formulation has resulted in excellent level of compliance by the industry. 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/ reference in various statutory rules and regulations of the land.

OISD and industry together strive to achieve nil incident in the entire hydrocarbon value chain. We at OISD, are confident that the provisions of this standard, when implemented in totality, would go a long way in ensuring safe operation in the oil and gas industry.

Executive Director
Oil Industry Safety Directorate

Bharat Petroleum Corporation Limited

NOTE

Oil Industry Safety Directorate (OISD) publications are prepared by the Oil and Gas industry under the Ministry of Petroleum & Natural Gas. This standard is a property of Oil Industry Safety Directorate (OISD) and shall not be reproduced or copied and loaned or exhibited to others without written consent from OISD.

OISD standards are published to facilitate sound engineering, operating practices and aimed to supplement the information to the oil and gas industry, however this may be used by anyone desiring to do so and are not intended to obviate the need for applying sound engineering judgement regarding when and where these standards should be utilized. The formulation and publication of OISD standard is not intended in any way to inhibit anyone from using any other practices and not to replace the prevailing statutory requirements, which must be followed as applicable.

Wherever Acts/ Rules/ Regulation and National/ International Standards are mentioned in the standard, the same relates to in-vogue version of such documents. Whenever there is any difference between the statutory norm and OISD standard, more stringent requirement should be followed. However, in case of any difference in the requirement between OISD standards, the requirement as specified in the standard released at a later stage shall prevail.

The industry has to carry out gap analysis and make necessary changes in their system in line with the revised standard and the requirement should be implemented within a time frame of 1 year (from the date of release of revised standard).

Though every effort has been made to assure the accuracy and reliability of the information contained in these documents, OISD hereby expressly disclaims any liability or responsibility for loss or damage resulting from the use of OISD standard.

The standards would be reviewed periodically based on the decision in the Steering Committee/ Safety Council, industry request, technological development, recommendations of high-level committee and accident investigation reports. Generally, OISD standards are reviewed and revised, reaffirmed or withdrawn at least every ten years.

Suggestions for revision are invited from the oil and gas industry and should be submitted to OISD at **ps-ed.oisd@gov.in**.

Bharat Petroleum Corporation Limited

CURRENT FUNCTIONAL COMMITTEE

NAME	DESIGNATION	ORGANIZATION
LEADER		
Vivek Bichave	Head – Safety (Manufacturing)	Reliance Industries Limited
MEMBER		
Jamunalal Rout[1]	Dy. Controller of Explosive	PESO (till 13.07.2021)
Jayamohan R. Nair	Chief General Manager - Prod	Oil & Natural Gas Corporation Limited
Joydip Paul	CGM – HSE (Retired)	GAIL (India) Limited
R.N. Barik	GM - Plant	Indian Oil Corporation Limited
Atul Bhongle	GM – Fire & Safety	Mangalore Refinery & Petrochemicals Ltd
B.K. Panda	GM – Fire & Safety	Indian Oil Corporation Limited
Shrikrishna R. Nawade	GM - HSSE	Bharat Petroleum Corporation Limited
Bipin Kumar Pathak	DGM - Electrical	Oil & Natural Gas Corporation Limited
Geetam Barthakur	GM – Pipeline Opns.	Oil India Limited
Roshan Shihab P.M.	GM – Corporate HSSE	Bharat Petroleum Corporation Limited
Vinod Karande	DGM - Safety	Hindustan Petroleum Corporation Limited
Rubul Baruah	Ch. Manager – Fire & Safety	Numaligarh Refinery Limited
Anant Tandale	Ch. Manager - HSE	Vedanta Limited (till 06.12.2020)
D. Kiran Kumar	Joint Director	Centre for High Technology
Saurabh K. Arya[2]	Additional Director – E&P	OISD, Noida (till 08.07.2022)
Vivek Prakash Singh[3]	Joint Director – P&E	OISD, Noida (till 29.05.2023)
MEMBER COORDINATOR		
D. Kalyan Verma[4]		OISD, Noida

OISD recognize the support & cooperation of several other experts from industry, who contributed to the preparation, review and finalization of this document.

Bharat Petroleum Corporation Limited

[1] Sh. Jamunalal Rout joined PNGRB effective July 2021
[2] Sh. Saurabh Arya joined ONGC as Chief General Manager – Production effective July 2022
[3] Sh. Vivek Prakash Singh joined IOCL as Chief Manager effective May 2023
[4] Sh. D Kalyan Verma joined BPCL as Chief Manager – Corporate HSE effective May 2023

WORK PERMIT SYSTEM

INDEX

S.No.	Content	Page No.
1.0	Introduction	1
2.0	Scope	1
3.0	Definitions	1
4.0	Objective & Function of Work Permit System	2
5.0	Types of Work Permits	3
5.1	Cold work permit	3
5.2	Hot work permit	3
5.3	Confined space entry permit	3
5.4	Composite work permit	4
5.5	Electrical isolation and energization permit	4
5.6	Other types of work permit	4
6.0	Work Permit System procedures/ requirements	4
6.1	Roles & Responsibilities	5
6.2	Job planning	5
6.3	Job safety analysis, control of hazardous energy sources & Toolbox talk	5
6.3.1	Job safety analysis	5
6.3.2	Control of hazardous energy sources	6
6.3.3	Tool box talk	7
6.4	Work permit system activities before commencement of job	7
6.4.1	Essential requirements for issuing & receiving work permits	7
6.4.2	Writing work permit forms	8
6.4.3	Printing & signing filled in work permit forms	8
6.4.4	Work permit interaction	10
6.4.5	Display of work permits	10
6.5	Work permit system activities while executing job	10
6.5.1	Permit supervision	10
6.5.2	Suspension & cancellation of work permit	11
6.5.3	Work permit extension/ handover	11
6.6	Hand back/ Closing of work permits after execution of job	12
6.7	Retention of work permit forms	12
6.8	Auditing and review of the work permit system	12
6.9	Training on the work permit system	12
7.0	Abbreviations	13
8.0	References	14
	Annexure-I: Typical cold work, hot work/ entry to confined space/ vehicle entry/ excavation works	15
	Annexure-II: Explanatory notes to composite work permit form	18
	Annexure-III: Typical electrical isolation/ energization permit	21
	Annexure-IV: Typical work permit system flow chart	23
	Annexure-V: Safe work practices	24
	Annexure-VI: Typical roles & responsibilities of work permit role holders	30
	Annexure-VII: Typical format of job safety analysis form	32
	Annexure-VIII: Lock Out & Tag Out procedure of electrical installations	33
	Annexure-IX: Typical format of tool box talk form	35
	Annexure-X: Major changes in the revised edition	36
	Annexure-XI: List of previous functional committee(s)	37

Bharat Petroleum Corporation Limited

1.0 INTRODUCTION

The hydrocarbon processing/ handling installations store and process large quantities of hazardous substances, including flammable and toxic materials. Given the oil and gas industries' inherent hazards, most operating activities are critical to safety. An essential part of controlling workplace hazards is an effective Work permit System to prevent incidents, provide safe working conditions and execute the work safely.

The primary purpose of the work permit system is to ensure that work is carried out in the safest possible manner to prevent injuries to personnel, protect property/ environment from damage and avoid fire/ explosion. Failure to properly implement the work permit system is often the root cause of the incidents.

A work permit is not simply a means of permitting one to do a job. It is a means of defining how a job can be carried out safely and under what circumstances. Issuing a work permit does not, by itself, make a job safe. The work permit does not relieve anyone of responsibility for taking all necessary precautions to eliminate the possibility of accidents such as fire or explosion before, during, and after work is performed.

The words 'permit-to-work' (PTW) and 'work permit system' (WPS) are synonymous with the purpose of this standard and are used interchangeably in this standard. Similarly, the words 'Work', 'Job,' or 'Task' are commonly used interchangeably in this standard.

2.0 SCOPE

This standard shall apply to all upstream, midstream, and downstream sectors of the Oil and Gas Industry. The provisions of this standard are applicable for construction activities (like excavation, scaffolding, road work, working in confined space and at height, painting, electrical jobs, cutting/ welding, radiography, etc.) in Grass root/ Green field project sites.

3.0 DEFINITIONS

3.1. **Authorized person:** is a person who possesses a certificate of competency or electrical work permit, issued by the appropriate Government required as per Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010 & its amendments thereof. This person can operate and carry out the work on electrical lines and apparatus.

3.2. **Cold Work**: An activity which does not produce adequate heat to ignite a flammable air - hydrocarbon mixture or a flammable substance.

3.3. **Confined space**: It is an enclosure that:-

(i) has limited openings for entry and exit.
(ii) could contain known or potential hazards.
(iii) is not intended for continuous occupation.
(iv) has insufficient natural ventilation.

3.4. **Hot Work**: An activity that can produce a spark or flame or other sources of ignition having sufficient energy to cause ignition, where the potential for flammable vapour, gas, or dust exists.

In Petroleum Rules 2002, hot work is defined as any work which involves welding, burning, soldering, brazing, sand blasting, chipping by spark-producing tools, use of certain power driven tools, non-flame proof electrical equipment or equipment with internal combustion engines and including any other work which is likely to produce sufficient heat, capable of igniting inflammable gases.

3.5. **Issuer**: A designated person authorized to issue the work permit by an organization and statutory guidelines. The issuer shall have the competency defined by the organization for executing the roles and responsibilities in the work permit system.

Bharat Petroleum Corporation Limited

The list of the designated permit issuers for a plant/ location/ unit/ facility shall be maintained by the organization.

3.6. **Lower Flammable Limit (LFL)**: the minimum concentration of a vapour in the air (or another oxidant) below which flame propagation does not occur in contact with an ignition source. This is usually expressed as the volume percentage of the vapour in the air. This is also referred to as Lower Explosive Limit (LEL).

3.7. **Personal Protective Equipment:** Devices or clothing used to insulate an individual from the chemical, thermal, explosive, electric shock, or other hazards presented by the environment in which one works. Examples of PPEs are safety spectacles/ goggles, safety shoes, safety helmets, cotton coveralls, hand gloves, ear muffs/ plugs, etc.

3.8. **Pyrophoric substance**: A substance capable of self-ignition on short exposure to air under ordinary atmospheric conditions.

3.9. **Receiver**: A designated person authorized to receive a work permit by an organization and statutory guidelines. He is responsible for the safe execution of the work. The receiver shall have the competency defined by the organization for executing his roles and responsibilities in the work permit system.

The list of the designated permit receivers for a plant/ location/ unit/ facility shall be maintained by the organization.

3.10. **Shall:** 'Shall' indicates mandatory requirement.

3.11. **Should**: 'Should' indicates that the provision is recommended as a good engineering practice.

3.12. **Hazardous Area:** An area shall be deemed to be a hazardous area, where:-

(i) Petroleum having a flash point below 65°C or any flammable gas or vapour in a concentration capable of ignition is likely to be present.

(ii) Petroleum or any flammable liquid having a flash point above 65°C is likely to be refined, blended, handled, or stored at or above its flash point.

3.13. **Simultaneous Operations (SIMOPS):** Also called 'combined operations,' are those where more than one major activity (e.g., drilling, production, workover operation, revamping/ construction, line break containing flammable material and hot work in the area around etc.) is undertaken at the same place or in the vicinity along-with activities such as material handling and hot work in an environment where oil/ gas is present or produced nearby.

Such 'combined operations' may conflict with each other and pose risks that may adversely impact people, property, or the environment.

4.0 OBJECTIVE & FUNCTION OF WORK PERMIT SYSTEM

The objective and function of a work permit system are as follows:

(i) It ensures that proper authorization has been granted to perform designated work.

(ii) It ensures those people conducting the work know the exact nature of the task, including hazards, restrictions, required precautions/ controls, time limitations, etc.

(iii) It specifies the controls and precautions necessary to undertake the work safely, e.g., isolating machinery, equipment, pipeline, energy source, etc.

(iv) It allows the ability to display, to those who need to know, exactly what ongoing work is.

(v) It provides a procedural means of suspending work when this is necessary.

(vi) It provides an ability to control work that might interact or conflict with ongoing operations or other work permit activities.

(vii) It provides a procedural means of handing over the work when it covers more than one shift.

(viii) It provides a procedural means of handing back the area or plant involved in the work.

Bharat Petroleum Corporation Limited

5.0 TYPES OF WORK PERMITS

The organization shall define the list of jobs exempted from the work permit system. Such activities involving routine production and process operations. The organization shall develop and implement procedures for executing such jobs safely.

The work permit is required for jobs like various construction activities, inspection, repair and maintenance work, entry into confined spaces, work at height, excavation, pressure testing of pipelines, use of electrical equipment that is not recommended for hazardous areas, and entry/ operation of vehicles that is not recommended for hazardous areas.

Based on the nature of the work to be performed, the following minimum type of work permits/ certificates shall be used:

(1) Cold Work Permit
(2) Hot Work Permit
(3) Confined Space Entry

} ***OR Composite Permit***

(4) Electrical isolation and Energization permit

Composite Integrated permit for cold/ hot/ entry to confined space, work at height, radiography, excavation, vehicle entry, etc., may be used. However, it shall comply with all the requirements of individual permits.

5.1 COLD WORK PERMIT

Work falling under the category of cold work such as opening process machinery, blinding & de-blinding, tightening of flanges, hot bolting, inspection, painting etc. shall be performed through Cold Work Permit. Cold work permits cover a variety of potentially hazardous activities that do not involve "hot work" or are not of a type covered by a hot work permit. Cold work permits are issued when there is no credible ignition source and when all contact with harmful substances has been eliminated, or appropriate precautions are taken.

5.2 HOT WORK PERMIT

Hot work permits are applied to any work that involves actual or potential ignition sources and is done in an area where there may be a risk of fire or explosion or involves the emission of toxic fumes from the application of heat.

They are typically used for tasks involving naked flames or tasks having spark potentials like welding or flame/ gas cutting, burning, shot blasting, soldering, hot tapping on hydrocarbon pipelines or piping, metal drilling, use of any tools which may produce sparks (spark-producing grinding wheels, pneumatic hammers, and chippers, excavators for excavation) and use of electrical equipment, machine/ tool which is not intrinsically safe or is of non-flameproof proof type.

Entry and operation of vehicles inside hazardous areas (like for construction activities) also fall in the category of hot work and shall be performed under the hot work permit. Vehicles whose design (like engine exhaust system) is not approved by PESO and are used inside hazardous areas also require hot work permit. Alternatively, Organizations may decide to have separate permits for vehicle entry/ movement.

Some cold work activities might include a line break or blinding/ de-blinding on pyrophoric service, which contains fire hazards due to entrapped residual traces of the pyrophoric substance. Such activities shall be carried out through hot work permits or line break permits.

5.3 CONFINED SPACE ENTRY PERMIT

This permit is required to protect personnel entering a confined space such as a vessel, boiler, storage tank, large diameter piping, aircraft Refueler tank, etc., against hazards such as oxygen deficiency, toxic and flammable material, falling objects, power-driven equipment, etc. Excavation more than 1.2 meters deep, an entry on a floating roof tank when the roof is more than 3 meters down from the top, entry into internal floating roof tank, space located below ground level such as a pit, drain channel, etc., also falls under the confined space.

A confined space entry permit specifies the precautions to eliminate exposure to dangerous fumes, cave-in/ slides, or an oxygen-depleted atmosphere before a person is permitted to

Bharat Petroleum Corporation Limited

enter a confined space. e.g., by maintaining forced ventilation and physical isolation or by providing personal protective equipment, including breathing apparatus. This permit shall confirm that the confined space is free from dangerous fumes or asphyxiating gases.

A confined Space Entry Permit shall be supplemented with a hot or cold work permit as per the type/ nature of work (if composite work permit is not used).

5.4 COMPOSITE WORK PERMIT

A composite work permit may be used for various jobs, such as cold/ hot work outside the confined space, entry to a confined space, and cold/ hot work inside the confined space. The checklist of the composite permit must address all the relevant aspects.

A typical composite work permit form for cold work, hot work, entry to confined space, vehicle entry, and excavation works is enclosed as Annexure-I. The explanatory notes of the composite work permit form are enclosed as Annexure-II.

Similarly, organizations may develop composite work permit forms for any combination of jobs. Checklist points of the composite permit may be sectionalized under various heads as given in the specimen copy. Based on the work to be performed, the relevant section checklist and the general section shall be duly ticked.

5.5 ELECTRICAL ISOLATION AND ENERGIZATION PERMIT

(i) Before issuing any work permit, the equipment/ facility to be worked on must be electrically safe, and electrical power shall be isolated by an authorized person to the extent necessary for the safe conduct of the authorized work.

(ii) All work on electrical equipment/ facility shall be carried out using electrical isolation and energization work permit.

(iii) Permits for electrical isolation and energization shall be in two sections. Section-A shall be used for electrical isolation and Section B for energization. The typical format for the electrical isolation and energization work permit is enclosed as Annexure-III.

5.6 OTHER TYPES OF WORK PERMIT

The following activities/ jobs shall also be covered under the Work Permit system. Organizations should develop specific work permits for such activities or include them in the composite work permit:-

(i) Working at heights
(ii) Heavy lifts
(iii) Excavation
(iv) Line-break
(v) Road closure
(vi) Diving
(vii) Radiography/ Work on the radiation source
(viii) High-pressure water cleaning
(ix) Quick sealing & hot tapping

6.0 WORK PERMIT SYSTEM PROCEDURES/ REQUIREMENTS

The term ‘Work Permit System, ‘permit,’ or ‘work permit’ refers to the paper or electronic form which is used as part of an overall system of work and which has been devised by the organization to meet its specific needs.

The permits can be written, printed, or electronic, whichever meets the organization's needs. The organizations shall implement the requirements of this standard through an electronic or manual system. The principles and content of the paper permits shall be adopted in the electronic system. Digital signature of the electronic work permit forms is permitted.

The typical process flow chart of the work permit system is enclosed as Annexure-IV. The following are the requirements and procedures which shall be adopted for the implementation of the work permit system:-

Bharat Petroleum Corporation Limited

6.1 ROLES & RESPONSIBILITIES

6.1.1 Organizations shall develop work practices/ procedures for the safe execution of jobs (like hot work, cold work, working in confined space, vehicle entry, working at heights, excavation, road closure, handling & lifting equipment, radiography, pressure testing, electrical, demolition, shot blasting/ spray painting, etc.).

6.1.2 Typical requirements to be included in safe work practices have been addressed in Annexure-V of this document. These practices shall address the requirements of certificates/ checklists required to support a work permit system such that the tasks are executed safely.

6.1.3 The Occupier/ Factory Manager/ Installation Manager (designated by the statutory laws) has overall responsibility for the development and implementation of the Work permit system, including defining roles and responsibilities of the Issuer and Receiver of the work permit system in line with the requirements of this standard.

6.1.4 The concerned management shall issue the appropriate authority levels for types of permits to the role holders at various installations. Alternate role holders shall be identified such that the work permit system is implemented correctly during the absence of the primary role holders from the location. The alternates shall be equally competent and trained to take responsibility.

6.1.5 The list of authorized personnel involved in the work permit system with their roles and responsibilities shall be available at the location. It shall be revised as and when necessary.

6.1.6 No hot/ cold job shall be undertaken without a work permit except in the areas pre-determined and documented in the organization's work permit system.

6.1.7 A copy of the organization's work permit procedures defined in line with this standard shall be available with all Installations/ plants.

6.1.8 The typical responsibilities of the permit role holders are given in Annexure VI.

6.2 JOB PLANNING

Job planning shall address the availability of authorized persons required to carry out safe isolations, handover, and execution of the job till the equipment is back in service.

6.3 JOB SAFETY ANALYSIS, CONTROL OF HAZARDOUS ENERGY SOURCES & TOOLBOX TALK

6.3.1 JOB SAFETY ANALYSIS (JSA)

(i) For jobs for which SOP is unavailable (for safe execution), it is mandatory to carry out JSA before issuing the work permit.

(ii) A careful Job Safety Analysis shall be made of the potential hazards and the operations to determine the appropriate safeguards before starting work.

(iii) A job safety analysis process typically includes the following:-

- description of a job.
- breaking the job down into a sequence of steps to accomplish the task.
- identifying the hazards, potential consequences, and risks associated with each of these steps.
- determining the control measures (as per the hierarchy of controls/ risk-reducing measures) to overcome these hazards.
- defining person responsible for implementing the control measures.

(iv) In listing the control measures, general statements such as 'be careful, 'use caution,' etc. shall be avoided. Specific statements describing what action(s) is to be taken and how it can be performed shall be preferred.

(v) JSA shall be work and job location specific. It shall properly document the safe precautions for carrying out the work applicable to the location site where work is carried out.

Bharat Petroleum Corporation Limited

(vi) Controls may include but are not limited to tools and equipment to be used, supervision and assistance required, work permits, safety observers, emergency response measures, and personal protective equipment. The action to be taken in an emergency shall be specified.

(vii) Other activities (simultaneous operations) taking place or planned to occur simultaneously as the task to be performed shall be identified as they could impact the JSA.

(viii) The JSA shall prescribe the frequency of the gas test (continuous detection using portable gas detectors or hourly or after every shift) & toolbox talks/ meetings. It shall also specify the site inspection process (who and when) during the execution of the work.

(ix) The emergency response & evacuation procedure at the site shall be referred in the JSA. The workers shall know what to do in the event of an emergency.

(x) If the JSA identifies hazards that cannot be addressed or if the proposed task poses unacceptable risks for people at the site, the work shall not be permitted.

(xi) When the task cannot be carried out because of insufficient safeguards or SIMOPS, the task shall be immediately discarded or delayed until other operations due to take place at the same time have been completed.

(xii) JSA should typically be prepared by a multidisciplinary team of relevant functions involved in task execution (like personnel from Fire & Safety depending on the critical nature of the job, M&I, Technical Services, Operations, and Executing Department. Wherever necessary, contractor/ his authorized representative should also be involved in the preparation of JSA. A typical JSA format is attached as Annexure-VII.

(xiii) There should be a system of approval of JSA defined in the organization's work permit system. The approved JSA shall be attached to the work permit.

(xiv) The JSA shall be reviewed and updated whenever a step changes or a new step is introduced in the job. The previous JSA shall be reviewed to ensure that the identified hazards and controls are relevant to the site, specific job, and personnel involved. Where appropriate, additional specific controls are to be identified.

(xv) The actions generated from the JSA shall be assigned to the respective functions to ensure that these are completed before issuing the permit.

(xvi) On completing the task, it is essential to capture any lessons learned and make improvements next time. The JSA shall be reviewed in case of an accident, incident, or near miss.

6.3.2 CONTROL OF HAZARDOUS ENERGY SOURCES

(i) Organizations shall develop a system for physical lock-out tag out (LOTO) of Isolation based on the energy source. The lock-out and tag-out system shall be used to disable machinery or equipment, thereby preventing the release of hazardous energy while employees perform servicing and maintenance activities. It controls hazardous energies - electrical, mechanical, hydraulic, pneumatic, chemical, thermal, and other energy sources. Annexure-VIII outlines the lock-out and tagging procedure used as safe work practice when employees are exposed to a hazardous energy source.

(ii) The most critical requirement of the lock-out and tag-out system is as follows: -

- use lockout devices for equipment that can be locked out. Tag-out devices may be used instead of lockout devices only if the tag-out program provides employee protection equivalent to that provided through a lockout program.
- ensure that new or overhauled equipment is capable of being locked out.
- use only lockout/tag-out devices authorized for the particular equipment or machinery and ensure that they are durable, standardized, and substantial.
- ensure lockout/tag-out devices identify the individual users.

Bharat Petroleum Corporation Limited

- the receiver shall also ensure that equipment is isolated before performing the job.

(iii) The isolations appropriate to the job shall be specified on the permit/ supplementary isolation certificate and correctly implemented.

(iv) All necessary people shall be aware of the isolated equipment.

6.3.3 TOOLBOX TALK

(i) Toolbox talks (or meetings) are intended to facilitate health and safety discussions on the job site and promote safety culture. It is aimed to refresh workers' knowledge, cover last minute safety checks, to raise workers' awareness of specific problems at job site.

(ii) Toolbox talk (TBT) shall be conducted at the job site before the commencement of the job, and start of the subsequent shifts/ daily in case the work is extended. The frequency of the tool box meetings depends upon the risks associated with the job to be carried out. The frequency of tool box meetings shall be documented in the JSA. TBT should be repeated if there is any change in the personnel executing the job.

(iii) It shall include all people involved in the work or those affected, such as subcontractors, vendors, contract supervisors, and contract workers. The job supervisor/ engineer-in-charge and safety officers should also attend these meetings based on their availability and criticality of the jobs.

(iv) The permit receiver/ job supervisor shall impart it.

(v) It shall cover safety topics related to the specific job, such as workplace hazards, emergency procedures, do's & don'ts, and safe work practices. The JSA shall be discussed during the toolbox talk. It shall involve the review of the potential hazards identified, and control measures (like PPE to be used and safety procedures) put in place to mitigate the hazards. Toolbox Talks should be used for post-accident communications/ accident case study, and pre-task planning etc.

(vi) Records of such talks should be maintained. The typical format of the toolbox talk form is attached as Annexure-IX.

(vii) Following information should be included when completing a Toolbox Talk Form:

- Names and signatures of all persons present.
- Topics discussed.
- Any job specific training or instructions that have been given in the meeting and who raised the issue or added to the discussion, to show that there has been active consultation with all persons attending the meeting and that all parties have had a chance to raise issues.

6.4 WORK PERMIT SYSTEM ACTIVITIES BEFORE COMMENCEMENT OF JOB

6.4.1 ESSENTIAL REQUIREMENTS FOR ISSUING & RECEIVING WORK PERMITS

(i) Work shall not start without a valid work permit.

(ii) While working at a height of more than 1.8 meters, working at height permit shall be issued before commencement of the job.

(iii) The single permit shall not be issued to multiple agencies.

(iv) The work permit shall be issued on the day of the commencement of the job.

(v) All work permits shall be issued or received by the authorized person of the area where work is to be carried out.

(vi) The work permit shall not be issued and received by the same authorized person, i.e., a person shall not issue a permit to himself. However, the issuer and receiver can be from the same Department.

Bharat Petroleum Corporation Limited

(vii) The work may be planned to be done either departmentally or through a contractor. In either case, the work permit preferably be received by the organization's authorized person. However, in some instances (like single-man locations), the permit may be directly received by the contractor's authorized supervisor. Such exceptions shall be documented in the organization's work permit system.

(viii) The permit-issuing authority shall not be delegated to the contractor/ his representative except in the following situations: -

- Retail Outlet, if not directly run by the organization: The permit issuing authority can be delegated to the Dealer/ Manager of the Retail Outlet, provided they are competent and authorized by the organization.
- Entire operations are outsourced on a contract/ turnkey project basis: the work permit system shall be governed by the approved 'bridging document.' During the preparation of contract agreements with outsourcing parties like in Rigs and Installations, the bridging document shall confirm that the implemented work permit system meets this standard's requirements.

6.4.2 WRITING WORK PERMIT FORMS

(i) The work permit shall be filled up carefully and accurately in clear writing, ensuring detailed and complete information is provided in all the sections/ subsections. The relevant sections and conditions of the permits shall be appropriately ticked in the permit form. Poor communication can cause mistakes and accidents.

(ii) The permit form shall have sufficient space against 'Description of work' to be done to give a clear and complete description of the work.

(iii) Other factors to be ensured while filling up the work permit form are: -

(1) sentences shall be short and simple while writing a description of work, additional precautions, remarks, etc., in the permit form.
(2) exact nature and scope of the work shall be clearly described.
(3) the details of the personnel (name and designation) issued to and involved in the permit shall be mentioned, like Issuer and Receiver.
(4) exact plant or geographical location of the work shall be specified.
(5) equipment details to be specified.
(6) the date and time that work can start.
(7) the period of the time the permit is valid for (operational time limit of the permit).
(8) details isolation certificates confirming implementation of the isolations appropriate for the job.
(9) cross-reference of common isolations.
(10) cross-reference of other relevant work permits.
(11) quantitative values and limits of gas test values shall be numerically specified.
(12) the applicable conditions/ checklist items of the permit shall be correctly ticked
(13) signatures on the work permit shall be dated.
(14) time of signature shall be mentioned.
(15) signatures and initials shall be pre-authorized by the organization, traceable and legible.
(16) electronic work permits can be digitally signed.

(iv) Legible certificates and attachments (sketches/ drawings) shall be attached to the work permit (manual/ electronic) wherever required to avoid miscommunication.

(v) Additions and alterations due to changes in identified conditions during the execution of the work shall be endorsed on all copies of the work permit.

6.4.3 PRINTING & SIGNING FILLED-IN WORK PERMIT FORMS

(i) Copies of the work permit shall be distributed to appropriate personnel. Permits are often issued in triplicate. Wherever available, the emergency personnel (Fire, First aid, Rescue, etc.) shall be advised of the work and its exact location. The copy of the permit shall be available at the worksite either as a printed hard copy or viewable in electronic form (like in a handheld device suitable for the hazardous area).

Bharat Petroleum Corporation Limited

(ii) All permits shall be serially numbered. General instructions applicable to the type of permit (manual/ electronic) shall be printed on the overleaf.

(iii) In a manual system, work permit forms shall be in the form of books preferably with a tear-off facility. In the case of an electronic permit system, the permit shall be accessible to the relevant stakeholder. A copy of the work permit shall be printed in case the handheld devices are unavailable with the crew at the work site.

(iv) Each organization shall develop a unique system to recognize different types of permits in manual or electronic work permit systems. The method may include color-coding the various permit forms or identifying the types of work permits by BOLD letters or symbols.

(v) The suggested color-coding system & the distribution of the copies are as follows:-

	Type of work permit	Color code	No. of copies	Copies to be distributed to
(1)	Hot work permit	Pink-edged or pink	Three	• Original: with receiver/ acceptor • Copy: Fire/ Emergency Services • Book Copy: Control Room/ designated location
(2)	Cold work permit	Yellow-edged or yellow	Two	• Original: with receiver/ acceptor • Book Copy: Control Room/ designated location
(3)	Confined space entry work permit	Colour other than that of cold and hot work permit	Three	• Original: with receiver/ acceptor • Copy: Fire/ Emergency Services • Book Copy: Control Room/ designated location
(4)	Composite work permit	White	Three	• Original: with receiver/ acceptor • Copy: Fire/ Emergency Services (if applicable) • Book Copy: Control Room/ designated location
(5)	Electrical isolation/ energization permit/ certificate	Green-edged or green	Two	• Original, along with a copy, shall be issued to the electrical section for electrical isolation/ energization. • The electrical section authorized person on isolation/ energization of the equipment/ circuit shall return the original to the issuer keeping a copy for record.

Bharat Petroleum Corporation Limited

(vi) The plant in charge/ his authorized representative/ permit issuer shall make a thorough inspection of the job site, accompanied by a Fire/ Safety Officer (as per requirement), area in-charge and permit receiver.

(vii) Clearance from the relevant authorities/ Department shall be obtained for excavation/ Road cutting /dyke cutting jobs.

(viii) The work permit will become live only after signing by the Permit Issuer (who authorizes the permit as issued) and the Permit Receiver (who accepts the permit confirming understanding of the work to be done, hazards involved, precautions required, and that the permit information has been explained to all personnel executing the job). Their signatures formally confirm that all necessary precautions have been taken and that work can now start, providing the necessary precautions are adhered. Their name and signature and the date and time should be clear.

(ix) The names and designation of the permit authorities (like issuer and receiver) shall be conspicuously visible in the printed work permit form.

6.4.4 WORK PERMIT INTERACTION

(i) When a work permit is being considered for a job, the person issuing the permit must be aware of any other activity (either planned or already underway) which may influence the work to be done under the permit.

(ii) In case multiple issuers exist at the workplace, close liaison is required by the various issuers to ensure that work done under one permit does not interact with another, creating hazards for either of them.

(iii) All common isolations shall be cross-referenced in relevant work permits. In case of isolations common to more than one permit, there shall be a procedure to prevent the isolation from being removed before all permits have been closed.

(iv) If more than one department works on the same equipment, a work permit shall be issued individually each department/ agency.

6.4.5 DISPLAY OF WORK PERMITS

(i) Copies of a work permit shall be displayed/ available:

- at the place where the work is being carried out or in a recognized close-by location.
- the copy shall be available with the executor at the site.

(ii) Copies of work permits issued for the same equipment/ facility shall be kept and displayed together.

(iii) The entity should have the provision to display the real-time status of critical work permits (like hot work, working at height, excavation, entry inside confined space, radiography) on the entity plot plan either digitally or manually. This information shall be available to the critical stakeholders at the facility, role holders of the work permit system, fire stations, and unit control rooms. This helps the incoming shift supervisor/s (both in fire stations and operation departments) get a quick idea of the hot jobs being undertaken and helps identify the areas that require inspection/ attention, depending upon the criticality of the area and the job. The site of hot jobs shall be indicated in this system (like using red pins on manual plot plans).

6.5 WORK PERMIT SYSTEM ACTIVITIES WHILE EXECUTING JOB

6.5.1 PERMIT SUPERVISION

(i) The area in charge shall be aware about the commencement of work. Once the job is commenced, it is essential to monitor the worksite for any changes in conditions or personnel that might alter the hazards and controls in place.

(ii) Site visits by the issuing authority, area in-charge, authorized person & safety officer/ fire officer (depending on the requirement) will depend on the complexity and duration of that work, and the hazards involved. In the case of hot work and confined space jobs, the site visits shall be carried out at least twice – at the start and completion of the work but more often if required. They shall verify whether the work is being carried out as per the conditions laid down in the work permit. The housekeeping of the site shall be proper to avoid incidents while executing job.

(iii) Suitable technologies like CCTV and gas monitoring devices should be utilized to monitor site conditions continuously when work is being carried out. Signs and barriers shall be used in the work area to prevent the entry of unauthorized persons, pedestrians, and vehicles.

(iv) Adequate supervision of the work permit system might get diluted in the case of many permits under one person's control. Hence, management shall ensure the necessary arrangements to maintain proper supervision of the jobs executed through work permit.

Bharat Petroleum Corporation Limited

6.5.2 SUSPENSION & CANCELLATION OF WORK PERMIT

(i) Many incidents happen when conditions at the worksite change or are not as foreseen. Work shall be stopped if any unsafe condition arises during work and the permit authorities shall be notified immediately.

(ii) Work being executed under a work permit should also be suspended:-

- if there is an emergency alarm/ siren.
- for operational reasons.
- if site conditions change or new hazards have arisen
- there is a change to the nature or scope of the work.
- where the ongoing work conflicts with other work being carried out.

(iii) The permits which have been suspended shall still be kept on the permit recording system. They shall specify the condition of the plant where the work has been suspended and any consequences for other activities which may be affected by that condition.

(iv) Isolations for the suspended work permits shall not be normalized till the work permit is closed.

(v) The conditions shall be restored before restarting the work. The suspended work shall not be restarted until the permit issuer has verified that it is safe to do so and has revalidated the risk assessment and corresponding work permit.

(vi) If the suspension of work is likely to be extensive/ indefinite, then the work permit shall be cancelled, and a new work permit with additional/ appropriate safeguards shall be issued to restart the work.

6.5.3 WORK PERMIT EXTENSION/ HANDOVER

(i) The permit extension is required if any work done under a work permit carries over into another shift. This allows the outgoing shift to communicate all relevant information about the work and the conditions of the permit to the new shift to ensure continuity and safety.

(ii) The information shall include the following: -

- any outstanding work under permit control.
- the status of that work (this shall be left in a condition that can be reliably explained to and understood by the incoming shift).
- the status of any other work which may affect the permit-controlled job (e.g., isolations).
- the status of the plant or installation.

(iii) The information can be recorded in a permit log, permit file, or on display boards. It is essential, however, to have good communication between the outgoing and incoming issuing and performing authorities.

(iv) The names and designation of the permit authorities, like issuer and receivers, shall be mentioned in the permit renewal sections.

(v) The permit shall be issued only for a single shift.

(vi) Where the work has to be continued, the same permit may be revalidated/ extended shift-wise for a period not exceeding seven calendar days in the succeeding shifts after satisfying the permit conditions.

(vii) In plant turnaround instances, work permit validity may be extended to fifteen days.

(viii) For construction activities to be undertaken in grass root project sites and turnkey projects, a Work Permit of validity not exceeding one month with periodic checks may be issued with the approval of the designated senior management. The frequency of periodic checks shall be mentioned in the Job Safety Analysis.

Bharat Petroleum Corporation Limited

6.6 HANDBACK/ CLOSING OF WORK PERMIT AFTER EXECUTION OF JOB

6.6.1 The permit closing/ hand back procedure is reinstating a plant or installation (or the part that has been worked on under a permit). This will ensure that the work has been completed, the worksite is in a safe condition, and normal operations can resume.

6.6.2 After completion of the job, the work permit shall be immediately closed.

6.6.3 The receiver shall satisfy himself about the completion of the job (thoroughly check the area for clearing of debris, removal of temporary electrical installation & machine, etc.) before closing the permit.

6.6.4 Similarly, the issuer shall satisfy himself regarding completing the job and that the area has been cleared before closing the permit. He is responsible for signing off the permit and verifying that the plant or installation is safe.

6.6.5 The person in control of operational activities will then refer to the permit that the plant or equipment (or the part which has been subject to work under a permit) has been reinstated to the control of the production staff.

6.6.6 The permit will be treated as "Closed" only after it is signed by Issuer and the Receiver (whether manually or electronically).

6.6.7 Electrical equipment or any other energy source is to be re-energized/ normalized only after the work on the equipment/ circuit has been completed and all the applicable work permits are closed.

6.7 RETENTION OF WORK PERMIT FORMS

6.7.1 On completion of the work and closing of the work permit, the original work permit shall be returned to the issuer.

6.7.2 Original along with other copies of work permits, supplementary checklists/ certificates, JSA, and risk assessments shall be properly filed as per serial number and kept as records for future reference and to enable auditing or incident investigation for at least six months from the date of completion of work or the successful commissioning of the facility for which the work permit was issued whichever is later.

6.7.3 Companies shall have a secure system for archiving and retrieving completed/ used work permits in the electronic permit systems to enable an effective monitoring and audit process.

6.8 AUDITING AND REVIEW OF THE WORK PERMIT SYSTEM

6.8.1 The work permit system implemented at the locations shall be audited during both internal & external safety audits (like OISD). The audit process shall examine monitoring records. Non-compliance with the work permit system shall be recorded, and subsequent remedial measures tracked to ensure all issues are effectively closed out.

6.8.2 The site and corporate management shall review the organization's work permit system annually to assess its effectiveness. This review shall include specific incidents related to inadequate control of work activity. It shall consist of lessons learned from incidents associated with the work permit system, safety alerts and case studies issued by OISD, and findings from internal and external audits.

6.9 TRAINING ON THE WORK PERMIT SYSTEM

6.9.1 As part of a site or installation safety induction training (fresh entrants and transferred employees from other Departments/ locations/companies), training on the work permit system shall be imparted through the course modules prescribed in OISD-STD-154.

6.9.2 The organization shall also have a system for refresher training for its employees who are involved in the work permit system.

6.9.3 Since several maintenance/ construction jobs are often carried out with assistance from contractors, it is essential to provide sufficient exposure to the contractor and its employees as well on the work permit system.

Bharat Petroleum Corporation Limited

6.9.4 The following topics shall be covered in the training sessions:

- objectives & principles of the work permit system.
- when permits are required.
- an understanding of the types of permits.
- job safety analysis & tool box talk procedure.
- responsibilities and competence requirements for signatories or authorized people within the work permit system.
- lessons from incidents associated with permits-to-work and findings from audit and review.

6.9.5 Once training has been given, acknowledgment shall be taken from the participants about the understanding of the requirements of the work permit system.

6.9.6 Records of training and competence of personnel involved in the work permit system shall be maintained for a minimum of three years.

7.0 ABBREVIATIONS

CCTV	Closed-Circuit Television
ELCB	Electric Leakage Circuit Breaker
JSA	Job Safety Analysis
LFL	Lower Flammable Limit
LEL	Lower Explosive Limit
LOTO	Lock Out Tag Out
M&I	Maintenance & Inspection
PESO	Petroleum and Explosives Safety Organization
PPE	Personal Protective Equipment
SIMOPS	Simultaneous Operations
TBT	Tool Box Talk

Bharat Petroleum Corporation Limited

8.0 REFERENCES

(i) The Petroleum Rules, 2002.

(ii) Oil Mines Regulations.

(iii) Factories Act, 1948.

(iv) API RP 2009, Safe Welding, Cutting, and Hot Work Practices in Petroleum and Petrochemical Industries.

(v) API STD 2015 – 2001, Requirements for safe entry and cleaning of petroleum storage tanks.

(vi) Task Risk Assessment, Step Change in Safety.

(vii) Health & Safety Executive: HSG250, Guidance on permit-to-work systems.

(viii) OISD-STD-137, Inspection of electrical equipment.

(ix) OISD-STD-154, Safety aspects in functional training.

(x) OISD-GDN-192, Safe Practices during construction.

(xi) OISD-GDN-207, Contractor Safety.

(xii) OISD-STD-190, Safety in Derrick Floor Operations (Onshore & Offshore Drilling Rigs).

(xiii) IS 5216, Recommendations on Safety Procedures and Practices in Electrical Work.

(xiv) IS 3016, Code of practice for fire precautions in welding and cutting operations.

(xv) OSHA standards 1910.147, 1910.333 & 1910.146.

Bharat Petroleum Corporation Limited

ANNEXURE - I

TYPICAL COMPOSITE WORK PERMIT
FOR
COLD WORK/ HOT WORK/ ENTRY TO CONFINED SPACE/ VEHICLE ENTRY/ EXCAVATION WORKS

(NAME OF ORGANIZATION)
(LOCATION)

Sl. No._____

Work clearance from _____ hrs. of date _____ To _____ hrs. of date _____
(Valid for the shift unless renewed)

Issued to (Department/ Section/ Contractor) _____

Exact Location of work (Area/ Unit/ Equipment no. etc.) _____

Description of work
_____

JSA Ref. No. _____ Cross-Reference of other permits: _____

Ref. No. of isolation certificates _____

THE FOLLOWING ITEMS SHALL BE CHECKED BEFORE ISSUING THE PERMIT
(Tick mark in the appropriate box.)

Sr. no.	Item	Done	Not Reqd.	Sr. no.	Item	Done	Not Reqd.
A	**General points and for cold work**			14	Proper ventilation and lighting provided		
1	Equipment/ work area inspected			**B**	**For Hot work/ Entry to confined Space**		
2	Surrounding area checked, cleaned and covered			2	Proper means of exit/ escape provided		
3	Sewers, manholes, CBD etc. and hot surfaces nearby covered			3	Standby personnel provided from Process/ Maint./ Contractor/ Fire dept.		
4	Considered hazard from other operations and concerned persons alerted.			4	Checked for oil and gas trapped behind the lining in Equipment		
5	Equipment properly drained and depressurized			5	Shield provided against spark		
6	Equipment properly steamed/ purged			6	Portable equipment/ nozzles properly grounded		
7	Equipment blinded/ disconnected/ closed/ isolated/ wedge opened			7	Standby persons provided for entry to confined space		
8	Equipment water flushed						
9	Iron sulfide removed/ kept wet			**C**	**For Vehicle Entry**		
10	Equipment electrically isolated and tagged vide permit no.			1	PESO approved spark elimination system provided on the mobile		

Bharat Petroleum Corporation Limited

					equipment/ vehicle provided.		
11	Gas test: HCs = %LEL Toxic gas = ppm O2 = %						
12	Running water hose/ Fire extinguisher provided. Fire water system available.			**D**	**For Excavation works**		
13	Area cordoned off and precautionary tags/ boards provided.			1	Clearance obtained for excavation/ road cutting/ Dyke cutting from concerned Department and Regulatory Authorities.		

REMARKS:

(1) The activity has the following expected residual hazards (Tick the relevant items): Lack of Oxygen/ H2S, Toxic gases/ Combustible gases/ Pyrophoric Iron/ Corrosive Chemicals/ Steam – Condensate / Others

(2) Following PPEs to be used in addition to standards PPEs (Helmet, Safety Shoes, Hand gloves, Boiler suit): Cotton Coverall/ Face Shield/ Apron/ Goggles/ Dust Respirator/ Fresh Air Mask/ Lifeline/ Safety Belt/ Airline/ Earmuff, etc.

(3) Additional requirements/ precautions if any:_____

(4)

Issuer Name & Designation	Issuer Signature with date and time	Receiver Name and Designation	Receiver Signature with date and time

Clearance renewal

Date	Time		Gas Test Values for HC's, Toxic, O2, etc.	Additional precautions if any, Otherwise mention "NIL"	Issuer's Name, Designation & Signature	Receiver Name, Designation and Signature
	From	To				

Closing of the work permit:

Receiver: Certified that the subject work has been completed / stopped and area cleaned.			**Issuer**: Verified that the job has been completed and area cleaned and is safe from any hazard.		
Date & Time	***Name & Designation***	***Signature***	***Date & Time***	***Name & Designation***	***Signature***

Bharat Petroleum Corporation Limited

General Instructions:

1. The work permit shall be filled up carefully and accurately in clear handwriting ensuring that complete information is provided in all sections/ subsections and none of the columns is left blank. Sketches shall be provided wherever possible to avoid miscommunication.
2. Appropriate safeguards and required personal protective equipment shall be determined by a careful analysis of the potential hazards and the operations to be performed prior to starting the work.
3. Requirement of standby personnel from Process/ Maintenance/ Contractor/ Fire etc. if any shall be mentioned in the additional requirement.
4. There shall be means of communication in case of an emergency at the worksite. In case of fire alarm/ siren, all work must immediately be stopped.
5. Only certified vehicles/ engines and permitted types of electrical equipment and tools are allowed in operating areas.
6. Welding machines shall be located in ventilated areas.
7. No hot work shall be permitted unless the explosive meter reading is Zero.
8. When a person is entering the confined space, a minimum one standby-designated person shall always be available at the manhole or entry point. If a standby person has to enter the confined space, then a substitute standby person shall be ensured at the manhole or entry point.
9. Compressed gas cylinders shall not be allowed to be kept in confined spaces.
10. Before boxing up any vessel manhole cover, ensure that no men/ materials are inside the vessel.
11. For renewal of work clearance, the issuer shall ensure that the conditions are satisfactory for the work to continue. If the conditions have changed, it may be necessary to issue a new permit or amend the existing permit.
12. This clearance on the same permit can be renewed/ extended up to a maximum of seven calendar days.
13. This permit must be available at the work site at all times.
14. On completion of the work, the permit must be closed and kept as record.
13. The industry may add other relevant instructions based on their operating and maintenance practices.

Bharat Petroleum Corporation Limited

Annexure - II

EXPLANATORY NOTES TO COMPOSITE WORK PERMIT FORM

Explanatory notes to fill up the work permit (Annexure-II) and its check-listed items are elaborated below to amplify the underlying concepts and highlight their significance:

(a) Exact Location (Area/ Unit/ Equipment no): Exact location of the area or the unit in which the work is to be carried out shall be written against it. E.g. AVU/ 12C-101, Tank farm A, Tank 501 etc. Wherever the equipment/ area is not identified, it shall be identified with the nearest/ smallest distance from a nearby equipment/ structure.

(b) Description of work: Precise description of the work to be performed shall be written. Sketches shall be attached wherever possible to avoid miscommunication.

(c) Equipment/ Area inspected: Equipment or area where work is to be conducted, shall be inspected to ensure that it is safe to carry out the work and assess other safety requirements/ stipulations. In case of equipment/ vessel box-up permits, it shall be ensured that the work is complete, all personnel are out, no maintenance gear is left behind, and debris removed.

(d) Surrounding area checked/ cleaned: Unsafe conditions for performance of work may arise from the surrounding area. It shall be cleaned up to remove flammable material such as oil, rags, grass, etc.

(e) Sewers, Manholes, Closed Blowdown (CBD) etc., and Hot Surfaces covered: Flammable gases may be released from nearby sewers. Hot un-insulated surfaces (equipment/ pipelines) may provide a source of ignition, and therefore, these are to be adequately isolated/ covered to prevent fires.

(f) Hazard from other routines/ non-routine operations considered and persons alerted: Other activities (routine/ non-routine) being carried out nearby, which can create conditions unsafe for performance of the permit work, shall be taken into consideration and the concerned persons shall be alerted accordingly.

(g) Equipment electrically isolated and tagged: Before issuing a permit, it shall be ensured that electrical isolation has been done, switches are locked-out and cautionary tags duly signed with date and time are attached. Single line drawing with isolation points shall be attached.

(h) Running water hose/ Portable extinguisher provided/ Fire water system available: Running water hose and portable fire extinguisher are required to flush/ dilute in case of release of any hazardous chemical or to quench sparks and to put out small fires immediately.

In order to meet any contingency, it shall be ensured that the fire water system including firewater pumps, storage, network etc. is checked and kept ready for immediate use.

For the open flame hot jobs, continuous gas monitoring shall be done.

(i) Equipment blinded/ disconnected/ closed/ isolated/ wedge opened: Equipment for which the work permit is being issued, shall be isolated from the rest of the plant in order to ensure that there is no change in the work environment with respect to presence of toxic/ flammable gases, liquids, hazardous chemicals etc. in the course of the work. The equipment shall be made hydrocarbon/ energy free.

Blinding is one of the most effective ways of isolation. Blinds shall be installed as close to the equipment as possible. If lines cannot be blinded, these shall be disconnected and the open ends shall be made safe by installing pipe caps/ plugs, blind flanges etc.

(j) Equipment properly drained/ depressurized: Equipment under pressure shall be depressurized after isolation. This shall be followed by draining/ purging/ water flushing etc. as the case may be.

Equipment containing liquid hydrocarbons shall be drained completely. There may be a possibility of overlooking of liquid collected in pockets or inaccessible areas such as level gauges, small nozzles / bleeders on vessels, laterals in pipe work etc.

All low point drains shall be in unplugged condition. Before any hot job in a petroleum storage tank, it has to be certified to be free of hydrocarbon gases.

Bharat Petroleum Corporation Limited

(k) Equipment properly steamed/ purged: Purging of equipment (tanks, vessels, pipelines etc.) is done to make them free of flammable hydrocarbon and toxic gases. Steam/ Inert Gas is used for gas freeing of vessels and pipes in refineries and other locations. Other means of purging is by displacement with water and final traces of gas removed by a properly earthed air eductor. All high point vents shall be unplugged while purging. It shall be done in a systematic manner to cover the entire equipment/ plant and continue till the concentration of toxic/ flammable gas is lowered to allowable levels.

(l) Equipment water flushed: Water flushing is an effective means of cooling, cleaning and even gas freeing of equipment. It is also employed to remove traces of acids/ chemicals. Equipment metallurgy must be considered before using sea/ saline water. Sometimes, flushing with demineralized water would be necessary depending upon the metallurgy of the equipment.

(m) Gas/ Oxygen deficiency test done: Gas test includes measurement of:

(i) Hydrocarbons.
(ii) % Oxygen concentration.
(iii) Toxic gases like Hydrogen Sulphide, Sulphur dioxide, Carbon Monoxide, and Chlorine etc.

The gas test shall be done using a calibrated instrument by trained gas testers. The calibration records of the instruments shall be maintained. Minimum two instruments should be available.

(n) Shield against sparks provided: Hot works like cutting, welding, grinding, etc. generates sparks which can provide a source of ignition to the surroundings. In order to protect the operating area from the hazards of sparks generated, shields are to be provided to contain the sparks generated. The shield material shall be non-flammable, shall not contain asbestos and shall be kept wet with water.

(o) Proper ventilation and lighting provided: Where natural ventilation is not available, fans/ air eductors shall be provided. These are also required for speedy dispersal of fumes generated by welding jobs. Only approved reduced voltage extension lights (not exceeding 24 volts) conforming to the hazardous area classification are to be allowed for work inside vessels.

(p) Proper means of exit provided: Proper means of exit is required in case of emergencies developed on account of the work or otherwise. Availability of an alternate route of escape shall be considered.

(q) Area cordoned off and caution boards provided: To prevent any unwarranted entry in the work area and also to caution other personnel taking actions which may endanger people working on the permit job, precautionary tags/ boards are to be provided to display like "No Entry" sign on roads or "Caution - Men at Work Inside" on the manhole of a vessel, "Danger - Radiography in progress" etc.

(r) Portable equipment/ Hose nozzles properly grounded: As a precaution against static electricity generation, portable equipment/ hose nozzles e.g. nozzle of a shot blasting gun, are to be grounded. Use of hydrocarbon lines for earthing shall be avoided. 30 milliamp earth leakage circuit breaker (ELCB)/ residual current circuit breaker (RCCB) shall be installed on electrical circuits/ cables feeding power supply to portable equipment.

(s) Standby person provided for entry to confined space: Whenever a person is entering in a confined space, minimum one designated person shall be kept at the manhole or entry point. The designated persons shall be in constant communication with the persons inside the confined space. The designated person's name shall be mentioned in the permit during revalidation in each shift. When a person is entering the confined space, a minimum one standby-designated person shall always be available at the manhole or entry point. If a standby person has to enter the confined space, then a substitute standby person shall be ensured at the manhole or entry point.

(t) Standby personnel provided for fire watch from Process/ Maintenance/ Contractor/ Fire Department: Depending on the criticality of the job, work permit issuer shall decide the type of standby to be provided i.e. from which department, of which level, how many and also additional firefighting support facilities etc.

(u) Pyrophoric substance removed/ kept wet: Pyrophoric substances may be present in the operating area/ equipment handling hydrocarbons. Iron Sulphide scale is the most common

Bharat Petroleum Corporation Limited

pyrophoric substance encountered. These shall be either removed to safe locations or kept wet all the time to prevent their auto-ignition.

(v) Clearance obtained for excavation/ Road cutting/ dyke cutting etc.: For any excavation work which may affect underground sewers/ telephone lines/ cables/ pipelines etc., clearance shall be obtained from all the concerned sections. Markers shall be put around the area where excavation is to be done and the depth to be indicated in the work permit.

Road cutting can hamper the movement of the fire vehicles; initial clearance shall be obtained from the Fire Department and final approval from the higher designated authorities.

When the dyke is cut, any mishap in the tank farm can lead to a free flow of oil to outside the bund. A higher level authority shall be designated for authorizing dyke cutting. Further, it shall be ensured that the dyke would be reconstructed in the shortest possible time.

(w) Checked spark arrestor on mobile equipment: No vehicle/ engine without PESO approved spark arrestor or spark elimination system shall be permitted in operating areas. However, if the exhaust of the diesel engine is based on design having electronic fuel management with unit injectors and electronic control unit coupled with turbo charger and intercooler arrangements, no separate spark arrester need to be provided. However such models shall have certification from OEM and PESO approval.

(x) Checked for oil/ gas trapped behind lining in equipment: Before undertaking hot jobs, a check shall be done for oil/ gas trapped behind lining in the equipment.

Bharat Petroleum Corporation Limited

ANNEXURE - III

TYPICAL ELECTRICAL ISOLATION/ ENERGIZATION PERMIT

(NAME OF ORGANIZATION)

(LOCATION)

SECTION-A: ISOLATION PERMIT.

Permit no.: _____ Cross-Reference of other Permit: _____

Request for Isolation:

Date: _____Time:_____

Department/ Section/ Area issuing the permit _____

Equipment number to be isolated: _____

Name of the equipment/ circuit to be isolated: _____

Description of the work to be carried out: _____

_____

The above-mentioned equipment/ circuit shall be de-energized and isolated from all live conductors to carry out the maintenance work by _____ section/ for operational requirement.

_____	_____	_____
Issuer Name	**Designation**	**Signature**

Certificate of Isolation:

Date: _____Time:_____

Certified that Equipment/ Circuit no. _____ of _____ plant has been made dead, is electrically isolated from all live conductors and has been connected to earth and the work mentioned above can now be carried out in accordance with the safety rules and regulations. For the purpose of making the equipment dead, the switches/ isolators/ links/ fuses (tick as applicable), have been opened and the section so isolated has been earthed at each isolation point and danger notice plates fixed thereon. The LOTO tag/ device no. _____ is put on the supply panel. Actions in respect of electrical isolation have been recorded in the electrical shift logbook including the instructions for the person who may relieve me.

_____	_____	_____
Name of Authorized Person	**Designation**	**Signature**

Bharat Petroleum Corporation Limited

SECTION-B: ENERGIZATION PERMIT.

Permit no.:_____

***Request for Energization**:*

Date: _____Time:_____

Department/ Section/ Area issuing the permit_____

Equipment number to be energized: _____

Name of the equipment/ circuit to be energized: _____

The above mentioned work on the subject equipment/ circuit has been completed and all the applicable work permits are closed. This equipment/ circuit may be energized.

_____	_____	_____
Issuer Name	**Designation**	**Signature**

Certificate of Energization:

Date: _____Time:_____

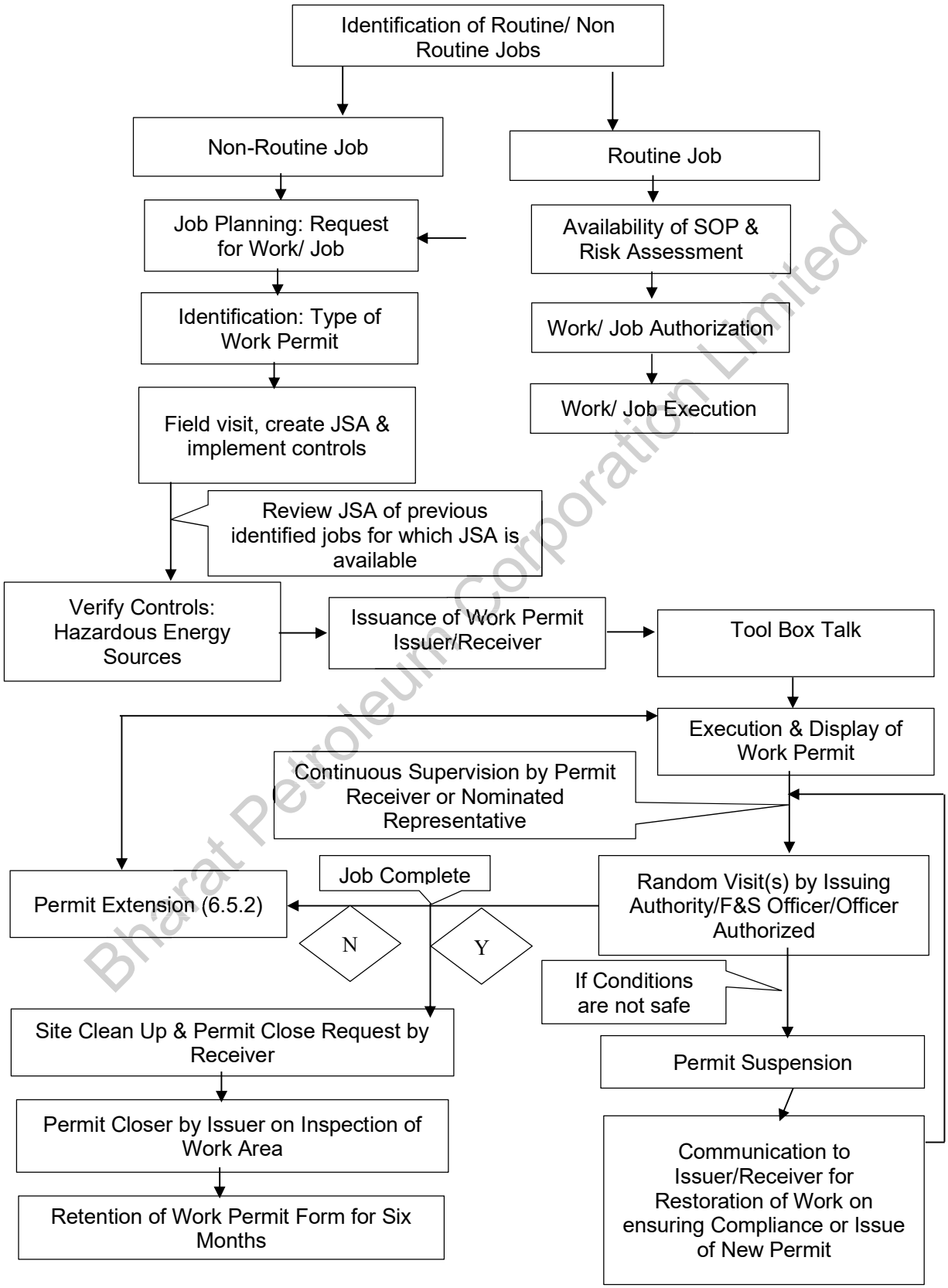
Certified that Equipment / circuit no._____ of _____plant has been electrically energized by closing the switches/ isolators/ links/ fuses (tick as applicable), and the equipment put back into service.

The danger LOTO tag/device no. _____ is removed from the supply panel. The temporary earths and other connections and danger notice plates made have been removed. Necessary entry is also recorded in the electrical shift logbook.

_____	_____	_____
Name of Authorized Person	**Designation**	**Signature**

Bharat Petroleum Corporation Limited

ANNEXURE – IV



Bharat Petroleum Corporation Limited

ANNEXURE- V

SAFE WORK PRACTICES

Organizations shall develop safe work practices to provide for the control of hazards. The practices shall support a work permit system in managing these activities safely. The practices shall include following minimum requirements to execute these activities to prevent potential major events including release of flammable or toxic material or serious injury to the people.

1.0 HOT WORK

Following the seven key principles along with other good safety practices which can prevent deaths and injuries from hot work:-

(a) Use Alternatives – Whenever possible, avoid hot work and consider alternative methods.

(b) Analyze the Hazards – Prior to the initiation of hot work, perform a hazard assessment that identifies the scope of the work, potential hazards, and methods of hazard control.

(c) Monitor the Atmosphere – Conduct effective gas monitoring in the work area using a properly calibrated combustible gas detector prior to and during hot work activities, even in areas where a flammable atmosphere is not anticipated.

(d) Test the Area – In work areas where flammable liquids and gases are stored or handled, drain and/or purge all equipment and piping before hot work is conducted.

(e) When welding on or in the vicinity of storage tanks and other containers, properly test and if necessary, continuously monitor all surrounding tanks or adjacent spaces (not just the tank or container being worked on) for the presence of flammables and eliminate potential sources of flammables.

(f) Use JSA – Ensure that qualified personnel familiar with the specific site hazards review, develop JSA and authorize all hot work and issue permits specifically identifying the work to be conducted and the required precautions.

(g) Train Thoroughly – Train personnel on hot work policies/procedures, proper use and calibration of combustible gas detectors, safety equipment, and job specific hazards and controls in a language understood by the work crew.

(h) Supervise Contractors – Provide safety supervision for outside contractors conducting hot work.

(i) Inform contractors about site-specific hazards including the presence of flammable materials.

Other Precautions to be taken while planning and executing hot work are:-

(a) Welding machine shall be kept in a safer location and ventilated area and shall be properly earthed. Before commencing the welding job, ensure that all the cables and earthing connections are as per the standard welding codes / practices. It shall be switched off immediately on completion of the job.

(b) While performing welding / cutting jobs in confined spaces, ensure that cylinders (oxygen, acetylene, nitrogen, argon, etc.) are kept outside separately and hoses for the gases are in good working condition. Flash back arrestor shall be provided for cutting the torch.

(c) Gas tests for hydrocarbons, oxygen deficiency, toxic gases, etc. shall be conducted as applicable as a prerequisite to issue permits for hot work/ vessel entry etc. No hot work shall be permitted unless the Explosive meter reading is zero.

(d) The gas testing shall be conducted as necessary to assure there is no accumulation of hazardous vapours. The atmosphere shall be tested either continuously or for a maximum interval of two hours.

(e) If the level of LEL above the prescribed limit is detected, the gas source shall be identified, and the leakage shall be rectified. The job shall be suspended during this time period. The permit conditions shall be reviewed. In case the original permit conditions are not restored, the permit shall be closed.

Refer OISD-GDN-192 & IS 3016 for safe practices to be followed while cutting/ welding.

Bharat Petroleum Corporation Limited

2.0 WORKING AT HEIGHT

Work at height means work in any place where, if there were no precautions in place, a person could fall a distance liable to cause personal injury. For example, person/s are working at height if they:

(a) Are working on a ladder or a flat roof.

(b) Could fall through a fragile surface.

(c) Could fall into an opening in a floor or a hole in the ground.

Before working at height, one shall work through these simple steps:

(a) Avoid work at height where it is reasonably practicable to do so.

(b) Where work at height cannot be avoided, prevent falls using either an existing place of work that is already safe or the right type of equipment.

(c) Minimize the distance and consequences of a fall, by using the right type of equipment where the risk cannot be eliminated.

(d) Ensure workers can get safely to and from where they work at height.

(e) Ensure equipment is suitable, stable and strong enough for the job, maintained and checked regularly.

(f) Make sure you don't overload or overreach when working at height.

(g) Take precautions when working on or near fragile surfaces.

(h) Provide protection from falling objects.

(i) Consider emergency evacuation and rescue procedures while planning the job.

Refer OISD-GDN-192 for Work at height

3.0 CONFINED SPACES

(a) No person shall be required or allowed to enter any confined space, until all practicable measures have been taken to remove any gas, fume, vapour or dust, which may be present so that to bring its level within the permissible limits and to prevent any ingress of such gas, fumes, vapours or dust and unless; Entry permit in writing has been issued based on the test carried out that the space is reasonably free from dangerous gas, fume, vapour or dust.

(b) Vessel entry, where no hot work is to be carried out, may be permitted under extra precautionary measures based on the careful analysis of the potential hazards if combustible gases are up-to 5% of lower explosive limit (LEL). Entry with an air-supplied mask may be permitted with LEL of up to 20%. The oxygen level shall be at least 19.5 % vol. and the concentration of toxic gases below the threshold limits.

(c) The person entering the confined space shall be equipped with a personal gas detector. In addition, the standby person or Safety watch shall have a portable gas detector to monitor the confined space environment periodically. The gas detector shall be calibrated every 6 months / OEM instructions and its functioning shall be verified before use. The records of persons entering and exiting the confined space shall be maintained.

(d) Special attention shall be given for confined space entry into vessels fitted with nucleonic gauges for level measurement which use radioactive elements (Cesium 137 or cobalt). The radioactive source holder is typically a lead block with a small aperture and shutter encased in a carbon steel enclosure. During maintenance and inspection, such vessels need to be inspected by entering the vessel. Before entry, it must be ensured that the source is isolated and permit issuer shall specifically mention the same in confined space entry permit.

4.0 HEAVY LIFTS

Typical incidents have included: the failure of lifting equipment; inappropriate lifting and slinging practices; inadequate supports or supports not resting on level/firm ground; incorrectly estimating of the weight or center of gravity of the load, and over estimation of an individual's capability to support a load or restrain its movement.

Bharat Petroleum Corporation Limited

If a heavy item has to be moved or temporarily supported during maintenance work, it is crucial that the risks involved are assessed and a plan of action is properly thought through.

Following precautions must be taken while planning Heavy lifts: -

(a) Carry out JSA involving rigging experts who can provide advice on safe slinging and on safe working practices for work involving heavy loads.

(b) Decide plan of action before a heavy item is moved or temporarily supported.

(c) Ensure the rigging plan is prepared by the qualified and authorized person.

(d) Make sure any equipment used to lift or support a heavy load is suitable and (where necessary) has had its inspection and test by a competent person.

(e) Do not leave heavy items unsecured where they may tip over, fall or slip, and don't work under suspended loads that haven't been properly propped in position.

(f) Don't overestimate the ability of a person to prevent a heavy item from moving.

5.0 EXCAVATION WORK

For excavation work regardless of the depth, permission from various sections shall be obtained with precautions to be taken for the underground facilities viz; sewers, telephone lines, cables, pipelines etc. Copy of permission for excavation shall be attached to the work permit. A feedback system shall be in place to inform all the concerned departments/ sections about the completion of work.

Following hazards of excavation shall be considered while planning the job:-

(a) The collapse of the sides of the excavation.

(b) Materials falling onto people.

(c) Falls, either people or vehicles.

(d) Nearby structures collapsing into the excavation.

(e) Electrocution, explosion, gas leak, or flooding, caused by damage to underground services.

Refer OISD-GDN-192 for safe practices during excavation.

6.0 VEHICLE ENTRY

Vehicle Entry permits are used whenever vehicles (including heavy duty equipment such as cranes, front end loaders, back-hoes) will be entering areas where there is:

(a) A possibility of volatile gas releases.

(b) The potential for serious, major or critical accidents occurring because of the vehicle entry into the area (e.g. potential for the vehicle striking and damaging equipment).

7.0 LINE BREAK

One of the dangerous and hazardous tasks in the realm of both process safety and safety at all facilities is non-routine process openings, commonly called line breaks. The risks involved in these processes affect the employees performing the task, workers and contractors throughout the entire site, and potentially could even impact off site receptors in the form of people and the environment.

Following precautions shall be considered while planning and executing the Line Breaks: -

(a) The exact location of the break in must be identified prior to work commencing and the undertaking of a risk assessment.

(b) For ALL line breaks, obtain and read the chemical SDS before performing any line break or work where the hazard of chemical exposure exists. Make sure appropriate PPEs are identified and worn as determined by the chemical manufacturer's SDS.

(c) Prior to beginning the work, verify operability of the closest safety shower/eye wash station.

Bharat Petroleum Corporation Limited

(d) Utilize required Personal Protective Equipment on the initial break into an isolated section and any subsequent breaks when it could be reasonable to expect trapped material, such as in the case of a low point in the line.

(e) Ensure PPE is in good condition and no noticeable defects that would expose you to the hazard

(f) Treat all lines as if they are under pressure. Break flanges "down and away" (out of the line of fire). The initial break shall be made over containment whenever possible. Be prepared to re-tighten bolts if the line is not clear.

(g) When breaking into an isolated section, the discovery or suspicion of plugged or pressurized equipment or piping requires that work be stopped, and operations personnel be consulted to develop a plan for unplugging and de-pressurizing.

(h) PPE requirements may be downgraded when it has been verified that the risk has been eliminated.

8.0 ROAD WORK AND ROAD CLOSURE

For any repair work or work involving closure of one or more roads inside the facility, the road closure permit procedure shall be followed:

(a) A road closure permit is required for a job which requires blocking of a road, partial or full, which can restrict the movement of emergency vehicles.

(b) No Road closure shall be permitted unless alternate routes are identified and accepted by emergency services.

(c) Necessary signage shall be displayed at such prominent locations so that vehicles will not have to go back to find alternate route.

(d) A Minimum 4 m width of the road shall be available for consideration of partial road closure.

(e) All jobs required road closure shall be planned with necessary approvals from all stakeholders with communication to all.

(f) Work Permits which are issued for carrying out the job during the road closure shall be linked on to the composite work permit.

(g) Single point responsibility shall be assigned to suspend / terminate a road closure permit in case of emergency.

9.0 DIVING

Diving is a high hazard activity. Diving certificate can be used to control the diving activity itself and to ensure that there are no other activities taking place nearby which create unnecessary additional risks.

Diving safety is the aspect of underwater diving operations and activities concerned with the safety of the participants. The safety of underwater diving depends on four factors: the environment, the equipment, behavior of the individual diver and performance of the dive team.

There is a large range of hazards to which the diver may be exposed. These each have associated consequences and risks, which shall be considered during dive planning. Where risks are marginally acceptable it may be possible to mitigate the consequences by setting contingency and emergency plans in place, so that damage can be minimized were reasonably practicable.

The JSA during job planning shall address all the hazards before the permit is prepared for diving activity.

10.0 RADIOGRAPHY/ WORK ON RADIATION SOURCE

Radiography with an X-ray machine shall be carried out under hot work permit. Cold work permit may be used if it is done with radio-active isotopes. Radiography shall be carried out when occupancy is least. Based on the maximum allowable radiation, areas shall be cordoned off. Adequate warning signs on the outskirts of the cordoned area shall be provided. Warning lights shall be used for night radiography. Refer OISD-GDN-192 & guidelines prescribed by Atomic Energy Regulatory Board (AERB) for industrial radiography practice.

Bharat Petroleum Corporation Limited

Nuclear gauges have been used in a wide range of industries to improve the quality of products, optimize processes, and save energy and materials. Nuclear gauges have a radioactive source that is covered by a radiation blocking shield. Gauges can contain a gamma, beta or neutron radiation source. Different sources are used depending on what the nuclear gauge is measuring.

If a radioactive source is present on or nearby any equipment where maintenance work is to be performed, the radioactive source has to be isolated before such a work is started. If isolation is not possible, the source must be physically removed.

The radioactive source Isolation and restoration shall be done by issuing separate work permits.

11.0 HIGH PRESSURE WATER CLEANING

Water jetting is vital to the Oil & Gas, chemical and petrochemical industry. It is used for cleaning and de-fouling a huge range of equipment, including heat exchangers, process vessels, holding tanks, large-diameter pipes and site drainage systems.

It is also used for surface preparation during construction and structural maintenance and intrinsically safe cold-cutting. The major hazards include:-

(a) Injury due to high pressure water jet.

(b) High-velocity impact.

(c) Chemical Exposure.

(d) Musculoskeletal Injury.

(e) Machinery and equipment.

Following precautions shall be considered while planning and executing the High-Pressure water cleaning tasks: -

(a) The area around the job, pump, and hoses shall be barricaded. The minimum boundary shall be decided by the engineer in charge depending upon the location, area, density of people around etc. and signs shall be displayed stating “DANGER - HIGH-PRESSURE WATER CLEANING” at the perimeters.

(b) Hose with exposed or damaged wire braid will be removed from high-pressure service.

12.0 ONLINE LEAK SEALING

Repair clamps are sometimes used as a temporary repair to seal small leaks in pipework. There are instances of failure of pipelines while executing the online sealing causing fatalities.

Following precautions shall help prevent such incidents: -

(a) The use of leak sealing clamps shall be adequately controlled by appropriate procedures. Users of leak sealing repair clamps shall carry out the following steps prior to the use of such a clamp:

(i) An assessment of the nature and extent of the defect being considered for repair.

(ii) A full assessment of the operating conditions to which the clamp will be subjected. This shall include pipe contents, pressure, temperature, pipe size and combinations thereof.

(iii) An assessment of the timescale for which the clamp is required to be in operation.

(b) If a leak sealing repair clamp is considered suitable following these assessments, then this information shall be communicated to the clamp supplier.

(c) It shall be ensured that all pipes enclosed by repair clamps are provided with structural restraint unless a suitable and sufficient assessment. It is important to consider the ability of the remaining wall thickness to accommodate the imposed axial loadings/stresses. In situations where the continuation of internal metal loss cannot be prevented it will be necessary to consider the suitability of the repair component to accommodate these loading/stresses shall this continuing metal loss affect the pipe's ability to carry these loading/stresses. Additional measures to provide sufficient structural restraint for axial loads shall be available from clamp suppliers.

Bharat Petroleum Corporation Limited

(d) Great caution shall be taken where there is a need to re-inject existing clamps and structural restraint has not been provided. A suitable and sufficient JSA of the conditions in which the clamp has been employed shall be carried out.

(e) Leak sealing repair clamps are temporary repairs. Such temporary repairs shall be removed and replaced with a suitable permanent repair at the next available maintenance opportunity. Temporary repairs may remain in place for a longer period of time only if approved and documented by a person competent to do so.

13.0 HOT TAPPING

Hot-tap is a connection technique to take new branches from the existing pipeline which is under pressure or in service. A special procedure is required to make a branch on the pipe without leaking any of the line contents.

Even though there are API codes and guidelines available for conducting welding/drilling on live systems, each facility is unique. It is recommended that each Organization shall develop an exhaustive procedure for carrying out hot tapping on live equipment at their premises.

The procedure shall detail the technical requirements and the responsibilities of the various agencies/personnel involved in the execution of the job.

The procedure shall indicate fluids used at the facility for which hot tapping is prohibited. As an example, fluids that can cause stress corrosion cracking in metals shall not be considered for hot tapping.

Considering the serious hazards, a well-documented approval matrix shall be put in place for authorization of each of the hot tapping jobs.

Bharat Petroleum Corporation Limited

ANNEXURE – VI

TYPICAL ROLES & RESPONSIBILITIES OF WORK PERMIT ROLE HOLDERS

The employer, site occupier, or installation duty holder (i.e., the installation owner or operator) is responsible for ensuring proper work permit systems are developed and followed.

Following are the responsibilities and duties of role holders under a work permit system:

(1) Site or Installation Managers, shall ensure that:

(i) All work requiring a work permit is identified.
(ii) The permit contains a clear description of the work to be done, its location, start time and duration.
(iii) Permits for work activities that may interact or affect other site activity are adequately controlled.
(iv) All other work that would create a hazard if undertaken at the same time is suspended and made safe.
(v) Limitations on the timing and scope of the work are defined as well as actions to be taken in the event of site emergencies.
(vi) All personnel engaged in the preparation of permits and responsible for the supervision and performance of the work are identified and competent.
(vii) Sufficient information is given to oncoming shifts about work for which there is a permit and which has not been completed.
(viii) All personnel (including contractors) working within the permit system have sufficient knowledge and competence to carry out their duties.

A responsible person (referred to as the 'area authority') shall be appointed to co-ordinate and control the issue and return of permits. That person shall have an overview of all operations under way and planned on site to avoid hazards caused by simultaneous activities.

The Site or Installation Manager is normally responsible for ensuring this coordination and control, either by controlling the issue and return of permits themselves (a preferable arrangement on smaller offshore platforms or where there are only a small number of permits daily), or by appointing an appropriate responsible person (or people) with sufficient authority to carry out this function on their behalf.

(2) Permit issuers, shall ensure that:

(i) All hazards associated with the proposed job have been identified and suitably assessed.
(ii) The work site has been examined, and all precautions specified to be taken before work commences (including isolations) have been taken and will remain effective while the permit remains in force.
(iii) The permit receiver is aware of the precautions taken, any additional ones which are to be taken, particular equipment to be used or worn, and any other procedures which are to be followed.
(iv) Work activities that may interact or affect one another are identified, and either conflict avoided or precautions included on the permit (e.g., use of welding shields).
(v) People are aware of the permit's duration and action to be taken if the work is suspended
(vi) Copies of all issued permits are displayed at an appropriate location and in a consistent arrangement so that site personnel can readily see and check which equipment is under maintenance and not available for operation.
(vii) The work site is examined at any time when work is suspended and before it is restarted, and finally when the work is completed to ensure that it is in a safe condition.
(viii) The shift handover procedure is followed correctly.
(ix) Any precautions and isolations are withdrawn at the end of the job unless they are cross-referenced to other permit activity.
(x) The area authority has acknowledged the return of plant or equipment to their full control.

The Occupier/ Factory Manager/ Installation/ Site Manager may be the Permit Issuer or delegate the permit issuing authority to a responsible, competent person the Organization authorizes.

Bharat Petroleum Corporation Limited

It is essential that people authorized to issue permits-to-work have sufficient knowledge about the hazards associated with the relevant plant, to allow them to identify those hazards and control measures (e.g. isolations) correctly. If authorized people are relocated to former workstations, then refresher training shall be given and recorded before they are reauthorized.

(3) Permit receivers, shall ensure that:

(i) They understand the operation of (and the consequences of non-compliance with) the permit-to-work systems applicable to the areas in which they are responsible for work.
(ii) The conditions and precautions specified in the permits are fully understood, implemented and effectively monitored.
(iii) The issuing authority is informed when a job has been completed, suspended, if conditions alter or if the task needs to be altered.
(iv) They do not start work on any job requiring a permit until one has been authorized and issued, its content understood and necessary precautions taken.
(v) If in any doubt, or if any circumstances or conditions change, they stop work, make the work area safe and get advice immediately.

Bharat Petroleum Corporation Limited

ANNEXURE - VII

TYPICAL FORMAT OF JOB SAFETY ANALYSIS (JSA) FORM

(NAME OF ORGANIZATION)

(LOCATION)

Date:	**Job Location:**	**Job type:**	**Work Permit & isolation certificates Ref. No.:**
Job Executed by: (give firm name & PO number)		**Job Description:**	

JSA prepared by:	**Name**	**Designation**	**Sign with date**
1.			
2.			
3.			
4.			
JSA reviewed & approved by:			
1.			
2.			

S. No.	**Job steps**	**Potential hazards**	**Hazard control measures**	**Person Responsible**

Additional comments (if any):

Bharat Petroleum Corporation Limited

ANNEXURE - VIII

LOCK OUT & TAG OUT PROCEDURE OF ELECTRICAL INSTALLATIONS

The term 'lock out' or 'tag out' (LOTO) refers to a procedure aimed at safeguarding someone working on or near a plant or machinery from that plant or machinery unexpectedly starting up or releasing energy of some kind. This procedure involves an authorized person disconnecting the plant or machinery from its energy source. This person then locks or tags the isolator to prevent anyone from re-energizing the plant or machine.

A lock-out device is a physical restraint that maintains the isolation device in a safe or 'off' position. It can only be removed with a key, or some other unlocking mechanism, which can only be used with the authority of the person in charge of the work permit system. For safety reasons, each lock must only have one key. No master keys are allowed on a lock-out system. Figure 3.0 shows an example of a lock-out device fitted to an isolator that prevents the isolator from being switched on.



Fig-3: Typical example of a Lock-out device

A tag-out device is a warning system that an authorized worker applies to the isolator to indicate work is being carried out on the plant or machine. As such, the isolator shall not be switched on while the work is underway. Tag-out devices are easy to remove. Consequently, they offer less protection than lock-out devices.



Fig-4: Typical example of a Tag out device

The general procedure for implementing lock-out and tag-out devices is as follows:-

(i) The person authorized to conduct the lock-out or tag-out action will identify the source(s) of energy to be controlled and the control method to use. A safe working procedure will then be established to implement the isolation, followed by the lock-out and tag-out action.

(ii) All personnel who may be affected by the isolation caused by the lock-out and tag-out action shall be informed. This information will include:

  (i) What plant/machinery is going to be isolated?
  (ii) Why it is going to be isolated.

Bharat Petroleum Corporation Limited

(iii) How long it will be isolated.
(iv) Who is the authorizing person?
(v) Who is the contact person?

(iii) The process or system shall be shut down as normal, and confirmation made that all controls are in the off position and that all moving parts have stopped.

(iv) The process or system shall be isolated from its energy source, following the safe working procedure set out by the authorized person at the identification of the energy stage. Depending on the source of energy, the procedure will vary as follows: -

(i) **Electrical energy –** the isolator to be switched to the off position and the breaker connections to be visually verified to be in the off position. The isolator switch is locked in the off position with a lock-out or tag-out device.

(ii) **Hydraulic or pneumatic energy –** the isolator valve shall be set in the closed position and locked in the closed position with a lock-out or tag-out device. Pressure shall be bled off by opening the pressure relief valve.

(iii) **Mechanical energy –** energy shall either be carefully and slowly released from compressed spring, or the components shall be blocked in the system or process which has the potential to be moved or activated by the spring's energy. If the components are blocked from moving, the block shall be locked in position with a lock-out or tag-out device.

(iv) **Gravitational energy –** an isolation block or pin shall be positioned to stop the system or process from moving. The block or pin shall be locked in position with a lock-out or tag-out device.

(v) **Chemical energy –** the isolator valve on the supply lines shall be set in the closed position. The isolator valve shall then be locked in the closed position with a lock-out or tag-out device. Where possible or appropriate, chemicals shall be bled off by opening the bleed valve.

(v) Verification that the isolation is effective needs to be made. This is normally done by attempting to try to restart the system or process. If it does not start, the isolation has been effective. Once isolation is verified, the start-up controls must be returned to their off or neutral position.

(vi) Once the work is completed, the lock-out and tag-out devices will need to be removed. This operation shall include:

(i) Ensuring all tools and equipment have been removed.
(ii) Ensuring all personnel are not near any hazardous areas.
(iii) All controls are in the off or neutral position.
(iv) Removal of the lock-out, tag out devices and re-energizing of the plant or process.
(v) Informing relevant personnel that the plant or process is back in service.
(vi) The person who has been undertaking the maintenance work shall remain while the plant or process is restarted.

(vii) Temporary Removal of Isolations: -

There are situations where isolations must be temporarily removed (e.g. when testing equipment during the work). When isolations must be temporarily removed, the work permit issuer must be informed and checks must be made to ensure that the isolation removal does not create any hazards for the work site and workers before the isolations are removed. After the requirement for the temporary isolation removal has been completed, the isolations should be reinstated and the Permit Issuer must be informed that the isolation's status.

Bharat Petroleum Corporation Limited

ANNEXURE - IX

TYPICAL FORMAT FOR TOOLBOX TALK FORM

(NAME OF ORGANIZATION)

(LOCATION)

DATE WITH TIME _____

WORK INSTALLATION/ UNIT/ FACILITY NAME _____

WORK PERMIT NO _____

CONTRACTOR NAME _____

TBT DELIVERED BY _____

CONTRACTOR SUPERVISOR NAME _____

TOPICS/ ISSUES DISCUSSED
OTHER POINTS OR ISSUES RAISED BY PARTICIPANTS

DETAILS OF PARTICIPANTS TO WHOM TBT WAS DELIVERED

NAME IN FULL	**SIGNATURE**	**NAME IN FULL**	**SIGNATURE**
1.		2.	
3.		4.	
5.		6.	
7.		8.	
9.		10.	

Bharat Petroleum Corporation Limited

ANNEXURE - X

MAJOR CHANGES IN THE REVISED EDITION

1. The scope of the revised standard has been extended to the construction activities in Grass root/ Green field project sites.
2. The definitions of cold work, hot work, and authorized electrical person involved in electrical isolation/ energization of equipment in the revised standard have been updated in line with the Statutory Acts/ Rules/ Regulations.
3. Electronic work permit system is introduced in the revised standard for ease of business. The salient guidelines are:
   (a) Digital signature of the Permit Issuer and Receiver is permitted in the work permit forms.
   (b) The digital copy of the work permit form is permitted at the work site.
4. Any work at height more than 1.8 m is considered as “working at height” in the revised standard.
5. The detailed procedure for Job Safety Analysis (JSA), and Toolbox talk/ meetings (TBT) are incorporated in the revised standard. The typical formats of JSA and TBT forms are prescribed in Annexures.
6. The lockout and tagout procedure for energy sources has been incorporated in the revised standard.
7. The revised standard clearly specifies that the work permits shall not be issued and received by the same person.
8. In the revised standard, the permit issuing authority shall not be delegated to the contractor/ his representative except for two cases:
   (a) Retail Outlets
   (b) Installations where operations are outsourced on a contract/ turnkey project basis
9. In the revised standard, the permit receiving authority shall be the organization's authorized person. However, in some instances (like single-man locations), the permit may be directly received by the contractor’s authorized supervisor. Such exceptions shall be documented in the organization’s work permit system.
10. In the revised standard, the procedure of colour coding and distribution of copies of the work permit forms have been left to the Organization. The standard only gives a suggestive table.

Bharat Petroleum Corporation Limited

ANNEXURE - XI

LIST OF PREVIOUS FUNCTIONAL COMMITTEES

1st FUNCTIONAL COMMITTEE (February 1988)

LEADER

T.C. Varghese	Hindustan Petroleum Corporation Limited

MEMBERS

V.S. Save	Hindustan Petroleum Corporation Limited
G. Raghunathan	Hindustan Petroleum Corporation Limited
S.V .Puthli	Hindustan Petroleum Corporation Limited
N. Lal	Oil & Natural Gas Corporation Limited
V.K .Ramesh	Oil & Natural Gas Corporation Limited
M.N. Gogoi	Oil India Limited
M.A. Sreekumar	Cochin Refineries Limited

CO-OPTED MEMBERS

A.Sinha	Oil India Limited
A.Varadarajan	Madras Refineries Limited

MEMBER COORDINATOR

B.K.Trehan	Oil Industry Safety Directorate

2nd FUNCTIONAL COMMITTEE (July 1998)

LEADER

T.K.Anjaneyulu	Hindustan Petroleum Corporation Limited (Refinery)

MEMBERS

R.N.Sharma	Indian Oil Corporation Limited (R&P Division)
T.S.Raghavan	Madras Refineries Limited
E.Nandakumar	Cochin Refineries Limited
K.V.Seshadri	Bharat Petroleum Corporation Limited (Refinery)
K.V.Moorthy	Oil & Natural Gas Corporation Limited
A.K.Sharma	Bongaigaon Refinery & Petrochemicals Limited

MEMBER COORDINATOR

S.N.Mathur	Oil Industry Safety Directorate

Bharat Petroleum Corporation Limited

3rd FUNCTIONAL COMMITTEE
(September 2004)

LEADER

S.P. Garg	GAIL (India) Limited, Pata.

MEMBERS

V. V. Kurup	Kochi Refineries Limited, Kochi
K.T.Lokhande	Deptt of Explosives, Nagpur
C.Bose	Oil India Limited, Duliajan
R.Abdul Raheem	Chennai Petroleum Corporation Limited, Chennai
S. M. Singh	Indian Oil Corporation Limited, Pipelines Division, Noida
A.K.Singh	Indian Oil Corp. Limited, Guwahati Refinery
Suhas Kate	Hindustan Petroleum Corp. Limited, Visakh Refinery
A.Tilwankar	Bharat Petroleum Corporation limited, Mumbai
M. K. Manocha	Oil and Natural Gas Corp., Mumbai.
A. H. Karande	Bharat Petroleum Corp. limited, Mumbai Refinery

MEMBER COORDINATOR

S. K. Aggarwal	Oil Industry Safety Directorate, New Delhi

(In addition to the above, several other experts from the industry contributed to the preparation, review and finalization of this document.)

Bharat Petroleum Corporation Limited

ANNEXURE - XIX
TO
SPECIAL CONDITIONS OF CONTRACT

[PRICE REDUCTION FOR SLIPPAGE IN COMPLETION
&
PRICE REDUCTION FOR DELAY IN ACHIEVING
INTERMEDIATE MAJOR MILESTONE]

PRICE REDUCTION FOR SLIPPAGE IN COMPLETION

1.0 Clause No. 22. of GCC stands modified to the following extent:

Liquidated Damages (LD) due to delay in completion (as specified in Annexure-I to SCC) shall be 0.5% of the Contract value per week or part thereof of the delay, subject to a maximum of 5% of the Contract value.

2.0 For the purpose of LD, part of the week in clause **1.0** shall be considered as one week.

PRICE REDUCTION FOR DELAY IN ACHIEVING INTERMEDIATE MAJOR MILESTONE

NOT APPLICABLE

ANNEXURE - XX
TO
SPECIAL CONDITIONS OF CONTRACT

[LIST OF BANKS]

Annexure I

List of banks meeting the stipulated criteria as on 02.06.2025

Sr No.	Name of Bank	Category of Banks
1	AU Small Finance Bank Ltd	Indian Bank
2	Axis Bank Ltd	Indian Bank
3	Bank of Baroda	Indian Bank
4	Bank of India	Indian Bank
5	Bank of Maharashtra	Indian Bank
6	Canara Bank	Indian Bank
7	Federal Bank Ltd	Indian Bank
8	HDFC Bank Ltd	Indian Bank
9	ICICI Bank Ltd	Indian Bank
10	IDBI Bank Ltd	Indian Bank
11	IDFC First Bank Ltd	Indian Bank
12	Indian Bank	Indian Bank
13	Indian Overseas Bank	Indian Bank
14	IndusInd Bank Ltd	Indian Bank
15	Karur Vysya Bank Ltd	Indian Bank
16	Kotak Mahindra Bank Ltd	Indian Bank
17	Punjab National Bank	Indian Bank
18	State Bank of India	Indian Bank
19	UCO Bank	Indian Bank
20	Union Bank of India Ltd	Indian Bank
21	Abu Dhabi Commercial Bank PJSC	Foreign Bank
22	Bank of America NA	Foreign Bank
23	Bank of Nova Scotia	Foreign Bank
24	MUFG Bank Ltd	Foreign Bank
25	BNP Paribas SA	Foreign Bank
26	Shinhan Financial Group Co Ltd	Foreign Bank
27	Citibank NA	Foreign Bank
28	DBS Group Holdings Ltd	Foreign Bank
29	Hongkong & Shanghai Banking Co	Foreign Bank
30	JPMorgan Chase & Co	Foreign Bank
31	Mizuho Bank Ltd	Foreign Bank
32	Westpac Banking Corp	Foreign Bank
33	Industrial & Commercial Bank of China	Foreign Bank
34	Credit Agricole SA	Foreign Bank
35	Cooperative Rabobank UA	Foreign Bank
36	Doha Bank QPSC	Foreign Bank
37	Qatar National Bank QPSC	Foreign Bank
38	United Overseas Bank Ltd	Foreign Bank
39	KEB Hana Bank	Foreign Bank
40	Industrial Bank of Korea	Foreign Bank
41	First Abu Dhabi Bank PJSC	Foreign Bank
42	Emirates NBD Bank PJSC	Foreign Bank
43	NatWest Markets PLC	Foreign Bank
44	Bank of China Ltd	Foreign Bank
45	CTBC Bank Co Ltd	Foreign Bank

Note:

1. The above list of banks is based on the credit rating as on date (Source: Bloomberg)
2. In case of any discrepancy/subsequent upgrade in credit rating, user department can contact Treasury for clarification.

ANNEXURE - XXI
TO
SPECIAL CONDITIONS OF CONTRACT

[ADVISORY ON ENVIRONMENTAL CRITERIA]

BPCL Supplier / Vendor Advisory on Environmental Criteria

Dear Suppliers / Vendors,
As you aware that environment is one of the most precious gifts given to us by Mother Nature. We must be conscious of our actions and act responsibly to preserve and conserve the environment. BPCL has always endeavoured to be a responsible & conscious corporate citizen. We would also want to engage you - our suppliers - in the efforts to reduce our impact on the environment.

Below are the advisory guidelines on environmental criteria, which we want our suppliers to follow:

1. Emission / Pollution Control (Air, Water, Soil, Noise etc.)

a. The organization and its all operations should follow all laws related to emission / pollution norms.
b. The organization should get all necessary approvals & certifications for emission / pollution control from relevant authorities for plants, equipment, vehicles etc.
c. Monitoring mechanism should be put in place for all emissions / pollution emitted from organization owned assets e.g. Equipment, vehicles etc.
d. Organization should conduct training and awareness programs for the staff on emission / pollution impacts & prevention.

2. Energy

a. Monitoring energy consumption by the organization from all sources should be done.
b. Organization should strive to reduce energy consumption by employing energy efficiency & conservation measures.
c. Use of alternate fuel sources & renewable energy should be promoted by the organization.

3. Water

a. Water consumption from all the sources should be monitored by the organization.
b. Reduction in water consumption should be aimed by treating waste water & alternative use of waste water.
c. Waste water should be treated to remove harmful elements before releasing it to the eco-system.

4. Reducing Resource Intensity

a. Optimization / re-use / recycle techniques should be used to reduce the use of resources.
b. Minimizing use of resources having major environmental impact should be done and substitutes should be found.
c. Proper handling should be done for hazardous resources (chemicals etc.) having impact on humans & eco system.

5. Waste Management

a. Waste segregation based on type of waste (solid, liquid, hazardous, etc.) generated by the organization should be done.
b. Opportunities for recycling & re-use of waste should be identified & promoted by the organization.
c. Hazardous waste should be handled by trained personnel & disposed to authorized agencies only.

6. Risk Mitigation

a. Environmental Risk Assessment should be carried out for all the organization's operations.
b. The severity / extent of damage due to the environmental risk should be estimated.
c. Staff / personnel involved in operations related to environmental risk should be trained and regular awareness programs should be conducted.

The guidelines are indicative of the direction that the suppliers should take to be more environmentally supportive. Suppliers should join hands with BPCL in making a value chain that is environmentally aware and responsible.

ANNEXURE - XXII
TO
SPECIAL CONDITIONS OF CONTRACT

[PROCEDURE FOR VENDOR INVOICE PROCESSING]

Business Process Excellence Centre

To Our Esteemed Suppliers/ Contractors,

BPCL has setup a Business Process Excellence Centre (BPEC) for Vendor Invoice processing.

BPEC will function as a payments factory to receive, digitize and process vendor invoices in a timely and accurate manner. In addition, the centre will receive and account for Bank Guarantees (BGs) & other allied activities like release of retention money/ security deposit etc.

➢ Bill Payments

Effective 1st May 2017, the following original documents will need to be sent to BPEC for release of payments:

i) Original Commercial / Tax invoice
ii) Any Supporting documents for payments e.g. Octroi certificate, freight bills, IRN, test certificate
iii) Copy of the Works Contract Tax (WCT) Exemption Certificate for lower/Nil deduction of WCT (Original must be submitted to Kochi Refinery procurement team for their records)

Please send these documents to the following address for payment processing*:

BUSINESS PROCESS EXCELLENCE CENTRE (BPEC)
4th FLOOR, BPCL OFFICE COMPLEX
PLOT NO. 6 SECTOR – 2
BEHIND CIDCO GARDEN, KHARGHAR
NAVI MUMBAI-410210

**Please note that this does not change the BPCL address that needs to be put on the invoice.*

The following documents should not be sent to BPEC:

- Excise invoice (Duplicate invoice For Transporter- DFT)
- User reference manuals
- Test booklets
- BG against Earnest Money Deposit (EMD) etc.

**These documents should be sent to the procurement location i.e Kochi Refinery*

How to Track Status of Bills sent to Business Process Excellence Centre (BPEC)?

1) For every valid bill received at BPEC, the vendor will be communicated with a unique DPID no. on their registered email ID & mobile no. as per BPCL records
2) Vendors can contact Toll Free No. 1800 224 221 during working days between 9.00 AM to 5.00 PM for any payment/ bill related queries
3) Vendors can write to z_vendorhelpdesk@bharatpetroleum.in for any queries
4) The payment status of your invoices can also be check in Vendor Portal (*https://efp.bpcl.in/*)
5) The payment status of your invoices can also be check in Mobile Application (https://ebiz.bpc.co.in/EbizPortal/)
6) For status of specific invoices, vendor can also use SMS application by sending SMS **"STAT (Space) <DPID>"** to 9223112222 from their registered mobile no.

General Guidelines for Invoices

All invoices should be legible and accompanied with supporting documents required for invoice processing as per the PO. Invoices should be compliant with government requirements on tax invoices and should have the following information:

- PO number, clearly mentioned (45XXXXXXXX)
- Vendor code (Available with your BPCL contract)
- Vendor name
- Vendor address, telephone number, email address and point of contact
- Tax registration number (VAT, Service Tax, Excise etc. as applicable)
- The invoice should be in name of Bharat Petroleum Corporation Limited (BPCL)
- Invoice number
- Invoice date
- Specification of goods and services delivered
- Total gross amount and breakup
- Taxes applicable, with individual tax rates matching with the purchase order
- BPCL Location name and address
- Kindly ensure multiple invoices are not bunched together (stapled) whilst sending the same to BPEC for processing.

**Please note that the above information should be present on the invoice, to ensure that the invoice is processed in a timely manner*.

➢ Release of Security Deposit/ Retention Money

Standard Template for Release of Retention Money & Security Deposit is duly attached herewith which should be used by all vendors/contractors while submitting their release of Retention/Security deposit requests to BPEC.

With respect to the said template vendors are required to note the following point:

1) Only single Purchase Order (45XXXXXXXX) / Contract (46XXXXXXXX) can be provided per request letter (separate requests letters for each Purchase Order/ Contract)
2) **Photo copies of old invoices/bills** to which the retention money pertains **should not be attached** with the request letter
3) Request letter must be duly signed by the vendor or their authorized representative
4) There is no requirement for BPCL officers to sign on the said request letter
5) Request letter must be sent to BPEC only after completion of job (for security deposit) or completion of defect liability period (for retention money)
6) Vendors can also send scan copy of the said letter duly signed to z_vendorhelpdesk@bharatpetroleum.in
7) Vendors will also be receiving emails for tracking of these requests on their registered email ID's

➢ Guidelines for Bank Guarantees and Performance Bank Guarantees

All PBGs and BGs should be accompanied with a cover letter stating one of the following (available with your BPCL contract)

- PO/ Contract number
- RFQ number

In addition, please clearly state the following:

- Vendor number
- Vendor Name, address, email address and phone number
- Vendor point of contact
- BPCL location and address

Further, currently on receipt of these BG's, letters are being sent to issuing Bank for BG Confirmation. On many occasions there are delays or no response from Banks with regards to confirmation of BG's which ultimately leads to delay in release of vendor payments.

Considering the above pain points, BPCL has tied up with SBI for implementation of SFMS (Structured Financial Messaging Service) Bank Guarantee Process and the salient features are as given below:

1) Vendors/ Contractors shall provide BPCL's Bank Account No. & IFSC Code (Details given below) to their existing Bank at the time of application for Bank Guarantee in favor of BPCL
2) Your Bank shall issue the Bank Guarantee & send SFMS message to BPCL Bank confirming the Bank Guarantee as genuine
3) **BPCL's Bank (SBI) shall in turn send the said SFMS message to BPCL's dedicated email ID basis which BPEC shall consider the said Bank Guarantee as verified by Bank**
4) Once the above process is completed, BPEC Team shall proceed with the release of payment to vendors which is due against the said Bank Guarantee.

Name of Bank: State Bank of India
Branch: CAG Branch, Mumbai
Account No: 11083980831
IFSC Code: SBIN0009995

REQUEST FOR RELEASE OF SECURITY DEPOSIT

Date: DD/MM/YYYY

To,

The Allied Process Team
BUSINESS PROCESS EXCELLENCE CENTRE
4th FLOOR, BPCL OFFICE COMPLEX
PLOT NO. 6 SECTOR – 2
BEHIND CIDCO GARDEN, KHARGHAR
NEW MUMBAI-410210

Dear Sir,

Sub: - **Request for Release of Security Deposit**

Request you to kindly release the Security Deposit money held by Bharat Petroleum Corp Ltd as per the details given below:

Purchase Order	**(45XXXXXXXX)**
Contract No (if applicable)	**(46XXXXXXXX)**
Vendor Code	
Vendor Name	
Description of Services / Job Carried	
Security Deposit Amount	

(Only one PO/Contract # per Request letter will be accepted)

Thanking you,

Yours faithfully
For M/s…….

_____

REQUEST FOR RELEASE OF RETENTION MONEY

Date: DD/MM/YYYY

To,

The Allied Process Team
BUSINESS PROCESS EXCELLENCE CENTRE
4th FLOOR, BPCL OFFICE COMPLEX
PLOT NO. 6 SECTOR – 2
BEHIND CIDCO GARDEN, KHARGHAR
NEW MUMBAI-410210

Dear Sir,

Sub: - **Request for Release of Retention Money**

Request you to kindly release the retention money held by Bharat Petroleum Corp Ltd as per details given below

The request to release is based on (Please tick whichever applicable)

- ☐ Retention money is due since defect liability period is complete
- ☐ Performance Bank Guarantee submitted against PO/Contract

Purchase Order	**(45XXXXXXXX)**
Contract No (if applicable)	**(46XXXXXXXX)**
Vendor Code	
Vendor Name	
Description of Services / Job Carried	

(Only one PO/Contract # per Request letter will be accepted)

S. No	Invoice Ref. No.	Invoice Date	Invoice Amount	Performance Bank Guarantee No. (if retention release against submission of PBG)	Retention Amount
1					
2					

Thanking you,

Yours faithfully
For M/s……

ANNEXURE - XXIII
TO
SPECIAL CONDITIONS OF CONTRACT

BOILER SUIT FOR CONTRACT WORKMEN

भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड
कोच्चि रिफ़ाइनरी

BHARAT PETROLEUM CORPORATION LTD.
Kochi Refinery

HSE DEPARTMENT

KR.HSE.CS.5.CW.EE

13-01-2021

NOTICE

Sub: Boiler Suit for Contract workmen

As you are aware, our Refinery is a hazardous process industry and we have taken all engineering and process controls to limit various types of hazards within the acceptable risk level. Usage of Personnel Protective Equipment is a pre-requisite for every contractor personnel working inside Kochi Refinery.

A vide notice KR.HSE.CS.5.CW.EE dated 16-07-2020 and 27-08-2020 regarding the usage boiler suit for contractor personnel for working at worksites had released.

The minimum requirements for the same is as follows:

1. *Single piece boiler suit for gents and two piece boiler suit for ladies.*
2. *Contractor name shall be prominently embroidered/stitched or printed (Letter size 3 inch) on the back side of the boiler suit.*
3. *Boiler suit shall be of cotton material with reflective stripes on the hand, leg and chest portion.*
4. *Color of the boiler suit shall be dark blue/ olive green. (Orange, yellow and dark brown color boiler suits shall not be used)*
5. *Reflective sleeveless padded jackets for supervisors and safety officers*
   - *Supervisors shall wear orange color jackets over boiler suit and the word "SUPERVISOR" shall be printed on the back side of the jacket.*
   - *Safety officers/stewards shall wear neon yellow jackets over boiler suit and the word "SAFETY OFFICER or SAFETY STEWARD" shall be printed on the back side of the jacket.*

Further, all the contract personnel shall wear the required PPE as required by the nature of work or as stipulated in the Work Permit.

It is requested that all contract workmen shall wear boiler suit with effect from 01- 02-2021. The dress code at the worksite shall be boiler suit with effect from the date mentioned above.

All contractors shall ensure strict compliance to the above.

Your whole hearted co-operation is solicited.

13/1/21.

Yatheendran M R
GM (Electr. & Contr. Safety)

To : All Contractors / Contractor's Notice boards
CC : Contractor Associations
: Trade/contractor Unions
: All GMS
: All CGMS
: ED (KR)

ANNEXURE - XXIV
TO
SPECIAL CONDITIONS OF CONTRACT

[TAXES AND DUTIES]

A. Price basis w.r.t inclusion/exclusion of taxes and duties

1. The quoted price(s) shall be inclusive of all the taxes and duties except GST (i.e. IGST or CGST and SGST/UTGST applicable in case of interstate supply or intra state supply respectively) and GST compensation cess, (if applicable) leviable on sale of finished goods/services.
2. In case of foreign bidders, bidders shall submit their prices on FOB international sea port of exit basis/CFR on destination port basis (INCOTERM 2020), unless otherwise stated in the bid document. FOB/CFR prices quoted shall be inclusive of all applicable taxes upto FOB international sea port of exit/CFR on destination port basis.
3. Transportation charges (if applicable) upto respective project site shall be exclusive of GST.
4. Site work prices, if applicable shall be inclusive of all taxes and duties except GST. All necessary registrations, if required, for carrying out the site activities shall be done by the bidder and costs towards the same shall be included in quoted site work prices.
5. Prices of per diem supervision charges, training/AMC, HAZOP Study etc. (as applicable) shall be exclusive of GST. However, GST shall not be applicable on training provided at foreign bidder's work/training facilities in any territory other than India.

B. TAX CLAUSES

1. Goods and Services Tax

a. The supplier/contractor will be liable to register with the respective tax authorities and to submit self-attested copy of such registration certificates and the supplier/contractor will be responsible for procurement of goods/services in its own registration (GSTN).

b. Supplier/Contractor shall be required to issue tax invoice in the form and manner prescribed under GST Act read with Rules thereunder including E-Invoicing provisions so that input tax credit under GST can be availed by OWNER. In the event that the supplier/contractor fails to provide the Tax Invoice/E-Invoice in the form and manner prescribed under the GST act read with GST invoicing rules thereunder, OWNER shall not be liable to make any payment on account of GST against such invoice.

c. In case supplier/contractor is not subject to E-Invoicing provisions under the GST Laws as amended from time to time, then a declaration to this effect shall be furnished by the supplier/contractor in format prescribed in Annexure A along with the Invoice.

Copyrights EIL – All rights reserved

d. GST shall be paid to supplier/contractor against receipt of Tax Invoice/E-Invoice and on auto-population of input tax credit on GSTN portal. In case of non-receipt of Tax Invoice/E-Invoice and/or non-auto-population of input tax credit on GSTN portal, Owner shall with hold the payment of GST.

e. The supplier/contractor shall always comply with the requirements of applicable laws and provide necessary documents as prescribed under the rules and regulations, as applicable from time to time. In particular, if any tax credit, refund or any other benefit Is denied/delayed to Owner or any interest/penalty is charged to Owner due to any non-compliance/ delayed compliance by the supplier/contractor under the GST Law (including but not limited to failure to upload the details of the sale on GSTN portal, failure to pay GST to the government or due to non-furnishing or furnishing of incorrect or incomplete documents, non-filing of GST return by the supplier/contractor), the supplier/contractor shall be liable to reimburse Owner for all such losses and other consequences including but not limited to the tax loss, interest and penalty. Owner shall be entitled to recover such amount from the supplier/contractor by way of adjustment from the next invoice, encashment of BG or by way of any other means either of same project or any other project of the Owner.

f. In case of any Advance including Mobilization/Secured/Other Advance is granted to supplier/contractor as per the provisions of Contract, then the supplier/contractor shall issue a Receipt Voucher / GST Invoice in the form and manner prescribed under GST Act read with Rules thereunder including e-invoicing provisions.

g. In case of any Price Variation as per the provisions of Contract, the supplier/contractor shall issue an Invoice in the form and manner prescribed under the GST Act read with Rules thereunder including e-invoicing provisions.

h. GST payable under reverse charge for specified services/goods under GST Act read with Rules thereunder, if any, shall not be paid to the supplier/contractor but will be directly deposited by Owner to the appropriate Government Tax Authority. If the same has already been reimbursed / paid to the supplier/contractor for any reason whatsoever, then Owner shall be entitled to deduct/set off /recover such amount against any amounts paid/payable by Owner to supplier/contractor.

i. Where Owner has the obligation to discharge GST liability under reverse charge mechanism and Owner has paid or is liable to pay GST to the government on which interest/penalty becomes payable as per GST law for any reason which is not attributable to Owner or Input Tax Credit w.r.t. such payment is not available to Owner for any reason which is not attributable to

Copyrights EIL – All rights reserved

Owner, then Owner shall be entitled to deduct/set off /recover such amount against any amounts paid/payable by Owner to contractor/supplier.

j. TDS under GST, if applicable shall be deducted from supplier/contractor bills at applicable rates and a certificate as per rules for tax so deducted shall be provided to supplier/contractor.

k. The supplier/contractor will be under obligation for charging correct rate of tax as prescribed under the respective tax laws. Further the supplier/contractor shall avail and pass on benefits of all exemptions/concessions available under applicable tax laws.

l. In case bidder is covered under composition scheme under GST law, then bidder shall quote the price inclusive of GST. Further, such bidder should mention "Covered under GST Composition Scheme" in column for GST of relevant price schedule(s). In case subsequently such bidder gets covered under regular GST regime, the prices including GST under regular GST regime shall not exceed the prices quoted by the bidder under composition scheme.

m. Owner prefers to deal with registered supplier/contractor of goods/services under GST. Therefore, bidders are requested to get themselves registered under GST, If not registered yet. However, in case any unregistered bidder is submitting bid, their prices will be loaded with applicable GST while evaluation of bid as per evaluation methodology of tender document. However, where Owner is entitled for input credit of GST, the same will be considered for evaluation of bid as per evaluation methodology of tender document.

n. In case of foreign bidders, for supervision/site-work/training, services provided by foreign bidder at project site, GST shall be paid by Owner directly to appropriate Government Tax Authorities, under Reverse Charge Mechanism, if applicable and prices of such services will be loaded with applicable GST while evaluation of bid as per clause E (Evaluation Methodology).

o. Bidder will be required to quote applicable tax rate (along with applicable HSN/SAC Code) as per provisions of GST Laws for all the line items forming part of the enquiry. Any higher rate of tax actually invoiced in excess of quoted rate of tax (except in compliance with provisions of Statutory Variation clauses) shall be adjusted in basic price.

p. In case of delay in supply/execution of contract, supplier/contractor shall be liable to raise invoices for reduced value as per Price Reduction Schedule (PRS) provision of the bidding document. In case the supplier/contractor raises invoices for full value, then supplier/contractor shall issue Credit Note,

Copyrights EIL – All rights reserved

in the form and manner prescribed under relevant GST Act read with Rules thereunder, towards applicable PRS amount with applicable GST thereon.

In case supplier/contractor fails to submit invoices with reduced value or does not issue Credit Note as mentioned above, Owner shall release payment to the supplier/contractor after giving effect to the PRS clause with corresponding reduction in taxes from invoice(s) of supplier/contractor.

In case any financial implication arises on Owner due to issuance of invoice without reduction in prices or non-issuance of Credit Note by supplier/contractor, the same shall be to the account of supplier/contractor. Owner shall be entitled to recover the amount of such financial implication paid or becoming payable by Owner together with penalty and interest thereon, if any.

q. E-way bills shall be issued directly by supplier/contractor in all cases except in cases of direct imports by Owner where E-way bill shall be issued by Owner.

r. In case of applicability of any recovery as per provisions of the contract, Owner shall raise `Invoice on supplier/contractor after charging GST at applicable rates as per prevailing provisions of GST Laws.

2. IMPORT DUTIES

a. Direct supplies by foreign supplier where, Owner becomes consignee

i. Consignee shall be Owner, bill of entry shall be filed by Owner, all import duties, Social Welfare Surcharge, IGST and GST Compensation Cess etc. as applicable in India shall be paid by Owner.

b. Imported supplies by Indian/ Foreign suppliers/Contractors as built in import content where goods are cleared by filing into Bill of Entry in the name of Owner

i. High seas sale shall be effected between supplier/contractor and Owner.

ii. Bill of entry shall be filed in the name of Owner by supplier/contractor, all import duties, Social Welfare Surcharge, IGST and GST Compensation Cess etc. as applicable in India shall be discharged by Owner.

iii. Custom duties, Social Welfare Surcharge, IGST, GST Compensation Cess, etc. as applicable in India on the imported materials shall not be included in the quoted prices by the bidder. All harbour dues/ pilotage fees, port fees, wharfage, unloading costs, demurrage

Copyrights EIL – All rights reserved

charges etc. incurred in India in respect of any imported goods shall be to supplier's/contractor's account.

iv. Bidder to indicate CIF value of built-in import content and applicable merit rate,Social Welfare Surcharge on custom in the relevant price schedule.

v. The supplier/contractor shall be responsible for and shall exercise due diligence in properly classifying the goods and materials, undertaking the payment of custom duties, and/or otherwise complying with all applicable laws w.r.t. import of the goods and materials

vi. If the total custom duties (BCD, SWS & IGST) paid or payable on the import of goods into India exceeds the total value thereof calculated as per the CIF value and rates indicated by supplier/contractor as above as increased or decreased for any increase or reduction in applicable rates or CIF valuation, the Supplier/contractor shall pay and bear and/or reimburse to the Owner such excess custom duties.

c. Imported supplies by Indian suppliers as built in import content where Suppliers/Contractors will become consignee of the goods or by filling Bill of Entry for Home consumption

i. Custom duties, Social Welfare Surcharge, IGST, GST Compensation Cess, etc. as applicable in India on the imported materials shall be included in the quoted prices by the bidder (considering the input tax credit of IGST, GST Compensation Cess on imported material) and supplier/contractor shall be responsible for the timely payment of the custom duties to the relevant government authority. All harbor dues/ pilotage fees, port fees, wharfage, unloading costs, demurrage charges etc. incurred in India in respect of any imported goods shall be to supplier's/contractor's account.

ii. Bidder to indicate, in relevant price schedule, CIF value of built-in import content and applicable concessional rate of basic custom duty, Social Welfare Surcharge on custom duty (considering the input tax credit of IGST, GST Compensation Cess on imported material) included in quoted price, in the price schedule.

iii. In case merit rate of custom duty is applicable and bids are invited on the basis of same, however at a later stage concessional rate of custom duty becomes applicable, concessional certificate shall be issued towards import of material against the advance request letter submitted by the domestic bidder and the differential custom duties between concessional rate and quoted merit rate of custom duty by supplier/contractor shall be passed on to the Owner or it shall be recovered by the Owner from the supplier/contractor's invoice.

iv. The supplier/contractor shall be responsible for and shall exercise due diligence in properly classifying the goods and materials, undertaking

Copyrights EIL – All rights reserved

the payment of custom duties, and/or otherwise complying with all applicable laws w.r.t. import of the goods and materials.

v. If bidder does not furnish built in CIF value and rates of custom duty, in that case bidder shall not be entitled to claim any variation in the custom duties even if bidder has quoted their prices considering custom duties.

vi. If custom duty rate actually paid on import of materials and components is found to be lower than the quoted rate of custom duty, then benefit of the same shall be passed on to the Owner.

vii. If bidder has considered Import Duty other than Merit Rate of Import Duty then statutory variation on the Import Duty shall be payable extra on the Merit Rate of Import Duty or the rate of Import Duty considered by the bidder, whichever is lower.

viii. In case, no import is made for execution of the order, clauses related to Imports will not be applicable.

d. General points:

i. In case Owner is exposed to any penal action, interest /penalties by the custom authorities for incorrect declaration and / or valuation of the goods or material by the supplier/contractor, or otherwise on account of any breach of applicable laws in the course of the import of the goods and material by supplier/contractor, the supplier/contractor shall indemnify and hold harmless the Owner for any and all costs, expenses or losses suffered or incurred by Owner in this regard

ii. If bidder intends to source import of goods from a country with which India has Free Trade Agreement (FTA) or Comprehensive Economic Partnership Agreement (CEPA) or any such multi-lateral / bi-lateral Agreement or Treaty with India or under Generalized System of Preference (GSP); or under any other notification (allowing lower rate of custom duty), then the bidder is advised to ascertain and confirm its applicability along with supporting documents in the bid and ensure that conditions of such agreement/treaty etc. are strictly complied with.

iii. The bidder shall be liable to provide all documentation to ensure availment of the exemption/waiver. In case the bidder defaults on this due to any reason, whatsoever, he shall be liable to bear the incremental custom duty applicable if any

iv. Any additional custom duty applicability on account of any change in the notification (allowing lower rate of custom duty)/ CEPA/FTA/multi-lateral/bi-lateral trade agreement shall be to bidder's account.

Copyrights EIL – All rights reserved

v. Documentation to be furnished for availing the exemption/waiver of custom duty shall be specifically listed in the letter of credit also as a prerequisite for release of payment against shipping documents and this documentation shall necessarily form a part of shipping documents.

vi. Owner will not bear any liability towards payment of Safeguard Duty, Anti-Dumping Duty, Protective Duty and applicable IGST including GST Cess on same or Countervailing Duty on subsidized articles or any other such duties of Customs imposed by Government under Customs Tariff Act, 1975.

vii. In case custom duty rate as quoted by Foreign bidder is less than Actual rate applicable on due date of submission of last price bid and payment of custom duty is on Owner's Account, differential amount on account of above-mentioned rate variation will be recovered from Foreign bidder.

3. INCOME TAX

a. Foreign supervisors/suppliers/contractors

Prices of site work, contracts and other services of foreign supplier/contractor shall be gross of income tax i.e., inclusive of Indian income tax at the applicable prevailing rate as per Indian Income Tax Act and Rules there under.

Owner shall deduct withholding tax at source (TDS) as applicable while making payments against each invoice. Certificate for TDS shall be provided to the supplier/contractor.

In case foreign bidder quotes Prices of site work, contracts and other services "net of Income Tax" i.e., exclusive of Indian income tax, Owner shall deduct and deposit TDS as applicable after grossing up the sums due while making payments against each invoice at the applicable prevailing rate as per Indian Income Tax Act and Rules thereunder.

Foreign bidder shall furnish the information required in line with the prevalent provisions of Income tax act read with rules thereunder including but not limited to Tax residency certificate, Form 10F, No permanent establishment declaration, No business connection certificate, PAN in India if available.

Copyrights EIL – All rights reserved

Failing to provide above documents/information, tax will be withheld at rates applicable as per the provisions of Income Tax Act, 1961 read with rules thereunder and the benefit of reduced rates will not be given.

If the non-resident is unable to obtain & submit Tax Residency Certificate to the Owner within a reasonable time, the bidder should furnish Form 10F along with an undertaking to the effect that the bidder is a tax resident of (the specified country) and that they shall obtain and provide the tax residency certificate (TRC) to the Owner before 30 days of submission of first Invoice by them or within 3 months from the date of entering into contract whichever is earlier.

In case of contracts with term exceeding one financial year, the relevant documents like TRC, Form 10 F, No PE / Business Connection Certificate etc. as applicable, as per Income Tax Act, 1961 must be submitted at the beginning of each financial year and the Owner will not bear additional tax liability (if any) arising from non-submission of documents.

The bidder shall be liable to intimate the subsequent changes (if any) to the information submitted against any of the above particulars, along with full details.

In addition to the above particulars, the bidder should also provide any other information as may be required at a later stage for determining the taxability of the amount to be remitted to the non-residents.

In case, any additional tax liability arises on the Owner due to any action of bidder like delay in submission / non-submission of information / documents required as above or change in residential status post submission of documents or change in any document (like TRC, Form 10F etc.) after its submission shall be recovered from the supplier/contractor.

b. Indian resident supervisors/ suppliers/contractors

Prices for supply and services of Indian suppliers/ contractors shall be inclusive of income tax.

Tax shall be deducted at source (TDS) by Owner on all sums due to supplier/contractor in accordance with the provisions of Indian Income Tax act read with rules thereunder as in force at the relevant point of time.

Owner shall issue a Tax Deduction Certificate to the supplier/contractor evidencing the tax deducted or withheld and deposited by Owner on

Copyrights EIL – All rights reserved

payments made to the supplier/contractor to enable the supplier/contractor to claim the credit of Tax deducted by Owner.

c. INCOME TAX (General Points):-

i. The supplier/contractor shall also be responsible for ensuring compliance with all applicable provisions of the Direct Tax Laws of India including, but not limited to, the filing of relevant Tax Returns and shall promptly provide all information required by the Owner for discharging any of its responsibilities/liabilities under such laws in relation to or arising out of the Contract. For the lapses/failure, if any, on the part of the supplier/contractor and consequential penal action taken by the Income Tax department, Owner shall not take any responsibility whether financial or otherwise and shall be indemnified by the supplier/contractor.

ii. The Indian Income Tax Act and Rules made thereunder contains provisions permitting deduction of tax at source (TDS) at lesser rate if the supplier/contractor is able to justify to the Income Tax Authorities such lesser rate of deduction. However, a deduction once made has to be deposited by the Owner with the Income Tax Authorities in India and will not be adjustable by the Owner. It is therefore in the interest of the supplier/contractor that prior to release of any payment due to the supplier/contractor under the Contract that the supplier/contractor obtains from the relevant Income Tax Authorities in India, a certificate specifying the rate of deduction/withholding of Income tax at source, failing which, payment to the supplier/contractor shall be made by the Owner after withholding/deduction at the rate as may be applicable to the supplier/contractor as per provisions of Income Tax Act, 1961.

iii. TDS on interest recovered on Mobilization/Other Advance will be deposited by the supplier/contractor and same would be reimbursed by the Owner against submission of Form-16A (TDS certificate).

C. INVOICING METHODOLOGY W.R.T. TAXATION

Unless otherwise stated, following invoicing methodology shall be followed:

1. In case of domestic / foreign PO's (Other than 2 below) , Invoice/E-Invoice shall be raised by the supplier/contractor in the name of Owner and consignee shall be Owner.
2. In case of package MR's (where title transfer or take over is envisaged to take place at site after completion of site work) and tenders, supplier/contractor shall bring material at project site in their own name and they themselves shall

Copyrights EIL – All rights reserved

be consignee. As per provisions of contract between Owner and supplier/contractor, Invoice/E-Invoice shall be raised by supplier/contractor to Owner after charging GST.

D. APPLICABILITY OF TAX CREDIT

For supplies, services and works contract carried out for PP exclusively, ITC on account of GST is 100% except for section 17(5) disallowances

For supplies, services and works contract carried out for PFCCU Revamp, ITC on account of GST is 16% except for section 17(5) disallowances

E. EVALUATION METHODOLOGY W.R.T. TAXES

Following shall be loaded for evaluation:

1. Applicable Custom Duty, Social Welfare Surcharge etc (Non-MOOWR cases)/Present value of deferred import duties (MOOWR cases), (excluding IGST & GST Compensation Cess (if applicable) on imported material which shall be dealt as per bid evaluation methodology given in E2 below) shall be loaded for price bid evaluation in respect of supplies for which bill of entry has to be filed by Owner/in the name of Owner (MOOWR cases).
2. a) GST on which input credit is not available to Owner including GST Compensation Cess (if applicable) [Excluding (b) below]
   b) Present Value of GST deferred under MOOWR scheme
3. Applicable Income tax, in case foreign bidder quotes prices net of taxes.

F. TAXATION TERMS FOR INDIAN SOURCED SUPPLIES (Applicable in case of foreign supplier)

Shall be the same as applicable for Indian bidders.

G. TAX IMPLICATION WHERE FABRICATION YARD IS OUTSIDE THE FACTORY PREMISES, WHEREVER APPLICABLE

In case of package MRs and tenders, since contractors/suppliers shall bring material at project site in their own name and raise invoice to Owner (as per payment milestone achieved) after charging GST, location of fabrication yard whether inside or outside factory premises will not attract any additional liability.

H. TAX IMPLICATION WHERE OWNER WILL ISSUE FREE ISSUE MATERIAL (FIM) TO CONTRACTORS/SUPPLIERS

Where Owner issues FIM's to suppliers/contractors, material will be released against delivery challan and such FIM shall be received back in factory premises as per provision of GST.

Copyrights EIL – All rights reserved

I. STATUTORY VARIATION (IN CASE OF MRS & TENDERS)

No variation on account of taxes and duties, statutory or otherwise, shall be payable to Supplier/Contractor except for the following:

1. GST: If after the due date of submission of last price bid and upto the contractual delivery/completion period (*Note 1), any increase/decrease occurs in the applicable rate of GST, the variation in such GST shall be to Owner's account and shall be adjusted (increase / decrease) to / from the Supplier's/Contractor's invoices based on the documentary evidence.

   Any increase in GST after the contractual delivery/completion period (*Note 1) shall be to Supplier's/Contractor's account. However, any decrease in the rate of GST shall be passed on to Owner.

   For calculating Statutory Variations ceiling amount as declared by the Bidder in price schedule shall only be considered.

2. Basic Custom Duty (BCD) & Social Welfare Surcharge (SWS): If after the due date of submission of last price bid and upto the 3/4th of contractual delivery/completion period (*Note 1), any increase/decrease occurs in the applicable rate of BCD & SWS on materials imported, the variation in such BCD & SWS shall be to Owner's account and shall be adjusted (increase/decrease) to/from the Supplier's/Contractor's invoices based on the documentary evidence.

   Any increase in rate of BCD & SWS on materials imported after the 3/4th of the contractual delivery/completion period (*Note 1) shall be to Supplier's/Contractor's account. However, any decrease in the rate of BCS & SWS on materials imported shall be passed on to Owner.

   For calculating Statutory Variations in BCD/SWS, ceiling amount of CIF Value and rate of custom duty as declared by the Bidder in relevant price schedule shall only be considered.

Note: Indian supplier/contractor to consider input tax credit of IGST and GST Compensation Cess if any (in case of import of raw Materials / components) in their quoted prices. Hence, Statutory variations on same in case of imported materials from outside India in Supplier's/Contractor's name (i.e., for Indian Bidders) shall be to Supplier/Contractor account.

3. Any new output taxes, duties, cess, levies notified or imposed after the due date of submission of last price bid but upto the contractual date of delivery/completion (*Note 1) shall be to Owner's account. These shall be reimbursed against documentary evidence. However, in case of delay attributable to supplier/contractor, any new output taxes, duties, cess, levies notified or imposed after Time for Completion, defined as above, shall be to supplier's/Contractor's account.

Copyrights EIL – All rights reserved

J. TAX INDEMNITY

Any omission/ errors of interpretation of applicability of taxes, duties, cesses and levies, whatsoever named, howsoever named, as are payable to any government, local or statutory authority in India or in any country other than India by the supplier/contractor shall be to supplier's/contractor's account.

If any fine/penalty/any other levy is required to be met by the Owner arising out of any non-compliance/fault/fraud/willful suppression/misstatement of facts/information/documents, whatsoever, of any applicable laws of India or any country other than India by the supplier/contractor/their personnel/sub-contractors/agencies, the same shall be recovered from any amount payable to the supplier/contractor under this contract or under any other contract of the Owner.

If any tax is paid / required to be paid by supplier/contractor in pursuance of any demand of any law enforcement agency/Tax Authority on account of non-compliance/fault/fraud/willful suppression/misstatement of facts/information/documents, whatsoever, of any applicable laws of India or any country other than India by the supplier/contractor/their personnel/sub-contractors/agencies, the same shall be to supplier's/contractor's account only.

GENERAL:

1. *Note-1 Contractual delivery/completion period shall include extended contractual delivery/completion period for the reasons attributable to Owner or due to Force Majeure condition.

Copyrights EIL – All rights reserved

<On Bidder Entity's Letterhead>

Annexure-A

Declaration for Non-Applicability of E-Invoicing

We, **<Name of Bidder entity>**, a *Proprietorship firm / Partnership firm / Company, having its registered office at **<address>**, having PAN No. _____and GSTN No._____, hereby declare that we are not required to comply with e-invoicing provisions under GST.

We also hereby declare that we will update ENGINEERS INDIA LIMITED/OWNER (herein after referred to as EIL/Owner) in case there is any change in the above details or in case we are required to adhere to e-invoicing provisions under GST due to any subsequent change in law. In such case, we shall comply with provisions of e-invoicing regime as and when the same becomes applicable to us.

We hereby declare the above statement is true and correct and we shall indemnify and hold EIL/Owner good for any demand, credit reversal, denial of refund, loss, interest or penalty, suit, action, costs and expenses whatsoever (including attorneys' fees and associated legal costs) which may be commenced against and/or incurred by EIL/Owner due to any incorrect declaration or non-compliance by us and EIL/Owner shall have the right to withhold or recover any such loss/cost/expense from any amount payable to us.

<Name and signature of authorized signatory >

For <Name of Bidder Entity>

<Bidder Entity's Seal/Stamp>

<Date>

*Delete whichever is not applicable.

Copyrights EIL – All rights reserved

ANNEXURE - XXV
TO
SPECIAL CONDITIONS OF CONTRACT

[TERMS & CONDITIONS FOR POST WARRANTY ANNUAL MAINTENANCE CONTRACT]

Signature Not Verified
Digitally signed by MD MAZHER ALI
Date: 2026.03.17 17:57:47 IST
Location: eProcure-EPROC