



**EXECUTIVE SUMMARY OF
ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

FOR

**PROPOSED COASTAL OIL STORAGE TERMINAL
AT KRISHNAPATNAM PORT, SPSR NELLORE DISTRICT, AP**

OF



M/s. BHARAT PETROLEUM CORPORATION LIMITED

PREPARED BY



Environmental Consultancy & Laboratory

**M/s. ULTRA-TECH
(ENVIRONMENTAL CONSULTANCY AND LABORATORY)
(Gazetted by MoEF)**

**Unit No. 206, 224, 225 Jai Commercial Complex, Eastern Express Highway,
Opp Cadbury Factory, Khopat, Thane (West) – 400 061
Tel: 022 2534 2776, Fax: 022 25429650, Email: sales@ultratech.In
Website: www.ultratech.in**



EXECUTIVE SUMMARY

Introduction

M/s **Bharat Petroleum Corporation Ltd (BPCL)** proposes to set up a new Coastal POL Terminal at Krishnapatnam Port, District SPSR Nellore, AP. The proposed terminal shall fully comply with PESO, OISD (Oil Industry Safety Directorate) standards mainly 244 and other statutory requirements. The Project is standalone and no Inter linked and interdependent projects are involved. BPCL have proposed to construct within the area of ~40.5 ha (100.00 acres) under port service agreement between M/s BPCL and M/s Krishnapatnam Port Corporation Limited (KPCL)

BPCL is India's 3rd largest company by turnover over INR 2418.59 bn in FY17 and INR 2176.82 bn in FY16. India's 2nd largest Oil Marketing Company (OMC) with domestic sales volume of over 37.68 MMT in FY17 and 36.55 MMT in FY16 has Domestic market share of 20.3% during FY17. Majority Govt. of India shareholding of 54.93% and explicit Govt. support through under-recovery compensation mechanism, It ranks 360th on Fortune 2017 global list; ranks 5th among the only seven Indian companies on the list. It is well positioned to meet market demand across India through Strategically located Refineries and Marketing Infrastructure. It is India's only OMC with a successful foray into upstream business.

The company appointed **M/s. Ultra-Tech (Environmental Consultancy & Laboratory, MoEFCC recognized and NABL approved)**, Thane to carry out study of the impacts of the project on local environment and for obtaining Environmental Clearance. **Ultra-Tech** is an established Consultancy in the field of Environmental Services for past 30 years.

Project Description

Bharat Petroleum Corporation Limited (BPCL) has proposed to set up a new POL Terminal at Village Krishnapatnam, District Nellore, and Andhra Pradesh. The project location is well connected with Venkatachalam railway station by a distance of 28.6 km (aerial). The total plot admeasuring approximately ~40.5 ha (100.00 acres) is awarded by Krishnapatnam Port company Limited under port service agreement between M/s BPCL and M/s KPCL Details of product wise tankage at Krishnapatnam Terminal are given in **Table 1**.

Table 1: Proposed Schedule of Tanks

Tank	Dia. (m)	Ht./ (Length) (m)	Capacity (m ³)	Pumpable Capacity (m ³)	Total Tanks	Total Capacity (m ³)	Total Pumpable Capacity (m ³)
HSD	40	15.5	18326	17200	3	54978	51600
HSD	17.03	15.5	3321	3115	1	3321	3115
MS	34	15	12139	11050	3	36417	33150



Tank	Dia. (m)	Ht./ (Length) (m)	Capacity (m ³)	Pumpable Capacity (m ³)	Total Tanks	Total Capacity (m ³)	Total Pumpable Capacity (m ³)
MS	17.03	15	3000	3000	1	3000	3000
Bio-Diesel	9	13.5	850	820	2	1700	1640
Ethanol	4	16.2	200	200	2	400	400
MS	3.2	12.60 (L)	100	100	1	100	100
HSD	3.2	12.60 (L)	100	100	1	100	100
SLOP	3.2	12.60 (L)	100	100	1	100	100
SLOP	3.2	12.69(L)	100	100	1	100	100
HSD	2.01	6.75 (L)	20	20	1	20	20
Phase I						100236	93325
HSD/ATF	40	15.5	18326	17200	2	36652	34400
MS	34	15	12139	11050	2	24278	22100
Phase II						60930	56500
Total Phase I and II						161166	149825

CR – Cone Roof Vertical Tank

EFR – External Floating Roof Vertical Tank

UG – Underground Horizontal Tank

Phase I tanks – Immediate

Phase II tanks – Later Stage

Technology and Process Description

There is no manufacturing process involved in the terminal. The process involved can be divided into

- **Receipt:** Receipt to BPCL POL Terminal at Krishnapatnam port, shall primarily come from BPCL Kochi refinery by Coastal movement by Ocean tankers and envisaged imports in future based on the Logistics and Market conditions.
- **Storage:** The petroleum products will be stored in fabricated tanks as per applicable /international standards.
- **Dispatch:** This POL Installation shall feed to Market by two means i.e., by Road by tank Lorries and by Rail by Tank wagons.
- The entire operation of **RECEIPT, STORAGE AND DISPATCH** of petroleum products is carried out in a closed system thereby eliminating risk of spillage of products and to achieve enhanced safety.

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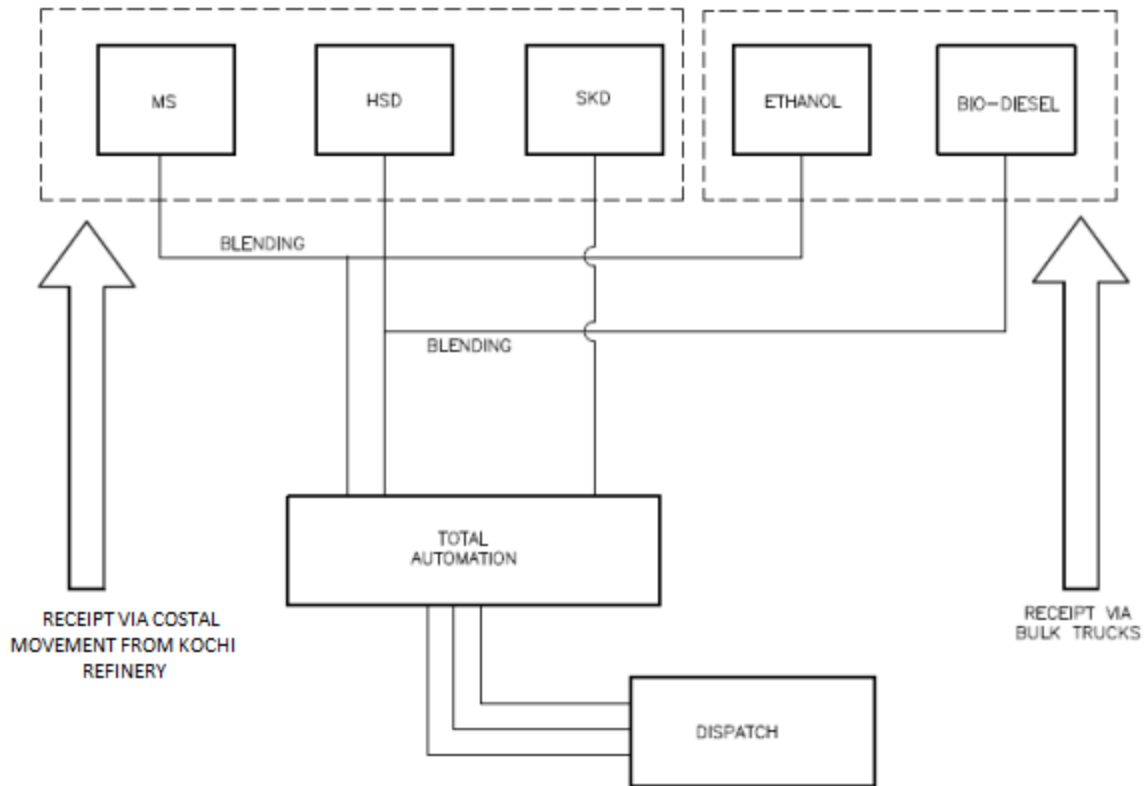


Figure 1: Process Flow Chart

TLF Sheds

There will be 8 TLF for Tank Trucks loading. The loading facilities will be bottom loading for all products excluding SKO. SKO will have top loading facility.

Product Pump House

Proposed project will have 1 TLF Pump House and TWD pump house of adequate sizes.

Fire Fighting Facilities

Fire Fighting Facilities will be provided as per prevailing safety guidelines issued by OISD 117, 118 and 244.

1. Full fledge auto-pressurized Fire Hydrant System to cover all facilities in the Terminal as per OISD-117/118/244 norms including Tank Truck Parking Area, as per latest Safety Norms.
2. Two no's of Fire Water Storage tanks each of 50% of water storage requirement (Total Capacity 100% of requirement as per OISD standard).
3. Fire Fighting Pumps with diesel engines including stand by units.

4. Jockey Pumps.
5. Fire Hydrant network system with monitors and hydrant valves
6. Provision of Fire hydrant piping network for all the new product tank farms.
7. Water Sprinkler system on A/G storage tanks in line with OISD 117/118/244.
8. Foam compound storage and delivery system.
9. Foam system on proposed A/G storage tanks.
10. Remote operated HVLR variable flow water cum foam monitors fixed type or portable type as per requirement,
11. Medium Expansion Foam Generators for Dyke Area.
12. Portable fire fighting equipment as per OISD standards.

The Fire Water tanks have been provided as shown in **Table 2**. Additionally, Fire Pump House shall be provided to accommodate fire engines and jockey pumps.

Table 2: Details of Fire Water Tanks

SN	Product	Type of Tank	Proposed Tanks and Capacities	Total Tankages	Diameter (m)	Height (m)
1	Fire water Tank	Above-ground	2x4713 1x4713 (Future)	9426 4713 (Future)	20	15

Dyke Wall Facility

Dyke wall shall be provided surrounding the POL tanks (above ground type). The Capacity of each tank and total maximum Capacity is highlighted below in **Table 3**.

Table 3: Dyke Wall Details

Sr. No.	Dyke Wall Containing Tanks	Enclosure Capacity m ³	Overall Dimension
1	MS	20,898	215x54x1.8
2	HSD	25,380	235x60x1.8
3	Bio-Diesel	1,739	42x23x1.8
4	MS (Phase II)	20,898	215x54x1.8
5	HSD (Phase II)	25,380	235x60x1.8

Impervious dyke wall surrounding the above ground product tanks can accommodate spilled oil. The dyke capacity is more than the maximum capacity of the largest product tank inside the dyke. Dykes are provided with adequate wall height of 1.8m as per OISD norms. Tank foundations are also provided with impervious membrane to avoid seepage of product into the



soil below. The tank farm flooring and dyke wall also are made impervious to prevent oil from seeping into ground/ surrounding area.

Instrumentation and Automation

Automation / Instrumentation system will be as per BPCL's latest Terminal Automation System (TAS) philosophy, which includes the following, as applicable:

- Terminal Automation System, Tank farm management system including Radar Gauges, Multi-Point Temperature Sensors, Pressure Transmitters, Overspill detection and audio, visual alarm system etc.
- Tank Truck loading system including, Flow meters, Batch Controller, DCV etc.
- Ethanol Blending and Multi-Functional Additives (MFA) dosing systems.
- Other field equipment such as online density and temperature sensors, Field Automation and Integration of Sub system Remote Operated Shut off Valves (ROSOV's), Motor Operated Valves (MOV's), Double block and bleed valves (DBBV's), Electrical sub systems, product delivery pumps, fire fighting systems. Tank Truck Entry system, bay queue display etc.
- Control Room equipment such as LRC, OIC's, Servers, PLC's, UPS etc. and necessary TAS software.
- Position sensors for tank dyke valves etc.
- Safety Shutdown System covering Automated Overfill Prevention System, ESD system.
- Meters proving and Calibration facilities.
- ROSOV's, MOV's, DBBV's master station, Push Button Stations etc.
- Necessary cabling, control panel, earthing etc.
- Air Compressor/Air Dryer/Air receiver and piping for pneumatic systems.
- Access control, zoning and multi zoning systems, security features like Door Frame Metal Detectors (DFMD's), Hand Held Metal Detectors (HHMD's) etc.
- CCTV system to cover total Terminal facilities including perimeter wall.
- Hydrocarbon detectors and flow sensors etc. near all potential leak sources of class ' A ' petroleum product,
- Other automation systems and its interface of SAP system with TAS, and to ensure that engineering and design addresses the need for standardization.

Manpower

The estimated manpower requirement for the Operation of Terminal in two shifts is as follows:

Category	Manpower (no's)
Management	19

Category	Manpower (no's)
Clerical	6
Workmen	7
Total	32

Water Supply

Water will be used for human consumption during construction and operation. Process water will not be required for operation of the facilities since no processing/ production is involved. The total water requirement would be as follows :

- a) During Construction stage : @ 75KL/day for human consumption(500 people) @ 150ltr/person/day
- b) During Operations(Post Commissioning)
 - 6KL/day for human consumption (120 people) @ 50ltr/person/day
 - 30KL/day for mock drills, gardening and Horticulture activities

Water to be sourced from private sources as per the requirements.

Power Requirement

Total power requirement for operation of the POL Coastal Terminal has been worked out as 1750 kVA. Backup power arrangement by providing DG sets of following Capacities 1 x 800 KVA, 1 x 500 KVA and 1 x 250 KVA. Provided. Also the DG Sets will be provided with acoustic enclosure

Description of Environment

The area around the proposed POL Terminal has been surveyed for physical features and existing environmental scenario. The field survey and baseline monitoring has been done from the period of **Mid November 2017 to Mid February, 2018**

Air Environment:

The ambient air quality is determined at 10 locations. The PM₁₀ varied from 47 to 68 µg/m³, PM_{2.5} varied from 24 to 38 µg/m³, SO₂ varied from 11 to 16 µg/m³, NO_x varied from 14 to 25 µg/m³. Other parameters like VOCs, Heavy metals, Benzene etc. were found Below Detectable Limit (BDL). All values are within prescribed NAAQS 2009.

Noise Environment:

Noise can be defined as an unwanted sound. A total of 10 locations were identified for ambient noise monitoring in the study area. The daytime varied from 43 dB (A) Leq to 58 dB (A) Leq and night time noise varied of 41.2 dB (A) Leq to 51.6 dB (A) Leq. Both daytime noise and night time noise was within the limit.



Water Environment:

In order to establish the baseline water quality, 10 ground water and 5 surface water samples were collected and analyzed in the study area. The analysis result for ground water samples were within drinking water limit as per IS 10500: 2012. Details of analysis result are given in the EIA report.

Soil Quality:

Soil samples were collected from 6 locations in the study area and analyzed for physico-chemical characteristics. Soil quality was found to be normal. Details of analysis result are given in the EIA report.

Land Use/Land Cover of the Study Area:

Land use pattern of the study area covering 10 km radius includes water bodies, agricultural land, Paddy, Vegetation, Open Scrub, Open waste Land and Built-up Land. Details of land use /land cover classification are given in the EIA report.

Biological Environment:

The ecological study of the area has been conducted within 10 km radius of the project site in order to understand the existing status of flora and fauna to generate baseline information.

Fauna: 7 species of mammals, 2 species of Ambhibians, 6 species of Reptiles,

Avifauna: 46 spieces were identified within the Study Area.

Socio-economic Environment:

Analysis of the demographical statistics, based on Primary Census Abstract, 2011 & field survey reveals that the study area has a total population of 99411 in the study area. Average scheduled castes constitute about 23.3 % of the total population of villages in the study area. Scheduled tribes constitute about 10.9 % of the total population of villages in the study area. Average literacy rate of the study area in 2011 was 56.1 % to total population. Villages in the study area have fairly good infrastructure facilities.

Anticipated Environment Impacts and Environment Management Plan

Impact on Air Environment:

No emission is envisaged during the receipt, storage & handling of petroleum products. There would be no fugitive emission during unloading and hence, no impact is envisaged. The air environment may have minimal impact due to truck movement for receipt and dispatch.

Impact on Noise Environment:

The project site is likely to have increased noise level up to 80-90 dB(A) due to the construction activity but it is likely to be insignificant, reversible and localized in nature and mainly confined to the day hours. As the proposed Terminal shall be operated in closed circuit, it is envisaged that noise environment would remain unaffected during operation of the proposed facilities.

Impact on Water Environment:



Water requirement will meet from local/outside agencies. The overall impact on water environment due to construction of proposed project is likely to be temporary, short term and insignificant.

Impact on Land Environment:

The project area is vacant land, there are no settlements and hence the question of rehabilitation and resettlement does not arise. As the complete system shall be closed loop, no impact is envisaged on the topography during operation phase.

Impact on Biological Environment:

The probability and consequences of significant ecological impacts occurring as a result of the operation of the POL Terminal are considered to be almost negligible. The risk of any leakage is almost negligible owing to stringent leak prevention technologies.

Municipal solid waste will be disposed through local bodies. Spent lube oil from D.G. set will be sold to APPCB Authorized recyclers. Hence no impact on flora and fauna is envisaged. Moreover there are no reserve forest and protected areas within 10 km radius. Greenbelt will be developed which will serve as ecosystem. There will be no effluent discharge in the water body. Thus there is no impact on the aquatic biota present in vicinity of proposed project.

Impact on Socio-economic Environment:

The construction of the proposed project is expected to provide temporary indirect employment to a good number of skilled and unskilled workers. The project will contribute to the socio-economic development of the area at the local level in turn reducing migration for employment. Hence the proposed project will have positive impact on the socio-economic environment.

Environmental Monitoring Programme

It is imperative that BPCL should engage domain expert to collect sample data at prescribed intervals as suggested by PCB guidelines to assess the environmental health in the post period. A post study monitoring programme is important as it provides useful information on the following aspects.

- It helps to verify the predictions on environmental impacts presented in this study.
- It helps to indicate warnings of the development of any alarming environmental situations, and thus, provides opportunities for adopting appropriate control measures in advance.

Additional Studies

Hazard Identification and Consequence Assessment

Quantitative Risk Study has been done to determine the potential risks of major disasters having damage potential to life and property and provide a scientific basis using PHAST RISK (Version 6.7) software developed by DNV GL. Disaster Management Plan is prepared for identification of



various hazards addressed qualitatively and included in onsite- emergency plan. Details of risk assessment are given in the EIA report.

Hazards we identified for release of MS, HSD, SKO, Bio-Diesel and Ethanol for scenarios of catastrophic rupture of storage tank at proposed site. Consequence analysis of all possible containment scenarios was carried out. **No domino effect envisaged as all tanks are adequately spaced and heat or pressure wave is limited to dyke area.**

Project Benefits

- The project will improve supply of the High Speed Diesel (HSD), Motor Spirit (MS), and Superior Kerosene Oil (SKO) in SPSR Nellore region and overall benefit the state of Andhra Pradesh which is vital for economic growth as well as improving the quality of life.
- The project shall provide indirect employment to potential under unskilled, semi-skilled and skilled categories. The employment potential shall increase with the start of construction activities, reach a peak during construction phase and then reduce with completion of construction activities. During operation phase also there will be indirect employment opportunities, mainly in service sector, although its magnitude will be little less.
- The employment opportunities exist mainly with the indirect employment like contractors and sub-contractors. These agencies will be persuaded to provide the jobs to local persons on a preferential basis wherever feasible.

Capital Investment and Project Schedule

The expected cost of the proposed project will be around Rs. 700 Crores. The project is scheduled to be completed within 18-24 months post obtaining Environmental Clearance and necessary statutory approvals.