

COCHIN PORT AUTHORITY



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No.MD/DM/HAZOP-QRA-DMP/2025

Date: 31-10-2025

NOTICE INVITING BUDGETARY OFFERS

Cochin Port Authority (COPA) is in the process of Upgradation of Fire Fighting Facilities of its three Tanker Berths viz. Cochin Oil Terminal (COT), NTB-STB and Q3-Q4. COPA intend to submit an application to the Chief Controller of Explosives (CCOE) for preliminary approval before commencement of work of Upgradation of Fire Fighting Facilities and other associated works. Upon completion of works, COPA propose to have final approval/Jetty License from CCOE under Petroleum Rule 16(4) for all the above three Terminals.

In connection with the above, COPA propose to appoint a Consultant through single stage two cover bidding system on lump sum price basis from experienced firms for the preparation of HAZOP Study Report, Quantitative Risk Assessment (QRA) Report and Disaster Management Plan (DMP) in line with the requirement of PESO for each of the above three Oil Terminals as per the Terms of Reference (TOR) attached as **Annexure-II**.

COPA now invites budgetary offers for the preparation of estimate of above tender. The bidders are requested to submit the Budgetary rates as per **Annexure-I** attached and may be sent in sealed cover superscribing “ Budgetary offer for the preparation of HAZOP Study Report, Quantitative Risk Assessment (QRA) Report and Disaster Management Plan (DMP) for Tanker Terminals of COPA” to the Superintending Engineer, Cochin Port Authority at the address given above (e-mail: sajeev.va@cochinport.gov.in) so as to reach us on or before 06-11-2025 at 17:00 hrs.

The bidders may note that the rates are invited only for budgetary purpose. Cochin Port is not bound to award the work to any bidders based on the **budgetary** rates submitted. Cochin Port Authority will not be liable for any financial obligation to the bidders in connection with the preparation of their budgetary rates.

Encl: As above

Sd/-

SUPERINTENDING ENGINEER(M)
TANKER TERMINAL

PRICE SCHEDULE - BUDGETARY OFFER

COCHIN PORT AUTHORITY					
NAME OF WORK		Preparation of (i) Hazard and Operability Report (HAZOP), (ii) Quantitative Risk Assessment (QRA) Report and (iii) Disaster Management Plan (DMP) for three Oil Terminals viz. Cochin Oil Terminal, NTB-STB and Q3-Q4 at Cochin Port.			
CONSULTANTS NAME & ADDRESS					
Sl. No	TERMINAL	SUB-HEADS		UNIT	TOTAL AMOUNT (Rupees) excluding GST
(1)	(2)	(3)		(4)	(5)
1	NTB-STB	(i)	Preparation of HAZOP Report.	Lump sum	
		(ii)	Preparation of QRA Report.	Lump sum	
		(iii)	Preparation of DMP.	Lump sum	
2	Q3-Q 4	(i)	Preparation of HAZOP Report.	Lump sum	
		(ii)	Preparation of QRA Report.	Lump sum	
		(iii)	Preparation of DMP.	Lump sum	
3	COT	(i)	Preparation of HAZOP Report.	Lump sum	
		(ii)	Preparation of QRA Report.	Lump sum	
		(iii)	Preparation of DMP.	Lump sum	
Grand total of Sl. No.1, 2 & 3					
Grand Total in words					
<p>NOTE:- The bidders may please note that the rates are invited only for budgetary purpose. Cochin Port is not bound to award the work to any bidders based on the budgetary rates submitted. Cochin Port Authority will not be liable for any financial obligation to the bidders in connection with the preparation of their budgetary rates.</p>					

Signature of bidder

ANNEXURE-II

TERMS OF REFERENCE (TOR)

Name of Assignment:- Preparation of HAZOP Study Report, Quantitative Risk Assessment (QRA) Report and Disaster Management Plan (DMP) for three Oil Terminals of Cochin Port Authority viz. COT, NTB-STB and Q3-Q4, in line with the requirement of PESO.

1. Background

Cochin Port is in the process of Upgradation of Fire Fighting Facilities of its three Oil Terminals viz. Cochin Oil Terminal, NTB-STB and Q3-Q4. COPA propose to submit application to Chief Controller of Explosives (CCOE) for preliminary approval before commencement of work of Upgradation of Fire Fighting Facilities and other associated works. Upon completion of works, COPA propose to have final approval/Jetty License from CCOE under Petroleum Rule 16(4) for all the above three Terminals.

In connection with the above, COPA propose to appoint a Consultant through single stage two cover bidding system on lump sum price basis from experienced firms for the preparation of HAZOP Study Report, Quantitative Risk Assessment (QRA) Report and Disaster Management Plan in line with the requirement of PESO for each of the above three Oil Terminals.

Capacity of each Terminal are as follows:-

Sl. No.	Berth & Cargo handled	Category as per Table -1 of OISD-STD-156 of 2017	Remarks
1	South Tanker berth (STB)- Petroleum	Tanker Berth at a wharf or Jetty handling Ships of less than 20,000 Tonnes deadweight capacity.	STB & NTB are adjacent berths commonly known as Oil Tanker Berths (OTB). A common Fire water pump house is provided for catering to the fire water requirement of both the jetties
2	North Tanker Berth (NTB)- Petroleum	Tanker Berth at a wharf or Jetty handling Ships of 20,000 Tonnes and above but less than 50,000 Tonnes deadweight capacity.	
3	Cochin Oil Terminal (COT)- Petroleum.	Tanker Berth at a wharf or Jetty handling Ships of 100,000 Tonnes deadweight or larger capacity.	Commissioned in 1984
4	Q4-Q3 – Petroleum & Hazardous chemicals.	Tanker Berth at a wharf or Jetty handling Ships of 20,000 Tonnes and above but less than 50,000 Tonnes deadweight capacity.	Oil Berth Q4 is in operation since 2014 & COPA is in the process of reconstruction of adjacent Q3 berth for handling hydrocarbons & Hazardous Chemicals.

2. OBJECTIVE OF THE ASSIGNMENT

Preparation of (i) Hazard and Operability Report (HAZOP), (ii) Quantitative Risk Assessment (QRA) Report and (iii) Disaster Management Plan (DMP) for three oil terminals viz. Cochin Oil Terminal, NTB-STB and Q3-Q4 in line with the requirement of PESO to apply for Preliminary approval and subsequently upon completion of Upgradation works, to obtain Jetty License from CCOE under Petroleum Rule 16(4). Bidders may please note that COPA does not have Storage facility either for Hydrocarbons or Hazardous chemicals in any of the Terminals mentioned above. The bidders shall consider this aspect while carrying out the studies. Vendor should submit draft Reports including soft copies in PDF Format in respect of each Terminal separately as per the priority indicated in this document. After getting approval from the Officer in-Charge of COPA, final copies (total 10 sets for each Terminal) shall be printed and delivered to COPA.

3. SCOPE OF THE ASSIGNMENT:

1. Hazard and Operability Study Report (HAZOP)

The Consultant shall conduct a HAZOP Study in accordance with OISD-STD-156, OISD-STD-244, IS-15656 and relevant national and international standards.

1.1 Purpose

To identify and assess process hazards and operability concerns during handling of Class-A, B & C petroleum products and other hazardous chemicals at the above 3 oil terminals, and to recommend mitigation measures ensuring compliance with statutory norms. Individual report shall be submitted for each Terminal .

1.2 Objectives

- Identify potential hazards and operability issues associated with cargo transfer operations.
- Evaluate adequacy of existing safeguards, control systems, and emergency provisions.
- Recommend design or procedural improvements to minimize risks to personnel, property, and environment.
- Ensure compliance with Petroleum Rules, OISD standards, and PESO requirements for approvals under Rule 16(4).

1.3 Methodology

Documentation Review-The Consultant shall review:

- Process Flow Diagrams (PFDs), Piping & Instrumentation Diagrams (P&IDs)
- Jetty layout drawings, line diagrams, and control philosophy
- ESD logic and instrumentation details
- Cargo handling and emergency operating procedures
- Maintenance and inspection records of safety and firefighting systems

A detailed study plan and node definitions shall be prepared and submitted for approval prior to the workshop. Software for HAZOP shall be PHA PRO or similar.

1.4 HAZOP Workshop Execution

- Conduct structured HAZOP sessions using standard guidewords to identify deviations, causes, consequences, safeguards, and recommendations.
- The study shall cover including but not limited to the following:
 1. Ship–shore interface (loading arms, hoses, couplings)
 2. Shore manifolds and emergency isolation valves
 3. Cargo transfer pipelines
 4. Metering, sampling, and pig launcher/receiver
 5. Emergency Shutdown (ESD) and control systems
 6. Firefighting and emergency response systems
 7. Electrical and instrumentation interfaces
 8. Corrosion / erosion of product pipelines
 9. Abnormal operations and human errors
 10. Maintenance and service failures
 11. Safety-critical systems
 12. Spare / standby equipment impacting system integrity

HAZOP sessions shall include representatives from COPA’s Operations, Maintenance, Fire & Safety, and Instrumentation departments and Terminal users viz. Oil Companies and Tank Farm Operators.

1.5. Site Visit

The Consultant shall conduct field visits to verify existing installations, collect operational data, and interact with terminal staff.

- Local transport within port premises will be arranged by COPA on Port account.
- All other travel and accommodation costs shall be borne by the Consultant.

1.6. Reporting and Deliverables

1. HAZOP Inception Note – Scope, methodology, node list, and work schedule.
2. Draft HAZOP Report – Including detailed worksheets and Action Tracker (Excel).
3. Final HAZOP Report (PDF) – Incorporating client comments.
4. Presentation Deck (PPT/PDF) – For management and PESO submission.
5. Node-wise Worksheets (Excel) and PESO Compliance Summary.

Each report shall clearly present:

- Methodology and study team composition
- Node-wise findings, safeguards, and recommendations
- Risk ranking and prioritization
- Action plan and PESO compliance summary

1.7. Compliance and Quality Assurance

- All methodologies, assumptions, and models shall be documented, traceable, and auditable.
- The final report shall conform to PESO / CCOE requirements and be suitable for submission under Petroleum Rule 16(4).
- If PESO requires any modification after submission, the Consultant shall revise and resubmit the report without additional cost to COPA.

2. Quantitative Risk Assessment (QRA)

The consultant shall carry out a comprehensive Quantitative Risk Assessment (QRA) for Cochin Port's oil terminals — Cochin Oil Terminal (COT), North and South Tanker Berths (NTB–STB), and Q3–Q4 — in line with OISD–STD–156, OISD–STD–244, IS–15656, and other applicable national and international standards. The objective is to identify, quantify, and evaluate all potential hazards associated with the handling of petroleum products and hazardous chemicals at these terminals, and to recommend mitigation measures ensuring compliance with the requirements of PESO/CCOE for preliminary approval and final jetty licensing under Petroleum Rule 16(4).

2.1 Data Collection and Review

The consultant shall collect and review all necessary technical, operational, and environmental information relevant to risk assessment, including but not limited to:

- Berth layout, mooring arrangement, fender system, and structural drawings.
- Loading/unloading systems – loading arms, flexible hoses, product and vapor return lines, pigging and manifold details.
- SCADA/control interlocks, emergency shutdown systems, alarm systems, and firefighting arrangements.
- Cargo characteristics (Class A/B/C petroleum and hazardous chemicals), physical and chemical properties, and quantities handled.
- Typical tanker sizes, cargo throughput, and operating modes (loading/unloading).
- Channel geometry, depth, turning circle, environmental data (wind, tide, current, temperature, stability class).
- Historical incident/near-miss data, maintenance and inspection records, and traffic statistics.
- Input from terminal users and tank farm operators (IOCL, BPCL, HPCL HHA, Konkan, GBL,) on operational practices, interconnections, and transfer systems.

2.2. Hazard Identification (HAZID)

- Identify all potential hazards and hazardous scenarios associated with ship berthing/unberthing, cargo transfer, pipeline operations, and storage interfaces.
- Consider process deviations, equipment failures, human errors, and external impacts (ship collision, dropped objects, mooring failure, power failure, etc.).
- Incorporate input from Oil Companies and tank farm operators and berth operating personnel to ensure comprehensive coverage of operational and site-specific hazards.
- Develop a Hazard Register summarizing identified hazards, causes, potential consequences, and existing safeguards.

2.3. Scenario Selection and Definition

- Identify credible accident scenarios (CAS) for each berth based on cargo handled, system configuration, and operating conditions.
- Define release conditions (hole size, phase, duration, release rate, ignition probability, and weather cases).
- Include scenarios such as vapor cloud formation and explosion, pool fire, jet fire, BLEVE (if applicable), toxic gas dispersion, and ignition cases.
- Include risks associated with navigation and berthing/unberthing operations through the Channel, including tug assistance and turning operations.

2.4. Frequency Analysis

- Quantify frequencies of identified scenarios using fault tree/event tree methodologies or recognized industry failure rate databases.
- Assess failure probabilities of major equipment and safety systems (hoses, loading arms, valves, interlocks, emergency shutdowns).
- Categorize scenarios by frequency and consequence (e.g., high consequence/low frequency and low consequence/high frequency events).

2.5. Consequence Analysis

- Conduct detailed consequence modeling for all credible release scenarios using recognized software (DNV PHAST or similar) and the Dow Fire and Explosion Index (F&EI).
- Determine thermal radiation, overpressure, toxic dispersion, and fragmentation zones for each scenario.
- Calculate downwind hazard distances and assess injury/damage potential to personnel, equipment, and nearby facilities.
- Evaluate pollution and health risks for terminal workers and surrounding communities, where applicable.
- Results shall include hazard contours, isopleths, and tabulated consequence distances corresponding to critical thresholds (e.g., 4, 12.5, and 37.5 kW/m² for thermal flux; 0.03, 0.1, and 0.3 bar for overpressure; AEGL/ERPG levels for toxic exposure).

2.6. Risk Estimation

- Combine frequency and consequence data to compute individual and societal risk values.
- Determine Location-Specific Individual Risk (LSIR) at key points within and around each terminal.
- Generate risk contours (e.g., 10^{-3} , 10^{-4} , 10^{-5} per year) and F–N curves to visualize risk distribution.
- Compare calculated risks with acceptable criteria based on OISD and international standards to identify high-risk areas and critical safety gaps.

2.7. Review and Evaluation

- Evaluate adequacy of mooring arrangement, fender system, loading arms, hoses, interlocks, pipelines, and ESD systems from a risk standpoint.
- Review environmental and navigational conditions affecting accident probability.
- Identify deficiencies, potential failure modes, and safety-critical recommendations.
- Prioritize mitigation measures based on risk significance (Critical / High / Medium) and suggest required updates to SOPs, maintenance schedules, and operating procedures.

2.8. Risk Mitigation and Recommendations

- Recommend cost-effective mitigation and control measures to reduce risks to As Low As Reasonably Practicable (ALARP) levels.
- Propose design, operational, procedural, and emergency response enhancements.
- Suggest additional safeguards or instrumentation where existing controls are insufficient.
- Recommend zoning, safety distances, and exclusion areas based on risk contour outcomes.

2.9. Reporting and Deliverables

For each terminal (COT, NTB–STB, Q3–Q4), the consultant shall submit:

- Draft QRA Report covering all activities and findings for review by Cochin Port Authority (COPA).
- Final QRA Report (10 hard copies and soft copies) incorporating COPA's comments. Each report shall include:
 1. Executive summary and objectives.
 2. Data and assumptions.
 3. Hazard identification and scenario selection.
 4. Frequency and consequence analysis.
 5. LSIR and societal risk assessment.
 6. Risk contour maps, F–N curves, and hazard zones.
 7. Mitigation recommendations and ALARP demonstration.
 8. Appendices with model inputs, outputs, and calculations.

2.10. Site Visits

The consultant shall carry out site visits as necessary to collect data, verify system configurations, and interact with operational personnel and terminal users. COPA will provide local transport between its offices and the terminals. All other travel and logistical expenses shall be borne by the consultant.

2.11. Compliance and Quality Assurance

- All methodologies, assumptions, and models shall be documented, traceable, and auditable.
- The final report shall comply with PESO/CCOE requirements and be suitable for submission to authorities for preliminary and final approvals under Petroleum Rule 16(4).
- In case PESO made any observation/ modification/correction in the QRA report during their scrutiny after submission of application for preliminary approval by COPA, the Consultants is required to submit the revised report meeting the requirement of PESO without any extra cost to COPA.

3. Disaster Management Plan (DMP)

3.1. Objective

To prepare comprehensive, site-specific Disaster Management Plans (DMPs) for the three oil terminals of Cochin Port Authority – COT, NTB–STB, and Q3–Q4 – covering prevention, preparedness, response, and recovery measures in compliance with O/CCOE, NDMA guidelines.

3.2 Scope of Work

The Consultant shall carry out the following tasks:

(i) Data Collection and Review

- Review existing documents, drawings, and records relating to:
 - Jetty layout and facilities
 - Piping and transfer systems
 - Product handling and emergency systems
 - Fire protection and communication systems
 - Existing emergency and safety procedures
- Conduct site visits to each terminal for assessment of infrastructure and emergency arrangements.
- Review CoPA’s Organizational Disaster Management Plan (2022) and Draft Oil Spill Disaster Management Plan (under approval by Indian Coast Guard) and incorporate relevant details.

(2) Preparation of Disaster Management Plan

Prepare separate DMPs for COT, NTB–STB, and Q3–Q4 in accordance with the guidelines of PESO, CCOE, NDMA, OISD, and MoPNG, including:

a. On-site Emergency Plan

- Organizational structure and command hierarchy.
- Roles and responsibilities of key personnel.
- Communication and alarm systems.
- Evacuation routes and procedures.
- Resource inventory (firefighting, rescue, and spill control).
- Mutual aid arrangements.
- Medical aid and first response measures.

b. Off-site Emergency Coordination

- Coordination with District Disaster Management Authority (DDMA), Police, Fire & Rescue Services, Coast Guard, and hospitals.
- Procedures for alerting and liaison with off-site authorities.
- Integration with State Disaster Management Authority (SDMA) protocols.

c. Emergency Response and Recovery Procedures

- Classification of emergencies and escalation matrix.
- Activation and deactivation of emergency plans.
- Post-disaster recovery, damage assessment, and rehabilitation.
- Periodic training and mock drill framework.

d. Environmental and Safety Measures

- Containment and mitigation of oil spills and vapor release.
- Environmental protection and marine ecosystem safety.
- Waste disposal and remediation measures.

e. Drawings and Annexures

Each DMP shall include:

- Terminal layout showing hazard zones and emergency facilities.
- Communication flow diagrams and contact lists.
- Location of fire fighting and emergency response equipment.
- Emergency assembly points, evacuation routes, and isolation valves.

3.3 Validation and Submission

- Conduct a tabletop or mock drill exercise if required by CoPA.
- Submit draft DMPs for review and incorporate CoPA's comments.
- Submit final DMPs (10 printed sets + soft copies) for each terminal.
- If PESO/CCOE requires modifications post-submission, revisions shall be made at no additional cost.

3.4. Deliverables

1. Inception Report.
2. Draft Disaster Management Plan (for each terminal).
3. Final Disaster Management Plan (10 hard copies + soft copy for each terminal).
4. Presentation to CoPA and relevant authorities.

3.5. Standards and References

The DMPs shall be prepared in accordance with:

- Petroleum Rules, 2002 (and amendments)
- PESO/CCOE Guidelines for Jetty Licensing
- NDMA Guidelines on Industrial and Chemical Disaster Management
- IS 15656 – Emergency Response and Disaster Management Plan (ERDMP) for Petroleum Sector
- MoEF&CC and CPCB Guidelines (as applicable)

3.6. Confidentiality

All data, drawings, and information provided by CoPA shall be treated as strictly confidential and shall not be disclosed to any third party without prior written approval of CoPA.

4. Documents to be made available by Cochin Port Authority:

- 1 Berth/Jetty Lay out drawings of NTB, Q3-Q4 and COT;
2. Brief Description of each Facility;
- 3 Location details of each Facility;
4. Description of the Products being handled at each Facility and their Quantity;
5. Basic Design Details: Civil, Structural, Mechanical, electrical and Instrumentation Systems.
6. Basic Details of existing Fire Fighting Facilities and proposed Upgradation;
7. Technical Details of Handling Facilities (including Unloading Arms & Hoses) available at each Terminal;
8. Process Flow Diagrams (PFDs) and Piping & Instrumentation Diagrams (P&ID) including interlocks of each Terminal.
9. MSDS of each product (Class A/B/C) being handled in the Terminals;

10. Technical details and operating parameters of product pipe lines and Fire Waterlines;
11. Tanker Capacities being handled;
12. Population details inside and outside berths;
13. Windrose;
- 14 Disaster Management Plan of COPA;
15. Disaster Management Plan of MULT;
16. Draft Oil Spill Disaster Contingency Plan of COPA

Consultants shall make their own arrangements for transport arrangements from Consultants premises to COPA. Local transport from Cochin Port Authority's Office to the Tanker Berths and other facilities within Willingdon Island that are required for the successful execution of the Consultancy Contract shall be arranged by COPA on Port Account.

5. List of Deliverables by the Consultants:-

Consultants shall submit the various documents as per the schedule indicated below:-

Sl. No.	Document	Scheduled Completion (days)		
		NTB	Q3-Q4	COT
1	Submission Draft Hazop & QRA Reports	42 days	63 days	91 days
2	Submission of Final Hazop & QRA Reports	63 days	84 days	112 days
3	Submission of Draft DMP	77 days	98 days	126 days
4	Submission of Final DMP	91 days	112 days	140 days

6. Work Plan:-

6.1. It is proposed to prepare and submit the reports pertaining to each Terminal in the sequence of (i) NTB STB (ii) Q3-Q4 and (iii)COT.

For each Terminal, the Reports shall be prepared in the following sequence:-

- (i) HAZOP and Quantitative Risk Assessment (QRA) reports shall be prepared concurrently.
- (ii) Draft of Disaster Management Plan shall be submitted after completing the Final HAZOP & QRA Reports

6.2 Schedule of various activities involved in the preparation of Reports are as below:-

Sl. No.	Activity	Duration	No. of days required for completion from Work Order
1	Issue of Work Order to the Consultants		
	NTB-STB		
2	Receipt of inputs & documents from COPA	7 days from 1	7 days
3	Review of documents by Consultants	7 days from 2	14 days
4	Onsite Data Collection & Meeting with Port Users	7 days from 3	21 days
5	Submission Draft Report (Hazop & QRA)	21 days from 4	42 days
6	Review by COPA & receipt of comments	7 days from 5	49 days
7	Submission of Final Hazop & QRA Reports	14 days from 6	63days
8	Submission of Draft DMP	14 days	77 days
9	Review by COPA & receipt of comments	7 days	84 days.
10	Submission of Final DMP	7 days	91 days.
	Q3-Q4		
11	Receipt of inputs & documents from COPA	28 days from 1	28 days
12	Review of documents received from COPA	7 days from 11	35 days
13	Onsite Data Collection & Meeting with Port Users	7 days from 12	42 days
14	Submission Draft Report (Hazop & QRA)	21 days from 13	63 days
15	Review by COPA & receipt of comments	7 days from 14	70 days
16	Submission of Final Hazop & QRA Reports	14 days from 15	84 days
17	Submission of Draft DMP	14 days from 16	98 days
18	Review by COPA & receipt of comments	7 days from 17	105 days
19	Submission of Final DMP	7 days from 18	112 days
	COT		
20	Receipt of inputs & documents from COPA	56 days from 1	56 days
21	Review of documents received from COPA	7 days from 20	63 days
22	Onsite Data Collection & Meeting with Port Users	7 days from 21	70 days
23	Submission Draft Report (Hazop & QRA)	21 days from 22	91 days
24	Review by COPA & receipt of comments	7 days from 23	98 days
25	Submission of Final Hazop & QRA Reports	14 days from 24	112 days
26	Submission of Draft DMP	14 days from 25	126 days
27	Review by COPA & receipt of comments	7 days from 26	133 days
28	Submission of Final DMP	7 days from 27	140 days

7. PAYMENT SCHEDULES:-

7.1. BOQ of the tender is in such way that the Charges for the preparation of (i) HAZOP Report (ii) QRA Report and (iii) DMP are to be quoted separately for each Terminal viz. (i) NTB-STB, (ii) Q3-Q4 and (iii) COT of the single price schedule. The bidders are required to

quote for all the line items of each Terminal. Otherwise the offer will be disqualified and rejected. Financial evaluation will be based on overall cost quoted for all the line items.

7.2. Price quoted by the Consultants and accepted by COPA for the preparation of (i) HAZOP Report (ii) QRA Report and (iii) DMP of each Terminal will be paid after submission of Reports **pertaining to the respective Terminal** as per the Schedule indicated below :-

Sl. No.	Description of Deliverables	Percentage of Agreed Total Lump sum Fee for the respective Terminal
1	On signing of the agreement and submission of Draft Hazop & QRA Reports	25%
2	Submission of Final Hazop & QRA Reports	25 %
3	Submission of Draft DMP Report	15 %
4	Submission of Final DMP Report	15 %
5	Balance Payment after satisfactory acceptance of Hazop, QRA and DMP Reports by CCOE during the processing of COPA's application for Preliminary PESO approval of the respective Terminal.	20 %
	Total	100%

8. Liquidated Damages

8.1. Time is the essence of the contract. It shall be the responsibility of the Consultants to complete the work and submit the specified deliverables within the stipulated period of completion. In case the Consultants fails to complete the work satisfactorily and submit the deliverables within the completion period or extended period owing to the reasons attributable to Consultant, he shall be liable to pay the COPA, as liquidated damages, a sum at the rate of ½ % (half percent) of the total contract price of the respective Terminal for every week of delay or part thereof, PROVIDED always that the total amount of such liquidated damages for delay to be paid under this contract shall not exceed 10% (ten percent) of the total contract price of the respective Terminal, as awarded.

8.2. The amount of Liquidated Damages can be adjusted or set-off against any sum payable to the Consultants. In case of delay due to reasons beyond the control of the Consultant, suitable extension shall be granted.

8.3. The Employer, if satisfied, that the assignments can be completed by the Consultants within a reasonable time after the specified time for completion, may allow further extension of time at its discretion with or without the levy of L.D. In the event of extension granted being with L.D, the Employer will be entitled without prejudice to any other right

or remedy available in that behalf, to recover from the Consultants as agreed damages equivalent to ½% (half percent) of the total contract price of the respective Terminal for every week of delay or part thereof.

8.4. The Employer, if not satisfied that the Assignments can be completed by the Consultants, and in the event of failure on the part of the Consultants to complete Assignment within further extension of time allowed as aforesaid, shall be entitled, without prejudice to any other right, or remedy available in that behalf, to rescind the contract.

8.5. The Employer, if not satisfied with the progress of the contract and in the event of failure of the Consultants to recoup the delays in the mutually agreed time frame, shall be entitled to terminate the contract.

8.6 In the event of such termination of the contract as described in clauses 8.4 or 8.5 or both, the Employer shall be entitled to recover L.D. as described in 8.1 above and forfeit the security deposit made by the Consultants besides getting the Assignment completed by other means at the risk and cost of the Consultants.

8.7 For levying compensation as mentioned above, the Employer is not required to have documentary evidence to quantify or to prove the losses suffered by the Employer due to delay in completion of assignment by the Consultants as per agreement conditions.
