

DEENDAYAL PORT AUTHORITY
(Erstwhile: DEENDAYAL PORT TRUST)



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www.deendayalport.gov.in

EG/WK/4712/Part II/ 34

Dated: 24/02/2025

To,
The Deputy Director General of Forests (C),
Ministry of Environment, Forest & Climate Change,
Integrated Regional Office,
Gandhinagar, A wing-407 & 409,
Aranya Bhavan Near CH-3 Circle,
Sector 10 A, Gandhinagar -382010
Email : ecompliance-guj@gov.in

Sub: "Development of Integrated facilities (Stage II) within the existing Deendayal Port Trust (Erstwhile Kandla Port Trust) at District Kutch, Gujarat (1. Setting up of Oil Jetty no. 7, 2. Setting up of Barge Jetty at Jafrabadi, 3. Setting up of Barge Port at Veera, 4. Administrative office building at Tuna Tekra, 5. Road connecting from Veera Barge Jetty to Tuna gate by Deendayal Port Authority (Erstwhile Deendayal Port Trust)- **Six monthly compliance report of the conditions stipulated in the EC&CRZ Clearance and Monitoring Report in Datasheet reg.**

Ref.: 1) MoEF&CC, GoI letter F. No. 11-13/2015-IA.III dated 19/02/2020
2) Regional office, western zone MoEF&CC, GOI Bhopal letter dated 30/05/2020
3) DPT letter EG/WK/4751/part/988 dated 29/08/2020 – submission of detail asked by regional office, western zone MoEF&CC, GOI Bhopal letter dated 30/05/2020
4) DPT letter no. EG/WK/4712/EC/Part II/52 dated 29/07/2021
5) DPT letter no. EG/WK/4712/EC/Part II/143 dated 08/02/2022
6) DPT letter no. EG/WK/4712/EC/Part II/139 dated 11/07/2022
7) DPT letter no. EG/WK/4712/EC/Part II/291 dated 03/05/2023
8) DPT letter no. EG/WK/4712/EC/Part II/370 dated 03/10/2023
9) DPA letter no. EG/WK/4712/EC/Part II/108 dated 09/08/2024

Sir,

It is requested to kindly refer above cited references for the said subject.

In this regard, it is to state that, Ministry of Environment, Forest and Climate Change (MoEF&CC), GoI vide F. No. 11-13/2015-IA.III dated 19/02/2020 has accorded Environmental and CRZ Clearance for the subject project of the Deendayal Port Authority.

Subsequently, DPA vide above mentioned letters had submitted the compliance report of the stipulated conditions mentioned in MoEF&CC, GOI vide letter No. F No. 11-13/2015-IA-III dated 19/02/2020

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In this regard, it is to state that the point wise compliance status for the period of June 2024 to September 2024 of various stipulations (as per applicability) of the EC&CRZ Clearance accorded by the MoEF&CC, GOI, New Delhi vide no. 11-13/2015-IA-III dated 19/02/2020 with supporting documents and report is being hereby submitted for your kind information and records.

Further, as per the MoEF&CC, Notification S.O.5845 (E) dated 26.11.2018, stated that **"In the said notification, in paragraph 10, in sub-paragraph (ii), for the words "hard and soft copies" the words "soft copy" shall be substituted"**. Accordingly, we are submitting herewith soft copy of the same through e-mail in ID ecompliance-guj@gov.in.

This has the approval of Chief Engineer, Deendayal Port Authority.

Thanking You.

Encl.: As above

Yours faithfully,


Dy. CE & EMC(I/c)

Deendayal Port Authority

Copy along with point wise compliance of stipulated conditions, to:

1) Shri Amardeep Raju,
Scientist E, Ministry of Environment,
Forest and Climate Change,
& Member Secretary (EAC-Infra.1),
Indira Paryavaran Bhawan,
3rd Floor, Vayu Wing, Jor Bagh Road,
Aliganj,
New Delhi- 110 003;
E-mail:ad.raju@nic.in

2) Shri Prasoon Gargava,
Scientist E & Regional Director,
Central Pollution Control Board,
Parivesh Bhawan,
Opp. VMC Ward Office No.10,
Subhanpura,
Vadodara - 390 023.
Email Id.Prasoon.cpcb@nic.in

3) Shri T. C. Patel,
The Unit Head, Kachchh,
Gujarat Pollution Control Board,
Paryavaran Bhavan,
Sector 10A,
Gandhinagar- 382 010.
Email-kut-uh-gpcb@gujarat.gov.in

4) The Regional Officer,
Gujarat Pollution Control Board,
Regional Office (East Kutch)
Administrative Office Building,
Deendayal Port Authority,
Gandhidham 370201
Email Id. ro-gpcb-kute@gujarat.gov.in

ANNEXURE I
Point wise compliance

Subject: Development of Integrated facilities (Stage-II) within the existing Deendayal Port Trust (Erstwhile Kandla Port Trust) at District Kutch, Gujarat. (1. Setting up of Oil Jetty No.7. 2. Setting up of Barge jetty at Jafarwadi 3. Setting up of Barge port at Veera; 4. Administrative office building at Tuna Tekra; 5. Road connecting from Veera barge jetty to Tuna gate by M/s Deendayal Port Trust (Erstwhile Kandla Port Trust)

CURRENT STATUS OF WORK – Upto September 2024

Sr.No.	Name of Project	Status
1.	Setting up of Oil Jetty No.7	Under operation w.e.f January 2023.
2.	Setting up of Barge jetty at Jafarwadi	No construction activity started yet.
3.	Setting up of Barge port at Veera	No construction activity started yet.
4.	Administrative office building at Tuna Tekra;	No construction activity started yet.
5.	Road connecting from Veera barge jetty to Tuna gate	No construction activity started yet.

Subject: Point wise compliance of stipulated conditions of EC & CRZ Clearance for "Development of Integrated facilities (Stage-II) within the existing Deendayal Port Trust (Erstwhile Kandla Port Trust) at District Kutch, Gujarat. (1. Setting up of Oil Jetty No.7. 2. Setting up of Barge jetty at Jafarwadi 3. Setting up of Barge port at Veera; 4. Administrative office building at Tuna Tekra; 5. Road connecting from Veera barge jetty to Tuna gate by M/s Deendayal Port Trust (Erstwhile Kandla Port Trust) - Environmental & CRZ Clearance - reg.". **(For the period Up to September 2024)**

Sr. No.	Stipulated Conditions	Compliance
i	Construction activity shall be carried out strictly according to the provisions of the CRZ Notification, 2011. No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area.	The work of project at Sr. No. 1 of EC i.e. " Setting up of Oil jetty no. 7 " is completed and it is under operation w.e.f January 2023. The Consent to Operate (CCA) from the Gujarat Pollution Control Board has already been obtained dated 20/1/2023 <u>Copy submitted along with compliance report submitted on</u> However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that, construction activities will be carried out strictly as per the provisions of the CRZ notification, 2011 and also no activity other than those permissible in Coastal Regulation Notification will be carried out in CRZ area.
ii	All the recommendations and conditions specified by the Gujarat Coastal Zone Management Authority vide letter No. ENV-10-2015-231-E (T Cell) dated 29.06.2016 shall be complied with	The compliance report of CRZ Recommendation issued by the GCZMA dated 29/06/2016 is attached herewith as Annexure A .
iii	The project proponent shall ensure that the project is in consonance with the new CZMP prepared by the State Government under the provisions of the CRZ Notification, 2011	The MoEF&CC, GoI accorded EC & CRZ Clearance for the subject proposal of DPA dated 19/2/2020. Accordingly, implementation of the remaining projects (Project at Sr.no. 2 to 5 – No construction activity started yet) will be carried out as per the EC & CRZ Clearance accorded by the MoEF&CC,GoI.
iv	The Project proponent would submit a certificate from Gujarat Water Supply and Sewerage Board (GWSSB) for providing required water. This should be submitted with the first compliance report.	The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. The required water supply is purchased from GWSSB. However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that condition mentioned will be complied with.
v	The Project proponent shall ensure that no creeks or rivers are blocked due to any activities at the project site and free flow of water is maintained.	The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that condition mentioned will be complied with.
vi	Dredging shall not be carried out during the fish breeding season.	The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. The Capital Dredging w.r.t. OJ 7 also completed in June 2023. However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that condition mentioned will be complied with.
vii	Dredging, etc shall be carried out in the confined manner to reduce the impacts on marine environment.	The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. The Capital Dredging w.r.t. OJ 7 also completed in June 2023.

		However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that condition mentioned will be complied with.
viii	Dredged material shall be disposed safely in the designated areas.	<p>The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. The Capital Dredging w.r.t. OJ 7 also completed in June 2023.</p> <p>However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that condition mentioned will be complied with.</p>
ix	Shoreline should not be disturbed due to dumping. Periodical study on shore line changes shall be conducted and mitigation carried out, if necessary. The details shall be submitted along with the six-monthly monitoring report.	<p>The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. The Capital Dredging w.r.t. OJ 7 also completed in June 2023.</p> <p>No activity started yet for other projects mentioned at Sr. no. 2 to 5.</p> <p>DPA issued work order vide no. EG/WK/4751/Part (EC- Shoreline study) Dated: 12/10/2021 to NCSCM, Chennai for Shoreline Change Study for Deendayal Port Trust, Kandla, Kachchh District, Gujarat, to Study the Effect of Dumping, if any reg. Final Report submitted by the NCSCM, Chennai had already been submitted with the compliance report communicated vide letter dated 11/07/2022.</p>
x	The ground water shall not be tapped within the CRZ areas by the PP to meet with the water requirement in any case.	<p>The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. Required water supply is purchased from GWSSB.</p> <p>However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that condition mentioned will be complied with.</p>
xi	While carrying out dredging, an independent monitoring shall be carried out by Government Agency/Institute to check the impact and necessary measures shall be taken on priority basis if any adverse impact is observed.	<p>The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. The Capital Dredging w.r.t. OJ 7 also completed in June 2023.</p> <p>As already informed, DPA appointed IIT-Mumbai as an Independent agent for monitoring the same And report of same has been submitted along with earlier compliance report.</p>
xii	Mitigate measures as given in the Marine Biodiversity Management Plan prepared by CSIR-NIO for protection of marine environment shall be complied with in letter and spirit.	Point noted for the compliance.
xiii	A copy of the Marine and riparian biodiversity management plan duly validated by the State Biodiversity Board shall be submitted before commencement of implementation.	A copy of Report entitled "Holistic Marine Ecological Monitoring of Deendayal Port Environment with Special Reference to Biodiversity and Preparation of Management Plan" prepared by M/s GUIDE, Bhuj and validated by Gujarat State Biodiversity Board vide letter dated 24/12/2019 had already been submitted vide DPA letter dated 29/8/2020 - Submission of Detail asked by Regional Office, Western Zone MoEF&CC, GOI Bhopal vide letter dated 30/05/2020.
xiv	A continuous monitoring programme covering all the seasons on various aspects of the coastal environs need to be undertaken by a competent organization available in the State or by entrusting to the National Institutes/reowned	DPA assigned work to M/s GUIDE, Bhuj, vide work order dated 3/5/2021 for "Regular Monitoring of Marine Ecology in and around the Deendayal Port Authority and Continuous Monitoring Programme covering all seasons on various aspects of the

	Universities with rich experiences in marine science aspects. The monitoring should cover various physico-chemical parameters coupled with biological indices such as microbes, plankton, benthos and fishes on a periodic basis during construction and operation phase of the project. Any deviations in the parameters shall be given adequate care with suitable measures to conserve the marine environment and its resources	Coastal Environs covering Physico-chemical parameters of marine water and Marine sediment samples coupled with biological indices, as per the requirements of EC & CRZ Clearances reg. (for three years (2021-2024)). The copy of the final reports has already been submitted with the last six-monthly compliance report submitted earlier. In continuation of the same, DPA assigned work to M/s GUIDE, Bhuj, vide work order dated 10/6/2024 for "Regular Monitoring of Marine Ecology in and around the Deendayal Port Authority and Continuous Monitoring Programme covering all seasons on various aspects of the Coastal Environs covering Physico-chemical parameters of marine water and Marine sediment samples coupled with biological indices, as per the requirements of EC & CRZ Clearances reg. (for three years (2024-2027)). A copy the work order had already been submitted along with the compliance report submitted on 09/08/2024.
xv	Marine ecology shall be monitored regularly also in terms of sea weeds, sea grasses, mudflats, sand dunes, fisheries, echinoderms, shrimps, turtles, corals, coastal vegetation, mangroves and other marine biodiversity components as part of the management plan. Marine ecology shall be monitored regularly also in terms of all micro, macro and mega floral and faunal components of marine biodiversity.	
xvi	The project proponents would also draw up and implement a management plan for the prevention of fires due to handling of coal.	Deendayal Port Authority issued a Circular (SOP) to the trade with regard to control of dust pollution arising out of coal handling and ensuring safety in coal handling (circular no. TF/SH/Circulars/2019/1256 dated 10/10/2019). A copy of circular is submitted along with compliance report submitted on 03/10/2023. DPA already installed Sprinkling system inside Cargo Jetty area for Coal Dust Suppression in Coal Yard (40 Ha. area) at the cost of Rs. 14.44 crores. Continues water sprinkling is being carried out on the heap of coal, at regular intervals to prevent dusting, fire and smoke.
xvii	Spillage of fuel / engine oil and lubricants from the construction site are a source of organic pollution which impacts marine life, particularly benthos. This shall be prevented by suitable precautions and also by providing necessary mechanisms to trap the spillage.	DPA is already having Oil Spill contingency plan & accordingly, necessary precautions will be taken to prevent spillage of Fuel/Engine oil and lubricants. A copy of updated oil spill contingency plan is placed herewith as Annexure B
xviii	Necessary arrangements for the treatment of the effluents and solid wastes must be made and it must be ensured that they conform to the standards laid down by the competent authorities including the Central or State Pollution Control Board and under the Environment (Protection) Act, 1986.	No industrial effluent is generated in the port area. Considering the smaller quantity of waste water generated as of now DPA is exploring possibilities of treating the same in bio toilets. DPA appointed GPCB approved vendors for collection of solid waste and they are collecting it regularly DPA has Appointed GEMI, Gandhinagar for the "Preparation of Plan for Management of Plastic Wastes, Solid waste including C&D wastes, E-wastes, Hazardous wastes including Biomedical". The work is completed. A copy final report submitted is placed herewith Annexure C Further, for projects at Sr. No. 2 to 5, construction activity not yet started. However, the stipulated condition will be complied with.

xix	All the recommendations mentioned in the rapid risk assessment report, disaster management plan and safety guidelines shall be implemented	All the recommendations mentioned in the Rapid Risk Assessment Report, Disaster Management Plan & safety Guidelines will be implemented
xx	Measures should be taken to contain, control and recover the accidental spills of fuel and cargo handle.	DPA already has an Oil Spill Contingency Plan. A copy of updated oil spill contingency plan is attached herewith as Annexure B
xxi	Necessary arrangement for general safety and occupational health of people should be done in letter and spirit.	DPA has included tender clause regarding the safety of all activities on the site.
xxii	The commitments made during the Public Hearing conducted in 2013 for earlier project and recorded in the Minutes shall be complied with letter and spirit. A hard copy of the action taken shall be submitted to the Ministry	The commitments made during the Public Hearing conducted will be complied with letter & spirit. In this regard, the details of CSR Activities implemented as well as proposed are enclosed herewith as Annexure D.
xxiii	All the mitigation measures submitted in the EIA report shall be prepared in a matrix format and the compliance for each mitigation plan shall be submitted to the RO, MoEF&CC along with half yearly compliance report.	Compliance of the mitigation measures suggested in the EIA report in the matrix format is attached herewith as Annexure E
xxiv	As per the Ministry's Office Memorandum F.No. 22-65/2017-IA.III dated 1 st May, 2018, the project proponent has proposed that an amount of Rs. 2.97 Crore (@ 0.75% of project Cost) shall be earmarked under Corporate Environment Responsibility (CER) for the activities such as Drinking water, Sanitation, Health, Education, Skill Development Roads, Electrification including Solar Power, Scientific support and awareness to local farmers to increase yield of crop and fodder, Rain water harvesting, Soil Moisture Conservation work and Avenue plantation and plantation in community areas. The activities proposed under CER shall be restricted to the affected area around the project. The entire activities proposed under the CER shall be treated as project and shall be monitored. The monitoring report shall be submitted to the Regional Office as a part of half yearly compliance report, and to the District Collector. It should be posted on the website of the project proponent	Out of 5 projects, only work of Oil Jetty no. 7 is completed and it is under operation w.e.f January 2023. DPA has appointed GEMI Gandhinagar for the work of "Planning and Monitoring of the activities to be under Environment management plan (EMP) under EIA and EC." Vide work order dated 01/11/2023. The same is under process.

B. GENERAL CONDITIONS:

i.	Appropriate measures must be taken while undertaking digging activities to avoid any likely degradation of water quality.	Point noted
ii	Full support shall be extended to the officers of this Ministry/Regional Office at Bhopal by the project proponent during inspection of the project for monitoring purposes by furnishing full details and action plan including action taken reports in respect of mitigation measures and other environmental protection activities.	It is assured that full support will be extended to the officers of this Ministry/Regional Office at Gandhinagar by the project proponent during inspection of the project for monitoring purposes.
iii	A six-Monthly monitoring report shall need to be submitted by the project proponents to the Regional Office of this Ministry at Bhopal regarding the implementation of the stipulated conditions.	DPA has been regularly submitting six monthly monitoring report to the Regional Office at Bhopal/Gandhinagar regarding implementation of the stipulated conditions.

iv	Ministry of Environment, Forest and Climate Change or any other competent authority may stipulate any additional conditions or modify the existing ones, if necessary, in the interest of environment and the same shall be complied with.	Point noted
v	The Ministry reserves the right to revoke this clearance if any of the conditions stipulated are not complied with the satisfaction of the Ministry	Point noted
vi	In the event of a change in project profile or change in the implementation agency, a fresh reference shall be made to the Ministry of Environment, Forest and Climate Change.	Point Noted.
vii	The project proponents shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of land development work	For one of the project out of 5 projects i.e. Construction of Oil Jetty No. 7, the Board of Trustees of DPA vide Resolution No. 25 in its meeting held on 08/06/2015 approved the project (Block estimate - 72 Crores). Accordingly, the work for construction of the Oil Jetty No. 7 started on 24/03/2020 now, it is under operation w.e.f January 2023.
viii	A copy of the clearance letter shall be marked to concerned Panchayat/local NGO, if any, from whom any suggestion/ representation has been made received while processing the proposal.	No such representations have been received. Hence, not applicable.
ix	A copy of this clearance letter shall also be displayed on the website of the concerned State Pollution Control Board. The Clearance letter shall also be displayed at the Regional Office, District Industries centre and Collector's Office/ Tehsildar's office for 30 days.	--
6.	Consent to Establish/Operate for the project shall be obtained from the State Pollution Control Board as required under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.	The Consent to Establish (CTE) from the GPCB had already been obtained vide CTE No. 74134 granted by the GPCB vide letter no. PC/CCA-KUTCH 1319/GPCB ID 48573 dated 27/11/2015. Subsequently, DPA obtained EC to CTE (PCB ID 48573) vide GPCB Order dated 13/10/2020 after obtaining Environmental and CRZ Clearance from MoEF&CC, GoI vide F. No. 11-13/2015-IA-III dated 19/02/2020. The copy of EC to CTE also obtained from the GPCB In addition to this as the construction work for the project at Sr 1 is completed and it is under operation w.e.f January 2023 therefore CCA has obtained from the Gujarat Pollution Control Board vide GPCB/CCA-Kutch-1319/ID-48573/701442 dated 20/01/2023. Copy of same is submitted along with compliance report submitted on 03/10/2023.
7.	All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.	Point Noted for the compliance.
8.	The project proponent shall advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental and CRZ Clearance and copies of clearance letters are available with the	DPA has already given advertisement in two local newspapers viz. KUTCHMITRA (In Gujarati) dated 23/2/2020 and in the Indian Express (In English) dated 23/02/2020 and also forwarded to the Regional Office , MoEF&CC,Bhopal vide letter dated

	State Pollution Control Board and may also be seen on the website of the Ministry of Environment, Forest and Climate Change at http://www.envfor.nic.in . The advertisement should be made within Seven days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the regional office of this Ministry at Bhopal.	28/2/2020 (Submitted along with the compliance report submitted on 03/05/2023)
9.	This clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.	Point noted.
10.	Any appeal against this clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	Point noted.
11.	Status of compliance to the various stipulated environmental conditions and environmental safeguards will be uploaded by the project proponent in its website	DPA regularly uploads the status of compliance of the stipulated Clearance conditions, including results of monitored data on their website www.deendayalport.gov.in
12.	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.	No suggestions/representation received. Public Hearing exempted. Copy of the EC letter has been uploaded in the website of DPA www.deendayalport.gov.in .
13.	The proponent shall upload the status of compliance of the stipulated Clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF&CC, the respective Zonal Office of CPCB and the SPCB	DPA regularly uploads the status of compliance of the stipulated Clearance conditions, including results of monitored data on their website www.deendayalport.gov.in .
14.	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF&CC, the respective Zonal Office of CPCB and the SPCB.	DPA is regularly submitting the report of compliance of the stipulated Clearance conditions including results of monitored data to the IRO Gandhinagar and copy to Office of MoEF&CC, GPCB, CPCB. Last compliance submitted on 03/10/2023.
15.	The environmental statement for each financial year ending 31 st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of Clearance conditions and shall also be sent to the respective Regional Office of MoEF&CC by e-mail.	Point Noted.
16.	The above stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act 1974, the Air (Prevention and Control of Pollution) Act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification 1994, including the amendments and rules made thereafter.	Point Noted.

ANNEXURE A
Point wise compliance CRZ
recommendation

DEENDAYAL PORT AUTHORITY
(Erstwhile: DEENDAYAL PORT TRUST)



www.deendayalport.gov.in

EG/WK/4751/Part (Stage II)/ 35

Administrative Office Building
Post Box NO. 50
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Gujarat: 370 201.
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Ph.: (02836) 220038

Dated: 24/02/2025

To,
Director (Environment) & Member Secretary,
Gujarat Coastal Zone Management Authority,
Forest & Environment Department,
Govt. of Gujarat,
Block No.14, 8th floor,
Sachivalaya, **Gandhinagar – 382 010.**

Sub: "Development of Integrated facilities (Stage II) within the existing Deendayal Port Trust (Erstwhile Kandla Port Trust) at District Kutch, Gujarat (1. Setting up of Oil Jetty no. 7, 2. Setting up of Barge Jetty at Jafrabadi, 3. Setting up of Barge Port at Veera, 4. Administrative office building at Tuna Tekra, 5. Road connecting from Veera Barge Jetty to Tuna gate by Deendayal Port Authority (Erstwhile Deendayal Port Trust)"– **Pointwise Compliances of the conditions stipulated in CRZ Recommendations reg.**

Ref.: 1) GCZMA CRZ recommendation vide letter No. ENV-10-2015-251-E (T cell) dated 29/06/2016
2) DPT letter EG/WK/4751/Part (Remaining 3 facilities)/53 dated 29/07/2021.
3) DPT letter EG/WK/4751/Part (Remaining 3 facilities)/144 dated 08/02/2022
4) DPT letter EG/WK/4751/Part (Stage II)/141 dated 01/07/2022
5) DPT letter EG/WK/4751/Part (Stage II)/292 dated 03/05/2023
6) DPT letter EG/WK/4751/Part (Stage II)/371 dated 03/10/2023
7) DPA letter EG/WK/4751/Part (Stage II)/109 dated 09/08/2024.

It is requested to kindly refer the above cited references for the said subject.

In this connection, it is to state that, the Gujarat Coastal Zone Management Authority vide above referred letter dated 29/6/2016 had recommended the aforesaid project of Deendayal Port Authority. Subsequently, the MoEF&CC, GOI had accorded the Environmental & CRZ Clearance vide letter dated 19/02/2020

Subsequently, DPA vide letter dated 22(24)/12/2020 has submitted compliance report of the stipulated conditions mentioned in the CRZ Recommendation letter 29/06/2016

.....Cont.....

Now, as directed under Specific Condition No. 28 mentioned in the CRZ Clearance letter dated 29/6/2016 i.e. **A six monthly report on compliance of the conditions mentioned in this letter shall have to be furnished by the DPA on a regular basis to this Department and MoEF&CC, GoI**, please find enclosed herewith compliance report (for the period June 2024 to September 2024) of stipulated conditions along with necessary annexures, for kind information & record please **(Annexure I)**.

Further, as per the MoEF&CC, Notification S.O.5845 (E) dated 26.11.2018, stated that **"In the said notification, in paragraph 10, in sub-paragraph (ii), for the words "hard and soft copies" the words "soft copy" shall be substituted"**. Accordingly, we are submitting herewith soft copy of the same via e-mail ID gczma.crz@gmail.com & direnv@gujarat.gov.in.

This has the approval of Chief Engineer, Deendayal Port Authority.

Thanking you.

Yours faithfully,



Dy. CE and EMC (I/c)

Deendayal Port Authority

Copy to:

Shri Amardeep Raju,
Scientist E, Ministry of Environment, Forest and Climate Change,
& Member Secretary (EAC-Infra.1),
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ANNEXURE I
Point wise compliance

Subject: Development of Integrated facilities (Stage-II) within the existing Deendayal Port Trust (Erstwhile Kandla Port Trust) at District Kutch, Gujarat. (1. Setting up of Oil Jetty No.7. 2. Setting up of Barge jetty at Jafarwadi 3. Setting up of Barge port at Veera; 4. Administrative office building at Tuna Tekra; 5. Road connecting from Veera barge jetty to Tuna gate by M/s Deendayal Port Trust (Erstwhile Kandla Port Trust)

CURRENT STATUS OF WORK – Upto September 2024

Sr.No.	Name of Project	Status
1.	Setting up of Oil Jetty No.7	Under operation w.e.f January 2023.
2.	Setting up of Barge jetty at Jafarwadi	No construction activity started yet.
3.	Setting up of Barge port at Veera	No construction activity started yet.
4.	Administrative office building at Tuna Tekra;	No construction activity started yet.
5.	Road connecting from Veera barge jetty to Tuna gate	No construction activity started yet.

Subject: Point-wise Compliance Status Report for CRZ Clearance for Developing Integrated facilities (Phase-II)- within the existing Kandla Port at Kandla Dist: Kutch by M/s. Kandla Port Trust – Regarding (For the period up to September 2024)

1. **Setting up of Oil Jetty No.7**
2. **Setting up of Barge jetty at Jafarwadi**
3. **Setting up of Barge port at Veera**
4. **Administrative office building at Tuna Tekra**
5. **Road connecting from Veera barge jetty to Tuna gate**

Ref No: - GCZMA CRZ recommendation vide Letter No- ENV-10-2015-251-E (T Cell) dated 29.06.2016

S No	CRZ Conditions	Compliance Status
SPECIFIC CONDITIONS		
1.	The provision of the CRZ notification 2011 shall be strictly adhered to by the KPT. No activity in contradiction to the provision of the CRZ notification shall be carried out by the KPT.	<p>The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. The Consent to Operate (CCA) from the Gujarat Pollution Control Board has already been obtained dated 20/1/2023 <u>Copy submitted along with the compliance report submitted on 03/10/2023.</u></p> <p>However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that, the provisions of the CRZ Notification, 2011 will be strictly adhered to by DPA</p>
2.	All necessary permissions under various laws/Rules/Notifications issued thereunder from different Government Department/agencies shall be obtained by M/s. KPT before commencing any enabling activities for proposed project.	<p>The Consent to Establish (CTE) from the GPCB had already been obtained vide CTE No. 74134 granted by the GPCB vide letter no. PC/CCA-KUTCH 1319/GPCB ID 48573 dated 27/11/2015.</p> <p>In addition to this as the construction work for the project at Sr 1 is completed and it is under operation w.e.f January 2023 therefore CCA has obtained from the Gujarat Pollution Control Board vide GPCB/CCA- Kutch-1319/ID-48573/701442 dated 20/01/2023. <u>Copy submitted along with the compliance report submitted on 03/10/2023.</u></p>
3.	The KPT shall have to ensure that there shall not be any damage to the existing mangrove area.	<p>The construction work for the project at Sr 1 is completed and it is under operation w.e.f January 2023.</p> <p>However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that, there shall not be any damage to the existing mangrove area</p>
4.	The KPT shall effectively implement the mangrove Development, Protection & Management plan for control of indirect impacts on mangrove habitat	<p>DPA had already undertaken Mangrove Plantation in an area of 1600 Ha. till date since the year 2005. A statement showing details of the mangrove plantation and the cost incurred is already submitted along with compliance report submitted on 09/08/2024.</p> <p>In addition to the above, DPA appointed M/s GUIDE, Bhuj, for "Regular Monitoring of Mangrove Plantation carried out by DPA" (period 15/9/2017 to 14/9/2018 vide work order dated 1/9/2017 and 24/5/2021 to 23/5/2022 vide work order dated 3/5/2021). The final report submitted by M/s GUIDE, Bhuj for the year 2021 to 2022. Submitted along with the compliance report submitted on 03/05/2023.</p> <p>Further DPA has assigned work to M/s GUIDE, Bhuj vide work order dated 10/06/2024 for "Monitoring of Mangrove Plantation 1600 Ha carried out by DPA" for the Period of 10/06/2024 to 09/06/2025. A copy Inception</p>

		report is attached herewith as Annexure A
5.	The KPT shall have to make a provision that mangrove areas get proper flushing water and free flow of water shall not be obstructed	<p>The construction work for the project at Sr 1 is Completed and it is under operation w.e.f January 2023.</p> <p>However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that, provision will be made for mangrove areas will get proper flushing of water and free flow of water is not obstructed.</p>
6.	The KPT shall have to dispose of the dredged material only after scientific study to be carried out by the Institute of National repute and at a location suggested by them.	<p>The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. Capital Dredging at O.J. completed on 14/04/2023.</p> <p>It is submitted that, in compliance of specific condition no. xi of the EC dated 19/02/2020 DPA appointed IIT- Mumbai as an Independent agency for monitoring the dredging activities undertaken, vide work order no. HD/WK/1078/2022/OJ7/dredging/ENV610 dated 21/12/2022.</p> <p>However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that condition mentioned will be complied with.</p>
7.	The KPT shall have to maintain the record for generation and disposal of capital dredging and maintenance dredging.	Point noted for the compliance.
8.	No dredging, reclamation or any other project related activities shall be carried out in the CRZ area categorized as CRZ I (i) and it shall have to be ensured that the mangrove habitats and other ecologically important and significant areas, if any, in the region are not affected due to any of the project activities	<p>It is hereby assured that DPA will undertake only activities recommended by the GCZMA vide letter dated 29/06/2016 and EC & CRZ clearance accorded by the MoEF&CC, GOI vide letter dated 18/02/2020. DPA has already prepared a mangrove preservation plan for the entire Kandla area</p> <p>In addition to the above, DPA appointed M/s GUIDE, Bhuj, for "Regular Monitoring of Mangrove Plantation carried out by DPA" (period 15/9/2017 to 14/9/2018 vide work order dated 1/9/2017 and 24/5/2021 to 23/5/2022 vide work order dated 3/5/2021). The final report submitted by M/s GUIDE, Bhuj, for the years 2017 to 2018 has been submitted in the earlier compliance report, and the final report for the year 2021 to 2022 is Submitted along with the compliance report submitted on 03/05/2023.</p> <p>In continuation of same, DPA appointed M/s GUIDE, Bhuj, for "Monitoring of Mangrove Plantation 1600 ha carried out by DPA" (period 10/06/2024 to 09/06/2025 vide work order dated 10/6/2024.A copy is inception report is attached herewith as Annexure A</p> <p>Further, DPA had assigned the work to M/s GUIDE, Bhuj for "Regular Monitoring of Marine Ecology in and around the Deendayal Port Authority and Continuous Monitoring Programme covering all seasons on various aspects of the Coastal Environs covering Physico- chemical parameters of marine water and marine sediment samples coupled with biological indices, as per the requirements of EC & CRZ Clearances reg. (for three years (2021-2024)). The final reports has already been submitted along with compliance report submitted earlier.</p> <p>In continuation of the same, DPA had assigned the work to M/s GUIDE, Bhuj for "Regular Monitoring of Marine Ecology in and around the Deendayal Port Authority and</p>

		<p>Continuous Monitoring Programme covering all seasons on various aspects of the Coastal Environs covering Physico-chemical parameters of marine water and marine sediment samples coupled with biological indices as per the requirements of EC & CRZ Clearances reg. (for three years (2024-2027)) vide its work order dated 10/06/2024. Copy already submitted along with compliance report submitted on 09/08/2024</p> <p>It is relevant to mention here that, DPA has already undertaken Mangrove Plantation in an area of 1600 Ha. till date since the year 2005. A statement showing details of the mangrove plantation already submitted along with compliance report submitted on 09/08/2024.</p>
9.	The KPT shall participate financially for installing and operating the vessel traffic management system in the Gulf of Kutch and shall also take lead in preparing and operational sing the Regional Oil Spill Contingency plan in the Gulf of Kutch	DPA had already contributed an amount of Rs. 98.955 crore i.e 25% of the total project cost of 395.82 crore for installing and operating VTMS in Gulf of Kachchh
10.	The KPT shall strictly ensure that no creeks or rivers are blocked due to any activity at Kandla	The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that condition mentioned will be complied with
11.	Mangrove plantation in an area of 50 ha shall be carried out by the KPT within 2 years in a time bound manner on Gujarat coastline either within or outside the Kandla port Trust area and six-monthly compliance report along with the satellite images shall be submitted to the ministry of Environment and Forest as well as to this Department without fail.	<p>DPA has signed MoU with Gujarat Ecology Commission, Gandhinagar to carry out mangrove plantation through PPP mode for the year 2020-2021.</p> <p>DPA (Erstwhile KPT) had already undertaken Mangrove Plantation in an area of 1600 Ha. till date since the year 2005. A statement showing details of the mangrove plantation and the cost incurred has already been submitted along with compliance report submitted on 09/08/2024</p> <p>In addition to the above, DPA appointed M/s GUIDE, Bhuj, for "Regular Monitoring of Mangrove Plantation carried out by DPA" (period 15/9/2017 to 14/9/2018 vide work order dated 1/9/2017 and 24/5/2021 to 23/5/2022 vide work order dated 3/5/2021). The final report submitted by M/s GUIDE, Bhuj, for the years 2017 to 2018 has been submitted in the earlier compliance report, and the final report for the year 2021 to 2022 is Submitted along with the compliance report submitted on 03/05/2023.</p> <p>In continuation of same, DPA appointed M/s GUIDE, Bhuj, for "Monitoring of Mangrove Plantation 1600 ha carried out by DPA" (period 10/06/2024 to 09/06/2025 vide work order dated 10/6/2024.A copy is inception report is attached herewith as Annexure A</p>
12.	No activity other than those permitted by the competent authority under the CRZ Notification Shall be carried out in the CRZ area.	<p>The construction work for the project at Sr 1 is completed and it is under operation. The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. The Consent to Operate (CCA) from the Gujarat Pollution Control Board has already been obtained dated 20/1/2023 .Copy of same is already submitted in the earlier compliance report submitted on 03/10/2023.</p> <p>However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that, no activity other than those permitted by the competent authority under the CRZ Notification Shall be carried out</p>

		in the CRZ area
13.	No ground water shall be tapped for any purpose during the proposed expansion/modernization activities.	<p>The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023 required water supply is purchased from GWSSB.</p> <p>However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet), it is assured that condition mentioned will be complied with.</p>
14.	All necessary permissions from different Government Departments/agencies shall be obtained by the KPT before commencing the expansion activities.	<p>DPA had already obtained the necessary EC & CRZ clearance for the project on dated 19/02/2020. Further, Consent to establish from GPCB had already been obtained from GPCB for the same. Subsequently, DPA obtained EC to CTE (PCB ID 48573) vide GPCB Order dated 13/10/2020 after obtaining Environmental and CRZ Clearance from MoEF&CC, GoI vide F. No. 11- 13/2015-IA-III dated 19/02/2020</p> <p>In addition to this as the construction work for the project at Sr 1 is completed and it is under operation w.e.f January 2023 therefore CCA has obtained from the Gujarat Pollution Control Board vide GPCB/CCA- Kutch-1319/ID-48573/701442 dated 20/01/2023. Copy of same is already submitted in the earlier Compliance report submitted on 03/10/2023.</p>
15.	No effluent or sewage shall be discharged into the sea/creek or in the CRZ area and it shall be treated to conform to the norms prescribed by the Gujarat Pollution Control Board and would be reused/recycled with in the plant premises.	<p>In this regard, it is to state that, DPA is already having a sewage treatment plant capacity of 1.5MLD for the treatment of domestic sewage. The treated sewages from STP of DPA are utilized for plantation / Gardening.</p> <p>DPA has been conducting regular monitoring of Environmental parameters through NABL Accredited laboratory since the year 2016 in continuation of this DPA appointed M/s Gujarat Environment Management Institute (GEMI), Gandhinagar (NABL Accredited laboratory) for regular Monitoring of environmental parameters vide work order dated 15/02/2023. The work is in progress & DPA is submitting the monitoring data regularly to all the concerned authorities along with compliance reports submitted. The latest Environmental Monitoring Reports is enclosed herewith as Annexure B.</p> <p>Further, necessary provisions will be made for the projects at Sr. No. 2 – 5 to not discharge effluent or sewage into the sea/creek or in CRZ area</p>
16.	All the recommendations and suggestions given by the Mantec Consultant Pvt. Ltd. New Delhi in their Comprehensive Environment Impact Assessment report for conservation/protection and betterment of environment shall be implemented strictly by the KPT.	<p>DPA has installed Mist Canon at the Port area to minimize the dust</p> <p>Further, DPA has already installed continuous sprinkling system to prevent dust pollution. Further, to control dust pollution in other area, regular sprinkling through tankers on roads and other staking yards is being done. Regular sweeping of spilled cargo from roads is done by parties on regular basis.</p> <p>DPA has been conducting regular monitoring of Environmental parameters through NABL Accredited laboratory since the year 2016 in continuation of this DPA appointed M/s Gujarat Environment Management Institute (GEMI), Gandhinagar (NABL Accredited laboratory) for regular Monitoring of environmental parameters vide work order dated 15/02/2023. The work is in progress & DPA is submitting the monitoring data regularly to all the</p>

concerned authorities along with compliance reports submitted. The latest Environmental Monitoring Reports is enclosed herewith as **Annexure B**.

For ship waste management, DPA issued Grant of License/Permission to carry out the work of collection and disposal of "Hazardous Waste/Sludge/ Waste Oil" and "Dry Solid Waste (Non- Hazardous)" from Vessels calling at Deendayal Port" through DPA contractors

Further, it is to state that, all ships are required to follow DG Shipping circulars regarding the reception facilities at Swachh Sagar portal

DPA assigned work to M/s GUIDE, Bhuj, for regular monitoring of Marine Ecology since the year 2017 (From 2017 - 2021), and reports of the same are being submitted regularly to the Regional Office, MoEF&CC, GoI, Gandhinagar as well as to the MoEF&CC, GoI, New Delhi along with compliance reports submitted.

The final report for the Holistic Marine Ecological Monitoring for the period up to May 2021 was submitted on 22.05.2021. Copy of the report was communicated vide earlier compliance report submitted vide letter dated 29/6/2021

Further, it is to submit that DPA issued a work order to M/s GUIDE vide its letter no. EG/WK/ 4751 /Part (Marine Ecology Monitoring) /11 dated 03/05/2021 for Regular monitoring of Marine Ecology in and around Deendayal Port Authority (Erstwhile Deendayal Port Trust) and continuous Monitoring Program covering all seasons on various aspects of the Coastal Environs for the period 2021-24. The copy of the final reports has already been submitted along with compliance report submitted earlier.

In continuation of the same, DPA had assigned the work to M/s GUIDE, Bhuj for "Regular Monitoring of Marine Ecology in and around the Deendayal Port Authority and Continuous Monitoring Programme covering all seasons on various aspects of the Coastal Environs covering Physico-chemical parameters of marine water and marine sediment samples coupled with biological indices as per the requirements of EC & CRZ Clearances reg. (for three years (2024-2027) vide its work order dated 10/06/2024. Copy of same is attached herewith as Annexure Dcopy already submitted along with compliance submitted on 09/08/2024

As already informed, DPA entrusted work of green belt development in and around the Port area to the Forest Department, Gujarat at Rs. 352 lakhs (Area 32 hectares). The work is completed

DPA has appointed Gujarat Institute of Desert Ecology (GUIDE) for "Green belt development in Deendayal Port Authority and its Surrounding Areas, Charcoal site' (Phase-I)" vide Work Order No.EG/WK/4757/Part [Greenbelt GUIDE, dated 31st May, 2022. The work completed. A copy of Final report is submitted along with the compliance report submitted on 03/10/2023.

Further DPA has accorded the work of "Green belt

		<p>development in DPA and its surrounding area (Phase II) to Gujarat Institute of Desert Ecology (GUIDE), Bhuj for the plantation of 10000 saplings of suitable species vide work order dated 23/06/2023. The work is completed and final report is attached herewith as Annexure C</p> <p>For dredged material management, DPA assigned work to M/s GUIDE, Bhuj for analysis of dredged material since the year 2017 and the reports are being submitted from time to time along with compliance reports submitted</p> <p>In continuation of same, DPA had issued work order to GUIDE, Bhuj for "Study on dredged material for presence of Contaminants for year 2021-2024. The copy of 1st Season, 2nd season & 3rd season report submitted by M/s GUIDE, Bhuj for the period 2023- 2024 is attached herewith as Annexure- D</p> <p>Further, Dredged Material will be disposed of at designated location as identified by the CWPRS, Pune</p> <p>Further, it is relevant to mention here that, DPA has commissioned a 45 kWP Solar Plant at Gandhidham on 7th July, 2022.</p> <p>DPA has installed 400 KWP solar plant and 600 KWP to be installed this year by PPP operator.</p> <p>DPA has installed 6 KWP solar plant at Jeev Seva Samiti, Gandhidham</p> <p>4000 Acres of land has been identified for developing 150 MW Hybrid (Solar Cum Wind) Energy Park.</p> <p>Further, for Oil Spill Management, DPA is already having Oil Spill Contingency Plan in place and Oil Response System as per the NOS-DCP guidelines. (Copy attached as Annexure)</p>
17.	The construction and operational activities shall be carried out in such a way that there is no negative impact on mangrove and other coastal/marine habitats. The construction activities and dredging shall be carried out only under the constant supervision and guidelines of the Institute of National repute like NIOT	<p>The construction work for the project at Sr 1 is completed and it is under operation w.e.f January 2023 and due care is being taken for so that, there is no negative impact on mangrove and other coastal/marine habitats.</p> <p>Further, for project at Sr. No. 2 to 5 (Construction not yet started); however, the specified condition will be complied with</p>
18.	The KPT shall contribute financially for any common study or project that may be proposed by this Department for environmental management/conservation /improvement for the Gulf of Kutch	Point noted for the compliance.
19.	The construction debris and/or any other type of waste shall not be disposed of into the sea, creek or in the CRZ areas. The debris shall be removed from the construction site immediately after the construction is over.	<p>The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. The Consent to Operate (CCA) from the Gujarat Pollution Control Board has already been obtained dated 20/1/2023. Copy of same submitted along with compliance report submitted on 03/10/2023.</p> <p>However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet) DPA had already issued general circular vide dated 3/9/2019 regarding Construction and Demolition Waste Management for strict implementation in DPA.</p>

		Copy is already submitted during the compliance report submitted on 03/05/2023
20.	The construction camps shall be located outside the CRZ area and the construction labour shall be provided with the necessary amenities, including sanitation, water supply and fuel and it shall be ensured that the environmental conditions are not deteriorated by the construction labours.	<p>The work of project at Sr. No. 1 of EC i.e. "Setting up of Oil jetty no. 7" is Completed and it is under operation w.e.f January 2023. The Consent to Operate (CCA) from the Gujarat Pollution Control Board has already been obtained dated 20/1/2023 Copy of same is already submitted in the earlier compliance report submitted on 03/10/2023.</p> <p>However, for other projects mentioned at Sr. no. 2 to 5 (no construction activities started yet) the condition will be complied with</p>
21.	The KPT shall regularly update their Local oil spill contingency and disaster management plan in consonance with the National oil Spill and Disaster Contingency plan and shall submit the same to this Department after having it vetted through the Indian Coast Guard.	<p>DPA already has updated Disaster management plan and Local oil spill contingency plan. Copy of same is attached herewith as Annexure E & Annexure F</p> <p>DPA has also executed MOU with Oil companies, i.e., IOCL, HPCL, BPCL etc, for setting up of Tier I facility for combating the Oil Spill at Kandla.</p>
22.	The KPT shall bear the cost of the external agency that may be appointed by this Department for supervision/monitoring of proposed activities and the environmental impacts of the proposed activities.	Point noted for the compliance.
23.	The KPT shall take up massive green belt development activities in and around Kandla and also within the KPT limits.	<p>DPA assigned work for green belt development in an area of about 32 hectares to the Forest Department, Govt. of Gujarat, in August 2019 at the cost of Rs. 352.32 lakhs. The work is completed. Further, DPA also undertook massive green belt development in and around the Port area and at the Gandhidham area.</p> <p>DPA has appointed Gujarat Institute of Desert Ecology (GUIDE) for "Green belt development in Deendayal Port Authority and its Surrounding Areas, Charcoal site' (Phase-I)" vide Work Order No.EG/WK/4757/Part [Greenbelt GUIDE, dated 31st May, 2022. The work completed. A copy of Final report is submitted along with the compliance report submitted on 03/10/2023.</p> <p>Further DPA has accorded the work of "Green belt development in DPA and its surrounding area (Phase II) to Gujarat Institute of Desert Ecology (GUIDE), Bhuj for the plantation of 10000 saplings of suitable species vide work order dated 23/06/2023. The work is completed and copy of final report is attached herewith as Annexure C</p>
24.	The KPT shall have to contribute financially for taking up the socio-economic upliftment activities in this region in consultation with the Forests and Environment Department and the District Collector/District development officer.	DPA has already been undertaking CSR activities. The details of CSR Activities implemented as well as proposed are enclosed herewith as Annexure G.
25.	A separate budget shall be earmarked for environmental management and socio-economic activities and details there of shall be furnished to this Department as well as the MoEF,GOI. The details with respect to the expenditure from this budget head shall also be furnished.	DPA has already kept Rs. 657 lakhs in B.E. 2024-25 under the scheme "Environmental Services & Clearance thereof".

26.	A separate environmental management cell with qualified personnel shall be created for environmental monitoring and management during construction and operational phases of the project.	DPA already has an Environment Management Cell. Further, DPA has also appointed an expert agency to provide Environmental Experts from time to time. Recently, DPA appointed M/s Precitech Laboratories, Vapi, vide work order dated 5/2/2021 Further, DPA has appointed a Manager Environment on a contractual basis for a period of 3+2 years. (Copy already submitted along with the compliance report submitted on 03/05/2022.)
27.	An Environmental report indicating the changes if any, with respect to the baseline environmental quality in the coastal and marine environment shall be submitted every year by the KPT to this Department as well as to the MoEF&CC,GOI	DPA has been conducting regular monitoring of Environmental parameters through NABL Accredited laboratory since the year 2016 in continuation of this DPA appointed M/s Gujarat Environment Management Institute (GEMI), Gandhinagar (NABL Accredited laboratory) for regular Monitoring of environmental parameters vide work order dated 15/02/2023. The work is in progress & DPA is submitting the monitoring data regularly to all the concerned authorities along with compliance reports submitted. The latest Environmental Monitoring Reports is enclosed herewith as Annexure B . DPA has been submitting the environmental monitoring report along with the compliance report to IRO, MoEF&CC, GoI
28.	The KPT shall have to contribute financially to support the National Green Corps Scheme being implemented in Gujarat by the GEER foundation. Gandhinagar in consultation with Forests and Environment Department.	Point noted for the compliance.
29.	A six monthly report on compliance of the conditions mentioned in this letter shall have to be furnished by the KPT on regular basis to this Department/MoEF&CC,GOI	DPA has been regularly submitting a six-monthly report in compliance with the conditions mentioned to GCZMA and MoEF&CC, GOI. Last compliance submitted on 03/05/2023.
30.	Any other condition that may be stipulated by this Department and MoEF&CC,GoI from time to time for environmental protection / management purpose shall also have to be complied with by DPT.	Point noted.

ANNEXURE B
Oil Spill contingency plan



**OIL SPILL RESPONSE CONTINGENCY PLAN
DPA KANDLA AND OOT VADINAR**



दीनदयाल पत्तन प्राधिकरण
DEENDAYAL PORT AUTHORITY

OIL SPILL RESPONSE CONTINGENCY PLAN

DPA KANDLA AND OOT VADINAR



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

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Contingency Planning Compliance Checklist

NAME OF PORT / OIL HANDLING AGENCY	DPA KANDLA AND OOT VADINAR / SADHAV SHIPPING LIMITED
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DESCRIPTION	COMPLIED YES / NO	REMARKS
1	Whether the facility procedures / handles / uses / imports / stores any type of petroleum product	YES Page-28, Para- 2.1.2.
2	Whether risk assessment is done	YES Page-25, Para-2.1
3	Who did the risk assessment	Environ Software Pvt. Ltd. Page-94, Para- 8, Annexure-26
4	whether maximum volume of oil spill that can occur in the worst-case scenario is considered	YES Page-32, Para- 2.2 Annexure-11
5	Whether relative measure of the probability and consequences of various oil spills including worst case scenario are considered	YES Page -33, Para-2.4
6	Whether all types of spills possible in the facility are considered including Grounding, Collision, Fire, Explosion, Rupture of hoses.	YES Page -31, Para-2.1.3
7	Please specify the list of oils considered for risk assessment	YES Heavy oils & Crude oil, Furnace oil. Page-32, Para-2.2
8	Whether the vulnerable areas are estimated by considering maximum loss scenario and weather condition.	YES Page -33, Para-2.2.1, Annexure -15
9	Whether impacts on the vulnerable areas are made after considering the Marine protected areas, population, fishermen, salt pans, mangroves, corals, and other resources within the area	YES Shoreline Maps Attached Page – 36, Para-2.5.3
10	Whether measures for reduction of identified high risks are included by reducing the consequences through spill mitigation measures.	YES Page – 33, Para- 2.3.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

11	Whether steps have been considered to reduce risks to the exposed population by increasing safe distances by acquiring property around the facility, if possible	YES	No Population along the coast at least about 10 Km
12	Whether risk levels are established for each month after consideration the probability with tide and current and consequences of each such spill	YES	Page 115, Annexure 15
13	Whether prevention and mitigation measures are included in the plan	YES	Page 33, Para 2.3, Annexure-7
14	Whether the spill may affect the shoreline.	YES	Annexure -15 Page -115
15	Whether time taken the oil spill to reach ashore in each quantity of spill in various months are mentioned in the plan	YES	Annexure-15, Page - 115
16	Whether sensitivity mapping has been carried out	YES	Page 147, Annexure-26
17	Does the sensitivity mapping clearly identify the vulnerable areas along with MPAs, corals, fishermen community, salt pans, mangroves and other socio-economic elements in the area	YES	Page 147, Annexure-26
18	Do the sensitivity maps indicate area to be protected on priority	YES	Page 39, Para – 2.7
19	Does the map indicate boom deployment locations	YES	Page 39, Para – 2.7
20	Whether any Marine Protected Area will be affected	YES	Annexure– 15, Para 2.5.3, Page - 36
21	Whether total number of fishermen likely to be affected is mentioned in the plan	YES	Page 30, Para 2.6.2
22	Whether any salt pan in the area is going to be affected	YES	Page 30, Para 2.6.2
23	Whether any mangroves in the area will be affected by a spill	YES	Page 30, Para 2.6.2



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Preparedness:

24	Whether any containment equipment is Available	YES	Annexure– 7. Page-105.
25	Whether any recovery equipment is Available	YES	Annexure– 7 Page-105
26	Whether the facility is having any temporary storage capacity	YES	Page - 105, Para 7 Annexure– 7
27	Whether location of the oil spill response equipment is mentioned in the plan	YES	Annexure– 7 Page-105
28	Whether suitable vessels Available for deploying the boom, skimmer etc.	YES	Annexure-7 Page-106.
29	Whether OSD held with facility	YES	3000 Liters Annexure -7 Page-105
30	Whether the OSD held with the facility is approved for use in Indian Water	YES	YES
31	Whether the facility has MOU with other operators for Tier-1 preparedness	YES	MOU With IOCL & NAYARA Energy. Annexure – 25, Page No. 140
32	Whether the list of oil spill response equipment Available with each agency in MOU is deliberated	YES	Annexure– 25. Page-144
33	Whether the facility has MOU with private OSRO	NO	NO
34	Whether the procedure for evoking the mutual aid is clearly described in the plan	YES	Page – 141 of MoU, Para-1
35	Whether additional manpower is Available	YES	Page –144
36	Whether list of approved recyclers is mentioned in the plan	YES	Annexure-22, Page-136
37	Whether NEBA (Net Environmental Benefit Analysis) has been undertaken	YES	Annexure-15, Detailed Report of NEBA carried out by National Institute of Oceanography is enclosed
38	Whether the areas from priority protection have identified in the plan	YES	Page – 36 Para – 2.5.3
39	Whether relevant authorities and stakeholders were consulted for NEBA and during the areas for priority protection	YES	YES
40	Whether District administration has been appraised of the risk impact of oil spills?	YES	YES



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

	Action Plan		
41	Whether the plan outlines procedure for reporting of oil spills to Coast Guard	YES	Page – 57, Para. – 7.1
42	Whether the oil spill response action is clearly mentioned	YES	Page – 71, Para. – 8.1.
43	Whether the action plan includes all duties to be attended in connection with an oil spill	YES	Page – 71, Para. –9.1.
44	Whether the action plan includes key personnel by their names and designation viz. C/C, S/C	YES	Page-76, Para-9.1
45	Whether alternate coverage is planned to take care of the absence of a particular person (in case where action plan is developed basis names)	YES	Page-76, Para-9.1
46	Whether the plan includes assignment of all key coordination's viz, the communication Controller, Safety Coordinator, Emergency management team, Administration and Communication Coordinator and Safety Coordinator	YES	Page-76, Para-9.1 Page-48, Para-5.1
47	Whether contact directory containing numbers of key response and management personnel is intimated in the plan	YES	Annexure-1, Page – 96 Annexure-3, Page- 98 Annexure-18, Page-121
48	whether approved recyclers are identified for processing recovered oil and oily debris	YES	Annexure -23, Page - 136
49	Whether the shoreline likely to be affected is identified	YES	Page – 115, Annexure -15
50	Whether final report on the incident is submitted to CGHQ as per NOS-DCP 2014	NA	NA
51	Whether the spill incident and its consequences are informed to fishermen and other NGOs for environment protection through media.	NA	NA



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Training and Exercises:

52	Whether mock Drill / emergency response drills are specified in the plan	YES	Page-53, Para 5.6.2
53	Whether the mock drills cover all types of probable oil spills	YES	YES
54	Whether the plan mentions list of trained manpower	YES	Page-136-137, Annexure-23-24
55	Whether the plan is updated according to the findings in mock drills and exercises	YES	YES
56	Whether the records for periodic mock drills are maintained in a well-defined format	YES	Also, entry is made in monthly log book.
57	What is the frequency of updating / revise of contingency plan?	YES	As and when required
58	Periodicity of joint exercise with mutual aid partners	YES	Once In 3 Months
59	Frequency of mock drills for practice	YES	Once In 6 Months

I hereby, declare that all the information appended above is true and correct to my knowledge or belief.

Date:

Dy. Conservator, DPA

Verified:

Date

(District Commander ICG)
Or his representative

Date

(Regional Commander ICG)
Or his representative



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Certificate of Endorsement

I hereby certify that:

1. The oil spill contingency plan for the facility under my charge has been prepared with due regard to the relevant international best practices, international conventions, and domestic legislation.
2. The nature and size of the possible threat including the worst-case scenario, and the resources consequently at risk have been realistically assessed bearing in mind the probable movement of any oil spill and clearly stated.
3. The priorities for protection have been agreed, considering the viability of the various protections and clean up options and clearly spelt out.
4. The strategy for protecting and cleaning the various areas have been agreed and clearly explained.
5. The necessary organization has been outlined, the responsibilities of all those involved have been clearly stated and all those who have a task to perform are aware of what is expected of them.
6. The levels of equipment, materials and manpower are sufficient to deal with the anticipated size of spill. If not, back-up resources been identified and, where necessary, mechanisms for obtaining their release and entry to the country have been established.
7. Temporary storage sites and final disposal routes for collected oil and debris have been identified.
8. The alerting and initial evaluation procedures are fully explained as well as arrangement for continual review of the progress and effectiveness of the clean-up operation.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

9. The arrangements for ensuring effective communication between shore, sea and air have been described.
10. All aspects of plan have been tested and nothing significant found lacking.
11. The plan is compatible with plans for adjacent areas and other activities.
12. The above is true to the best of my knowledge and belief.
13. I undertake to keep the plan updated at all times and keep the Indian Coast Guard informed of any changes through submissions of a fresh certificate of endorsement.

Seal

Signature :

Name :

Designation: Dy. Conservator

Organization: Deendayal Port Authority

Place: Gandhidham

Date :



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

DISCLAIMER

The task of preparation of OSCP has been done by Sadhav Shipping Limited at the request of DPA.

Conclusion and recommendations resulting from the consulting services has been informed in good faith and on the basis of the best information Available from sources believed to be reliable.

Sadhav Shipping Limited provides no Warranty, express or implied, as for the accuracy, completeness or correctness of the analysis and report preparation work.

Sadhav Shipping Limited accepts no liability arising out of or in connection with the results, recommendations, or omissions. It is concluded that any usage / implementation / interpretation of the recommendation is at the client's risk. In particular, the recommendations should not be considered as certified, legal, or otherwise.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

IMPORTANT NOTE

The oil spill contingency plan outlines the steps required for the management of responses to marine oil spills that are the responsibility of the Deendayal Port Authority (DPA), KANDLA and OOT VADINAR

This document should be read / referred to in conjunction with the National Oil Spill Disaster Contingency Plan (NOS-DCP).

This document is prepared in three Parts:

- Parts- I Including Strategy.
- Parts- II Including Action and Operations.
- Parts- III Includes Data Directory.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

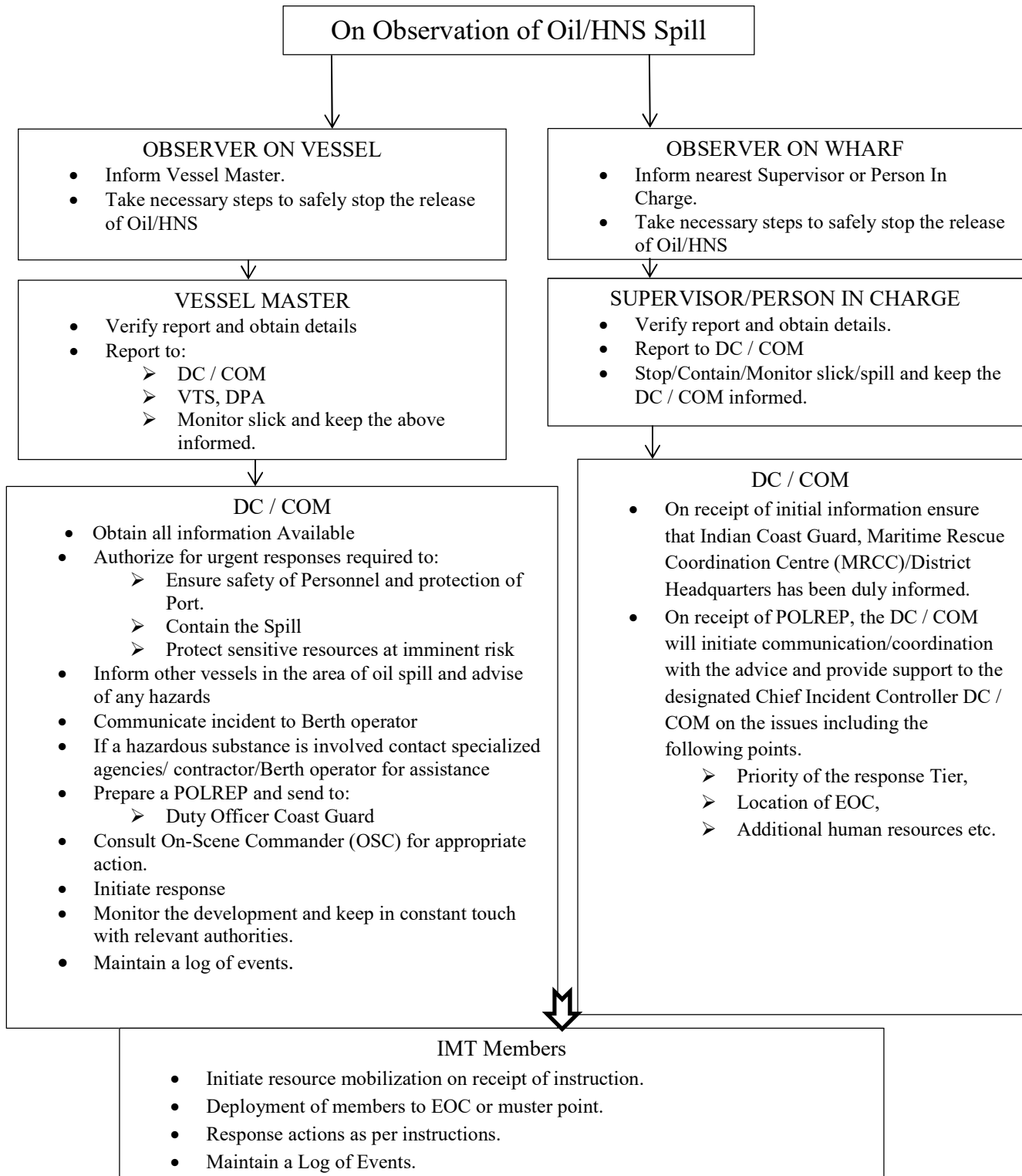
ABBREVIATIONS

COT	Crude Oil Tank farm
CRZ	Coastal Regulatory Zone
DPC	Duty Port Captain
DPA	Deendayal Port AUTHORITY
DWT	Dead Weight Tonnage
NBTSL	NAYARA Bulk Terminal SALAYA Limited
ECT	Emergency Control Team
ERDMP	Emergency Response Disaster Management plan
ESD	Emergency Shutdown
FCA	Forest Conversation Act
HS&F	Health, Safety & Fire
HSEF	Health, Safety, Environment & Fire
ICG	Indian Coast Guard
IOCL	Indian Oil Corporation Limited
I TOPF	International Tanker Owners Pollution Federation
ICMAM	Integrated Coastal and Marine Area Management
IPIECA	International Petroleum Industry Environmental Conservation Association
KPT	Kandla Port AUTHORITY
LFP	Land Fall Point
MTCB	Marine Terminal Control Building
NOSDCP	National Oil spill Disaster Contingency plan
OSC	On Scene Commander
OOT	Offshore Oil Terminal
OSR	Oil Spill Response
OHC	Occupational Health Centre
P & I	Protection and Indemnity
PIT	Product Intermediate Tank Farm
PMC	Pollution Management Cell
PO	Port Officer
SPM	Single Point Mooring
SIC	Shift In-charge
VLCC	Very Large Crude Carrier
VOTL	Vadinar Oil Terminal Limited
WLPA	Wild Life Protection Act



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

DEENDAYAL PORT AUTHORITY OSCP ACTION FLOWCHART





**OIL SPILL RESPONSE CONTINGENCY PLAN
DPA KANDLA AND OOT VADINAR**

PART – I

STRATEGY



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

1. INTRODUCTION

A. CONTINGENCY PLANNING:

In spite of best intentions to avoid oil spills through best and safe practices and rigid enforcement of good intentions in work place, the spills still occur and will keep on occurring. The next best post spill activity, then, is to address them in terms of containment and recovery within shortest possible time and through best Available means that need to be planned and kept ready in advance and spelled through a Contingency Plan for the facility or area handling oil, oil products or other pollutants.

Increase in density of marine traffic, especially oil tankers and petroleum-based installations along the Indian coast has increased the risks for occurrence of spills in harbor, coastal waters and during terminal operations apart from spills that could occur from collision, grounding of vessels and stranding. To address the fallout of incidents and accidents that could lead to pollution of marine environment, all countries handling polluting agents are required to have capabilities and create infrastructure and set up means that could handle the pollution response activity in case of any spill. The working parameters and strategy to address the response activities are spelled through a Contingency Plan.

B. PURPOSE AND OBJECTIVES:

India being signatory to number of international agreements and conventions aimed at controlling marine pollution through measures and rules applicable to marine facilities or surface units, is under an obligation to honor and implement the same through municipal legislation and through adopting means, practices and rules in accordance with Article I of the Convention 73 and Protocol 78 i.e. MARPOL 73/78.

The article has placed an obligation on the parties to the convention including India “to give effect to the provisions of the present convention and those Annexes there to by which they are bound, in order to prevent the pollution of the marine environment by the discharge of harmful substances or effluents containing such substances in contravention of the convention”.

Apart from the specific obligations imposed by MARPOL, being a signatory to UN Convention on the Laws of the Sea (UNCLOS), India has an obligation to protect and preserve the marine environment in addition to obligations under International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC Convention).

Accordingly, India too had to formulate rules or administrative directions giving effect to international procedures through structures to be developed by ports and facilities handling vessels and oil cargo.

While, regulatory procedures are expected to be put in place through rules- implementing the various provisions and annexure of MARPOL 73/78, the practical aspects of marine pollution to set up a mechanism on the ground are dealt by OPRC – National Oil Spill Disaster Contingency Plan being an instrument for the same.

NOS-DCP has its origin in IMO convention OPRC – 1990, ratified by India. As per the convention it is imperative upon each signatory state to have laws and mechanisms to respond to oil spills in its waters.

National Oil Spill Disaster Contingency Plan is aimed at coordination of resource agencies to combat an oil spill in Indian waters and also spells the actions required of oil handling facilities i.e. to prepare contingency plans for respective facilities and to develop Tier I response capabilities and also to report oil spills. NOSDCP mandates a number of resource agencies comprising of 03 ministries and 15 departments apart from oil industry, off shore terminals etc. to an obligation to Render resources for pollution response when called for, Report Oil Spills,



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

prepare contingency plans for respective spill scenario, Set up Tier I response facilities and Use of Oil Spill dispersants (OSD) in accordance with Plan.

Of the three tiers of response envisaged and planned to handle a spill situation in consonance with quantum of spill, Tier 1 is the primary and first step of responses, to be mounted by the facility where the spill takes place.

While, NOS-DCP outlines the response activities as per Tier system of addressable of spill, the facility plan is the instrument to address the spill scenario at local level. Tier 1 being the first and primary response level has to be executed and undertaken by the facility handling polluting cargo, for which purpose drafting of a CP is the primary requirement.

The National Oil Spill Disaster Contingency Plan was first drafted in India by Coast Guard during 1996 with an objective to put in place the machinery and mechanisms to combat oil spills in Maritime zones of India. The Plan has since been updated in 2002.

C. AIMS & OBJECTIVES:

The aims and objectives of the Oil Spill Response Contingency Plan (here after termed the Plan or CP) of a port or facility are to draw a methodology and strategy to indicate actions required to be taken by responders to:

- Ensure Availability of timely, measured and effective response to incident so oil spill in waters under jurisdiction of the port facility,
- Take measures to control the spill within minimum area,
- Minimize volume of spill by securing the source in most appropriate way,
- Minimize extent of movement of released oil from the source by timely containment,
- Minimize environmental impact by timely containment and recovery response,
- Maximize effectiveness of recovery actions through selection of appropriate equipment and techniques,
- Maximize response effectiveness through trained and competent, operational and response teams,
- Guide response personnel through the process of managing a spill originating within their area of operation, Mitigate consequences of oil pollution incidents,
- Allow those involved in response to rapidly disseminate information to parties involved and to ensure optimum deployment of Available equipment.

1.1 AUTHORITIES & RESPONSIBILITIES

This OSCP has been prepared and issued in accordance with:

The provisions of Merchant Shipping Act, 1958 as amended and /Major Ports AUTHORITYs Act, 1963 as amended.

Stakeholders identified as a part of this plan are DPA, individual Terminal Operators within its jurisdictional limit and other members as per Mutual Aid Plan. The institutional mechanism has been proposed for ensuring the effective participating of identified stakeholders for oil spill preparedness and response for achieving the objectives of Facility Level Oil Spill Contingency Plan for DPA at KANDLA and Vadinar.

1.1.1 Deendayal Port Authority will

- Maintain an adequate response preparedness (Tier-1 level) in Port by (Pollution response equipment preparedness)
- Providing equipment
- Providing PPE to the personnel
- Actively participate in the local, district, state, and national level committees / forums for Oil Spill Response contingency.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

- Make all responsible efforts to act as early as possible on occurrence of oil spill and becomes the “First Response Agency” in the DPA.

1.1.2 Berth Operators, Associated staff, and Ship’s crew

- It is the responsibility of berth operators, associated staff, stevedores, and ship’s crew to report all identified Oil / HNS spills.
- Take all steps necessary to effectively prevent spills or limit the spread of spills that have occurred.

1.1.3. Other Government Agencies and CMG

- The roles and responsibilities of other relevant Government agencies and CMG group are detailed in NOS-DCP (8.6.2.5)

1.2 a. COORDINATING COMMITTEE DPA KANDLA

Chairman
Deputy Chairman
Management Team DPA, KANDLA

- 1) Deputy Conservator
- 2) Harbour Master
- 3) Lead HSEF
- 4) Shift in charges
- 5) Lead Diving team
- 6) Support Team Outsourced Agency.

b. COORDINATING COMMITTEE DPA OOT VADINAR

Chairman
Deputy Chairman
Management Team DPA, OOT Vadinar

- 1) Chief Operations Manager
- 2) Marine engineer
- 3) Lead HSEF
- 4) Shift in charges
- 5) Lead Diving team
- 6) Support Team Outsourced Agency.

The callout system for an oil spill incident is identical to any other emergency as contained in disaster management plan of DPA. Emergency Control Team (ECT) will arrange mobilization of additional resource like Emergency Response Team (ERT) as and when, required.

HEAD VOTL

- Responsibilities:**
- a) Liaise with Mutual Aid Organizations
 - b) Liaise with corporate communication for press statements release.
 - c) Liaise with Coast Guard Monitor as appropriate
 - d) Confirm / amend initial classification
 - e) Manage the VOTL response
 - f) Authorize expenditure

Note: Port Captain will take the charge till the Head VOTL arrives, after that he will assist the Head VOTL.

MARINE ENGINEER

- Responsibilities:**
- a) Observe or receive report of oil spill incident
 - b) Initiate measures to prevent/reduce further spillage
 - c) Maintain communication with all other vessels
 - d) Act as per instruction of SIC



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Lead HSEF

- Responsibilities:**
- Initially access the situation and initiate action
 - Verify classification
 - Provide accurate situation to Head VOTL
 - Manage the pollution prevention response & Resources

SHIFT IN-CHARGE

- Responsibilities:**
- Initially assess situation and initiate action
 - Verify classification
 - Provide accurate situation reports to Head VOTL/Port Captain
 - Collect evidence and / or statements
 - Liaise with Lead HSEF (as applicable)
 - Liaise with incident vessel regarding status of oil spill (if applicable)

LEAD DIVING

- Responsibilities:**
- Observe and Initiate action upon information
 - Provide accurate situation reports to PMC
 - Assist in Collecting evidence and / or statements
 - Liaise with incident vessel regarding status of oil spill (if applicable)

1.3 STATUTORY REQUIREMENTS:

1.3.1 MARPOL 73/78:

India being signatory to number of international agreements and conventions aimed at controlling marine pollution through measures and rules applicable to marine facilities or surface units, is under an obligation to honor and implement the same through municipal legislation and through adopting means, practices and rules in accordance with Article I of the Convention 73 and Protocol 78 i.e. MARPOL 73/78.

BROAD CLASSIFICATION OF OILS AS PER MARPOL 73/78 is placed at **Annexure- 6**

1.3.2 International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC), 1990:

Apart from the specific obligations imposed by MARPOL, being a signatory to UN Convention on the Laws of the Sea (UNCLOS), India has an obligation to protect and preserve the marine environment in addition to obligations under International Convention on Oil Pollution Preparedness, Response and Co-operation 1990(OPRC Convention).

NOS-DCP has its origin in IMO convention OPRC – 1990, ratified by India. As per the convention it is imperative upon each signatory state to have laws and mechanisms to respond to oil spills in its waters.

1.3.3 National Regulations includes:

- Indian Port Act, 1908
- Coastguard Act, 1978
- Merchant Shipping Act, 1958
- Major Port Act, 1963
- Water (Prevention & Control of Pollution) Act, 1974, amended in 1988
- Environmental Protection Act, 1986 (amended 1991)
- Coastal Regulation Zones Notification – 1991

1.4 MUTUAL AID AGREEMENTS:

Refer Annexure – 25, Page -138



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

1.5 GEOGRAPHICAL LIMITS OF PLAN:

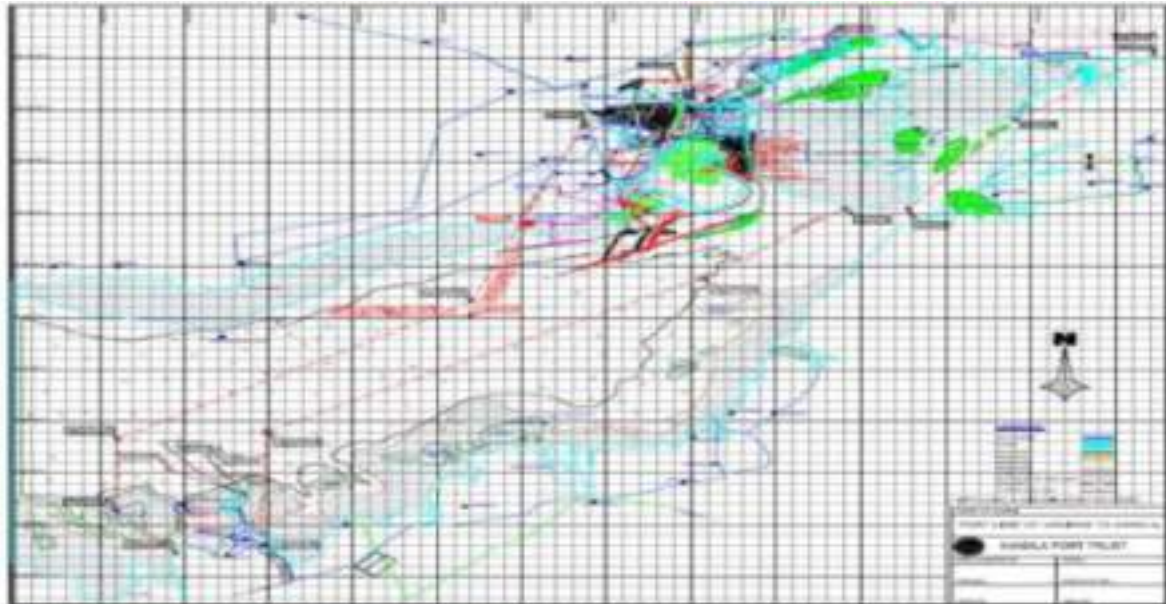
Deendayal Port Authority is located along the west bank of the Kandla creek situated at the north-east head of Gulf of Kutch which is at the west coast of India. Ships calling at Deendayal Port Authority therefore have to traverse across the GOK. This plan is limited to Deendayal Port Authority and up to anchorage area.

The plan contains details of contingency arrangements required for responding to the actual or threatened oil pollution incidents within the marine terminal area, as below. BETWEEN POINT A, B, C & D MENTIONED BELOW PIC





OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR



Response strategy for the DPA KANDLA plan has been developed taking into account the spill risks, and possible sources of spillage associated with Marine Terminal operations including those at the SPM and Jetty berths and other facilities within the Port.

The geographical area of operations is bound by, but not limited to, one mile either side of the line joining following coordinates.

POINT A COORDINATES: LAT 23° 3'7.00"N, LONG 70°13'3.17"E
POINT B COORDINATES: LAT 23° 3'6.71"N, LONG 70°13'34.73"E
POINT C COORDINATES: LAT 22°57'59.87"N, LONG 70°13'38.65"E
POINT D COORDINATES: LAT 22°58'49.71"N, LONG 70°14'21.28"E

OIL JETTY –I LAT, 23°01.6' N LONG 70°13.3'E
OIL JETTY –II LAT, 23°01.7' N LONG 70°13.3'E
OIL JETTY –III LAT, 23°01.9' N LONG 70°13.3'E
OIL JETTY –IV LAT, 23°02.0' N LONG 70°13.3'E
OIL JETTY –V LAT, 23°02.2' N LONG 70°13.3'E
OIL JETTY –VI LAT, 23°02.4' N LONG 70°13.3'E

DRY DOCK: LAT, 23°00.9' N LONG 70°13.3'E
SNA JETTY: LAT, 23°00.6' N LONG 70°13.3'E

CARGO JETTY STARTING FROM NORTH TO SOUTH IN STRAIGHT LINE STARTING FROM NORTHERN END OF CARGO JETTY 1 LAT, 23°00.4' N LONG 70°13.4'E TO END OF LAST CARGO JETTY NO. 16'S SOUTHERN END LAT, 22°58.4' N LONG 70°13.8'E DISTANCE 2.030 NAUTICAL MILES.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

DPA KANDLA AND OOT VADINAR Port is located along the west bank of the Kandla creek situated at the north-east head of Gulf of Kutch which is at the west coast of India. Ships calling at DPA KANDLA AND OOT VADINAR port therefore have to traverse across the GOK. This plan is limited to DPA KANDLA AND OOT VADINAR port and up to anchorage area, which is 4 nautical miles from port.

The plan contain details of contingency arrangements required for responding to the actual or threatened oil pollution incidents within the marine terminal area, as below.



Response strategy for the DPA KANDLA AND OOT VADINAR plan has been developed taking into account the spill risks, and possible sources of spillage associated with Marine Terminal operations including those at the SPM and Jetty berths and other facilities within the Port.

Note: Deendayal Port Authority port limit extends from Kandla to Vadinar and IOCL & Nayara Energy installations are located at Vadinar under port limits.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

The geographical area of operations is bound by, but not limited to, one mile either side of the line joining following coordinates.

SPM1:	22°30'14" N/69°39'35" E
LFP:	22°27'59" N/69°43'26" E
Berth B (North End):	22° 27' 15" N 069° 40' 10" E
Berth A (South End):	22°26' 54" N 069° 40' 11" E
Sea Water Intake:	22°26' 11" N 069° 40' 32" E
LO- LO/ RO-RO Jetty:	22°26' 24" N 069° 40' 29" E
SPM2 (proposed):	22°31' 48" N 069° 40' 18" E
Berth C (proposed):	22°27' 21 N 069° 40' 09" E
Berth D (proposed):	22°27' 27 N 069° 41' 10" E

1.6. INTERFACE WITH ROSDCP & NOSDCP

Oil company and port oil spill contingency Plans (Kandla)

The companies whose installations are located in nearby area have individually prepared their own contingency plans, which detail their response to tier one incident. Agreement dated 28.12.2019 of Mutual Aid- Scheme for Oil Spill Response and control by oil handling Member Organization Between IOCL, BPCL, HPCL, strengthens Oil Spill response capability in the area, the agreement is valid for five years.

Sl. No	Owner
1	Indian Oil Corporation Limited, KANDLA
2	Kesar enterprises Ltd.
3	J.R Enterprises
4	IFFCO Kandla unit
5	BPCL
6	Friends oil & chemical terminals Pvt Ltd.
7	Indo Nippon co Ltd.
8	HPCL
9	IMC Ltd.
10	Mother diary fruit & vegetables Pvt Ltd.
11	Parker agro hem product Ltd.

Oil Company and port oil spill contingency Plans (OOT Vadinar)

The companies whose installations are located in nearby area have individually prepared their own contingency plans, which detail their response to tier one incident. Agreement dated 28.12.2019 of Mutual Aid- Scheme for Oil Spill Response and control by oil handling Member Organization Between VOTL, IOCL, BORL, RIL, EBTSL & Cairn India Ltd, strengthens Oil Spill response capability in the area, the agreement is valid for five years.

Sl. No	Owner
1	Indian Oil Corporation Limited, Vadinar
2	Reliance Industries Ltd, Sikka
3	Bharat Oman Refinery Ltd, Sikka
4	Cairn India Limited, Bhogat
5	Vadinar Oil Terminal Limited, NAYARA ENERGY



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

District Plans

In the event of actual or threatened spread of oil extent of which is or is likely to be beyond the mitigating resources Available with DPA, then the **ICG Oil Pollution plan** may be implemented. In such case nominated officer of ICG will assume the function of On Scene Commander

National Oil Spill Disaster Contingency Plan (NOS – DCP)

In the event of an oil spill incident which calls for a Tier-III response, the coast guard will implement the NOS – DCP. DPA and all Mutual Aid Partners will continue to deploy their anti-pollution resources, as directed by the Coast Guards on scene commander

2. RISK ASSESSMENT

As required of a Contingency Plan, this Plan has tried to compare the hazard and vulnerability in a particular location to see the kind of risk that are posed and then to addresses those problems by determining how best to control the spill, how to prevent certain ecological elements or environments from exposure to oil, and how best to advise the local civil authority of the dangers that could be posed by the spill and how to address them and to repair the damage done by the spill.

2.1. IDENTIFICATION OF ACTIVITIES AND RISK:

In spite of best intentions to conduct cargo work under best practices, a spill could still occur at a port or terminal during cargo work because of the failure of pipelines, loading arms, flanges or equipment. The potential accidents associated with a plant, port, terminal or pipeline can be divided into two categories in terms of Generic and Specific operating failures.

Generic failures are associated with mechanical component of the facility or terminal like vessels, pipelines, pumps or compressors. The failures under this category could be caused by factors as corrosion, vibration or external impact. A small event like a leak may escalate into a bigger event by itself causing a bigger failure.

Specific operating failures is the prime cause of human errors but they can also include accidents.

Every significant mechanical component that could fail with its operating conditions, contents and inventory, is a contributor to failure identification. The study of Generic failures requires consideration of each component under their normal operating conditions.

The possible range of failures being large in number are generally considered under the following heads and incidents

For vessel/ storage tanks

Rupture (Full bore)

- Large leaks (20%mm equivalent leaks)
- Medium and small leaks (due to corrosion, impact and other such cases)

For pipelines

- Full bore ruptures
- Large, medium and small leaks



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

2.1.1 Failure frequencies - Pipelines

The failure frequency of pipelines is subject to a number of factors like rate of corrosion, age of pipeline, duration of use, size of damage and length etc. Different value of any of these will give different figures for failure frequency. The data as per table 1 gives the failures frequencies in relation to type or size of leak and represents the chances of occurrence of mentioned type of leak per unit length of pipeline per unit diameter.

TYPE	% of cross sectional	Frequency per year
Small leak	< 1	2.8×10^{-7} L/D
Big leak	5	1.2×10^{-7} L/D
Catastrophic leak	20	5.0×10^{-7} L/D
Rupture(guillotine failure)	100	2.2×10^{-7} L/D

Table1. – Pipe leak frequencies as per size of leak.

With respect to causes of leak as per the failure of different systems, the frequencies are as per table 2

The following scenarios are identified for probable oil spills in marine operations of DPA KANDLA AND OOT VADINAR:

- I. Spill due to floating hose failure at SPM.
- II. Spill due to rupture of subsea crude oil pipeline from SPM to LFP (iii) Spill due to collision at SPM & tanker route.
- III. Spill due to overflow from tanker while transfer of Oil at Jetty.
- IV. Spill due to Loading arm failure at Jetty.
- V. Spills due to tanker collision / grounding in the vicinity of Jetty.

Kandla Port established under Major Ports Act, 1963 is now renamed as Deendayal Port Authority one of the busiest major multi-product port of India located in the Kachchh district of Gujarat. Kandla has 16 dry cargo berths with a total of 2.57 km in a straight-line and 6 dedicated LIQUID CARGO berths for handling EDIBLE OILS, PETROLEUM, POL and chemicals.

During 2019 - 20 the port handled 115 MMT of cargo and thereby retaining number one position for volume of cargo handled among the Major Ports of India. Deendayal Port is located in inner most eastern part of Gulf of Kutch, It is connected by Road by national Highway, Port is also connected with Rail connectivity Nearest Railway Stations are Kandla and Gandhidham, Port handles various types and sizes of the ships, tankers and container ships, Maximum DWT permitted at Deendayal Port is 75000mt, Max draft permitted is 14 Mtrs, Max draft permitted is 13.5 Mtrs.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

DPA's Satellite Port, Vadinar Oil Terminal is located close to Jamnagar. It is connected by road through SH-25. 12.5 km spur line connects the rail gantry of Vadinar Terminal to Jodhpur railway station. Nearest railway station is Jamnagar. Oil Jetties can handle up to a maximum size of vessel 56,000 DWT. SPM handle Very Large Crude Oil Vessels (VLCC) with a maximum pumping capacity of 10000 tons per hour. Hence, it should be inferred that the area is having high density of potential sources. Images of KPT & Vadinar Terminal are given in

Figure 2.1



DPA Kandla



DPA Kandla oil jetty

Figure2.1. Layout of Deendayal Port & Vadinar Terminal

The port has been achieved the first position among all major ports of India, of so last decade. Presently, the port can handle dry bulk, break-bulk; liquid bulk and container cargo. Important commodities handled at the port are Coal, Petroleum Oil PRODUCTS and Lubricants (POL), Food Grains and Container Cargo, Ports, various Chemicals Oil handling facilities & Ships in and around the Deendayal Port Limit are the other potential sources of oil spill. The location map of Ports, SPMs & Captive Jetties of Gulf of Kachchh is given as



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Figure 2.2. Majority of Installations are located within the DPA limit or very close to it.

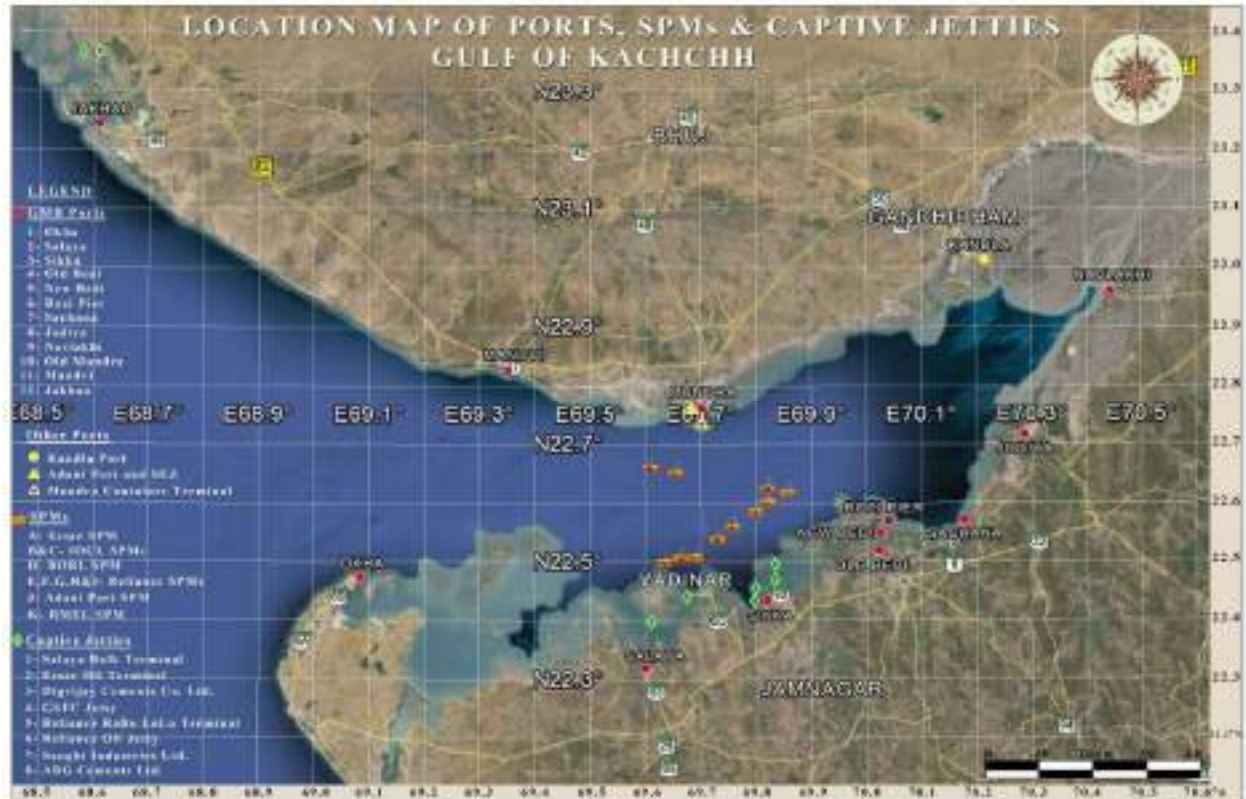


Figure2.2. Location of Ports and allied Facilities in Gulf of Kachchh

2.1.2. Existing Facilities at Kandla Port

Deendayal Port has 16 berths, 7 oil jetties, 1 maintenance jetty, 1 dry-dock and a few small jetties for small vessels. Adjacent to all these terminals and jetties there are storage facilities for covering cargo received by pipelines, containers to petroleum products.

There is an existing steel **floating dry dock** within the port caters the need of port crafts as well as outside organizations and has capacity to accommodate vessels of following parameters.

- Length Overall (LOA) - maximum up to 95meters.
- Breadth - maximum up to 20meters.
- Draft - maximum up to 4.5meters.
- Lift displacement - maximum up to 2700tones.

Port's Chemical and Liquid Handling Complex has total storage capacity for 21.9 lakh kiloliters. Private sector storage terminals have capacity for 9.8 lakh kiloliters.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Port consists of 185 hectares of custom bonded port area. Port offers an excellent and vast Dry Cargo Storage Facilities inside the Custom Bonded Area for storage of Import and Export cargoes, on very competitive rates. Also, it has the largest capacity in India for storing liquid cargoes, and it is served by a modern pipeline network. The storage facility for liquefied petroleum gas has capacity for 30 thousand cubic meters. The container handling facilities include 545 m of quays equipped with four rail-mounted quay cranes and two harbor or mobile cranes. The container facilities include an almost 11- hectare container yard, a 6.5 thousand square meter container freight station, and 90 reefer points for refrigerated containers.

2.1.2. Offshore Oil Terminal (OOT), Vadinar

DPA had commissioned offshore oil terminal facilities at Vadinar in 1978, jointly with Indian Oil Corporation. It has capacity of 58 MMTP and handle crude oil and petroleum products. Vadinar one of the deepest natural draft terminals in India and it does not require any maintenance dredging. The facilities consist of three offshore Single Point Mooring (SPM), two jetties for handling liquid petroleum products, tanks for storage of crude oil and petroleum products and rail and road gantries for dispatch of petroleum products.

The features of the OOT Vadinar is as presented below:

- A draft of up to 33 m at SPMs and Lighterage Point Operations(LPO)
- Handling VLCCs of 300000 DWT and more.
- Providing crude oil for the refineries of Koyali (Gujarat), Mathura (Uttar Pradesh), Panipat (Haryana) and NAYARA Refinery, Jamnagar(Gujarat)
- Simultaneous handling of three VLCCs possible at the SPMs with vast crude tank age facility.
- Two nos. of 50 Tons state-of-art B.R SRP Pull-back tugs are Available for smooth and simultaneous shipping operations on the SPMs and product jetty.
- One oil and debris recovery tug for oil pollution control has been acquired and stationed at Vadinar.
- Excellent infrastructure facilitating transshipment operations, even during the monsoon.

2.1.3. Traffic Handled at Kandla

Deendayal Port has shown buoyant growth in cargo handling in the recent past. The port's share in traffic handled by all major ports has risen steadily over the years. The past traffic profile of the port is shown in **Figure 2.3**. During 2018-19 & 2019-20 total traffic handled are 115.40 MMT and 122.61 MILLION METRIC TONNES respectively



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

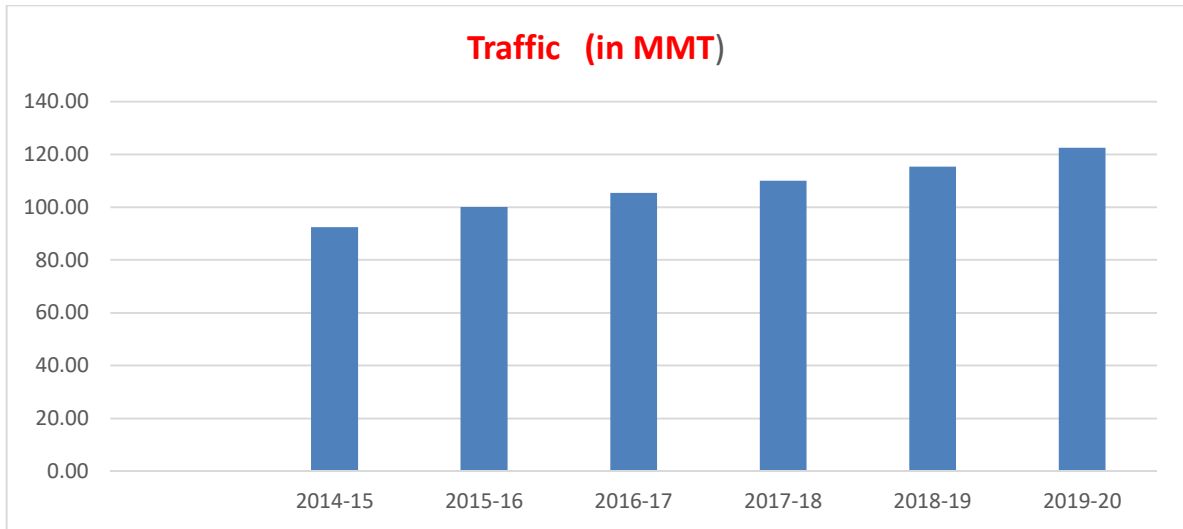
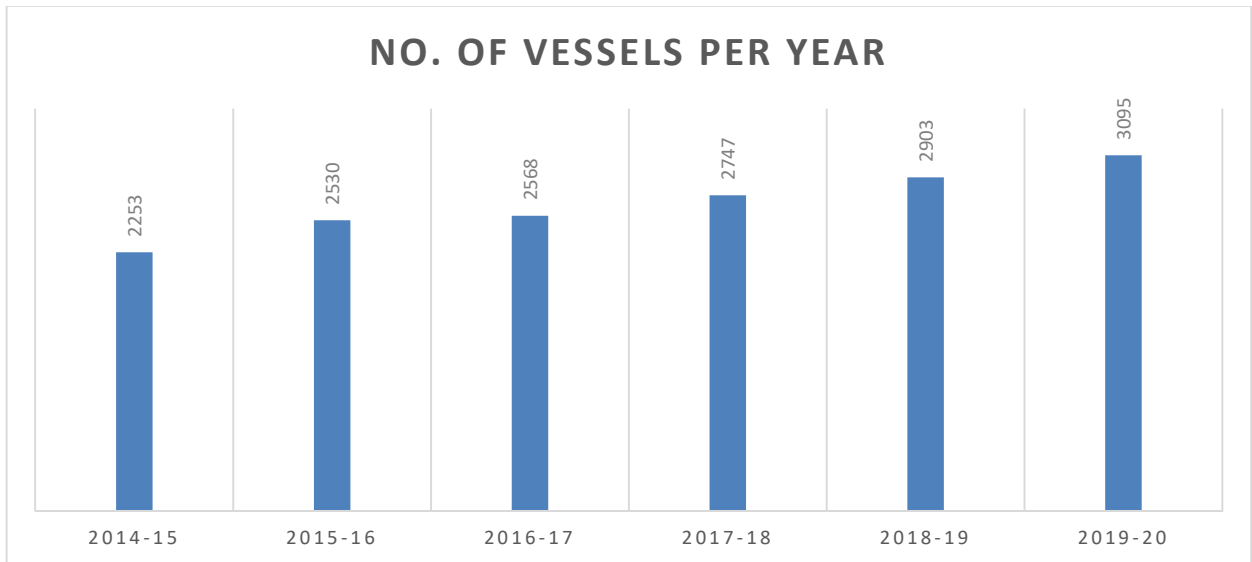


Figure2.3 Traffic Profile OF DEENDAYAL PORT AUTHORITY

Total number of ships visited KPT during the year 2014-2020 are given as shown in **Figure.2.4**. Among them almost 75 % visited KPT and remaining 25 % visited Vadinar.





OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Total number of ships handled at DPA commodity wise during the period of 2014-2020 is as presented in **Figure2.5**

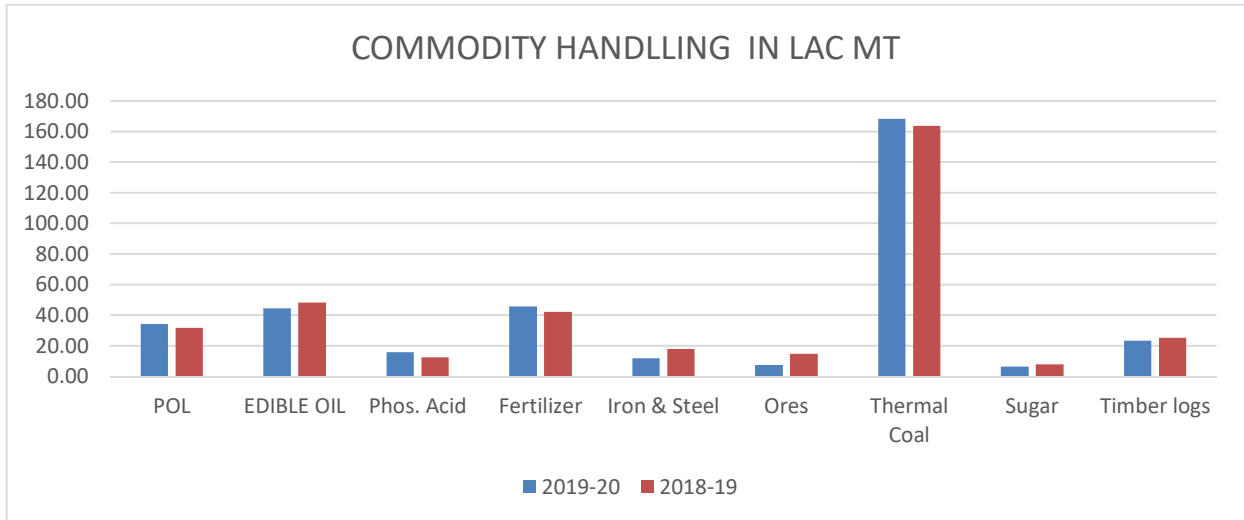


Figure2.5. COMMODITY Handled at DPA

Risk Assessment Summary for Maximum Oil Spillages:

Cause	Assessed Risk	Spill Quantity
SPM – Floating Hose Failure	Rare Phenomenon	153 T
Overflow from tanker while transfer of oil at Jetty	Rare Phenomenon	56 T
Jetty Berths –Loading Arm Failure	Extremely Low	10 Liter.
Rupture of subsea crude oil pipeline from SPM to shore tanks	Rare Phenomenon Very rare, Not Likely	1-2 Liter

2.1.4. Cargo Ops or Transfer Spill Frequencies

Transfer spill is defined as an event where the oil is released to sea due to failure or error during loading/unloading of cargo or fuel oil. This includes loading in port and ship-to-ship transfer also. Typical causes for this spill include overflow, hose failure, errors in setting valves etc.

As per figures compiled by DNV, during 2000-10, ten transfer spills on oil tankers with known quantities were reported. The oil tanker exposure during this period was 74,471 ship years. Based on an Average of 80 port visits per ship year, a total of 5.6 million cargo transfers were undertaken. This figure gives a transfer spill frequency of 1.7×10^{-6} per cargo transferred.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

2.1.5. Spill Volume Calculations – Pipelines

The quantity of oil spilled can be calculated in terms of total rapture and also for pin hole leaks using software taking into account the diameter of hole and flow rate. The formula for total rapture calculation is:

Volume of Spill = 2 Pie X Radius of Pipeline X Length of Pipeline X Flow Volume. (Refer Annexure-11)

2.2. TYPES OF OIL LIKELY TO BE SPILLED: Characteristics of different classes of oils is placed at an Annexure-9

No	Oil Type	Specific Gravity	Genre	Characteristics	Examples
1	Light oil	< 0.84	White oils	Non-persistent, Volatile	Aviation fuel, Kerosene, Motor spirit, Naphtha, HSD.
2	Crude oil	>0.84	Black oils	Persistent, Viscous, Emulsion. Fresh oil amenable to dispersants	Arabian Light, Arabian Heavy etc.
3	Heavy oil	>0.95	Black oils	Persistent, Viscous, Emulsion, Generally not amenable to dispersants	Fuel Oils, LSWR

Table 3

Flammability (Nf) 3 – Liquids and solids that can be ignited under almost all ambient temperature conditions
2– Materials that must be moderately heated or exposed to relatively high ambient Temperatures before ignition can occur

Health (NH) **0** - Materials which on exposure under fire conditions would offer no hazard beyond that of Ordinary combustible material
1 – Materials which on exposure would cause irritation but only minor residual injury if no Treatment is given

Reactivity (Nr) **0** – materials which in themselves are normally stable, even under fire exposure conditions and which are not reactive with water

It is apparent that risks to human life caused by most of the hydrocarbons in terms of flammability, health and reactivity are not very significant and can be handled with some degree of expertise.

2.2.1. CAUSES OF OIL SPILL

The common causes of spill are:

- Cargo operations- loading, discharge
- Ship collision, or grounding
- Bunker/ fueling operations
- Ship distress / sinking



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Pipeline ruptures /accidental spills from sub-sea/over the sea/shore approach (in the tidal zone) pipelines Location of spill within the scope of this Plan. Based on the location of vessel at the particular time of incident within the area of operation, the likely spill could occur at any of the following locations.

- I. Sea or in channel due collision etc. during passage
- II. Close shore due grounding or
- III. Alongside at jetty or at the terminal during cargo operations
- IV. Iv. Sea or at landfall point from interbreed pipelines.

Notwithstanding the above locations, it is possible that an eventuality occurring at sea like a collision or mechanical failure could lead to a situation where the consequences would be felt in some other location at a coastal location.

2.3. SPILLED OIL MITIGATION

DPA KANDLA AND OOT VADINAR is prepared to mitigate Oil Spills of Importance from routine operations, while oil spill situations of higher magnitude are dealt with neighboring industries viz. IOCL, NAYARA ENERGY, Indian coast Guard cooperation and external intervention. However, accidental leakages are arrested immediately with Remote operating controls/QSD valves by automated sensors. The exact quantities from each incident is difficult to predict due to the variables of operating conditions and the length of risk exposure, optimum risks associated with the events has been considered while devising the oil spill contingency plan

2.4. DEVELOPMENT OF OIL SPILL SCENARIOS INCLUDING WORST CASE DISCHARGE CONSIDERING MAXIMUM LOSS AND WEATHER CONDITION

DPA KANDLA AND OOT VADINAR is operating 02Nos.Berths (A & B) which can accommodate vessels ranging from 25,000 to 100,000 DWT for oil handling & one SPM which can accommodate vessels ranging from 87,000 to 350,000 DWT for crude oil. Marine Terminal is located within an area which has been declared as a Marine National Park/ Marine Sanctuary. The mean tidal range is approximate 6 meters and current speed in excess of 2 knots may be experienced alongside the jetty.

2.5. SHORELINE SENSITIVITY MAPPING:

The quantity of the spill reaching to the coast and affected areas for various seasons for various hydrological and meteorological conditions and predicted BY use of Hyrodyn-OILSOFT software is as follows.

2.5.1. Main Approach Channel

The least depth in the main approach channel to the tanker jetty is 14 meters; the maximum acceptable draft alongside jetty berths is 14 meters. A minimum under keel clearance of 6% of vessel's maximum sea going draft plus 0.60 meters is applied to all vessels under way.

While the risk of grounding is low, it cannot be totally eliminated. The most likely cause is steering or propulsion system failure which could result in grounding on the channel margins with consequent damage to the bottom and/or the mid body plating. The potential spill quantities depend upon the size / type of tanker and the area of impact damage. The vessels calling the product terminal, in bound and out bound will be escorted by minimum two tugs in fair weather condition. This considerably reduces the risk of the vessel running aground in the channel.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Deendayal Port located in the northern plank of the GOK, in an area with irregular and dissected configurations, with numerous creeks surrounded by marshy lands on the bank of Kandla creek. Located at the juncture of Kathiawar and Saurashtra peninsula, i.e., at a transition zone between arid and semi-arid zone having striking characteristics of the arid area.

The port limits extend from Navlakhi at the head of GOK to NARARA Bet in the southern arm. While from Tuna in the north coast to Kalumbhar Bet in the southern arm. The limit is bounded by Kachchh in the North & North-East, Morbi at East and Devbhoomi Dwarka and parts of Jamnagar district towards South & South-East respectively. Along the coast there are numerous coastal villages with people engaged in traditional occupation of fishing hosting large and small fish landing centers. Also, being the adjoining land masses of ports, many of them have been developed into port towns and subsequently developed as industrial pockets.

Sathsaida bet, flamingo flats, IFFCO Intake location, Fishermen Residence, Saltpans surrounding port are important sensitive areas of DPA. Important organisms include algae, mangroves, corals, sponges, mollusks, prawns, fishes, reptiles, birds and mammals. In order to protect the rich biodiversity of the GOK, several intertidal mudflats and coral reefs along its southern shore are declared as Marine National Park and Marine Sanctuary (MNPS). There are also are as declared as Important Bird and Biodiversity Areas (IBAs) and Important Within the port limit is one of the most productive and diversified habitats along the West coast of India. The high tidal influx covers vast low-lying areas comprising a network of creeks, marshy tidal flats and rocky regions, which provide congenial environment to a wide variety of marine biota. The northern shore is predominantly sandy or muddy confronted by numerous shoals, creeks and sustains large stretches of mangroves. There are vast mudflats towards the Mundra coast. There are narrow beaches along the coast behind the mudflats. Towards the southern limit, shoreline is comprised of numerous islands and inlets, which harbor vast areas of mangroves and coral reefs with living corals Coastal and Marine Biodiversity Areas (ICMBAs).

Thus, the peculiarities of Deendayal Port area which are to be duly considered with respect to oil spill sensitivity can be briefed as follows:

- An all-weather Major Port with several oil handling facilities including SPMs within port limits
- Dry Weather and Mild Monsoon
- High tidal ranges and strong tidal currents
- Extensive creek system acting as tidal channels
- Valuable ecological resources such as Corals, Mangroves, Mudflats and bird flocking areas around the vast creek system

Association (IPIECA), & International Association of Oil & Gas Producers (OGP). NOS-DCP-2015 put forwards the same scheme for the preparation oil spill contingency plan at various levels in the Indian context.

- ESI index is based on three parameters including Extensive socio-economic activities including Special Economic Zone (SEZ), saltpans, fishing areas and intake points of shore-based industries.

Environmental Sensitivity Index (ESI) is an international scheme used for classifying as well as ranking the shoreline based on their sensitivity towards oil spill. This methodology was prepared by National Oceanic and Atmospheric Administration (NOAA) further promulgated jointly by IMO, The International Petroleum Industry Environmental Conservation:

- Shoreline Classification, which takes sensitivity of the shore habitats, natural persistence of oil and ease of cleanup.
- Biological Resources including oil-sensitive animals, rare plants
- Human-Use Resources that have sensitivity because of their typical use, such as beaches, parks and



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

marine sanctuaries, water intakes, and archaeological sites.

While preparing the ESI maps, the sensitivity of the shore is represented by color-codes along the coast while, biological and human-use resources are represented by symbols. The coastal area has been studied and the ecological resources have been mapped for the Deendayal Port Area.

2.5.2. Approach to SPM

Tankers bound for SPM will follow the deep-water route. Berthing and unberthing of the tankers on to the SPM will be done by DPA Pilots. Charted depth at SPM location is 34.5 meters. Grounding of Tankers in the SPM area is considered as very remote.

A detailed shore line sensitive mapping has been carried out. The Sensitivity chart is attached below for reference. Further CZMP map showing sensitive shoreline is attached as Annex – 06 for our area. Map showing sensitive areas i.e. Saltpans, Mangroves, Fishing Grounds Landing ground, Boat jetty etc.



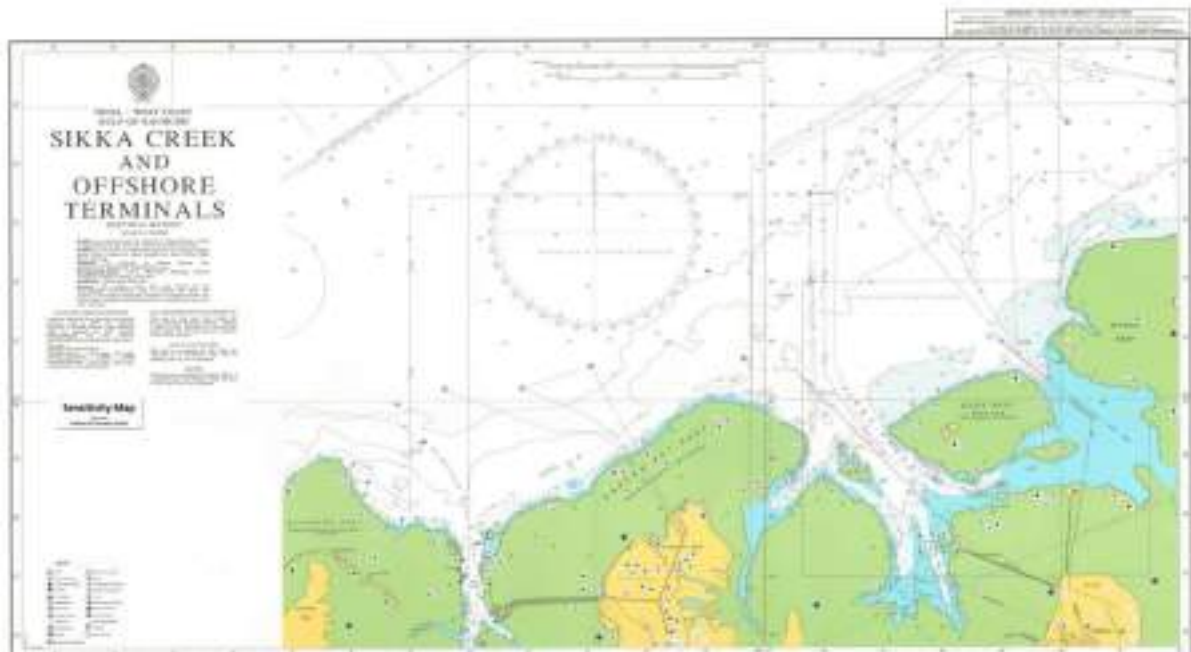
Map-1
Sensitive areas - Overview



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

AREA CHART OF DPA KANDLA AND OOT VADINAR PORT

Map-2



2.5.3 ENVIRONMENTAL SENSITIVITY INFORMATION (Refer Annexure15)

This section summarizes the environmental sensitivity information derived from a variety of studies. It should be consulted, in conjunction with the Spill Response Guidelines to identify priority Areas for protection and the most appropriate response technique(s).

The Marine Terminal is located within an area which has been designated a National Marine Park / Marine Sanctuary. The Authorities have listed the following as their priorities for protection, in descending order, from spilled oil;

1. Marine National Park
2. Marine Sanctuary
3. Salt works
4. Forest Areas
5. NAYARA refinery intake location
6. Mangroves area



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

2.6. SHORELINE RESOURCES, PRIORITIES FOR PROTECTION:

2.6.1. SHORELINE RESOURCES

The adequate shoreline clean up equipment Available to deploy and effective clean up shall be done. **Annexure-7**

Deendayal Port is located inside extensive creek system surrounded by bays including intertidal and high tidal mudflats, while its limit extends to the Port. Because of its geographical extent, the area is described as two zones- Kandla Zone for the areas in Northern side of the port limit and Vadinar Zone is located towards the southern side of port limit. The inner portion of Gulf area has more uniform and stable environmental conditions. The important shoreline features of the port limit are given as **Table 2.1**. Deendayal Port limit is free from significant wave disturbances while the Vadinar has marine meteorological conditions dominated by tides and monsoons.

Table 2.1. Important Shoreline Features of the Port Limit

Sl. No.	Nature of Coast	Coastal Stretch	Length(km)	Major Feature
1	Mix- Wave & Tide dominating Coast	Mundra - Tuna	45	Mudflat, Paleo-mudflat/ Salt Pan, Ebb Delta/ Sand Ridges
2	Tide Dominating Coast	Tuna – Kandla	15	Mudflat including Hard Mudflats bordering LRK, Paleo-mudflat/ Salt Pan, Mangrove
3	Tide Dominating Coast	Kandla – Vadinar	60	Islands of southern arm such as Kalumbhar and NARARA with Corals, Mangroves & Mudflats.

2.6.2. PRIORITIES FOR PROTECTION AND CLEAN-UP

In the event of a major oil spill, large stretches of the coastline may be threatened and, ultimately, impacted by oil. The response to such a spill can be divided into two aspects:

- Protection
- Clean-up

The priority shall be given as per sensitivity mapping as shown in Map-1, like Marine national park and marine sanctuary where corals and mangroves are surviving.

Prioritization of resources is an integral part of sensitivity mapping since it will be helpful in determining the response priorities, achieving optimal resource use and essentially ensure maximum resource protection. This was done by giving ranks to each resource types which has been already described under the heads of Environmental sensitivity i.e. Sensitivity to Oil Pollution, Environmental Value, Cultural & Social values and Economic values (Kandla et al, 2008). Ranks between 10 were assigned for the resource. Same rank was given to different resource when the occupied same position in different heads. Two resources may take a same value as required by the circumstance. Hence, it is not necessary that all the values must be present under one category at a time. Intake points considered here are only of industrial use. Weight ages were given to each head i.e., Sensitivity to Oil Pollution (30), Environmental Value (30), Cultural & Social values (20) and Economic values (20). Priority Index (PI) was worked out based on this. Details of Prioritization of Resources are given as **Table 2.2**. below.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Table 2.2. Prioritization of Resources

Resources	Sensitivity for Oil Pollution (1-10) Weight (30%)	Cultural & Social Values (10%)	Scientific Values (20%)	Environmental Importance (30%)	Economic Considerations (10%)	Total Relative Response of Sensitivity	Risk Value	Priority	
								Index	Order
Rocky Coast	3	1	2	2	1	2.1	1	2.1	D
Port/ Harbor/ Jetties	1	7	2	4	8	3.4	2	6.8	C
Intake Locations	10	2	1	1	2	3.9	3	11.7	B
Salt Pans	3	8	2	6	5	4.4	1	4.4	D
Sandy Beach	6	8	3	5	2	4.9	2	9.8	D
Fishing Grounds	7	8	5	6	8	6.2	2	12.4	B
Sub tidal Coral Reefs	2	9	10	9	6	6.8	1	6.8	C
Intertidal Mudflats	7	4	7	8	3	6.6	2	13.2	B
Mangroves	9	10	8	10	8	9.1	3	27.3	A
Intertidal Corals	10	9	10	9	9	9.5	3	28.5	A

Areas requiring special consideration include presence of protected areas such as SATHSAIDA BET, MANGROVES, birding areas and other animal frequenting areas, estuaries, mangroves & fish breeding areas, tourist areas including recreational & heritage areas, industrial water intake points, resource extraction areas such as salt pans and aquaculture ponds and multi-featured areas - especially in the coral islands with variable features within a short distance from the shoreline along the southern arm.

2.7. SPECIAL LOCAL CONSIDERATION

Marine National Park/Marine Sanctuary in Gulf of Kutch is located in close vicinity of DPA KANDLA AND OOT VADINAR. Special consideration be made for handling of crude & product oil in the area.

The area identified in this region is mangroves habitat, corals reef and mudflats which needs a special consideration.

The Authorities have listed the following as their priorities for protection, in descending order,

- a) Marine National Park
- b) Marine Sanctuary
- c) Salt pans
- d) Forest Areas
- e) NAYARA refinery intake location



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

2.8. FATE AND EFFECTS

Oil spilled on water undergoes a progressive series of changes in physical and chemical properties which are referred to as weathering. The weathering of oil starts immediately after it has been spilled and proceeds at a rate which varies according to the type of oil involved and ambient climatic conditions. Weathering rates are not constant throughout the duration of an oil spill, and are usually highest in the first few hours. The process of weathering occurs simultaneously with the spreading and movement of an oil slick. Major processes which contribute to the weathering of oil spilled on water include evaporation, dissolution, oxidation, emulsification, and microbial degradation. In effect, weathering is the loss of certain components of the oil through a series of natural processes which begin when the spill occurs and continue indefinitely while oil remains in the environment. The lighter and more volatile components of the spilled oil are lost most rapidly. Consequently, the rate of weathering is highly dependent on the type of oil spilled; light crude and fuel oils typically weather at a much faster rate than heavy crude or heavy fuel oils which contain a smaller proportion of light fractions. Indefinitely while oil remains in the environment. The lighter and more volatile components of the spilled oil are lost most rapidly. Consequently, the rate of weathering is highly dependent on the type of oil spilled; light crude and fuel oils typically weather at a much faster rate than heavy crude or heavy fuel oils which contain a smaller proportion of light fractions.

Movement of Oil on Water

In large oil slicks, the waves will be partly suppressed and wave transport will be reduced. The movement of an oil slick on the surface of water is determined mainly by the current and wind velocity in the area.

Current velocities depend on wind velocities, geographical latitude, eddy viscosity, position in the water column, water depth, and proximity to coasts. Surface currents are directed to the right decreasing and turning more to the right with depth.

Winds can be broadly divided into prevailing winds, which vary over time periods of weeks to seasons, and short-term winds which vary over time periods of hours to weeks. High winds are also generated infrequently by summer tropical storms and cyclones.

When wind and currents are in different directions, they can interact in a complex manner to break up an oil slick into windrows. Windrows are long, narrow columns of relatively thick oil separated by wide bands of relatively oil-free water. In most mathematical models of oil slick drift, the oil is assumed to drift with the same velocity as the surface current. A floating oil slick is dragged along the water surface by wind friction whereas oil dispersed into the water column is not. When wind and current are not in the same direction, each tends to drive the slick in a different direction at a different speed.

The spilled crude oil and products such as FO (Fuel Oil), HSD (High Speed Diesel) and MS (Motor Spirit) undergo a number of physical and chemical changes (weathering).

2.9 Weathering Processes:

WEATHERING PROCESSES AND TIME SCALES

Refer Annexure-10



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

3. RESPONSE STRATEGY:

3.1 PHILOSOPHY AND OBJECTIVES:

Within the scope of this Plan, a response action required to be mounted could be at any of these locations

- I. Sea or channel, incident due collision etc. during passage,
- II. Close shore due grounding or stranding,
- III. Alongside at jetty or at the terminal during cargo operations.

It is feasible that a casualty occurring at sea like a collision or mechanical failure could lead to a situation where the consequences would be felt in some other location or at a coastal location due movement of pollutants from the site of incident.

The factors that would dictate immediate and long-term strategies to deal with the spill are

- I. Location of discharge,
- II. Spill movement and likely fate of spilled oil,
- III. Time window Available for response before hitting the coastline,
- IV. Nature of shoreline and priority for protection.

Keeping in account the location of spill, the response will be required to be initiated either at the jetty / terminal or at sea and guided by this OPERATIONS MANUAL. The actions required to be initiated would be immediate and long term, depending on a study and analysis of spill movement.

3.2 LIMITING AND ADVERSE CONDITION:

Weather and Time play very important role in conducting the Oil Spill Response activities. However other factors also play important role in OSR operation:

- i. **Weather:** Weather, sea conditions and time factor play an important role in oil spill response operations. While, operations could continue at terminal or at the jetty most of the time, operations at sea would be largely restricted during night hours and sea conditions. The area of operations of this CP is subject to rough and severe weather conditions during SW monsoon i.e. June to September. An appreciable weather change in the area is subject to heavy rains, high winds and waves. The sea conditions being rough, it is not possible to mount sustained operations or deploy equipment at the Harbor mouth or in the channel. However, it is possible to continue operations at DPA and KPT, though at a restricted scale. Best use of good weather windows would be required to be made to mount operations.
- ii. **Terrain:** A large portion of the area being mudflats is not accessible from sea and is constrained by Availability of depths for vessels to approach.
- iii. **Site approach:** Certain areas especially mudflats and mangrove vegetation stretching long distances are not approachable by road or tracks from the shore.
- iv. **Other limitations:** that might need consideration while planning response activity could include the Following:
 - Safety factors including vessel limits, night movements, risk of fire and explosion, toxicity (oil contact/inhalation/ingestion) and hazardous environments such as fast flowing rivers and steep terrain.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

- Environmental conditions that can influence logistics including inclement weather, hazardous terrain and accessibility including condition of roads.

3.3 OIL SPILL RESPONSE IN OFFSHORE ZONES:

Containment and recovery will be the strategy for offshore zones. Immediately on noticing the oil slick/oil spill, all endeavors will be to contain the spill by deploying suitable Oil Spill Response equipment and then efforts will be made to recover the oil as soon as possible.

Allowing the oil slick to hit the shores and then initiate shore cleanup measures will be the last resort, as it leads to excessive manpower requirements and also time-consuming effort.

The strategies for responding to Offshore Oil Spills are as follows:

- a) Monitor and Evaluate
- b) Containment & Recovery
- c) Dispersant Spraying

3.4 OIL SPILL RESPONSE IN COASTAL ZONES:

The strategies for responding to Offshore Oil Spills are as follows:

- a) Monitor and Evaluate
- b) Containment & Recovery
- c) Dispersant Spraying

Containment of Oil

Booms are the primary method used to contain, deflect, or exclude oil floating on the water. Booms are typically classified according to form or location of use and have the following characteristics:

1. A flotation unit or freeboard designed to contain or divert the oil as well as to resist oil splashing over the top;
2. A skirt or curtain to prevent oil from being carried beneath the boom;
3. A longitudinal strength member (usually, cable, chain, or high tensile strength fabric) that serves to join boom sections and provide anchoring points; and
4. A ballast unit or weight designed to hold the skirt perpendicular to the current flow. Containment booms encircle and contain the floating oil so that it can be collected and recovered. A simple spill in calm weather and with minimal current movement can be contained by stretching a boom across a waterway perpendicular to the path of the spill.

Deflection booming attempts to intercept, deflect, or shunt a slick towards a more desirable recovery site. Deflection booming is used when swift currents render containment booming ineffective.

Exclusion booming is largely a protective measure. Instead of being deployed to contain or intercept the oil slick, exclusionary boom is used to protect sensitive areas such as marshlands, water intakes, and shorelines by keeping oil out of an area. Exclusionary booming may have to be coupled with deflection booming to provide the best overall defense.

Mechanical Recovery of Oil

In offshore areas, mechanical clean-up with skimmers is usually begun immediately after containment measures have been implemented. Oil skimmers are used to recover oil from the surface of the water. Skimmers come in a variety of designs and sizes. Small skimming units can be used successfully on spills ranging from minor spills to major offshore disasters. Large skimming vessels are generally used on larger, open-water spills. They are usually self-propelled and are much more expensive to purchase and maintain than small skimming units.

In shoreline areas, clean-up efforts are not subject to the same time constraints imposed upon protection efforts. As a result, planning may be conducted with greater attention to detail, damage assessment, selection of techniques, and cost effectiveness. Shoreline cleanup, however, should be implemented as rapidly as possible to reduce the effects of oil migrating to adjacent clean shorelines.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

In Situ Burning

In situ burning involves the containment of oil with fire-proof boom so it can be ignited. In order for in situ burning to be effective in most situations, the burn must take place within a few hours after the spill, or the oil will have dispersed too much to be burned successfully.

Use of Dispersants

Dispersants are chemicals that reduce the interfacial tension between oil and water. This enables waves to break an oil slick into tiny droplets and suspend them in the water column. As a result, the oil will present less of a threat to shorelines and coastal resources. Once the oil is dispersed into the water, chemical and biological processes convert it to carbon dioxide, oxygen, salts and other materials. High sea states which prevent oil spill containment and clean-up with booms and skimmers will mix the oil and dispersant together, providing excellent conditions for dispersant effectiveness. Chemical dispersants are effective in areas where environmental or logistical considerations will not allow the deployment of clean-up equipment and personnel. Dispersants are most effective if used within 24 hours after the spill occurs, and will:

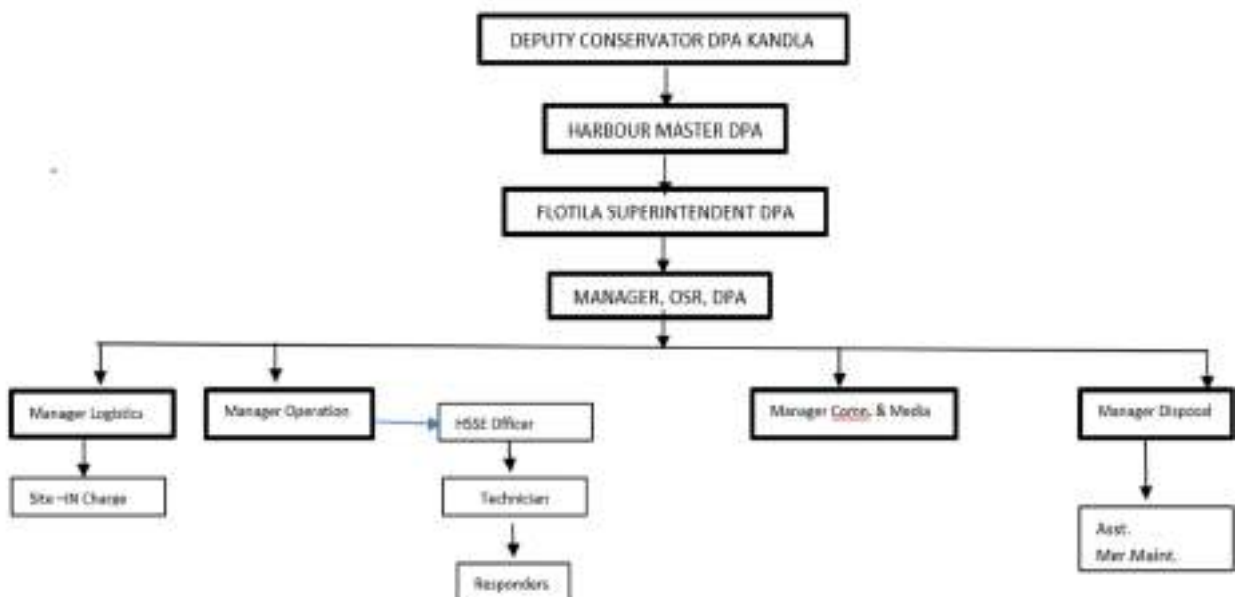
1. Remove oil slicks from the water surface;
2. Break the slick into tiny droplets which expedites biodegradation and decomposition of the oil spill;
3. Reduce the overall level of effort and manpower requirements necessary for responding to major spills; and
4. Prevent or reduce adverse effects on birds and mammals.

However, dispersants are not effective for oil spills in waters with low temperatures, low salinity, broken ice, or high energy. They accelerate the transfer of oil into the water column and thereby temporarily create high localized concentrations of dispersant/oil mixtures which could be toxic to some marine life.

The use of dispersants at and in the vicinity of our site is prohibited. The decision to use the dispersants rests with the ICG. Reference is made of Policy and Guidelines for use of oil spill Dispersants (OSD) in Indian Water.

Refer Annexure- 20

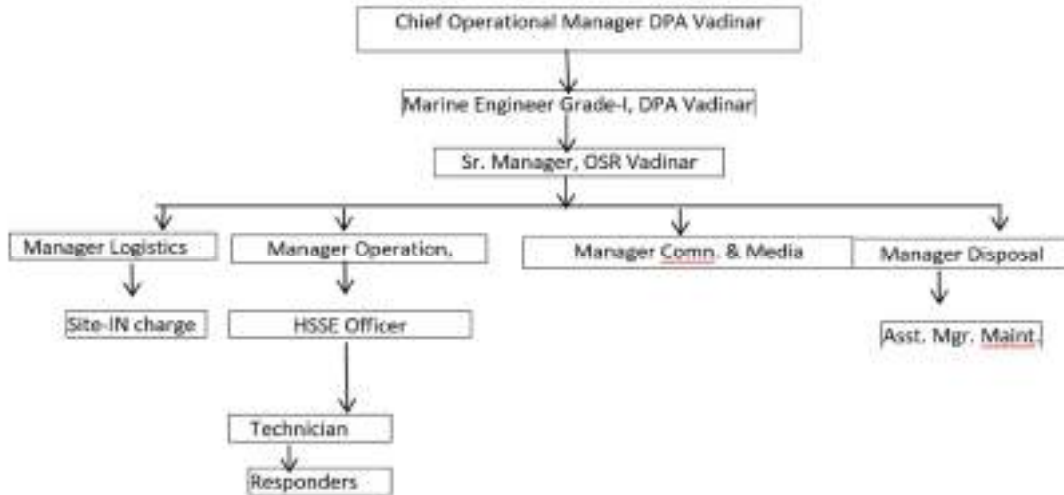
Pollution Management Cell under the chairman ship of Chairman, DPA / Dy. Chairman, will be established at MTCB to manage the initial response to the incident.





OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

3.5. SHORELINE OIL SPILL RESPONSE: ORGANIZATION CHART



The Vadinar Oil Terminal Port (DPA KANDLA AND OOT VADINAR) is situated in the middle of the most ecological sensitive marine environment. In order to conserve and protect this precious marine environment, Government has the area around it as Marine National Park and Marine Sanctuary

The response to shoreline oiling, clean-up effectiveness, and eventually, to conduct final evaluations of shorelines to ensure they meet clean-up end points.

Shoreline oil spill response process includes eight basic steps:

1. Conduct reconnaissance survey(s).
2. Segment the shoreline.
3. Assign teams.
4. Develop clean-up guidelines and endpoints.
5. Monitor effectiveness of cleanup.
6. Conduct post-cleanup inspections.
7. Conduct final evaluation of cleanup activities.

Manual recovery is the most common method of shoreline cleanup, involving teams of workers using rakes, shovels and the like to pick up oil and debris. The oily materials are collected in buckets and drums for transfer to a processing station. Workers may also use suction hoses, pumps and vacuum trucks to recover spilled oil. While manual cleanup is a slow, painstaking process, it generates less waste than other techniques.

Monitor Only: Spill clean-up operations inevitably have their own environmental impacts. For example, heavy equipment can damage sensitive plants and disrupt wildlife habitats. When the potential harm caused by a spill is less than the potential harm caused by attempts to remove it, spilled petroleum products are allowed to degrade naturally. Technicians periodically monitor the breakdown of the spill to be sure there is no unforeseen threat to sensitive ecosystems and/or groundwater supplies.

Wildlife Cleanup: Oiled fish, birds and animals may absorb potentially lethal toxins through their skin. Following spills, birds, otters, seals and walrus may be collected for cleaning and treatment, and then returned to the environment. This is an expensive, time-consuming undertaking and, although techniques have improved greatly in the past few years, recovery rates are often poor. Many other species cannot be rehabilitated because they are either too difficult to capture, or the stress of captivity is likely to have more negative effect than the oiling.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

3.5.1. PORT- VESSEL POLLUTION EMERGENCY INTERPHASE: For appropriate action & responsibility to be initiated as per table placed at an **Annexure-13**

The spilled oil contained on the terminal/ jetty will be handled manually. While, use of vacuum pumps could be made, the absorbents will be required to be used to collect the spilled oil. In respect of oil released or introduced into water, response as per water body procedures are to be initiated. (Refer Annexure-13).

3.5.2. Water Response:

The spill at sea could occur at anchorage or in channel due any eventuality or accident. An oil spill occurring due damage to vessel is a point source spill which would need to be addressed earliest. Taking into account the fact that a multiple response may be required, the vessel and responders will have to mount a rapid reaction.

3.5.3. Vessel Response

While, the first action is expected of the vessel operator in containing the spill by way of plugging of leak as far as possible, the first action of the response team is to be to contain the spill by placing booms attached to ship's hull to isolate the damaged area. Recovery of spilled oil would also be required to be undertaken simultaneously.

OSR Response

The response team being stationed afloat with equipment placed on response vessel, would deploy the equipment to contain the spill. In the event of a spill originating from the ship side, containment will be handled by placing booms along the ship side.

In case of a large spill, the actions to lighten the ship or transfer the cargo will be initiated by the port authority or ship owners.

While, Containment and recovery would be the preferred option, the other alternatives like dispersion could also be put to use subject to local restriction

3.6. REFINERIES AVAILABLE IN GUJRAT & IN INDIA

The details of Refineries Available near DPA KANDLA AND OOT VADINAR, In Gujarat State and in India are placed as an **annexure- 8**

3.7. STORAGE AND DISPOSAL OF OIL AND OILY WASTE:

3.7.1. Storage:

Initially, when the skimmer recovers the oil, it is to be stored in the floating storage tank onboard Oil Spill Response Vessel and OSRO Centre, specially designed for the purpose.

3.7.2. Disposal:

Disposal of recovered oily waste is an integral part of the Operation Manual and is explained in detail in "WASTE DISPOSAL PLAN". The purpose of disposal is not only to direct the recovered oil and waste to a final processing facility but also to bring to attention of responders, the methods to minimize the amount of waste generated during operations.

All disposal is to be undertaken keeping in view the provisions of different statutes and legal parameters like 'The Environmental Protection Act 1986' and the Hazardous Waste (Management & Handling and Trans boundary Movement) Rules 2008. Disposal of certain waste like solids and debris etc. that cannot be processed by participating oil companies will be required to be undertaken in close consultation with local administrative authority. In the event, where, spill originates from any unit of the participating oil companies, the custody of waste and recovered oil is to be handed over to the company for transportation, storage and disposal.

Any dispute arising on this account will be settled by respective CMT, whose decision will be final and binding.

The details of refineries Available in Gujarat & in India are placed as below:

Refer Annexure – 23



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

LIST OF DISPERSANTS APPROVED FOR APPLICATION BY COAST GUARD

The NIO and Coast Guard approved list of oil spill dispersants (OSD) are enumerated below:

Type II - Water dilutable (1 part of dispersant: 10 parts of sea water is to be used in the ratio 1 part of diluted dispersant: 2-3 parts of oil)

COREXIT-8500 - (JAN 2003)

BG Exploration & Production India Ltd.,
1st Floor, Mitax Sahar Plaza
Kandivla, M/V Road, Andheri (E), Mumbai - 400 059
Phone : 022-28395841 Fax : 022-28395201

Gold Crew - (Feb 2003)

MS Centerprise
Mayaparkh, 5th Floor
Ajaynagar, Jambli Naka, Thane (W) - 400 601
Phone : 022-25401016/25971030 Fax : 022-25373642

FireChem - (Feb 2003)

MS Fire Chem Private Ltd
B-4, Rana Commercial Complex
Sector-25 B, Near Ajronda, Faridabad - 121 007
Phone : 0129-25288189/25288167 Fax : 0129-25288700

Spillcare-O - (Dec 2004)

Spillcare - O Metaclean Pvt. Ltd
AB-148, 3rd Main Road, Anna Nagar,
Chennai - 600 040, Phone : 044-26200482 Fax : 044-26281457

Type III - Concentrate (to be used neat in the ratio 1 part of dispersant : 25 parts of oil)

COREXIT-8500 - (JAN 2003)

BG Exploration & Production India Ltd.
1st Floor, Mitax Sahar Plaza
Kandivla, M/V Road, Andheri (E) Mumbai - 400 059
Phone : 022-28395841 Fax : 022-28395201

Challenger-OSD EF III - (Aug 2003)

Challenger Chemicals & Polymers Private Ltd.
PR No. 0917, 3 Balasubramam Lay Out
Siddhanada School Road,
New Siddhanada, Coimbatore - 641 044
Phone : 044-2218224 Fax : 0422-2218181

Spillcare-O - (Dec 2004)

Spillcare - O Metaclean Pvt. Ltd
AB-148, 3rd Main Road, Anna Nagar,
Chennai - 600 040
Phone : 044-26200482 Fax : 044-26281457

NOVA CHEMICALS - (JUNE 2005)

Pragj Windoos CHS
Room No.50, 4th floor, 20/24 Old Hasamun Lane
Kandivli, Mumbai - 400 002, Phone/Fax : 022-50947337

ICG requirements for selection of OSD :

Physical State	: Flowing clear and homogeneous liquid free from suspended solid.
Stability	: Between 100-90%
Efficiency	: Above 80% for Type-II Above 50% for Type-III after dilution
Flash Point	: 60°C Minimum
Cloud Point	: 0 to -2°C
Shelf Life	: 5 to 10 years
Validity	: Should be in possession of valid N/O evaluation certificate
Date of Manufacture	: Within 3 months of date of supply



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

4. EQUIPMENT:

4.1. Marine Oil Spill Response Equipment:

The typical response equipment required for mounting an operation consists of equipment for water response and shoreline operations and could include:

Off Shore

Control Station

Booms

Skimmers

Absorbents

Sprayers & dispersants

Radio communication Equipment

Boats / tugs / response vessel

Pumps / hoses

Aircraft Transportation

4.2 INSPECTION, MAINTAINANCE AND TESTING:

Inspection & maintenance are being carried out as per manufacturer's manuals.

(Annexure- 4)

4.3. SHORELINE EQUIPMENT, SUPPLIES AND SERVICES:

General provisions

- 1) Control Station
- 2) Protective clothing for everybody (including boots and gloves), spare clothing cleaning material, rags, soap, detergents, brushes
- 3) Equipment to clean clothes, machinery etc. with jets of hot water
- 4) Plastic bags (heavy duty) for collecting oily debris.
- 5) Heavy duty plastic sheets for storage areas especially
- 6) temporary storage pits
- 7) Spades, shovels, scrapers, buckets, rakes
- 8) Ropes and lines
- 9) Anchors, buoys
- 10) Lamps and portable generators
- 11) Whistles
- 12) First Aid Material
- 13) Special equipment which may be used
- 14) Workboats
- 15) Trucks / cars (four wheel drive)
- 16) Radio transmitter/ receivers
- 17) Workshop / repair facilities
- 18) Bulldozers, mechanical scrapers and similar earthmoving Equipment
- 19) Vacuum trucks Tank trailers
- 20) Life vests
- 21) Explosive meters



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

5. MANAGEMENT:

5.1 CRISIS MANAGEMENT AND FINANCIAL AUTHORITIES CHART: Refer Annexure-15

5.1.1 Crisis Management Team:

	DESIGNATION	APPOINTED MEMBER
1	Chief Incident Controller (CIC)	Dy. Conservator
2	On Scene Commander	Sr. Manager OSR/ Harbour Master
3	Member Admin & Finance	FA&CAO
4	Member HSE & Media	Port safety and Fire officer
5	Member legal	Secretary
6	Member Tech	Chief Mechanical Engineer
7	OSRO/ Response Specialist	To be appointed by OSRO, in case response being undertaken by OSRO

	DESIGNATION	APPOINTED MEMBER
1	Chief Incident Controller (CIC)	Chief Operations Manager
2	On Scene Commander	Sr. Manager OSR/ ME Gr.- I
3	Member Admin & Finance	Accounts Officer OOT
4	Member HSE & Media	Port safety and Fire officer
5	Member legal	Secretary
6	Member Tech	XEN (E&M)
7	OSRO/ Response Specialist	To be appointed by OSRO, in case response being undertaken by OSRO

CMT is the primary unit for incident management and is composed of senior managers from various departments for providing advice and resources and take 'on the spot decisions' to meet any immediate requirements arising during the response.

The major functions that would need to be carried out by CMT to discharge the Plan are as per table below:

Field Operations	<ul style="list-style-type: none"> • Initiation, Control of Operations and response activity • Emergency Control room functions • Implementing tired response and disposal • Shoreline cleaning (when initiated through this CP) • Planning and strategy
	<ul style="list-style-type: none"> • Victuals • Transport • Additional Manpower and Equipment • Security
Technical matters	<ul style="list-style-type: none"> • Cargo ops, Availability of response items, repairs • Communication- operational and with other • Government / non govt. authorities, Media
Legal	<ul style="list-style-type: none"> • Documentation of damages, claims and compensation, notifications



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Health and safety	<ul style="list-style-type: none"> • Medical assistance
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TABLE 12 Major functions of Crisis Management Team

5.1.2 Financial Authorities:

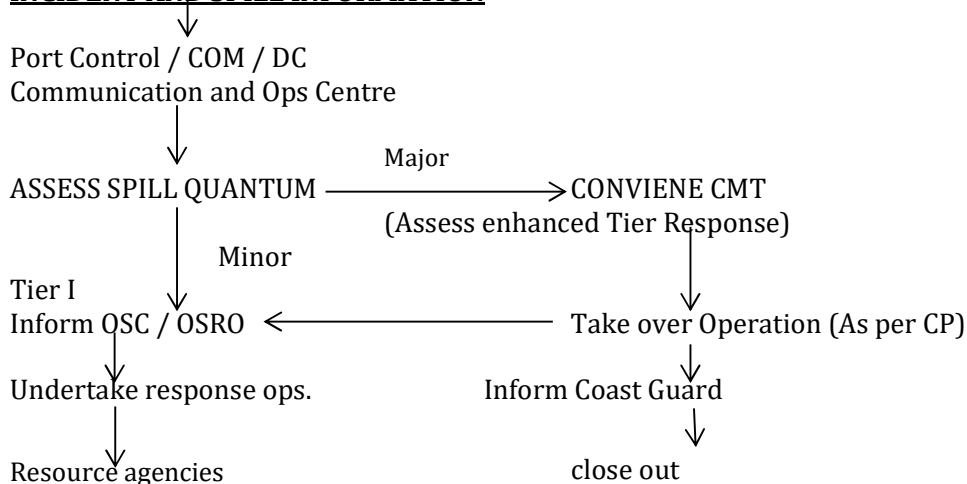
The Financial Authorities of DPA is as per the existing organization structure. At the time of the crisis, the need of the hour will be understood and requirements of OSC /ERT will be met at a faster rate than normal. Since all Head of Departments (HODs) would be Available, immediate on the spot approval will be accorded.

5.2 Incident Organization chart:

CMT is the primary unit for incident management and is composed of senior managers from various departments for providing advice and resources and take 'on the spot decisions' to meet any immediate requirements arising during the responses. Organization Chart is as follows: Refer **Annexure -14**

INCIDENT ORGANIZATION CHART:

INCIDENT AND SPILL INFORMATION



Responsibilities: -

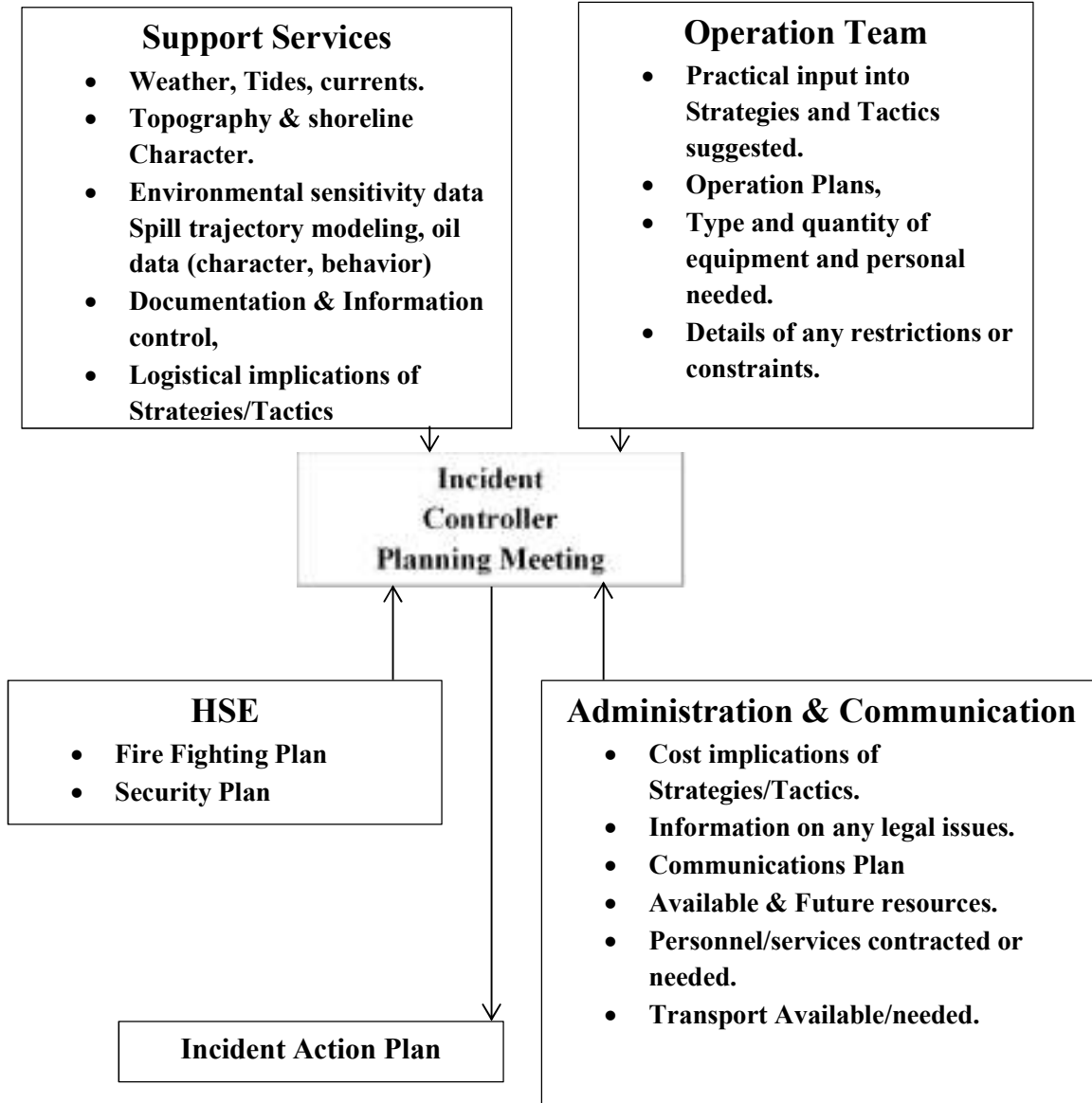
- Liaise with Mutual Aid Organizations
- Liaise with corporate communication for press statements release
- Liaise with Coast Guard Monitor as appropriate
- Confirm / amend initial classification
- Manage the DPA KANDLA AND OOT VADINAR response
- Authorize expenditure

Alert

Indian Coast Guard, Mutual Aid Partners, OISD and other External organizations.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR





OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

5.2.1 Functional Designations:

Following functional designations stand identified and notified through the Plan, to give effect to this Plan:

- (i) Crisis Management Team
- (ii) Chief Incident Controller
- (iii) Incident Controller (On Scene Commander)
- (iv) Incident Manager / OSRO Manager
- (v) On Scene Coordinator / Response Specialist
- (vi) Responders

5.3 Manpower Availability (on-site, on-call):

Terminal Area is manned on 24x7 hours basis; manpower is Available at site to meet any exigency. However, DPA department will provide assistance of water craft, vehicles, cranes etc. for movement of men and material.

5.3.1 Afloat Operations and Response Team/ Teams

Incident operations and response team comprises of CMT or part thereof, as decided by CIC as per the magnitude of spill (Reference 9.2.1 Note v). While, the CMT would be activated to meet in the event of a major accident, a comparatively small incident may need only limited action of CMT to be performed by a part of team.

- I. **Chief Incident Controller (CIC)** - DC / COM is nominated permanent Chief Incident Controller irrespective of the magnitude of spill. While, in the event of a large spill, major decisions and duties are expected of him to be discharged along with CMT, in the event where the spill can be handled by response team alone, the incident will be handled by Incident Controller (IC). The appointed IC will carry out the functions of On Scene Commander for the operation. However, the CIC is to keep account of the operation and ensure to be kept informed.
- II. **Incident Manager (IM)** – is a member appointed by DC / COM or respective CMT leader to undertake the responsibilities associated with administration of operations and giving effect to decisions arrived at by CMT. He is to ensure timely execution of demands and decisions with a view to provide continuity to operations. To facilitate ease of operations and administration, a permanent IM is to stand nominated at all times by DC / COM or CMT leader.
In the event, the response activity is assigned by the port to an OSRO; the OSRO will appoint a manager in addition to Incident Manager to undertake the responsibility of meeting the demands of response teams.
- III. **Operations Response Team (OSRO specialist/ Responder / OSC)** - the response team is to have a permanent status and is to be nominated by CIC on behalf of CMT. The team would comprise of persons specifically nominated on account of their experience of response operations, their qualification or expertise in the matter. The nominated members could be employee of the port or any department in addition to nomination to response team. Being of permanent status, the details of identified members are to be Available at Communication and Operations Center at all times and is to be inserted as a temporary enclosure to this plan. All responders are to be qualified in terms of having undergone IMO Level I course are to be inserted as a temporary enclosure to this plan.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

The functions of response team can be assigned to an identified and qualified OSRO also. (The details of National & International OSRO are placed at an **Annexure-2** in such an event of nomination, all functions with respect to response team and On Scene Co-coordinator will be carried out by the OSRO or OSRO representative, while, CMT and CIC will continue to function hitherto.

Response resources like equipment to be deployed having been identified in terms of quantity and location, additional resources like spill response vessel (SRV) and work boat etc. along with responders would be as per identification and notification by CMT leader. In the event of an OSRO being assigned the responsibility to provide resources, OSRO will have to mobilize the different units.

5.4 AVAILABILITY OF ADDITIONAL MANPOWER:

The response team is to comprise of a Manager, Specialists, responders and response workers apart from the crew of the vessel or work boat assigned to response duties. The team and additional resource composition is

- (i) Incident Manager / OSRO Manager
- (ii) OSC- Incident Controller/On Scene Coordinator
- (iii) SR Vessel and Captain
- (iv) Responders
- (v) Vessel crew
- (vi) Work boat, master and crew

Additional responders or additional teams could be assembled during response ops as the requirement demands.

5.5 ADVISORS AND EXPERTS (Contact details are placed at an **Annexure-1**) – SPILL RESPONSE, WILDLIFE, AND MARINE ENVIRONMENT:

The following Authorities and Organization have been consulted during the preparation of this plan:

1. Indian Coast Guard
2. Integrated Marine Facilities at Kandla & Vadinar.

Oil Industry Safety Directorate (OISD) has decided that, all the Ports and Oil companies should create Tier 1 facilities for maintenance and combating oil spills, Therefore, DPA KANDLA AND DPA OOT VADINAR has established Tier-1 facilities.

This report presents the methodology and results of an assessment of the risk of a significant oil spill occurring at DPA KANDLA AND DPA OOT VADINAR in or around SPM, channel route, along pipeline corridor at product jetty and in the area proposed for expansion in the Gulf of Kutch. The assessment has considered low to moderate frequency with low to moderate impact events, i.e. Tier-I spills.

5.6 TRAINING / SAFETY SCHEDULES AND DRILL / EXERCISE PROGRAMME:

5.6.1 Training:

Oil Spill Response Requires Specialist Training which should be developed at all levels of the response. Also, the Management of an oil spill incident is a major task and has a crucial bearing on the outcome of an oil spill response, issues such as the control of crisis situations, political interest, media pressure, public environmental awareness and legal and financial implications can add substantial burdens to the oil spill response team and must be effectively handled if the overall response has to be successful. Effective Training hence becomes crucial for the response team in order to handle the situation aptly and correctly. There is no denying the fact that oil spill combating in any capacity is a rare event for most people and therefore, it is important to keep in touch with skills and knowledge gained as a part of ongoing personnel Training. This too, will help in ensuring that all those involved in the response operation understand each other's role in an oil spill incident.

At present Organization has 10 employees trained in IMO Level-I Oil spill response and 04 employees trained in IMO Level-II Oil spill response.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

5.6.2 Exercises and Drills

The purpose of exercises and drills is to test the knowledge of persons and members associated with response activity and maintain them in the highest state of readiness and professional competence. The exercises would aim to assess acquaintance of response teams with operation ability and initiation of Plan and also the knowledge of operational parameters.

For this purpose, it is required to conduct both in house training and evaluation exercises and also multi agency co-ordination exercises are being conducted at regular intervals.

In addition to classroom training, the responders would need to go through regular internal and external exercises that would include deployment of equipment to demonstrate level of proficiency. With respect to management of operations in consonance with the plan, it is desirable to conduct real time CP exercises with all industrial stake holders involved. Such an exercise conducted at a large magnitude would need to incorporate the staff from DPA, Participating Oil Companies and the Indian Coast Guard and scheduled as mutually agreed.

The purpose of exercises and drills would be to check the following:

1. Organizational and Planning

- (a) Knowledge of Contingency Plan and Procedures
- (b) Personnel Notifications and Staff Mobilization
- (c) Ability to operate as per CP and Operations Manual

2. Operational Response

- (a) Oil spill assessment
- (b) Response equipment selection
 - I Containment strategies
- (d) Spilled oil recovery techniques
- (e) Disposal of recovered oily water and contaminated material

3. Response Support

- (a) Communications
- (b) Logistics
- (c) Personnel support
- (d) Documentation

5.6.3 SAFETY-Refer Page-64

5.6.4 Types of exercise:

Exercise requirement as per contract is to conduct internal and external exercise. In addition to classroom training, Exercises are to include deployment of equipment to demonstrate satisfactory levels of proficiency. External exercises are to incorporate with the staff from DPA, participating oil companies and the Indian Coast Guard.

- (i) **Type A:** Internal exercises lasting approx. One day for ensuring OSR readiness of all equipment, services and personnel.
- ii. **Type B:** Emergency Response Exercise (Tier-I) is to be conducted once a year.
- iii. **Type C:** These exercises designed to test either specific scenarios or emergency plans and include external participation (i.e. mutual aid, govt. agencies)



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

6. COMMUNICATION

6.1 INCIDENT CONTROL ROOM AND FACILITIES:

Communications plan

Communications between the MTCB, COT and PIT Control Room and Marine personnel during the response to any oil spill within the local area will be primarily by VHF private channel radio.

Communications between the MTCB and other vessels will be established on VHF

Radio Channel 16/12.

Use of cellular telephones is to be kept to minimum. Cellular phones are **NOT** to be used in the vicinity of spill.

Contact details OOT Vadinar:

Port Control	Landline - DPA	02882573005
	VHF - DPA	Marine channel 12, 16 Marine Channel 13
COC/ME Gr-I	Landline number	02882573033
	Mobile	9979126681
	VHF	Marine Channel 12 and 13,16
COM /CIC	Landline- KPT	02882573001
	Mobile	9819999227
Marine Engineer Grade - I	Mobile	9979126681

Table 13

Contact details Kandla:

Port Control	Landline - Kandla/Gandhidham	Kandla-02836-270529/270194 Gandhidham-02836-233585
	VHF - Kandla	Marine channel, 08,10,12,16
COC/HM	Landline number	02836270201
	Mobile	8976741054
	VHF	Marine Channel 08 and 10,16
DC / CIC	Landline- DPA	02836233585
	Mobile	9603123449
Flotilla Superintendent	Mobile	9825227610

Table 14



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

6.2 FIELD COMMUNICATION EQUIPMENT:

6.2.1 Equipment:

The communication center is to be provided the following equipment

- i. VHF – 2 numbers
- ii. Walkie-talkies – as per the number of response teams and functional team leaders
- iii. Telephone (landline or wireless) – 1
- iv. Computer and printer with internet and projector facility

6.2.2 Publications: NOS-DCP

6.3 REPORTS, MANUALS, MAPS CHARTS AND INCIDENT LOGS:

For Reports use formats described

- 1) Map of Local Area
- 2) Geographical limit and sensitivity map
- 3) Sensitivity Mapping CZMP as annexure -
- 4) Refer the logs maintain by MTCB & Individuals log if any

The Log Incident Report form as per **Annexure-17** sample has to be developed to ensure that the basic information required to formulate a response to an Oil Spill Emergency is obtained during the notification (if required). Port Control / COM /Communication and Ops Centre will complete the form and dispatch to the concerned authorities by the fastest means. In all cases, the original status report forms will be handed over to ECT, who, in turn, would maintain record of all such documents.

The personal log form and continuation sheets have to be as per **Annexure -18** to allow all personnel involved on the emergency response to maintain a personal log of event. The personal log forms and the continuation sheets are to be used during the oil spill response to record the contacts and activities carried out during such emergency.

Incident Logs are for logging of all the events taking place. This will help in preparing a comprehensive Incident Report on a day to day basis as well as on completion of operation.

After the response work is over, the personal log form as per sample at annexure-18 and the continuation sheets are to be numbered, signed and handed over to the COM.



PART II

ACTIONS

AND

OPERATIONS



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

7. INITIAL PROCEDURS

7.1 NOTIFICATION OF OIL SPILL TO CONCERNED AUTHORITIES

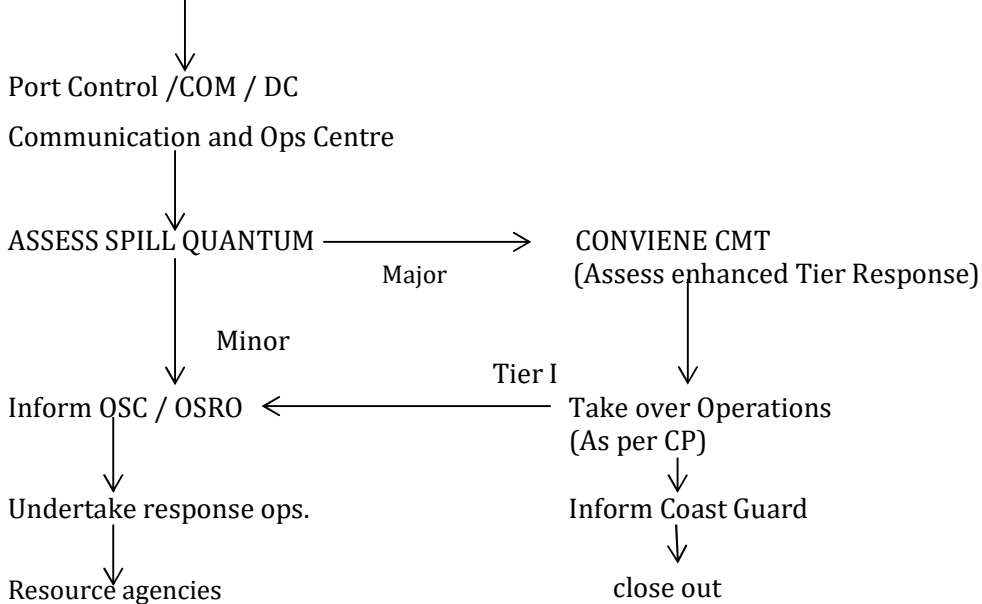
Any INFORMATION RECEIVED WITH RESPECT TO A SPILL, BEING OF IMPORTANCE TO ARRIVE AT A DECISION FOR ACTIVATION OF CMT and RESPONSE REQUIRED TO BE TAKEN, HAS TO BE RECORDED WITH CARE AND WITH ALL POSSIBLE DETAILS.

Correct knowledge of the quantity of spill is a factor that would facilitate the CMT and other responders to decide on the scale of response action and also the requirements to decide on Tier responsibility. The information has to contain the following details

- Authority reporting spill (with all details)
- Time and position of spill
- Type of oil
- Assessed quantum of spill

INCIDENT AND INFORMATION FLOW CHART

INCIDENT AND SPILL INFORMATION





OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Notification matrix

The matrix gives the primary telephone contact number; alternative telephone and facsimile numbers are included in **Annexure-19**

7.1.1 ADDITIONAL INFORMATION:

In addition to the above information, following info is also to be recorded and provided to the responder or OSRO,

- Detailed weather conditions – wind, direction and speed
- Sea conditions

7.2 PRELIMINARY ESTIMATE OF RESPONSETIER:

The moment oil spill takes place or is detected, immediately the time and place of the spill started and stopped should be ascertained from the originator of the oil spill. The information about diameter of pipe, rate of pumping /flow of oil would help in determining the quantity of oil that has spilled into water. In case, accident is due to collision the sounding of the tank would talk about the quantum of oil spilled into the water and then only magnitude of spill could be established. The notification as per NOSDCP will be adopted for declaring Tier I, II or Tier III spill or spill of a minor nature.

7.3 NOTIFYING KEY TEAM MEMBERS AND AUTHORITIES:

The Key Team Members are – COM, Marine ENGG GR -I, Fire Officer, Sr. Manager OSRC and other HODs. These members can be informed over Phone /Mobile phone, and same be also logged at ECR.

7.4 MANNING CONTROL ROOM:

Marine Terminal Control Building (MTCB) will be the control room, unless otherwise location nominated by the Head DPA KANDLA AND OOT VADINAR

7.5 COLLECTING INFORMATION (OIL TYPE, SEA / WIND FORECASTS, AERIAL SURVEILLANCE, BEACH REPORTS):

Samples to be collected from various points, clearly marked and sealed. Samples to be stored for further investigations, as required. The following equipment shall be held for the purpose of storing samples

- a) At least 6 sampling bottles,
- b) One seal tag for each sampling bottle
- c) Prognosis and Synopsis weather reports
- d) Any other relevant matter

The moment oil spill is reported /intimated to the various departments, the action by

- i. Marine department will provide all the relevant data for that day to ECR i.e. Tide conditions at that time, Tide timings, Current, Wind direction /speed, Weather forecast, Vessel movements, Vessel position in DPA Port, Water crafts Availability for pollution response activities. Relevant Navigation Charts and any other important data /information Available may also be provided. Also number of Security Personnel Available at that time will be made Available.
- ii. Traffic department to provide information regarding Availability of type and number of vehicles Available for transportation of men and equipment. Also, number of Casual Labors Available at that time will be made Available.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

- iii. Fire department to indicate readiness about FIRE CONTINGENCY including OIL FIRE and also number of spare Life Jackets Available.
- iv. ECT Ensure that no individual is working / supervising / observing OSR operations/ Exercise Without Life Jackets "ON".

OSC is to collect following information immediately in case of oil spill:

- Time of oil spill occurred.
- Position with reference to prominent land mark and also, if possible, in latitude and longitude.
- Visual appearance, apparent thickness of oil and extent of area covered.
- Percentage covers of various thickness of oil.
- Existing weather condition and weather forecast
- Current and tide conditions
- Immediate Availability of support vessel, equipment and manpower.
- Estimate oil spill trajectory and likely area and time of its landfall.

7.5.1 Information Display:

The following latest information is to remain displayed at all times on wall boards in the Control and Operations Center:

- Vessels working cargo in port – quantity of cargo, location and expected times of completion
- Prevailing weather conditions and future forecast
- Vessels expected to arrive and depart port in next 24 hrs., cargo and quantity
- Important contact numbers of CMT, OSRO and other CP aid agencies
- Continuous watch on working frequencies used by ships, port and terminal for POL cargo ops
- Watch on Ch 16 at all times
- Log all information in respect of an oil spill (with maximum details) received through keeping watch or from any other source
- In case of first receipt of information, pass all the details regarding spill to CMT leader to facilitate complete or partial activation of team or response actions by OSRO
- Pass all information regarding spill to OSRO and duty vessel or tug assigned response duties.
- Remain in constant touch with designated response team leader and response / support vessels as per working channel decided for operations
- Collect latest information from MET dept. on weather conditions in the area including wind direction & speed, tide condition and other weather parameters (all received information is to be logged)
- Provide weather data to operational teams as demanded



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

7.6 ESTIMATED FATE OF SLICK&PLANNING MEDIUM-TERM OPERATIONS (24-48 AND 78 HOURS):

The likelihood of oil spill taking place are from two factors mostly, during vessel operations and secondly due to collision. Since, during vessel operations, OSRO personnel as well as ship's staff present at the site, any mishap taking place could be tackled immediately as reaction time will be very less and damage control could be done very fast. Therefore, quantity of oil spilling into water is expected to be minimum and the spill could be neutralized quite easily. Here in this case dispersants, sorbents may be used and whole operation is likely not to last more than 24 hours. In fact, OSR items are kept handy in OSRV to use any time.

However, in case of oil spill occurring due to Collision, it is certainly going to be at a higher magnitude. As, when the collision takes place, everybody's attention is likely to be toward safety of the vessel i.e. to Avoid vessel getting grounded, Avoid colliding with other vessels, preventive action against fire or carryout firefighting, damage control action against flooding and so on. It is anticipated that in case of collision the oil spill is likely to occur due to rupture of or crack in fuel tanks. It should be clearly understood that

i. In case of rupture of fuel tanks a sudden gush of oil will be there, and for some time it will be uncontrollable. By the time any effective damage control action is taken, a substantial amount of oil would have already gone overboard. This would necessitate immediate oil containment measures, as well as starting of oil recovery action. This oil spill recovery action may go well beyond 48 hours, keeping weather and sea conditions in mind, because one does not know at what time of the Day or Night accident takes place which will determine the time delay in appreciation of the situation and mobilization of OSR team and equipment. It may clearly be understood that appreciation of oil slick between sunset and sunrise is quite difficult and at times it may be fully incorrect, hence slight time delay may be anticipated.

Such accidents don't happen quite often, but very rarely. Hence readiness of OSR team and Equipment shall be maintained at all times.

ii. The oil spill scenario through cracked fuel tank /tanks is not very different than the previous one, because due to cracked/fractured /material failure occurred in the fuel oil tank/tanks, oil would continue leaking in a small /moderate rate. But it would be difficult to locate the source/point of oil leak and by the time source /point of leak is detected, suitable action is initiated and leak is arrested, a sizeable quantity of oil would have already been over board. Detection of oil leak will become more difficult if the crack /fracture develops after some time due Collision related structural stress and ship is secured alongside jetty with the damaged /leaking side situated between shipside and jetty. The problem will become more compounded if the accident takes place after sunset during severe monsoon conditions and detection of oil slick in the night would be really quite difficult. Like above serial (i), here also one cannot deploy OSR men and equipment precisely and reaction time to deploy OSR men and equipment, subsequently recovery of spilled oil is going to take more or less the same time.

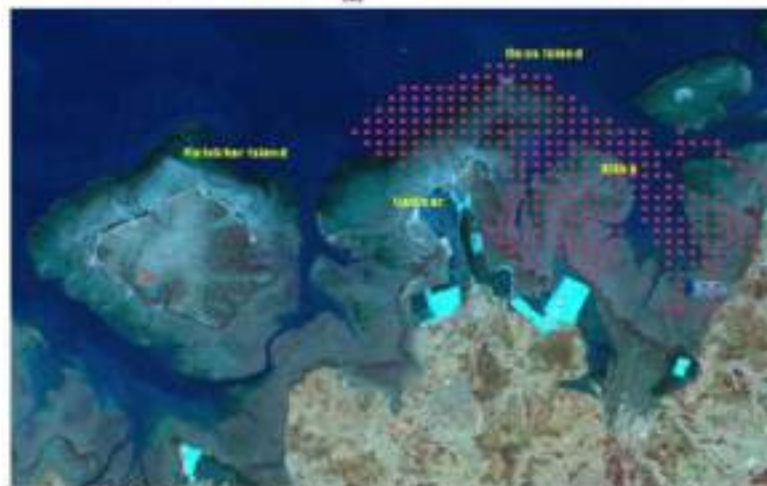
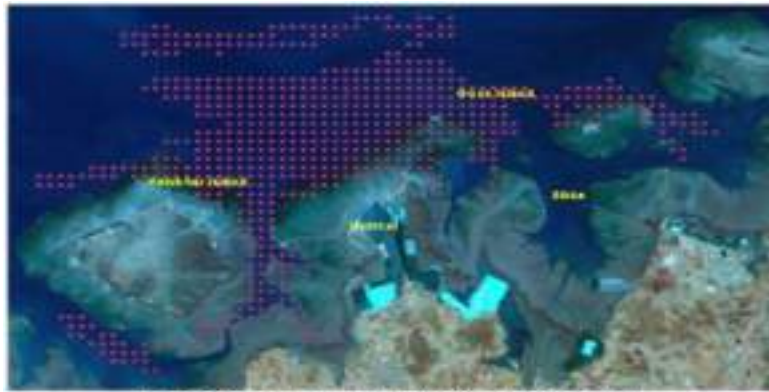
Here the vessels taken on consideration are visiting ships of various sizes in all weather conditions but not the minor vessels or tug boats.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

7.7.1 ESTIMATED FATE OF SLICK: (24, 48 AND 72 HOURS):

Please refer to the picture below and apply the prevailing factors deduced from the weather reports.

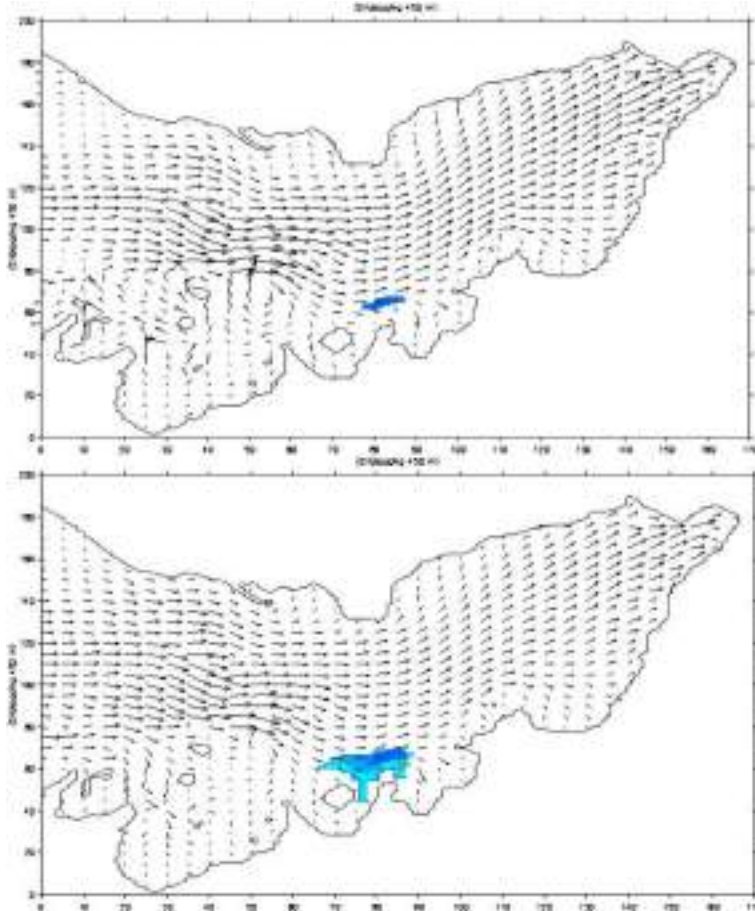




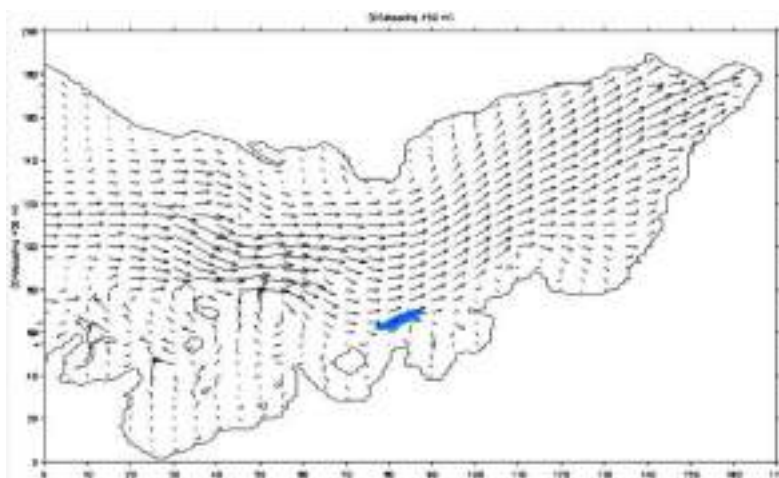
OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Estimating fate of slick.

Oil trajectories at the end of 2 hour and 24 hours for scenario I: No wind condition:

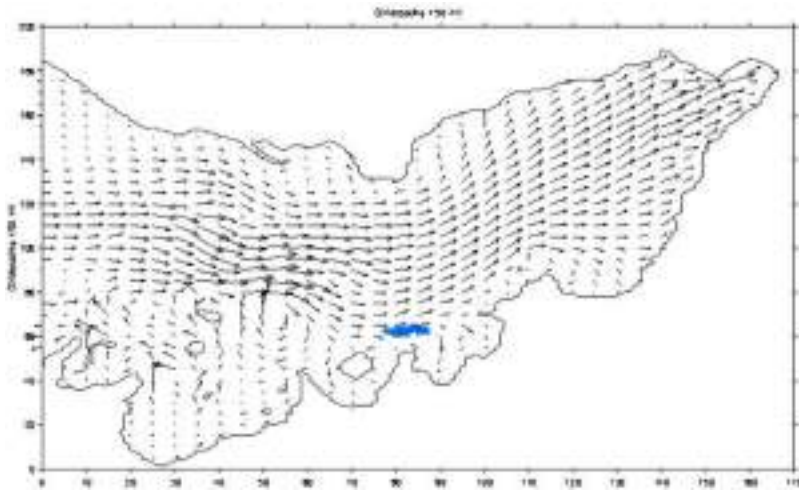


Oil trajectories at the end of 2 hour and 24 hours for scenario II: 5m/s wind from 240 degree N

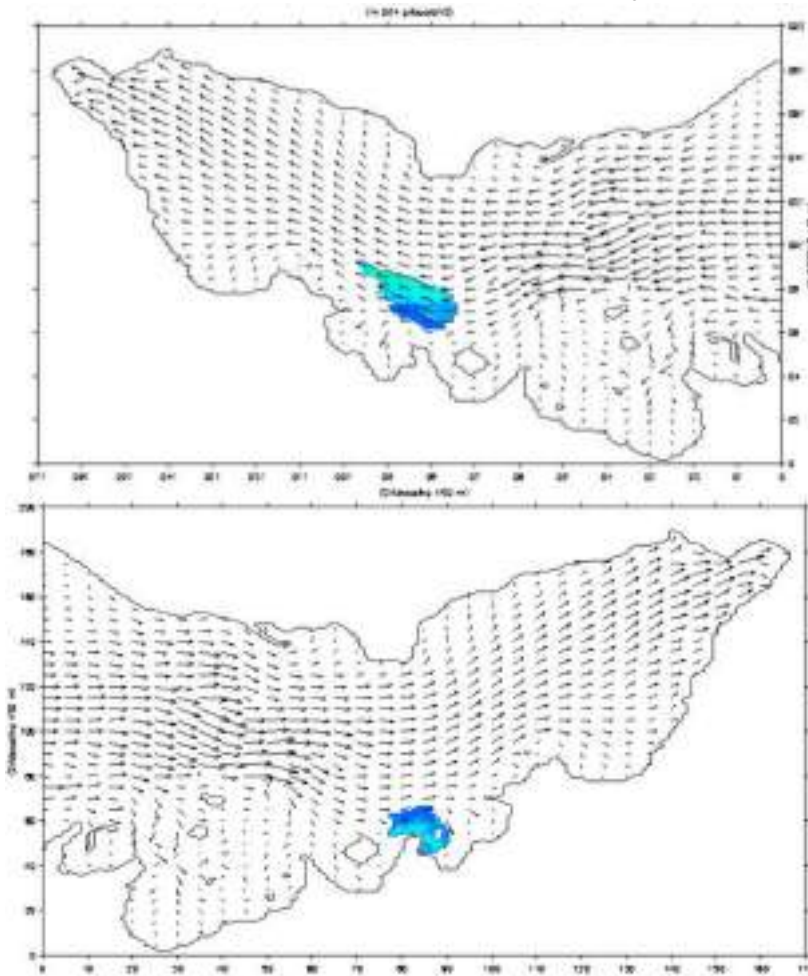




OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR



Oil trajectories at the end of 2 hour and 24 hours for scenario III: m/s wind from 330 degree N





OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

7.6 IDENTIFYING RESOURCES IMMEDIATELY AT RISK, INFORMING PARTIES:

There are no resources which will be immediately at risk except Marine national park & ESSR intake. No population along the coast up to about 10 km, the mangroves are at about 5 km. salt pans are at about 7-8 km. The mangroves and salt pans are likely to be affected only at highest high water during NE monsoon. Depending upon the place of spill, the resources at risk will be assessed.

7.7. Surveillance

The aim of surveillance is to detect, characterize and preferably quantify spilled oil that may be present in a range of settings (on-water, in-water and onshore). This is of critical importance in enabling the incident command to effectively determine the scale and nature of the oil spill scenario, make decisions on where and how to respond, control various response operations and, over time, confirm whether or not the response is ineffective. Irrespective of the final response strategy selected monitoring of oil spill will commence immediately after the oil spill and will continue until the response operation is terminated. The information gathered through monitoring and evaluation will be used by the IMT to steer the response, and ensure that the most effective and efficient response strategies are being adopted.

Five monitoring and evaluation methods are discussed in this section:

- Aerial Surveillance
- Vessel Surveillance
- Satellite Surveillance
- Surface Plume Tracking
- Spill Trajectory Modeling.

7.7.1 Aerial Surveillance

Aerial surveillance is the first response for any ongoing reportable incident as it allows the Incident Management Team to quickly gather initial information about the incident and formulate tactical plans to combat the spill. Aerial surveillance can be carried out throughout the incident management process to provide feedback to the command Centre on daily progress and to help evaluate the success of the response strategies.

A written or verbal flight task is given to the aerial observer detailing the purpose of the mission, such as:

- Confirming the location of the spill using ladder or spiral search path
- Quantifying the amount of oil on the water and verifying the results from modeling
- Directing response operations such as directing vessels/aerial dispersant application planes onto the thickest part of the oil
- Conducting shoreline surveys to identify areas that may have been, or may be impacted.

Followed by the aerial surveillance and preliminary shoreline survey substantiated by notes, sketches, photographs and videos supported by GPS readings. In case considerable part of oil spill sunk due to environmental conditions, oil characteristics or both, under water survey may be required. The survey may be undertaken using visual assessment, divers, remotely operated vehicles, acoustic sensors or sorbents. Environmentally hazardous areas must be marked specifically based on the secondary data already Available so that many accidents resulting in loss of life and property can be Averted.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

7.7.2 Vessel Surveillance

Before the arrival of aircraft for aerial surveillance, vessels Available on the scene can help to conduct initial visual surveillance by following the leading edge of the slick. This location in formation can then be communicated to the Incident Management Team to guide the aerial surveillance aircraft to the slick. This is only a temporary measure as the vessel's visibility ranges restricted and there is a risk of secondary contamination of the vessel.

7.7.3 Satellite Surveillance

Surveillance of oil spill is also possible through satellites with sensors such as SAR (Synthetic Aperture RADAR—an active sensor that send out a micro wave pulse and reads there turn) and Optical sensors– (Relies on reflected energy). RADAR imagery is the preferred option as the active pulse from space reacts with surface textures giving all-weather day / night imaging. This service may be gauged through Space Application Centre, Ahmedabad.

7.8. SAMPLING

Identification of the responsible source for an oil spill incident is essential because of its legal implication. Laboratory analysis of the oil samples is thus required following a spill incident. From the same it is possible to identify differences between one type of oil & the other and also to determine the similarities between spilled oil and its source. Source of the oil could be identified by the comparison of the spilled with the potential source samples. Sampling is as important as laboratory analysis and investigation.

Sampling of both biotic and abiotic resources from spill affected area is the first and foremost part of the oil spill testing. Resources can be water, oil, sediment, air or biota. Samples should be representative, since they are used to quantify the oil, predict its weathering characteristics and to identify the source.

Improper samples or sampling will lead to wrong results and conclusions that will not stand up in legal examination and subsequently laboratory analysis and investigations will become mere wastage. Personnel who are supposed to collect the samples should be given minimum training and practice to do better response in a real spill situation. A sampling plan shall be adopted that will describe the sampling procedures in brief and will ensure that all the required operations are taking place accurately and sequentially without any missing.

Sampling of oil from different environment site, from vessel engine to water body or even from an organism will be required. Also they can be of varied forms mainly of heterogeneous nature some of which are given below.

- Oil, oily water, heavily emulsified oil, tar balls or lumps on the water surface
- Mixtures of oil, sorbents or other materials which are soaked with oil
- Oiled animals on the water surface or on beaches mainly in the intertidal area
- Oil in tanks on ships, offshore constructions or land facilities
- Oily water bilges and slop tanks on ships, offshore constructions or land facilities
- Oily sludge in the sludge tanks on ships, offshore oil installations/ drilling rigs or land facilities.

Sampling equipment shall be pre cleaned to remove any oil residues including finger oils that may mix with the oil collected and interfere with the laboratory analysis. Oil contaminated sampling containers should be Avoided. Sampling equipment if not purchased preleased shall be cleaned with a detergent wash, rinsed with distilled water and then rinsed with solvents like dichloromethane, hexanes. Pre cleaned supplies can be wrapped in aluminum foil to prevent contamination while being stored or transported to the spill.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Table 7.1: Details for Oil Spill Sampling

Sl. No	Sample Type	Sample Container	Quantity of Sample	
1	Oil	Glass Bottle 500 ml Clean. Colored (dark) glass is preferred for water samples. Preferably supplied by laboratory. Top should be sealed with aluminum foil under the cap.	Pure Oil Source Sample	30-50 ml
			Contaminated Oil (Emulsified Oil, oil from the sea or shore, sandy tar ball)	10-20 g
			Debris with oil, oil stained sand	Sufficient quantity that oil content is approx.10g
2	Water		Water sample with visible oil	1 liter
			Water sample with no visible oil	3-5 liter
3	Sediment	Fine: Silt - Pebble	Glass Jar 250 ml Clean. Colored (dark) glass is preferred for water containing samples. Preferably supplied by laboratory. Top should be sealed with aluminum foil under the cap.	
		Coarse: Cobble	Wrapped in aluminum foil Once wrapped they can be stored in plastic bags.	
4	Biota	Glass Jar same as Glass Bottle/ Jar	Oiled feather	5-10 feathers depending on the quantity of oil present
		Wrapped in aluminum foil Whole specimens. Once wrapped they can be stored in plastic bags.	Fish, shellfish (flesh and organs)	Multiple individuals of the same species totaling 30g



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

A sampling kit may be arranged for this with necessary sampling equipment's as described in the **Table 7.2** given below.

Table 7.2 Components of the Sampling Kit

Sl. No	Item	Details
1	Sample jars (250 ml or other size)	Pre cleaned, Teflon or aluminum cap or Alf oil barrier as required. Plastic should not be used
2	Slick/pooled oil sampling equipment	Wooden spatulas/tongue depressors or stainless-steel spatulas/spoons.
3	Sheen sampling equipment	TFE fluorocarbon polymer nets or small squares of sorbent. Polymer nets or bags with rings and extension poles, TFE polymer sheets of mesh fabric can also be used.
4	Disposable gloves	100% nitrile medical examination gloves
5	Sorbent padding for storage cooler.	
6	Sample storage coolers with pre-frozen freezer blocks.	
7	Waterproof plastic envelope.	
8	Sample identification labels	>1/sample. White Adhesive 5cm to 10cm water and oil resistant
9	Sample Log Sheets.	
10	Chain of Custody Forms.	
11	Decontamination equipment if needed,	
12	Cardboards Shipping Tubes, &Fiber board boxes	(25cm x 25cm x 25cm), For packing sample jars for shipment
	Sorbent material	
	Grease proof plastic bags 50cm x 65cm	
13	Tape for sealing jars, shipment tubes and fiberboard box 2 to 10 cm wide	
14	Towels absorbent cloth or paper, twine	
15	Tongue depressors or pre-cleaned metal scoop	To aid collecting samples of heavy oil or tar Balls
16	Sediment Sampler	
17	Onsite Probes	e.g. DO, Turbidity, Conductivity, Odor, Ambient Hydrocarbon Detector, Multi Wavelength Fluor meter etc.
18	Kit/ Pouch to hold all sampling equipment to spill location	

7.8.1. Sample Identification and Security

Sample identification, labeling and security are very important part of oil spill sampling, especially when it has a forensic value. The sample jar is to be sealed using tape to seal the lid to the jar, before placing the labels on the jar. While placing the labels on the jar, two labels should be kept one for the purpose of sample identification and the other for chain of custody. Writings on the jar should be legible and written using indelible ink. A sample identification label has been shown in **Figure7.1**. Below.

Figure7.1. Sample Identification Label

CASE NO: _____	SAMPLE NO: _____
TIME _____	DATE _____
SPILL <input type="checkbox"/>	SUSPECTED SOURCE <input type="checkbox"/>
SAMPLE DESCRIPTION _____	
LOCATION _____	
SAMPLER _____	
WITNESS _____	

7.8.2. LABELING AND SEALING

All necessary information required for identification of the sample shall be there on the label such as geographic location, signature on suspected source sample from master or crew man, dates sealed and who sealed sample, etc., should be a part of the label.

Case number is a unique number as signed by investigator to help keep track of spills overtime. Sample number stands for serial number given for each sample 1, 2, 3 etc. Sample description used to distinguish one sample from another sample. For water samples the description should have information relating the sample to a fixed point like name of creek, distance from a bridge pier or any other identifiable structure. For sample from suspected vessels, the description should have the name of the vessel and specific location of the sample such as engine oil bilge. Samples taken from a shore facility should include the name of the facility including a city, location of the sample on the facility (IMO).

7.8.3. SAMPLE LOG

For each sampling operation a sample log should be prepared and transferred along with along with sampling jars and kept in safe custody. It should contain all the Available details regarding the sample including the necessary things given below.

- A. Sample number or code (Optional, but advisable for multiple sampling at a single location).
- B. Sample description (oil, debris, thick slick, film, sediment, air and biotitic).
- C. Time and Date (24 hr. Clock, Day/Month/Year).
- D. Location (GPS coordinates or other description).
- E. Name of person taking the sample.
- F. Witness (If a sample for legal purposes).
- G. Identification and description of samples and locations.
- H. Subcontractor information and name(s) of on-site personnel.
- I. Dates and times of sample collections and chain-of-custody information.
- J. Records of photographs.
- K. Site sketches of sample location including identification of nearest roads and surrounding developments.
- L. Calibration results



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7.8.4. CHAIN OF CUSTODY (COC)

8. After sampling it is important that samples are to be kept in a person's custody or possession so that either he can see them or they are locked up. The sample description here should be exactly same as that of sample label. All persons who have control of the samples need to sign in the signature part of the COC as well as the chain of custody label on the sample. COC document should be sent with the samples to the laboratory. Format for chain of custody is attached as **Table 7.3**.

Table 7.3. Format for Chain of Custody

Chain of Custody Record			
Organization's name			
Address:			
Spill	Source	Sample no	Description of samples for case no:
Person Assuming Responsibility for Samples			Time/ Date

Chain of Custody Record					
Sample number	Relinquished by:	Time/ date	Received by	Time/ date	Reason for change of custody
Sample number	Relinquished by:	Time/ date	Received by	Time/ date	Reason for change of custody
Sample number	Relinquished by:	Time/ date	Received by	Time/ date	Reason for change of custody

Page of _

7.8.5. HANDLING THE SAMPLES

Samples must be handled, stored and transported with care so that they remain uncontaminated, intact and fit for purpose. Handling procedures should also be documented such that sample integrity can be demonstrated. Containers should be filled as full as possible to avoid losses of light hydrocarbons. All samples should be labeled immediately. Labels should not be placed inside the sample container. Labels should be applied to containers after the sample has been sealed. This will allow the container's exterior to be cleaned and dried before the label is attached. While sampling care should be taken that there is no contamination from exhausts of engines or cooling water of sampling vehicles.

7.8.6. Storing the Samples

Samples should be held overnight or for any extended time in a secure room, with in a suitable containerize. a refrigerator. A sample room may be established and a sample room controller may be appointed and log may also be kept for the room. Samples should have a Chain of Custody record attached to track the location and handling of samples. Samples are stored in a cool dark room. Weathering may be accelerated in the presence of heat and sunlight. The samples may be placed in an



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insulated pouch or Stay of a cooler's closed vehicle is no desirable especially in summer even when a cooler issued. Hence it is better to Avoid such journeys or for the optimum condition i.e., keep the samples in an explosion proof refrigerator at 2 to 7°C. Samples should not be freeze and hence the temperature should be maintained above - 4°C. The preservation methods are given **Table 7.5**below.

Table 7.5. Preservation Methods for Different Types of Samples

Sl. No.	Sample Type	Preservation Method
1	Sediment	Chilled to < 4 °C- but not frozen
2	Oil	Chilled to < 4 °C- but not frozen
3	Soft Marine Fauna/Fish	10 % formalin in sea water Or freshwater if sample is from fresh water
4	Crustaceans/ Fish	Freezing (for large fish and crustaceans)

All areas where samples are handled or stored must be decontaminated before and after use, designated to be NO smoking areas, isolated from combustion engines, exhausts or other sources of hydrocarbon contamination. Samples will be transferred to the sample intake team to be frozen as soon as possible especially for sediment and tissue chemistry samples. Water samples will be analyzed immediately due to holding time limitations, while sediment and tissue samples collected for VOC and PAH analyses will be archived. Sediment samples collected for nutrient analyses will be analyzed within the 28-day holding time. (MC252OilSpill–Jean Lafitte National Historic Park and Preserve Submerged Aquatic Vegetation NRDA)

7.8.7. Shipping of Samples

The guidelines for this are laid down by International Air Transport Association (IATA). This ensures safe, intact arrival of samples and prevents damage to other parcels. Packaging and Shipping of the mis regulated under IATA's Dangerous Goods Regulations. Most of the samples belongs to the following to categories Flammable Liquid, packaging group II consists of oils with flash points less than 23°C e.g. gasoline, naphtha and most of the crude oil. Flammable Liquid, packaging group with flashpoints more than 23°C but less than 60.5°C e.g. Kerosene, jet fuels, turbine fuels, No.1 fuel oils etc.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

8. OPERATIONS PLANNING

8.1 ASSEMBLING FULL RESPONSE TEAM

Area of operation of this Plan being confined to DPA Port. All responses and actions would get limited to coastal zone and within the estuary.

8.1.1 Crisis Management Team/s (CMT)

The core operational team discharging the functions of incident control, administration and management is designated as Crisis Management Team/s (CMT) operating from the identified control center located in the Port Administrative building.

8.1.2 CMG:

Apart, from the designated CMT, another senior level team designated as Core Management Group (CMG), headed by the respective head of DPA, will get activated in times of major spill crisis that may require liaison with senior level state, center authorities or other agencies. The other team members of CMG will be the heads of departments. The functions of CMG will be the same as CMT with a view to provide support to operations in terms of administrative requirements. CMG will assemble on the recommendation of Chief Incident Controller.

This Plan formulates the policies and strategies to be followed in case of a response and to be executed on the ground by CMT along with response team or Oil Spill Response Organization (OSRO).

The operational spill prevention provisions of this CP will be discharged by three CMTs - headed by Chief Incident Controller, one each for the area of jurisdiction of DPA, NAYARA, Reliance. Duties and responsibilities of all the three teams would largely remain the same- as spelled in this CP, with additions and amendments undertaken by each team as per operational situation and requirements particular to their area of operation. Each team would be responsible for operations in their respective area of Jurisdiction.

8.2 IDENTIFYING IMMEDIATE RESPONSE PRIORITIES

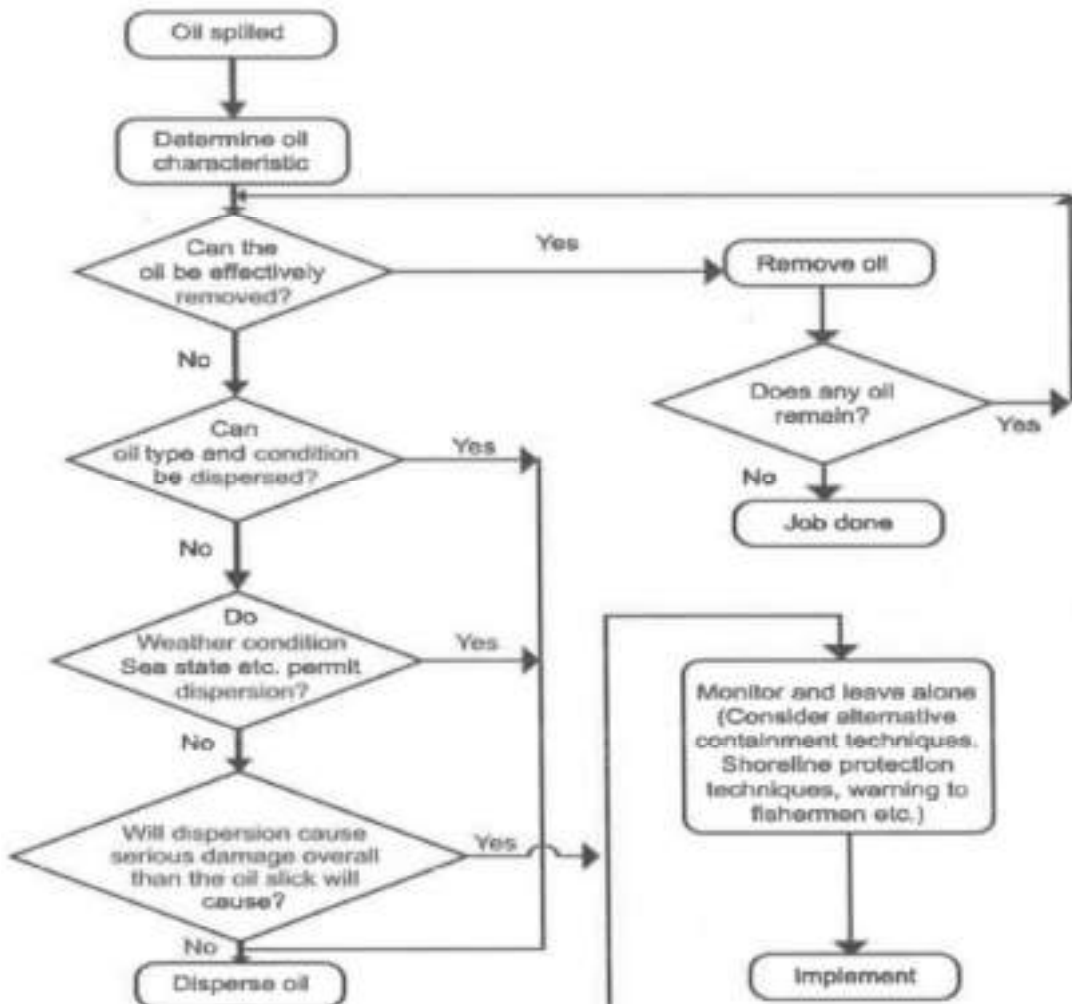
Major actions that would be required to be taken when a spill occurs are mentioned below. While, some actions like containment are required to be initiated immediately following a spill, some actions like shore line clean up etc. will get initiated in due time. The purpose of fast response is to minimize hazards to human health and environment. The following response is accordingly addressed through the Contingency Plan and Operations Manual:

- Stoppage of discharge and containing spill within a limited area.
- Defining size, position and content of spill, direction and speed of movement and likelihood of Affecting sensitive habitats.
- Notification to private companies or government agencies responsible for cleanup actions.
- Movement of trained personnel and equipment to site.
- Initiation of Response activity.
- Ensuring safety of response personnel and public.
- Oil removal and disposal.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

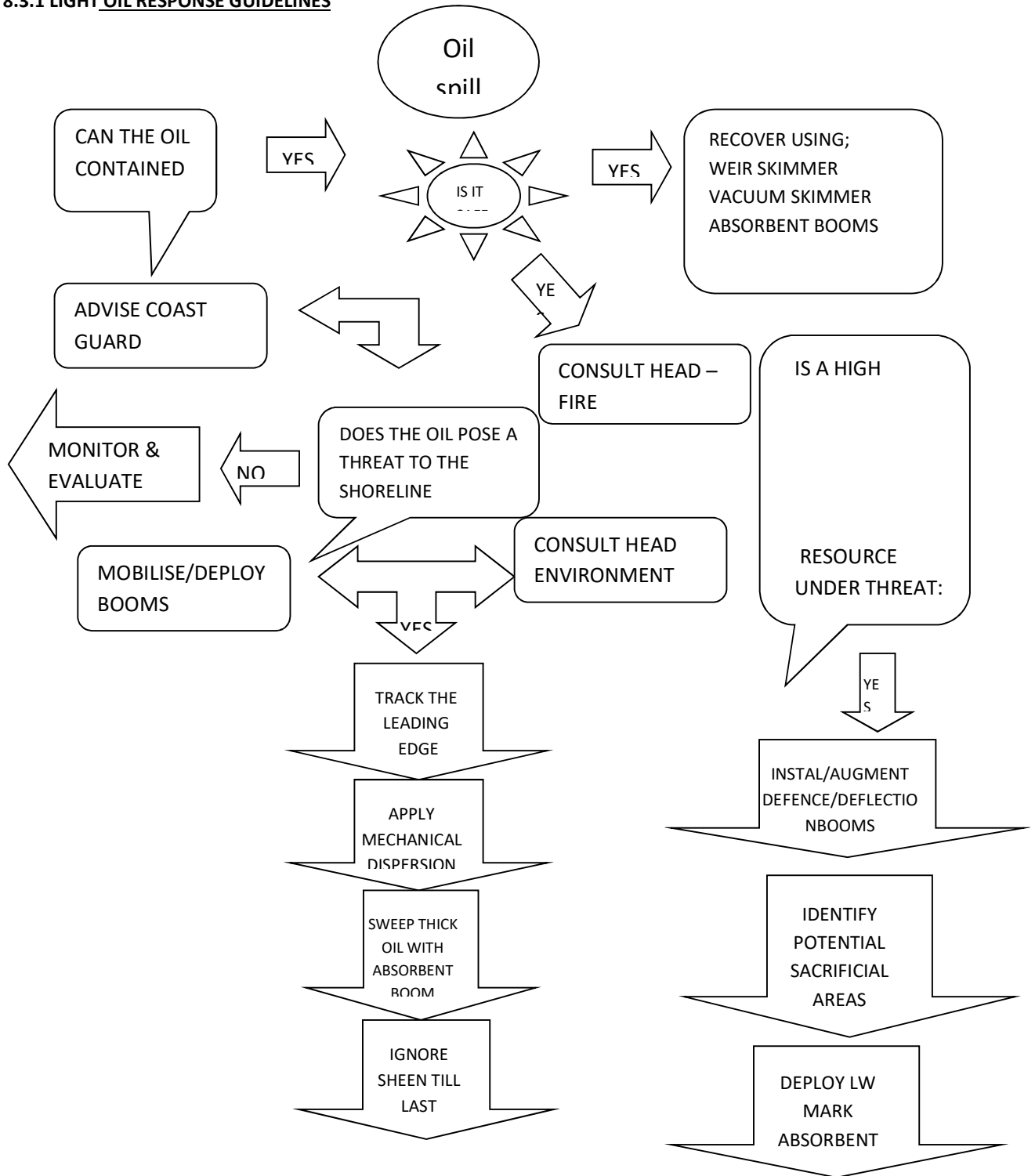
8.3 MOBILIZING IMMEDIATE RESPONSE:





OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

8.3.1 LIGHT OIL RESPONSE GUIDELINES





OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

8.4 MEDIA BRIEFING:

Release of Information to media is to be as per 'Media policy' of the respective organization heading the CMT for particular operation. Refer **Annexure-5**

Media Holding Statement (Tier 1 incident)

Timed at:hrs.day Date
Athrs. on Date
.....day

An oil spill current at (location)

The estimated quantity of oil (state type) spilled is.....liters/tones or

The quantity of oil (state type) spilled is not yet known.

DPA KANDLA AND OOT VADINAR has initiated spill response measures and is investigating the cause. The Indian Coast Guard and all other concerned authorities have been informed

NEXT PRESS STATEMENTS AT HRS IST

8.5 PLANNING MEDIUM-TERM OPERATIONS (24-48 AND 78 HOURS):

The likelihood of oil spill taking place are from two factors mostly, during vessel operations and secondly due to collision.

Since, during vessel operations, OSRO personnel as well as ship's staff present at the site, any mishap taking place could be tackled immediately as reaction time will be very less and damage control could be done very fast. Therefore, quantity of oil spilling into water is expected to be minimum and the spill could be neutralized quiet easily. Here in this case dispersants, sorbents may be used and whole operation is likely not to last more than 24 hours. In fact, OSR items are kept handy in OSRV to use any time.

However, in case of oil spill occurring due to Collision, it is certainly going to be at a higher magnitude. As, when the collision takes place, everybody's attention is likely to be toward safety of the vessel i.e. to Avoid vessel getting grounded, avoid colliding with other vessels, preventive action against fire or carryout firefighting, damage control action against flooding and so on. It is anticipated that in case of collision the oil spill is likely to occur due to rupture of or crack in fuel tanks. It should be clearly understood that

- i. In case of rupture of fuel tanks, a sudden gush of oil will be there, and for some time it will be uncontrollable. By the time any effective damage control action is taken, a substantial amount of oil would have already gone overboard. This would necessitate immediate oil containment measures, as well as starting of oil recovery action. This oil spill recovery action may go well beyond 48 hours, keeping weather and sea conditions in mind, because one does not know at what time of the Day or Night accident takes place which will determine the time delay in appreciation of the situation and mobilization of OSR team and equipment. It may clearly be understood that appreciation of oil slick between sunset and sunrise is quite difficult and at times it may be fully incorrect, hence slight time delay may be anticipated. Such accidents don't happen quite often, but very rarely. Hence readiness of OSR team and Equipment shall be maintained at all times.
- ii. The oil spill scenario through cracked fuel tank /tanks is not very different than the previous one, because due to cracked/fractured /material failure occurred in the fuel oil tank/tanks, oil would continue leaking in a small /moderate rate. But it would be difficult to locate the source/point of oil leak and by the time source /point of leak is detected, suitable action is initiated and leak is arrested, a sizeable quantity of oil would have already been over board. Detection of oil leak will become more difficult if the crack /fracture develops



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after some time due Collision related structural stress and ship is secured alongside jetty with the damaged /leaking side situated between shipside and jetty. The problem will become more compounded if the accident takes place after sunset during severe monsoon conditions and detection of oil slick in the night would be really quite difficult. Like above serial (i), here also one cannot deploy OSR men and equipment preciously and reaction time to deploy OSR men and equipment, subsequently recovery of spilled oil is going to take more or less the same time.

Here the vessels taken on consideration are visiting ships of various sizes in all weather conditions but not the minor vessels or tug boats.

8.6 DECIDING TO ESCALATE RESPONSE TO HIGHER LEVEL:

If oil spill is larger magnitude and is beyond spill combating capabilities of DPA KANDLA AND OOT VADINAR, in such case Head DPA KANDLA AND OOT VADINAR in consent with senior management, will inform Indian Coast Guard accordingly and shall provide all further assistance required by ICG.

8.6.1 NEBA May be Considered while deciding to escalate if required. Refer **Annexure -15**

8.7 MOBILIZING OR PLACING ON STANDBY RESOURCES REQUIRED

To be decided by the On-scene commander and Head DPA KANDLA AND OOT VADINAR considering the control on spillage, mitigation progress and weather forecast. It should be borne in mind that mobilization of resources from out stations is a time consuming and cumbersome process, therefore the anticipated arrival time of the Pollution Response Equipment should be calculated well before hand on account of:

- (i) Transportation time by rail /road /sea/air.
- (ii) Time taken by Custom /Government formalities.
- (iii) Time taken in loading/unloading.
- (iv) Availability of specialized loading /unloading machineries and accessories.

8.8 ESTABLISHING FIELD COMMAND POST AND COMMUNICATIONS

The OSC will be equipped with VHF (Walkie-Talkie) and mobile phone. The OSR team leaders would also be having hand held VHF sets. (They can also be provided with mobile phones). Therefore, establishing Field Command Post is considered not necessary, unless the spill is of large magnitude.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

9. CONTROL OF OPERATIONS

9.1 ESTABLISHING A MANAGEMENT TEAM WITH EXPERTS AND ADVISORS: -

The members of the DPA Executive Advisory Committee are:

NAME	DESIGN.	ALTERNATE	DESIGN
Capt. Pradeep Mohanty	Deputy Conservator	Shri Lalji Meena	Harbour Master
Shri A. Ramasamy	Chief Operations Manager	Shri Narendra Naik	ME Gr-I
Shri B Ratna Shekhar Rao	Traffic Manager	Shri Sudipto Mukherjee	Sr. Dy. Traffic Manager
Shri Sushil Chandra Nahak	Chief Mechanical Engineer	Shri Rajdeo Kumar	ME Gr-I
Shri B. Bhagyanath	FA&CAO	Shri Hitesh Thakkar	Dy. CAO

9.2 UPDATING INFORMATION (SEA/WIND/WEATHER FORECASTS, AERIAL SURVEILLANCE, BEACH REPORTS):

VTMS, (Port Control) is entrusted the responsibility of providing initial information pertaining to wind direction & speed, water current, tide position at the time of oil spill, high water & low water timings, sea condition, swell /wave heights, weather forecasts & existing weather warning, navigational warnings, any Coast Guard or Naval aircraft or helicopter sighted /in contact, any other relevant information Available. The moment information about OIL SPILL is received all these data / information is to be provided to ECR. This information is to be automatically updated as and when received. Regular inputs must be obtained from local sources regarding health of the surrounding coastal areas.

9.3 REVIEWING AND PLANNING OPERATIONS:

The ongoing operations should be assessed and reviewed as and when the ECT considers it necessary or suggested by OSC. This is necessary to upgrade the level of operations or scale down the operations due to different prevailing factors /compulsions. Review of operations is an ongoing process and accordingly the planning is to be reoriented to maximize the utilization of men and machinery without compromising on safety of both. Here operational rest to men and machinery should also be kept in mind because response teams can be rotated at regular intervals but continuous running machinery also needs rest after certain stipulated continuous running hours.

9.4 OBTAINING ADDITIONAL EQUIPMENT, SUPPLIES AND MANPOWER

The equipment maintained on the vessel will be the first to be deployed for containment and would be augmented by movement of additional equipment as required by the situation. In the event of a decision being taken by the team managing the spill, the equipment held with the participating units will be made Available to response teams.

In the event of an ongoing spill or a spill that requires declaring of Tier 2 or 3 responses, the additional equipment and manpower held with any other OSRO or facility will be sourced in an accelerating manner including resourcing from the international spill handling companies. Contact details of companies holding equipment in India and International OSROs are as follows:



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

9.5 PREPARING DAILY INCIDENT LOG AND MANAGEMENT REPORT:

To maintain detailed daily log of activities undertaken by OSR Manager / Responders/Control Room and their team including deployment of equipment, advice rendered or demands rose. The log is to mention action taken daily (in narrative form) and observations made as per **Annexure-16 & 17**.

IC/ OSC / VESSEL MASTER DAILY LOG

INCIDENT TITLE: ----- NUMBER-----

DATE:

Incident Severity – Minor / Major / Tier I / Tier II / Tier III

1. RESPONSE RESOURCES AVAILABLE

VESSEL BOAT

EQUIPMENT

2. ACTION INITIATED

CONTAINMENT

EQUP DEPLOYED

POLLUTION COLLECTED AND DISPOSED TODAY

TODAY TONS: -----

TOTAL TONS: -----

3. REPORTING AUTHORITY (DESIGNATION)

9.6 PREPARING OPERATIONS ACCOUNTING AND FINANCING REPORTS:

This will be done by Finance and Legal Department. As one of their members is always in the ECR they would find it easier to take stock of the situation and prepare the accounts and reports on a day-to-day basis.

9.7 PREPARING RELEASES FOR PUBLIC AND PRESS CONFERENCES:

Information to media is to be released by the person identified through respective Media policy of the organization. In the event of non-authorization of any one person, the Media release will be made by CIC or by a person nominated by him after authorization by head of the Organization.

The daily report of actions taken on a particular day as prepared by COC and OSC is to be shared with the person nominated to brief the media. Each press brief is too cleared by CIC prior being provided to media.

While, providing factual details and information to media assists in passing the situational report to public likely to be affected by a spill, it is advisable not to sensualist the information with unwanted figures or actions that could shock or distress the public.

Most of the factual information like precautions required by public to be taken with respect to fishing activity, closure of beaches, demand for beach cleaning volunteers could be disseminated through media.

9.8 BRIEFING LOCAL AND GOVERNMENT OFFICIALS:

Consequent upon releases cleared by Chairman, local and government officials are to be briefed by the PRO or any other person authorized to do so.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

10. TERMINATION OF OPERATIONS

10.1. DECIDING FINAL AND OPTIMAL LEVELS OF BEACH CLEAN-UP

The coastal stretches off DPA are varied in terms of ecological sensitivity; with large stretches of mangroves interspersed with sandy beaches and rocky shores. DPA harbor estuary shows differences in physical environment, the degree of exposure to waves and energy levels and currents. Geomorphic features like the terrain greatly influence the distribution and persistence of oil.

While, the first priority would be to stop the ingress of oil onto the coast, still the requirement of coastal or beach cleaning operations cannot be ruled out. The local administration being responsible for shore cleaning activity is to be notified in time about the movement of spill and advised about the strategy to be adopted.

Tactical beach cleaning ops are to be conducted as per the physical properties of the terrain with respect to retention of oil. Operations are to be guided as per OPERATIONAL MANUAL parameter.

10.2. STANDING-DOWN EQUIPMENT, CLEANING, MAINTAINING, AND REPLACING

Once the Pollution Response Operations are over, the equipment and machineries are to be accounted for, consumables are to be accounted for, checked for their serviceability and then stored in their respective places.

All equipment and machineries are to be thoroughly washed with fresh water as per the OEM's guidelines, necessary maintenance carried out and then equipment is to be secured.

10.3. PREPARING FORMAL DETAILED REPORT

After the operations are complete, the OSC will prepare a detailed report covering all the aspects of the oil spill cleanup, which will include success and failures as well, lesson learnt recommendations about equipment, manpower, plans etc. The report will be forwarded to Deputy Conservator for submission to ECT.

Detailed report for the incident will be prepared by Head-DPA KANDLA AND OOT VADINAR as per prescribed format.

INVESTIGATION

Every oil pollution incidence is followed by investigation both by the Company as well as Nodal agencies. In order to assist such investigations complete and accurate records, as specified below, shall be maintained,

- a. Certificates and records of equipment issued by regulatory authorities,
- b. Log Book showing weather and details of the incidents,
- c. Chronological record of loading / discharging bunkering including agreed plans of such loading / discharging / bunkering,
- d. Brief report on spill including:
 - i. Time,
 - ii. Location,
 - iii. Cause and Type of oil.
- e. Samples of spilled oil shall be taken as per procedures described g) Estimate of amount spilled and the process of such estimation,
- f. Copies of notification & update reports,
- g. Record relating to direction and rate of spread,
- h. Weather reports and recorded weather in log book and
- i. Where possible photographic evidence shall also be collected. Such photographic records shall be identified with date, time and location.

Where any original evidence is demanded by Nodal Authorities, photocopies of such evidence be retained and the concerned authority shall request to certify the same as true copy of the original



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

10.4 REVIEWING PLANS AND PROCEDURES FROM LESSONS LEARNT:

Contingency Plan being a sequence and layout of dynamic operating procedures and parameters is subject to revision due changes in operational parameters of port, cargo, equipment innovations and changing response strategies. Exercises and real time drills being operational tasks might also necessitate a review of plan to be undertaken to incorporate the observations made, apart from the above mentioned.

Accordingly, a study in detail of observations made during every response operation would be undertaken by CMT with a view to incorporate the observations into the Plan for easy and flaw less implementation.

ROLES AND RESPONSIBILITIES OIL TERMINAL LIMITED (DPA KANDLA AND OOT VADINAR)

DPA KANDLA AND OOT VADINAR has responsibility for dealing with oil spills which occur within the Marine Terminal Local Area.

Responsibility for management of the response remains with DPA KANDLA AND OOT VADINAR unless the slick migrates outside the Local Area or more than 500 meters from the spill source/marine facilities of the company. In the event that the oil migrates to the port area administered by Deendayal Port AUTHORITY, the AUTHORITY will assume responsibility for leading the pollution response.

Should the spill migrate to other areas, or to other areas in addition the Deendayal Port AUTHORITY harbour area, the Coast Guard Monitor will assume the position of On Scene Commander and will direct the response effort. In both cases, DPA KANDLA AND OOT VADINAR will act and deploy their resources as required by the relevant On Scene Commander.

Deendayal Port AUTHORITY (DPA)

The Statutory Port Authority responsible for administering the area embraced by the Deendayal port AUTHORITY limits. The IOC Terminal along with DPA KANDLA AND OOT VADINAR Marine facilities at Vadinar is located within the port limits.

Indian Coast Guard (ICG)

The Indian Coast Guard has a statutory duty to protect the maritime and other national interests of India in the Maritime Zones of India and to prevent and control marine pollution. Coast Guard is also the Central Co-ordination Authority for marine pollution control in the country. The Indian Coast guard is responsible for implementation and enforcement of the relevant marine pollution laws.

The coast guard will assume the role of On-Scene commander in the event of oil spill exceeding the capability and jurisdiction of DPA (Deendayal Port AUTHORITY)

Gujarat Pollution Control Board

The Gujarat Pollution Control Board is responsible for, and controls, waters up to 5 km from the shoreline. They require to be advised of all pollution incidents.

Gujarat Maritime Board

Gujarat Maritime Board is required to be informed of all pollution incidents; however, DPA KANDLA AND OOT VADINAR facility is not under the jurisdiction of GMB.

Ministry of Environment, Gujarat

The Ministry requires to be informed of all pollution incidents.

Oil Industry Safety Directorate (OISD)

OISD is required to be informed of all oil spill incidents.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Oil Pollution Management cell

Pollution Management Cell (PMC) is the nomenclature used to describe the command-and-control team established for a spill incident within the Marine Terminal Local Area.

The PMC will convene at the MTCB, under the chairmanship of the Head -DPA KANDLA AND OOT VADINAR and will consist of a Management Team and a Support Team.

Nearest Bird Handlers Details:

1. Nature Conservation society, Lakota Nature club Jamnagar,

Contact no. +919377526667, +919879516990

2. "Sir Peter Scott Bird Hospital", Saat Rasta, Jamnagar, Contact No. 7574000108.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

11 HEALTH AND SAFETY PLAN

11.1 Introduction

Full account must be taken of the health and safety requirements for all personnel involved in oil spill response activities. The site-Specific Health and safety Plan Assessment Form list site characteristics, site hazards and personnel protective equipment and site facility needs. This plan is intended to act as an aide-memoir to ensure that all applicable health and safety requirements are considered and appropriate action are taken.

The applicable requirements noted in the **Company's HSEF Procedures** must also be observed.

Following Section gives guidance on specific oil spill clean-up tasks and hazards.

11.2. SITE HAZARDS

11.2.1. Bird Handling

Handling of birds must be undertaken by properly trained personnel to ensure the protection of both bird and handler; wild birds have no way of understanding human intentions. Even a greatly weakened bird can inflict serious injury to handlers, especially to their eyes. Open wounds on hands and arms from such injuries can present opportunities for oily contaminants and disease to enter the handler's blood stream.

Handling of oiled birds is usually best left to experts, or to volunteers who have received some training. Chasing and man handling birds puts them under additional stress.

11.2.2. Equipment Required:

- a) thick gloves (able to withstand nasty pecks),
- b) Overalls
- c) Safety footwear
- d) Cardboard Box with lid of a suitable size to give the bird some room for movement
- e) Goggles to protect eyes,
- f) Optional long – handled net to help catch bird

11.2.3. Procedures:

- a) Do not let the bird get close to your head, as it may try to peck your eyes.
- b) Catch the bird by hand or with the aid of a long-handled net. Do not put the birds under any more stress than necessary. Only attempt capture if it can be done quickly and efficiently.
- c) Hold the bird with both hands to hold the wings in.
- d) Put the bird in a cardboard box lined with absorbent material (e.g. newspaper), with a lid.
- e) Do not wrap the bird up in anything it may get too hot and too stressed.
- f) Take the bird to a cleaning station as soon as possible. Let them know where and when the bird was caught.
- g) Keep a note of all birds caught and sent to cleaning station. Make a note of species if possible.

11.2.4. Tug & Work Boat Safety

- a) Boat operators must familiarize themselves and passengers with safety features and Equipment on their boats.
- b) Boats must be operated by qualified individuals.
- c) Lifejackets must be worn by personnel on boats.
- d) Use of cold-water immersion suits is particularly critical under conditions of cold stress.
- e) Boats should generally not be used after sunset for oil recovery. If this is required or poses minimal risk, areas of operation should be carefully prescribed, and individual boat operators should maintain a communication schedule with a shore base. Each boat should be fully equipped with appropriate navigation lights.
- f) Distress signals should be carried on all vessels.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

- g) Boat operators must keep their supervisors informed of their area of operation, especially when they change their work area (if plans call for a boat to move to another location during a shift, the operator should advise the supervisor of his actual time of departure)
- h) Portable fuel tanks should be filled outside of the boat. All sources of ignition in the area of refuelling should be isolated.

Personnel working in or operating boats should wear appropriate non-slip footwear.

- a) Fixed ladders or other substantial access/egress should be provided at boat transfer locations from low water line to platform.
- b) Workers should be cautioned about using their arms or legs to fend off during berthing or getting their hands, arms, or legs between vessels and docks or fixed structures.

11.2.5. Chemical Hazards

Attach appropriate Material Safety Data Sheets for all hazardous substances likely to be used at a spill site.

11.2.6. Cold Stress

Cold stress can occur among responders as a result of prolonged exposure to low environmental air temperatures or from immersion in low temperature water. It can lead to a number of adverse effects including frostbite, chilblain and hypothermia. This single most important aspect of life-threatening hypothermia is the fall in the deep core temperature of the body.

11.2.7. Drum Handling / Manual Handling

Drum handling at a spill site will primarily involve drums of waste and contaminated clothing. Several types of drums and containers may be used ranging from 25 to 200 liters in size. All drums and containers must be properly labelled. If in doubt as to the contents of a drum – seek advice.

Manual lifting and moving of drums should be kept to a minimum. A guide to manual handling is as follows:

- (a) Wear gloves.
- (b) Assess the weight of the load and get help if it is beyond your capability.
- (c) Where appropriate, use mechanical aids provided.
- (d) Size up the job – remove any obstructions; note any snags and make sure there is a clear space where the load has to be set down. Ensure that you can see over the load when carrying it.
- (e) Look out for any splinters, projecting nails or sharp edges or wire.
- (f) Stand close to the object and with your feet 20 to 30 cm apart, place one foot in advance of the other, pointing in the direction you intend to move.
- (g) Bend your knees to a crouch position, keeping your back straight.
- (h) Get a firm grip at opposite corners of the load with the palm of the hand and the roots of the fingers, arms as close to the body as possible.
- (i) Lift with your thigh muscles by looking up and straightening your legs.
- (j) Bend your knees to a crouch position, keeping your back straight.
- (k) Get a firm grip at opposite corners of the load with the palm of the hand and the roots of the fingers, arms as close to the body as possible.
- (l) Lift with your thigh muscles by looking up and straightening your legs.

AIR TEMPERATURE CELSIUS

Relative Humidity	21°	24°	26°	30°	32°	35°	38°	40°	44°	46°
20%	19°	22°	25°	28°	31°	34°	37°	41°	45°	49°
40%	20°	24°	26°	30°	34°	39°	*44°	*51°	**58°	**66°
60%	21°	25°	28°	32°	38°	*46°	**56°	**65		
80%	22°	26°	30°	36°	*45°	**58°				
☒ Heat cramps or exhaustion likely. Heat stroke										



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

12. Response to HNS Incidents

12.1. RESPONSE OPTIONS

In many cases, particularly if the release involves a chemical that evaporates or dissolves rapidly, it will not be possible to physically contain or recover the spilled product from the sea. In these cases, the response options may be limited to monitoring and measures designed to mitigate the potential hazards, for example communication to advise local residents to remain indoors or prohibition of fishing.

Following the identification of the hazards posed by the release, including consideration of the effects of fire and potential reactivity, the response operation must evaluate which techniques can be used. It is important to rapidly establish which response techniques are feasible in order to reduce or if possible, eliminate the impacts of the hazardous substance on humans and the environment.

In most chemical incidents the rapid communication of relevant information, both internal and external to the response activities is likely to be the most important action that response agencies need to carry out. The polluter will, therefore, maintain continuous liaison with the chemical/ HNS manufacturer and repositories of data (such as the French Centre of Documentation, Research and Experimentation, or CEDRE) regarding HNS properties and response and promptly provide such data to the responders.

12.2. MONITORING

Many chemical spills will be difficult or impossible to observe with the naked eye and it is essential that an appropriate monitoring strategy is put in place to ensure the safety of responders and to confirm predictions of the spread and dispersion of the slick. The type of monitoring implemented will depend on the specific properties and hazards posed by the substance involved.

12.2.1 MONITORING GASES IN AIR

It is essential to systematically monitor the concentrations of chemicals in air throughout any incident involving gases or vapors. Key aspects of monitoring include:

- **Oxygen concentrations** any atmosphere having <19.5% oxygen i.e., an oxygen-deficient atmosphere, should be entered only by personnel wearing self-contained breathing apparatus, monitoring is carried out using oxygen cells.
- **Combustible or explosive gas levels** to identify areas where flammable air/fuel mixtures exist; a value below 10% of the Lower Explosive Limit may be considered safe. Typical instruments are combustible gas detectors and explosion meters. Continuous monitoring must be carried out as the situation and the concentration of gas can change rapidly raising the value over 10% LEL.
- **Toxic substances** to identify areas where toxic substances are present and to establish safe outer limits where it is reasonably safe for unprotected personnel. Instruments must be capable of measuring at ppm level and include gas detection tubes, flame ionization detectors, photo- ionization devices, IR trace gas detection (these instruments typically provide only approximate levels) and portable gas chromatographs and portable mass spectrometers (these instruments typically require specialist personnel to operate them).

12.2.2 MONITORING THE WATER COLUMN

Monitoring the concentration of chemicals in the water column typically involves two main techniques:

- **Collecting water samples** – these are then transferred for analysis at fixed or mobile laboratories;
- **Use of towed probes** – a number of monitoring devices can be towed through the water column to establish the extent of a slick and to provide real-time data. Typical measurements include: pH, light absorption, electrical conductivity.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

12.2.3 MONITORING SURFACE SLICKS

Thin films on the sea surface can damp capillary waves. A number of techniques have been developed that make use of the altered properties of the sea surface:

- **Side-Looking Airborne Radar (SLAR)** makes use of the reduced intensity of the backscatter and the surface slick appears as a darker area on the SLAR image;
- **UV scanners** can identify changes in the UV reflectivity of the sea surface;
- **IR scanners** and **Forward-Looking Infrared Imagers (FLIR)** identify changes in the radiation temperature of the sea surface.

The effectiveness of these techniques differs depending on the properties of the chemical involved and the environmental conditions. Understanding the Available resources and their applicability is a key part of the contingency planning process.

12.2.4 MONITORING SUNKEN SPILLS

When a pool of liquid chemical collects on the seabed, there will be a phase boundary between the chemical and the sea water. It may be possible to use echo sounders to locate this phase boundary and hence to identify the area affected by the spill. Monitoring of the concentration of the spilt substance at different depths may also be useful to delineate the area affected.

12.3 RESPONSE TECHNIQUES

12.3.1 RESPONSE TO GASES AND EVAPORATORS

Plume modeling, air monitoring and defensive strategies such as water sprays are commonly used to respond to gas leaks. When applied as a fine droplet, i.e., as a mist and in calm conditions, they can:

- knock down water soluble gases;
- stop, steer or disperse sparingly soluble or insoluble gas clouds;
- Reduce the risk of fire and explosion in flammable clouds of gases, by cooling hot surfaces, putting out sparks and suppressing flame formation.

When applying water sprays, it is also important to be aware of consequences such as high volume waste streams and, in extreme cases, contributing to the instability of the vessel.

12.3.2 RESPONSE TO FLOATING CHEMICALS

A chemical that floats on the water surface will spread and form a large contact surface with the air. Depending on its vapor pressure, it may evaporate and give rise to a vapor cloud above the slick. Monitoring of air concentrations is important in these situations to assess fire and explosion risks and health risks. The selection of response technique must also take account of these hazards and the overall objective of the response. It is possible to attempt to contain and recover spills of floaters, but only of those substances that evaporate or dissolve slowly i.e., category F substances. Typical techniques involve:

- **Covering the slick with foam** – for flammable substances, this reduces evaporation and hence reduces possible fire and explosion risks (taking care to use the type of foam appropriate to the chemical involved).

It also restricts spread over the water surface and hence can increase the effectiveness of containment and recovery operations. In this case, consideration must be given to the toxicity of the foam to marine life.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

- **Application of sorbents** either loose, as mats or in “sausages”. As many low viscosity chemical spills rapidly spread to cover a large surface area, these techniques are most applicable if the spread of the chemical can be confined.
- **Bubble curtains** created by releasing compressed air through a perforated hose may be used to contain floating slicks in shallow, slow-flowing waters.
- **Conventional oil spill response booms and skimmers** may be used to contain and recover spills of floating chemicals. The effectiveness of these techniques depends on the physical properties of the substance involved, as the equipment may not be able to deal with the thin films and low viscosity of some floating chemicals. Compatibility of the equipment with the chemical must also be considered.

12.3.3. RESPONSE TO DISSOLVED CHEMICALS

The potential to contain and recover spills of chemicals that dissolve is extremely limited. Response techniques are generally restricted to forecasting their spread, monitoring and mitigation of their effects. In the case of spills in shallow or confined waters, treating agents can include:

- Neutralizing agents;
- Flocculation agents
- Oxidizing agents;
- Reducing agents
- Gelling agents
- Activated carbon; and
- Ion exchangers.

In practice though, the use of these treating agents is often ineffective as the dosage is difficult to estimate and recovery of the substance may be difficult. Curtain barriers may also be used to contain dissolved chemical spills in shallow and almost stagnant waters. Response to sunken chemicals must consider not only the recovery of the chemical itself, but the removal and treatment of contaminated sediments. The principal technique is that of dredging.

12.4 HNS RESPONSE EQUIPMENT INVENTORY

It is submitted that no HNS being handled at KANDLA. No HNS Inventory held with port however, if at all an importer handling agent has been instructed to maintain required equipment as per MOU/Permission granted for handling.

12.5 DISPOSAL

Before commencing any actions that may lead to the recovery of spilled chemical, it is essential that an appropriate and legal disposal route has been identified for both the recovered chemical and any waste generated. Even temporary storage must take proper account of the physical properties of the chemical and its potential to evaporate or leak. Waste streams may be subject to transportation regulations covering hazardous waste, so relevant national regulations must be identified.

NOTE: It is submitted that no HNS being handled at OOT Vadinar.



PART – III

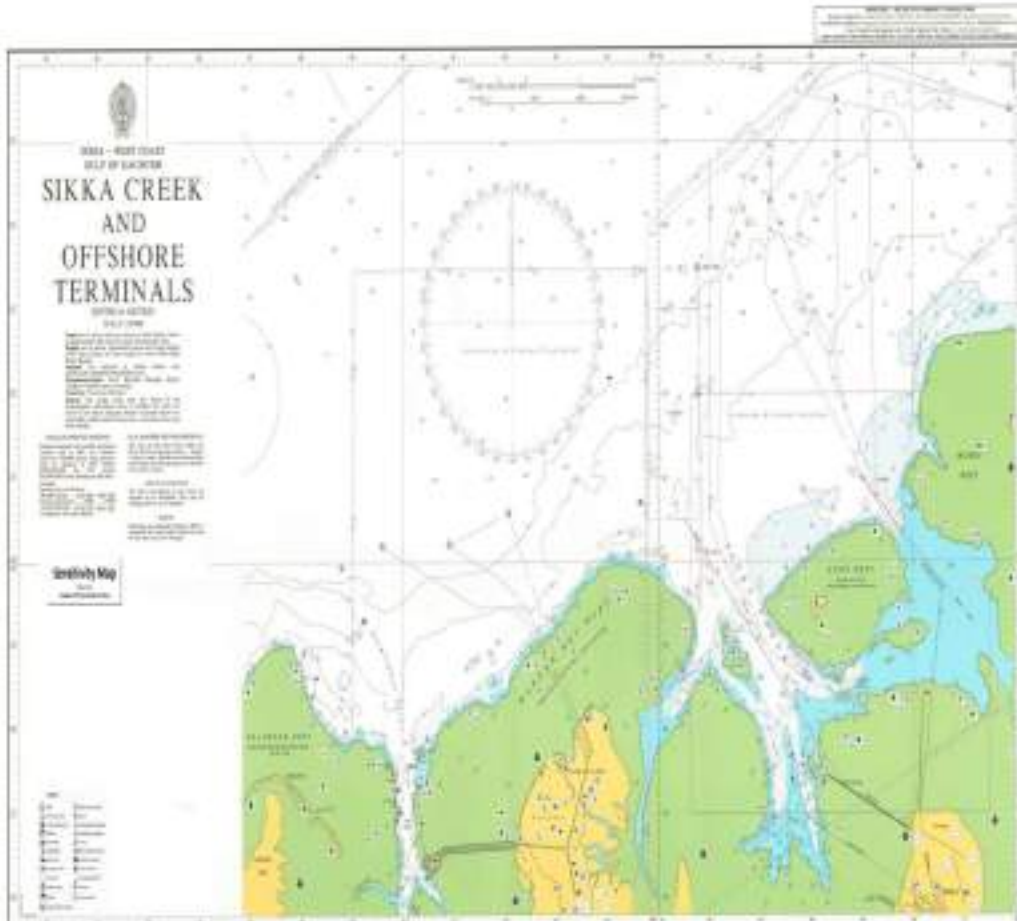
DATA DIRECTORY



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

COASTAL CHARTS, TIDAL INFORMATION, CURRENTS (RANGES AND STREAMS) PREVAILING WINDS

1.1 COASTAL CHART:



REPORTS, MANUALS, MAPS, CHARTS AND INCIDENT LOGS.

A copy of the relevant manual is kept with DPA Office at Vadinar. Maps/charts of creek & the Coastal Charts, currents, tidal information prevailing wind are Available with survey section of port.

1.1.1. COASTAL FACILITIES, ACCESS ROADS.

DPA includes jetty area and oil terminal. The distance between these two is about 500 m. These terminals are connected by road as well as by sea.

1.1.2. TIDAL INFORMATION

The dominant tide in the DPA KANDLA AND OOT VADINAR is the semi-diurnal tide with a period of 12 hours and 40 minutes. The following are the particulars of tidal levels related to Chart Datum.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Month	High Tide		Low Tide	
	Max	Min	Max	Min
January	5.87	4.11	2.45	0.15
February	5.89	4.04	2.50	0.29
March	5.77	3.75	2.35	0.43
April	5.74	3.79	2.16	0.31
May	5.72	3.94	2.05	0.32
June	5.62	4.17	2.19	0.41
July	5.76	4.37	2.34	0.30
August	5.90	4.28	2.37	0.22
September	5.90	4.08	2.28	0.31
October	5.90	3.89	2.15	0.13
November	5.84	3.79	2.07	0.16
December	5.68	3.82	2.29	0.32

YEAR	Tide (Mtrs.)	
	Max.	Min.
2015	7.27	-0.02
2016	7.27	-0.02
2017	7.19	-0.16
2018	7.25	-0.06
2019	7.25	-0.02

The dominant tide in the DPA KANDLA is the semi-diurnal tide with a period of 4 years 2015-2019 The following are the particulars of tidal levels related to Chart Datum.

1.1.3. CURRENTS:

The currents in DPA and the near shore zones are tide induced with reversal at high and low waters. The current strength ranges from 1.5 to 3 knots.

Current speeds and directions within the Bay and associated tributaries are largely due to the tidal movements and show little variation from non-monsoon to monsoon. The maximum current speed in the outer Bay exceeds 1 m/s and the variation in the water column at any given time is not significant.

Lateral variations in the speed however occur with current in the eastern area being somewhat stronger. The maximum current speeds decrease in the inner creek and are typically around 8.0 m/s, decreasing markedly during neap tide.

As characterized for a tide dominated system, the alongshore components are fairly strong with the dominance of seaward component while cross shore components are relatively weak. Their relative magnitude and directions are indicative of net seaward movement over a tidal cycle though shoreward drift can be significant around the change of tide.

Excursion lengths and Average current speeds observed for the Bay based on the Available drogue trajectories are as per table below:



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

YEAR	WAVE LENGTH PATTERN AT OTP	
	Significant wave length	Maximum wave length
2015	2.20 mt.	3.70 mt.
2016	2.20 mt.	3.70 mt.
2017	2.20 mt.	3.70 mt.
2018	2.20 mt.	3.70 mt.
2019	2.20 mt.	3.70 mt.
2020	2.20 mt.	3.70 mt.

October	6.5
November	6.2
December	6.5
Total / Average	6.4

Table 15

1.1.4. WIND:

General direction of wind is from the North to the West Quarter, with seasonal variations as shown below:
Seasonal wind Variations

YEAR	Wind Speed	
	Max.	Avg.
2015	46 KMPH(July)	9 KMPH
2016	36 KMPH(June)	9 KMPH
2017	32 KMPH(July)	9 KMPH
2018	32 KMPH(April)	9 KMPH
2019	34 KMPH(July)	9 KMPH
2020	39 KMPH (JULY)	10 KMPH

Month	Wind speed max (Km/hrs.)	Wind speed min (Km/hrs.)
January	28.00	4.00
February	22.00	2.00
March	22.00	2.00
April	22.00	4.00
May	28.00	6.00
June	32.00	8.00
July	38.00	10.00
August	28.00	4.00



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

September	24.00	4.00
October	14.00	2.00
November	16.00	4.00
December	34.00	4.00
Total/Average	25.66	4.5

Table 16

The physical and chemical characteristics of spilled oil change almost immediately when spilled in the marine environment due to evaporation, dispersion, emulsification, dissolution, oxidation, sedimentation and biodegradation. All of these processes that set in together are collectively referred to as oil weathering and decide the final fate of spilled oil and quantities that would need to be removed physically. An uncertainty in a trajectory fore-cast builds over time due to these processes that the spilled oil goes through.

If the oil is persistent and does not vaporize immediately or disperses and comes ashore, then the costs in terms of cleanup, damages and economic losses can be considerable.

1.1.5 POINT SYMBOLS FOR BIOLOGICAL RESOURCES

Refer **Annexure -12**

2. Risk Locations and probable fate of oil

The Following are the Risk Locations near/vicinity of DPA KANDLA, Gujarat

- 1) Mangroves inside / Surrounding Port Area
- 2) Sathsaida bet, consist of 10 sq. Km mangroves & marshy area.
- 3) IFFCO Intake
- 4) Fishermen hutments & Basti & fishing boat parking area north of Dry Dock
- 5) Salt pans
- 6) Flamingo flat

The Following are the Risk Locations near/vicinity of DPA OOT VADINAR, Gujarat

- 1) Marine National Park
- 2) Marine Sanctuary
- 3) NAYARA Refinery Intake
- 4) Mangroves
- 5) Salt pans
- 6) Forest Areas

The physical and chemical characteristics of spilled oil change almost immediately when spilled in the marine environment due to evaporation, dispersion, emulsification, dissolution, oxidation, sedimentation and biodegradation. All of these processes that set in together are collectively referred to as oil weathering and decide the final fate of spilled oil and quantities that would need to be removed physically. An uncertainty in a trajectory fore-cast builds over time due to these processes that the spilled oil goes through.

If the oil is persistent and does not vaporize immediately or disperses and comes ashore, then the costs in terms of cleanup, damages and economic losses can be considerable.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

OIL THICKNESS AND APPEARANCE OF SLICK:

Oil slicks form very thin films on open water. Depending on the properties of the product, the thickness can range from a tenth of a micron to hundreds of microns. The color of oil film post spreading is a good measure of quantity of oil that may be contained within the slick.

When direct light from the sun contacts a very thin oil film (<0.1 micron; μ), much of the light is reflected back to the observer as gray or silver sheen.

If the film is thicker (0.1 to 3 μ), the light passes through the film and is reflected off the oil-water interface and back to the viewer. The observer will then see a film that can range from rainbow to darker-colored sheens.

For very thick films (> 3 μ), the light is absorbed and the slick appears dark-colored (i.e., black or brown) to the observer. However, the viewer can no longer determine film thickness based on color. If the slick is dark-colored, the observer cannot tell whether the film is 3 μ or 100 μ thick.

In order to quantify oil thickness, the following is used as guidelines

Appearance	Thickness
Silver Sheen	0.0001mm
Rainbow sheen	0.003 mm
Light brown/ Black slick	0.1 mm
Dark brown/ Black slick	more than 1 mm

To determine an approximate quantity of spilled oil, the following formula is used:

$$L \text{ (Length of slick) meters} \times W \text{ (Width) X Thickness (mm)} = \text{Cubic meters} \times 100$$

The extent of spread in terms of length and breadth along with % of area showing a particular color as per thickness can be used for calculation of quantity of spill through spill calculation software. Calculation of spill quantity as per slick characteristics are placed at **Annexure-12**

3. Shoreline Resources for priority Protection Held At DPA KANDLA AND OOT VADINAR:

ANTI – POLLUTION RESOURCES (Local Area) DPA KANDLA AND OOT VADINAR are placed at **Annexure-7&19**

3.1 LIST OF REFINERIES

Refer **Annexure -8**

4. Shoreline Types:

SHORELINE TYPES AND RANKING

Vulnerability index of shores in order of increasing vulnerability to oil spill damage as per Gundlach and Hayes 1978

1. Exposed rocky headlands	Wave reflection keeps most of the oil offshore. No cleanup necessary.
2. Eroding wave- cut platforms	Most oil removed by natural processes within wave swept weeks.
3. Fine-grained sand beaches	Oil does not usually penetrate into the sediment, facilitating mechanical removal if necessary. Otherwise, oil may persist several months. (Some evidence suggests that penetration can occur)
4. Coarse-grained beaches	Oil may sink and/or be buried rapidly, making clean-up difficult. Under moderate to high-energy condition, oil will be removed naturally from up difficult. Under moderate to high-energy conditions, oil will be removed naturally from most of the



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

	beach face. Most oil will not adhere to, nor penetrate into, the Compacted tidal flat. Clean-up is usually unnecessary
--	--

5. Mixed sand and gravel beaches Oil may penetrate the beach rapidly and become buried. Under moderate to low energy conditions, oil may persist for years.
6. Gravel beaches same as above. Clean-up should concentrate on high-tide/swash area. A solid asphalt pavement may form under heavy oil accumulations.

7. Sheltered rocky coasts	Areas of reduced wave action. Oil may persist for
8. Sheltered tidal flats	Concentration is very heavy.
9. Salt marshes/mangroves	Areas of great biological activity and low wave Most productive of aquatic environments. Oil may persist for years. Cleaning of salt marshes by burning or cutting should be undertaken only if heavily soiled. Protection of these environments by booms or absorbing material should receive first priority

5. Sea Zones and Response Strategies:

Within the scope of this Plan, a response action required to be mounted could be at any of these locations

- (i) Sea or channel, incident due collision etc. during passage,
- (ii) Close shore due grounding or stranding,
- (iii) Alongside at jetty or at the terminal during cargo operations.

Notwithstanding the above locations, it is possible that an eventuality occurring at sea like a collision or mechanical failure could lead to a situation where the consequences would be felt in some other location at a coastal location.

6. Shorelines Zones and Clean-up Strategies:

A number of shoreline response strategies are Available as per table below, but shorelines should be assessed so see whether these are suitable. This will depend on:

- Rate and likelihood of natural cleaning
- Access for personnel and machinery
- Nature and distribution of the Oil / HNS
- Shoreline character
- Availability of personnel and machinery
- Safety issues
- Environmental sensitivity to Oil / HNS and cleanup methods.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

PRIMARY CLEANUP						FINAL CLEANUP						
	Pumping / skimming	Mechanical removal	Manual removal	Natural recovery	Comments	Low pressure flushing	High Pressure washing / Sand blasting	Dispersants	Natural organic sorbents	Batch recovery	Natural recovery	Comments
Rocks, Boulders and artificial structures	V	NA	V	+	Poor access may prevent pumping / skimming. Exposed / remote shorelines best left to natural recovery	NA	V	+	+	NA	V	Avoid excessive abrasion of rocks / artificial structures. Cleanup of boulders difficult and often gives poor results.
Cobbles, Pebbles and shingle	V	X	V	+	Exposed / remote shorelines best left to natural recovery	V	X	+	+	+	+	If load bearing character good, consider pushing oiled material to surf zone to enhance natural recovery
Sand	V	+	V	+	Heavy equipment only applicable on firm beaches	V	X	+	NA	+	+	Solid oil can be recovered using beach cleaning machines. Enhance natural recovery by ploughing / harrowing
Mud flats marshes and mangroves	+	X	+	V	Operation preferably carried out on the water from small, shallow drought vessels.	+	X	X	+	NA	V	Operations should preferably be carried out on the water from small, shallow-drought vessels.

Table : Application of techniques to different shoreline types

V : Viable + = Possibly useful X = Not recommended NA : Not Applicable

7. Oil and Waste Storage / Disposal sites:

An efficient and monitored disposal of waste includes immediate classification, segregation, packaging and labeling at source. List of Approved Recyclers –Placed at Annexure -23

	Packaging	Storage Capacity (m ³)
ON WATER	On board Storage	100 to >1,000
	Barges	10 to 10000
	Flexible / towable bladders or tanks	500 to 15000
SHORELINE	Plastic bags or sacks	0.25 to 15,000
	Super sacks	0.5 to 2.5
	Barrels or drums	~0.2
	Portable tanks	1 to 5
	Skips or dumpsters	10 to 40
	Lined pits	Up to 200
	Vacuum trucks	7.5 to 20

HW: Hazardous Waste, MTA: Metric Tons per Annum, TSDF: Treatment, Storage and Disposal Facility



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

WASTE DISPOSAL OPTIONS

WASTE	PRIMARY OPTION	SECONDARY OPTION	ALTERNATE OPTION
Fresh Oil	Refining	Fuel Blending	Ex Situ burning
Weathered	Fuel blending	Land Treatment	Landfill
Emulsions	Fuel Blending	Land Treatment	Landfill
Hydraulic Fuels	Refining		
Oil debris	Incineration	Open burning	Landfill
Oily PPE	Incineration	Landfill	
Oily Sand / Gravel	Ex situ burning	Land treatment	Landfill
Oily sorbents	Fuel blending	Incineration	Landfill
Oily Waste water	Electro coagulation treatment		
Animal carcasses	For research	Incineration	
Domestic waste	Incineration	Landfill	
Non oily debris	Incineration	Landfill	
Pallets	Recycle / reuse	Open burning	Landfill
Paper board	Recycle / reuse	Open burning	Landfill
Drums	Recycle / reuse	Landfill	
Hazardous wastes	Social handling, storage treatment		

8. SENSITIVITY MAPS/CHARTS.

The Gulf abounds in marine wealth and is considered as one of the biologically richest marine habitats along the west coast of India. It is endowed with a great diversity of natural ecosystems, of which the major systems are salt pans, intertidal zones, marine algae (seaweeds), sea grass and sand dunes, mangroves, coral reefs, creeks, and Open Ocean. The Risk Assessment Studies for Marine Oil Spill for Jetties and SPMs and sensitive mapping of (Gulf of Kutch) has been carried out by NAYARA Energy Limited, Vadinar recently in February 2024 through Environ Software Pvt. Ltd., and is placed as an **Annexure -26**.

B. LIST OF EQUIPMENT AND MANPOWER REQUIREMENT

1) AUXILIARY EQUIPMENT:

- a) OSR DUMP BARGE: ANURADHA
- b) Harbor Tugs
- c) Pilot Vessels, launches and others

Refer Annexure-21

2) SUPPORT EQUIPMENT:

- a) Computer and printer with internet
- b) Walkie-talkie Sets
- c) Telephone Lines
- d) Mobile Sets



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

3) SOURCES OF MANPOWER

In the event of oil spill, Traffic, Mechanical as well as Civil department of DPA shall provide required facility with regard to catering, housing, transportation, field sanitation and shelter etc.

The Following are the Sources of Manpower to combat any oil spill incident in DPA KANDLA AND OOT VADINAR:

- A. OSR Manager
- B. OSR Operational Managers
- C. OSR responders
- D. DPA Fire Brigade Department

A: OSR Manpower: Following qualified OSR man power are presently available at DPA Kandla & OOT Vadinar:

- 1. IMO Level - III
- 2. IMO Level -II
- 3. IMO Level -I

Refer Annexure-23 & 24

4) LOCAL AND NATIONAL GOVT. CONTACTS:

Refer Annexure-3

5) CONTACT DETAILS OF LOCAL ADMINISTRATION.

Refer Annexure-18

6) CONTACT DETAILS OF EXPERTS AND ADVISORS

Refer Annexure- 01



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE -1 (Page-77, Refer Para 6)

CONTACT DETAILS OF EXPERTS AND ADVISORS:

The Management group will seek assistance from experts indicated in the following:

Name of Body	Telephone No.	Fax
Nautical Advisor	022-2613651-54	9122-22613655
DG Shipping, Mumbai	022-22613651-54, 022-226131156	22-22613655
Indian Register of Shipping	022-30519400	022-25703611
IIT- Gujarat	079 2395 2800	022-25723480
Cyclone Detection Radar	022-22150431/ 22174707	-
Area Cyclone Warning Centre (ACWC)- Colaba, Mumbai	022-22150431	022-22160824
Ministry of Environment and Forest (MOEF)	011-24360721, 011-24361896	011-24362746
The National Environmental Engineering & Research Institute (NEERI)	0712-2249999/66	0712-2244900
Directorate of Maharashtra Fire Services	022-26670438/39	022-266600287
Ministry of Petroleum & Natural Gas	011-23387404	011-23383100
National Institute of Ocean Technology (NIOT)	044-667893300	044-22460275/ 22460645
National Ship Design and Research Centre	07386677846	
Department of Explosives	0712-2510248 022-27575946 27575946,27564941	
Inspectorate Dock Safety, Mumbai	022-22692180/ 56565511/56565558 9757222853	022-22613391
GPCB, GUJRAT	079 2323 2152	079 2323 2156
GPCB, JMNAGAR	0288 2752366	0288 2753540
Meteorological Observatory, Ahmedabad	079-22865165	22865449



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-2
(Refer 5.3, Page 40)

LIST OF ADDITIONAL RESOURCES AND INTERNATIONAL OSROs

1. SADHAV Shipping LTD.

Oil Spill Response Unit,
618, Laxmi Plaza
New Link Road, Andheri (West)
Mumbai-400053
Tel- 022-400053, Fax-022-40003366.
Mail- Shipping@SADHAV.com . Web - www.SADHAV.com

2. Australian Marine Oil Spill Centre

PO Box 305
Victoria 3214
Australia
Tel + 61 3 5272 1555 Fax + 61 3 5272 1839
Mail: amose@amosc.com.au Web: <http://www.aip.com.au>

3. Fast Oil Spill Team

C/o PIM 40 G 23 Tour Elf
92078 Paris- La Defense Cedex France
Tel: + 33 1 4744 5636 Fax : + 33 1 4744 2677 Mail :
giefost@club-internet.fr

4. Oil Spill Response Ltd

Oil Spill Services Centre
Lower William Street Northam
Southampton SO1 1 QE, UK
Tel: + 44 1703 331 551 Fax: + 44 1703 331 972
Mail: osrl@osrl.co.uk Web: <http://www.oilsillresponse.com>

5. Petroleum association of Japan

Oil Spill response Department Keidanren Building
9-4, 1 – Chome, Ohtemachi Chiyoda Ku,
Tokyo 100, Japan
Tel: + 81 3 3279 3819 Fax: + 81 3 3242 5688
Mail: mail@pcs.gr.jp Web : <http://www.pcs.gr.jp>



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-3
(Ref Para-4 Page-77)

LOCAL AND NATIONAL GOVT. CONTACTS:

1. The Commander
Coast Guard Region (North West)
Gandhinagar, Gujarat
Tel 079 23243315, 23243316
Fax: 079 23243305
Email ID: rhq-nw@indiancoastguard.nic.in
2. The Commander Coast Guard Dist. HQ -15,Okha
Tel -02892262260, 61223421
Email ID: cgs-okh@indiancoast.nic.in
3. The Commanding Officer,
Indian Coast Guard Station, Vadinar.
Tel 02833256333
Email [ID: vdr@indiancoastguard.nic.in](mailto:vdr@indiancoastguard.nic.in)
4. Coast Guard Pollution Response Team (NW)
Tel- 079 23243315, 23243316
Ops- 079 23243264, 3283,3292
Fax 079 23243305
EmailID-prt-nw@indiancoastguard.nic.in

2. FISHERIES

Nature Conservation society, Lakota Nature club Jamnagar,
Contact no. +919377526667, +919879516990

3. STATE POLLUTION CONTROL BOARD – REGIONAL OFFICES

Sardar Patel Commercial Complex,
Rameshwar Nagar
Kasturba Gandhi Vikas Gruh Marg, Bedi Bandar Road
Jamnagar- 361 008
Tel-(0288) 2752366



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

CONTACT DETAILS OF STATE GOVERNMENT

DEPARTMENT	DESIGNATION	TELEPHONE	FAX
Gujarat Maritime board, Gandhinagar	Chairman GMB	079-23234696	23234703
	Chief Engineer	079-23234699	23244132
	Traffic manager	079-23246726	23234705
	Dy Secretary Control Room GBM	079-23234706	23234706
	Nautical Officer	079-23234716	23234716
	Officer on Special duty	079-23234698	23240274
Forest & Environment	Principal Chief Conservator of Forests	079-2354100	
	Director Environment, Govt. of Gujarat Gandhinagar	079-23251062	23252156

CONTACT DETAILS OF PORTS

NAME OF PORT	DESIGNATION	TELEPHONE	FAX
Okha	Port officer	02892-262008	262002
Vadinar	Chief Operation Manager	02882573001	
		9819999227	
Bedi Port	Port Supervisor	0288-2755207	
Sikka Port	Port Supervisor	0288-2344230	
Salaya Port	Port Supervisor	02833-285526	
Jakhau Port	Traffic Inspector	02834-223033	230033
Sangchi Port	Port Officer	02831-287233	274115
Kandla Port	Dy Conservator	02836-220235	02836-233585
	VTS GOK	02836-270110	02836-270110
	Harbor Master	02836-270624	270427
	Signal Station Port Officer	02836-270194	270624
Old Port Mundra GMB	Traffic Inspector	02838-222136	222136
Mandvi Port GMB	Port Officer	02834-230033	230033
Tuna Port	Superintendent	02836-299510	271465



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

CONTACT DETAILS OF OHA

NAME	DESIGNATION	TELEPHONE	FAX
Vadinar			
IOCL	CGM, IOCL	02833-256464	256543
	Manager Marine	07894407768	
Nayara energy	Head VOTL	09909908611	
RIL	Head Security	0288-4011911	4010000,4011253
BORL	Vice President	02833- 256499,08238069222	256499
	Port Control Room	9726701985,07069073711	
HPCL-MITTAL, Mundra	DGM Pipe line	02838-271050	271050
APSEZL, Mundra	Marine Services	02838- 255671,9825228673	02838-255110

DISTRICT ADMINISTRATION

OFFICE	DESIGNATION	TELEPHONE	FAX
Devbhoomi-Dwarka	District Collector & District Magistrate	02833 232803,	232102
Jamnagar	Office of the Collector	0288-2555869	2555869
Kachchh	District Collector	02832-252347	02832-250020
Morvi	District Collector	02822-240701	02822-243703



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE- 4

(Page-36,41, Ref Para-4.2,5.6)

WEEKLY MAINTENANCE / TRAINING PROGRAMME, DPA

Date	Event of the Day	Duty Staff
Monday	Tool Box Meeting General cleaning and maintenance of equipment Training/Starting of Power pack and DBD Skimmer Lecture/Discussion on HSE	
Tuesday	Tool Box Meeting General cleaning and maintenance of equipment Training/Starting of Spate 75 pump and Mini Max skimmer Lecture/Discussion on OSD	
Wednesday	Tool Box Meeting General cleaning and maintenance of equipment Training/Power pack & Terminator Skimmer and Discussion on Firefighting appliances	
Thursday	Tool Box Meeting General cleaning and maintenance of equipment Training and Maintenance of Equipment -Onboard OSR Dumb barge Anuradha. OSD pump and spraying system Training/Instruction on OPRC IMO Level I	
Friday	Tool Box Meeting General cleaning and maintenance of equipment Training/Ro Boom, Anchor and anchor chain Discussion on Booms/Skimmers	
Saturday	Tool Box Meeting. General cleaning and maintenance of equipment Training/Maintenance of Skimmer Disc/brush Davit and OSD back pack sprayer. <ul style="list-style-type: none">• Discussion on safety of Men and Materials during loading/unloading of OSR Equipment/items	



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE - 5 (Refer Para-8.4, Page-57)

MEDIA COMMUNICATIONS GUIDELINES

The degree of interest from the press in a specific oil pollution incident is unpredictable but normally closely related to the number of other news items at the time of the incident. Experience shows that even quite extensive pollution does not always attract the attention from the media, while minor, rather insignificant pollution can create a media storm when there is little else to report.

The media can be an effective means of ensuring that the public is kept informed of the incident, its effects and what is being done. Therefore, proper attention to the media and providing the correct information is very important.

The responsibilities of First Responders do not include dealing with the media. Though, it is advisable to refer all and any questions to the media liaison officer identified through the Contingency Plan, still the response leaders on all levels should be prepared to answer questions from the press because of media's persistence for news.

The lesson to be learned is that - unless otherwise instructed, it should always be remembered that even precise information can be misinterpreted or misunderstood. It is therefore recommended to obtain the name and telephone number of members of the press who have received information in order to verify or correct wrong news stories based on misunderstood information.

The basic questions from the press are likely to be:

- What happened?
- Why did it happen?
- What are the measures being taken by the authorities with respect to the pollution?
- What is being done to prevent such an incident happening again?

How to deal with these approaches is a matter of experience but the following guidelines can be used by First Responders:

- Tell the truth. If there is something you do not know, then say so to Avoid getting chased by the press,
- comment only about your area of responsibility and do not speculate on other topics, avoid offering opinions,
- Emphasize the positive points of the operation like outcome of operations, objectives going to be achieved etc.,
- Never make assumptions, your information must be verified and solid before released,
- Do not offer a personal opinion,
- Beware of language (e.g. it is better to say that two ships collided than one crashed



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

into the other if it is not clear which was at fault),

- Be polite, patient and never get personal or sarcastic (you will normally be treated in the same way you treat a person and aggressive behavior from your side can cause you a lot of unnecessary problems),
- Insist that the press observe local safety regulations.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE -6 (Refer 1.3.1Page -20)

BROAD CLASSIFICATION OF OILS AS PER MARPOL 73/78

Asphalt solutions	Gasoline blending s
Blending stocks	Alkylates- fuel
Roofers flux	Reformats
Straight run residue	Polymer - fuel
Clarified	Casing head (natural)
Crude oil	Automotive
Mixtures containing crude oil	Aviation
Diesel oil	straight run
Fuel no. 4,5 and 6	Fuel oil no.1 (Kerosene)
Residual fuel oil	Fuel oil no. 1-D
Road oil	Fuel oil no. 2
Transformer oil	Jet fuels Fuel oil no. 2-D
Aromatic oil (excluding vegetable oil)	
Lubricating oils and blending stocks	JP-1 (Kerosene)
Mineral oil	JP- 3, 4
Motor oil	JP-5 (Kerosene, heavy)
Penetrating oil	naphtha
Spindle oil	Mineral spirit
Turbine oil	Solvent
Straight run	Petroleum Heart cut distillate oil



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-7 (Refer Para-3, Page -74)

ANTI – POLLUTION RESOURCES (Local Area) DPA KANDLA AND OOT VADINAR

Equipment List as per NOSDCP 2018	List of Equipment available at DPA Kandla	List of Equipment available at DPA OOT Vadinar	Total List of Equipment available with DPA	Requirement	Shortfall/ Excess (if any)
Inflatable Booms	1200	2000	3200 Mtrs.	1000 Mtrs.	+2200
Fence boom (Material: Neoprene rubber/Neoprene rubber/ PU/ PV)	200	Nil	200 Mtrs.	1000 mtrs	-800
Skimmer (20TPH 50% weir type, 50vo Brush type)	02 Nos.	03 Nos.	05 Nos.	06 Nos.	-01
OSD Applicator with Spray arms type along with 02 Nozzles system and 02 hand lancers (No')	03 Nos.	05 Nos	08 Nos.	07 Nos.	+01
Oil Spill Dispersant (Chemical Dispersant) (liters)	5000 ltrs.	3000 Ltrs.	8000 Ltrs.	5000 Ltrs.	+3000 Ltrs.
Bio-remediation (liters)	Nil	Nil	Nil	3000 Ltrs.	-3000 Ltrs.
Flex Barge 10 Tons (no.)	5 Nos.	4 Nos.	09 Nos.	07 Nos.	+2 Nos.
Weir Boom 100 meters with minimum 02 weirs with power pack and accessories (no's) or integrated containment cum recovery system with power pack and accessories (no's)	Nil	02 Nos.	02 Nos.	03 Nos.	-1 Nos.
Sorbent boom size min. 5 inch Dia, min. length 5 feet (no')	Nil	500 Nos.	500 Nos.	700 Nos.	-200 Nos.
Sorbent Pads min. 20 inch x 20 inch (no.)	Nil	2000 Nos.	2000 Nos.	2200 Nos.	-200 Nos.
Mini Vacuum pumps	01 Nos.	04 Nos.	05 Nos.	07 Nos.	-02 Nos.
Portable Oil temporary storage facility capacity 10 m3	Nil	05 Nos.	05Nos.	08 Nos.	-03 Nos.
200 meters Shoreline sealing boom with power pack and accessories (material: Rubber/Neoprene rubber) (nos.)	Nil	Nil	Nil	04 Nos.	-04 Nos.
VOC Portable Monitor	Nil	Nil	Nil	02 Nos.	-02 Nos.
Level A protection: Positive pressure, full faces	Nil	05 Nos.	05 Nos.	08 Nos.	-03 Nos.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

<p>piece self-contained breathing apparatus (SCBA) or passive pressure air respirator with escape SCBA;</p> <p>Totally encapsulated chemical and vapor protective suit;</p> <p>Inner and outer chemical resistant gloves; and</p> <p>.Disposable protective suit gloves, and boots</p>					
<p>Level B protection:</p> <p>. Positive pressure, full face piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA;</p> <p>. Inner and outer chemical-resistant gloves;</p> <p>. Face shield;</p> <p>. Hooded chemical resistant clothing;</p> <p>.overall; and</p> <p>. Outer chemical-resistant boot.</p>	Nil	Nil	Nil	16 Nos.	-16 Nos.
<p>Level C protection:</p> <p>.Full face air purifying respirators;</p> <p>.inner and outer chemical-resistant gloves;</p> <p>' Hard hat;</p> <p>' Escape mask; and</p> <p>. disposable chemical resistant outer boots"</p>	10 Nos.	20 Nos.	30 Nos.	Nil	30
				Nil	30
				05	25
				Nil	30
				Nil	30
OSR Vessels					
Work Boats	2	2	4	4	NIL
Tugs	4	4	8	4	+4



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE – 8
(Refer Para-3.6,page-34)

LIST OF REFINERIES

NEARBY AND IN GUJRAT STATE

Reliance Industries Ltd. (Domestic Tariff Area) (RIL-DTA) (Private Sector). JAMNAGAR (Gujarat)
Reliance Industries Limited – SEZ (RIL-SEZ) (Private Sector). Jamnagar
Nayara Oil Limited (EOL) (Private Sector), Vadinar, Gujarat

REFINERIES AVAILABLE IN INDIA:

Guwahati Refinery (Assam) – Indian Oil Corporation Limited (IOCL)
Barauni Refinery (Bihar) - Indian Oil Corporation Limited (IOCL)
Koyali Refinery (Gujarat) - Indian Oil Corporation Limited (IOCL)
Haldia Refinery (West Bengal) - Indian Oil Corporation Limited (IOCL)
Mathura Refinery (Uttar Pradesh) - Indian Oil Corporation Limited (IOCL)
Digboi Refinery (Assam) – Indian Oil Corporation Ltd (IOCL)
Panipat Refinery (Haryana) - Indian Oil Corporation Ltd (IOCL)
Bongaigaon Refinery (Assam) – Indian Oil Corporation Limited (IOCL)
Visakha Refinery (Andhra Pradesh)- Hindustan Petroleum Corporation Limited (HPCL)
Kochi Refinery (Kerala) – Bharat Petroleum Corporation Limited (BPCL)
Manali Refinery (Tamil Nadu) – Chennai Petroleum Corporation Ltd (CPCL)
Basin Refinery (Nagapattinam-Tamil Nadu) – Chennai Petroleum Cauvery Corporation (CPCL)
Numaligarh Refinery (Assam) - Numaligarh Refinery Limited (NRL)
Mangalore Refinery (Karnataka) – Manglore Refinery Limited (MRL)
Tatipaka Refinery (Andhra Pradesh) – Oil & Natural Gas Corporation Limited (ONGC)
Reliance Industries LTD.(Domestic Tariff Area) (RIL-DTA) (Private Sector).JAMNAGAR (Gujarat)
Reliance Industries Limited – SEZ (RIL-SEZ) (Private Sector). Jamnagar
NAYARA Oil Limited (EOL) (Private Sector), Vadinar, Gujarat
Bina Refinery – Bharat Oman Refineries Limited (BORL) (Madhya Pradesh)
Guru Gobind Singh Refinery – HPCL – Mittal Energy Limited (HMEL), Bhatinda (Punjab)



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-9 (Refer Para-2.2, Page-25)

CHARASTRISTICS OF DIFFERENT CLASS OF OILS

OIL TYPE	DENSITY	Viscosity	Pour point C	Flash point C
	(kg/l) At 15C	mPa at 20C		
Crude oil	0.8- 0.95	1-100	+10 to – 35	Variable
Gasoline	0.70 – 0.78	0.5	Na	Less than 0
Kerosene	0.8	2	Less than – 40	38-60
Jet fuel	0.8	1.5-2	Less than – 40	38-60
Diesel oil	0.85	5	-5 to -30	More than 55
Light FO IFO60	0.9	60 at 50 C	+ 50 to -20	More than 60
Medium FO IFO 180	0.9	180 at 50 C	+ 30 to – 20	More than 60
HeAvgv FO IFO 380	0.99	380 at 50 C	+ 30 to – 20	More than 60



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-10 (Refer Para-2.9,Page-29)

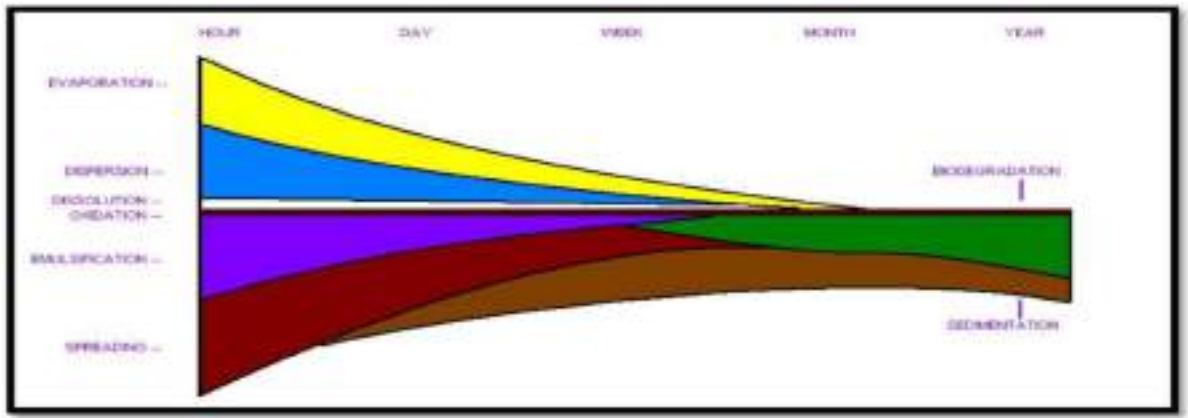
WEATHERING PROCESSES AND TIME SCALES

Process		Importance	Time frame
Evaporation	Conversion of liquid to Gaseous state. Lighter fractions are lost first	Major process accounting for loss of oil. At 15 C gasoline will evaporate completely over a 2 day period, 80% of diesel fuel and 40% of light crude , 20% of heavy crude and about 5- 10% Of Bunker C fuel.	< 5 days
Emulsification or mousse formation	Small water droplets get mixed into liquid oil. Water content will reach 50-80%	Will increase the amount of pollutant to be Recovered by a factor of 2-4.	Onset may be delayed but emulsification process will start Rapidly.
Natural dispersion	Breakup of an oil slick into small droplets	Removes oil from water surface	< 5 days
Dissolution	Mixing of soluble oil components into water	Water soluble components are most toxic	< 5 days
Biodegradation	Breaking of oil by microbes into smaller compounds and finally to water and carbon dioxide	Rate depends on oil type, temperature, nutrients, oxygen and amount of oil	Weeks to months
Formation of tar balls	Breakup of heavy crudes and refined oils into small patches with long persistence	Hard to detect	Days to weeks



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Shows schematic diagram of weathering processes with time



The physical and chemical changes, which spilled oil undergo are sometimes collectively known as weathering. However, the main processes are as follows:

2.9.1 Spreading: -Open out (something) so as to extend its surface area, width, or length. Oil spreads out and is pushed across the water by wind and currents.

2.9.2 Evaporation: -The process of turning from liquid into vapour. Oil evaporates very slowly. Oil doesn't mix with water, and most oils are less dense than water.

2.9.3 Photo-oxidation

This process occurring due changes to chemical and physical properties of spilled oil and sets in because of exposure to sunlight and is limited to the surface of oil, resulting in a thin, crusty" skin" on slicks and tar balls. The "skinning" of oil, limits evaporation because the lighter oil components can no longer diffuse through the surface of the slick. Photo-oxidation may increase the ease of emulsification and is considered a long-term weathering process taking weeks to months.

2.9.4 Dispersion: -The action or process of distributing things (oil) over a wide area.

2.9.5 Emulsification: -An emulsion is a mixture of two or more liquids that are normally immiscible

2.9.6 Dissolution: -Water soluble compounds in an oil may dissolve into the surrounding water. ... Most crude oils and all fuel oils contain relatively small proportions of these compounds making dissolution one of the less significant processes.

2.9.7 Oxidation: -Oxidation occurs when oil contacts the water and oxygen combine with the oil to produce water-soluble compounds. This process affects oil slicks mostly around their edges.

2.9.8 Sedimentation: -The process of settling or being deposited as a sediment.

2.9.9 Biodegradation: -Biodegradation is the process by which organic substances are decomposed by micro-organisms into simpler substances such as carbon dioxide, water and ammonia.

The processes of spreading, evaporation, dispersion, emulsification and dissolution are most important during the early stages of a spill whilst oxidation, sedimentation and Biodegradation are long-term processes, which determine the ultimate fate of oil.

Emulsification

Mousse begins to form when 19% of the oil has evaporated

Wind and wave conditions

Wind speed – 10 knots from 245 degrees

Wave height – computed from wind speed, unlimited fetch (default)

Water properties



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Temperature – 30 degree C Salinity 32ppt
Sediment load – 500g/ m3 (muddy river)
Current – 3.0 knots towards 80 degree

ANNEXURE-11 (Refer Para-2.1.3, Page-23)

CALCULATION OF SPILL QUANTITY AS PER SLICK CHARACTERISTICS

The quantity of oil spilled can be calculated in terms of total rupture and also for pin hole leaks using software taking into account the diameter of hole and flow rate. The formula for total rupture calculation is:

Volume of Spill = 2 Pie X Radius of Pipeline X Length of Pipeline X Flow Volume

SPILL AREA AND OIL VOLUME		Average Slick Length		2.5		Km		TOTAL SPILL AREA		1,500,000		m ²	
		Average Slick Width		0.6		Km		1.50		Km ²			
OIL TYPE	APPEARANCE	THICKNESS (mm)	LOADING m ³ / Km ²	COVER %	AREA Km ²	VOLUME m ³							
Sheen	Silvery	0.0001	0.1	40%	0.60	0.060							
Sheen	Rainbow	0.0003	0.3	30%	0.45	0.135							
Slick	Yellow/Brown	0.01	10	20%	0.30	3.000							
Crude/Fuel Oil	Black/Brown	0.1	100	10%	0.15	15.000							
Mousse	Brown Orange	1.0	1000	0%	0.00	0.000							
				100%	1.50								
								TOTAL OIL VOLUME		18,195		L	
								TOTAL OIL VOLUME		18.20		m ³	



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-12
(Refer Para 1.1.5, Page-70)

POINT SYMBOLS FOR BIOLOGICAL RESOURCES

BIRD	MARINE MAMMAL	SHELLFISH AND INSECT
Alcid / Pelagic Bird	Dolphin	Bivalve
Diving Bird	Manatee	Crab
Gull / Tern	Polar Bear	Echinoderm
Passerine Bird	Sea Otter	Gastropod
Raptor	Seal / Sea Lion	Lobster/ Crayfish
Shorebird	Whale	Shrimp
Wading Bird	REPTILE / AMPHIBIAN	Squid/ Octopus
Waterfowl	Alligator / Crocodile	Insect
TERRESTRIAL MAMMAL	Turtle	Insect
Bat	Other Reptiles / Amphibians	HABITAT
Bear	FISH	Coral/ Hardbottom Reef
Deer	Fish	Floating Aquatic Vegetation
Small Mammal	Nursery Area	Rare Plant
		Submerged Aquatic Vegetation

ESI HUMAN USE RESOURCE SYMBOLS

Access	Factory	Park
Airport	Ferry	Recreational Fishing
Aquaculture	Hazardous Waste Site	Special Management Area
Archaeological Site	Historical Site	Subsistence Fishing
Beach	Hoist	Surfing
Boat Ramp	Indian Reservation / Tribal Land	Washover
Camping	Lock/Dam	Water Discharge
Coast Guard	Logging	Water Intake
Commercial Fishing	Marina	Water Quality
Critical Habitat	Marine Sanctuary	Water Supply
Diving	Mining	Wildlife Refuge, Reserve, Preserve
ES/RSI Change	National Park	National or State Boundary
Facility	NOAA Data Buoy	Park or Refuge Boundary



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Annexure-13
(Refer Para-3.5.1, Page-33)

PORT- VESSEL POLLUTION EMERGENCY INTERPHASE

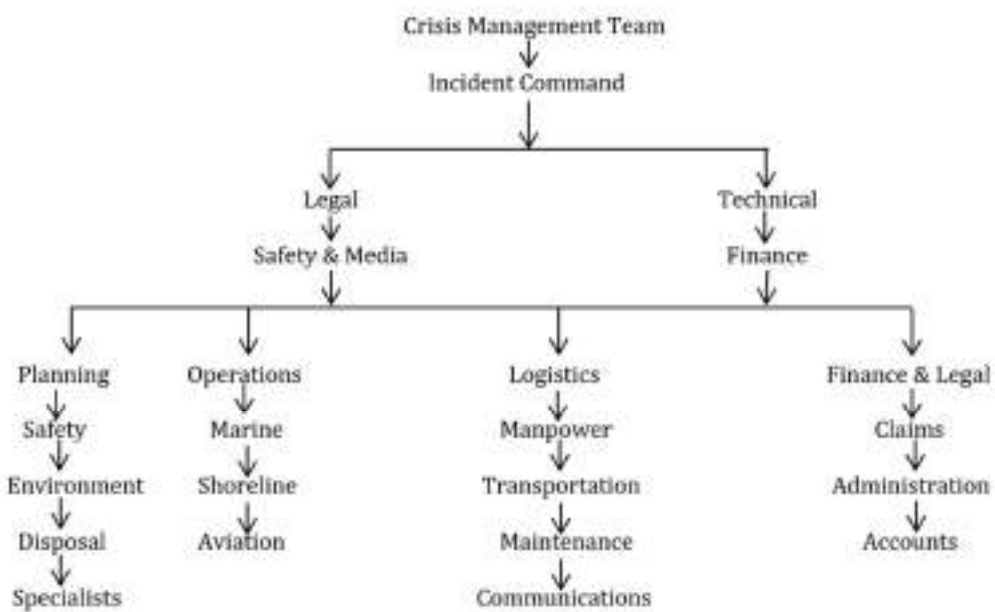
ACTION	RESPONSIBILITY
IMMEDIATE ACTION	
Sounding Emergency Alarm	Person noticing spill
Initiating Vessel Pollution Response Plan	Duty officer
INITIAL RESPONSE	
Suspend cargo ops	Ch. Eng./ Duty officer
Information to Terminal/Port Control / Master	Master / Duty officer/Ch. Engg.
Call crew to Pollution Response Positions	Master/ Duty officer
SECONDARY RESPONSE	
Location of source of spill	Chief officer
Assess & consider -	
Fire risk & manning of fire positions	Master
Stopping of air intake	Chief Engineer
Transfer of bunker to empty or slack tank, shore /barge	Master/ Ch. Engineer
Prepare detailed report of spill and actions	Master/ Ch. Officer
Inform agent, owners and PI club	Master/ Ch. officer
FURTHER RESPONSE	
Call in external assistance to locate spill (if below waterline)	Master – Port
Consider stability of vessel	Master/ Ch. officer
Follow directions of response authority	Master



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Annexure-14
(Refer Para-5.2, Page-38)

ORGANISATIONAL CHART





OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Annexure-15

(Refer Para-2.5.3 & 8.6, page 26 & 57)

NET ENVIRONMENTAL BENEFIT ANALYSIS (NEBA)

Detailed Report of NEBA carried out by National Institute of Oceanography is enclosed

Sensitive areas in an around DPA KANDLA AND OOT VADINAR

PORTS OF NAYARA Energy, IOCL, NAYARA and Reliance

TRANSHIPMENT FACILITIES AT Jetty A & B at OOT Vadinar

SPM

The sensitive areas likely to be threatened in case of oil spill are as follows.

Marine National Park

Mangrove area

Salt pans

Forest area

NAYARA refinery intake

Mangroves Area

MOVEMENT OF OIL:

Spreading and advection are the two major processes that transport oil on water. For small spills (<100 barrels), the spreading process is complete within the first hour of the release, whereas for bigger spills the spreading process could continue for larger durations of time.

Winds, currents, and large-scale turbulence (mixing) are advection mechanisms that transport oil to large distances. For calculation purposes, the oil movement is estimated as the vector sum of the wind drift (using 3% of the wind speed) and 100% of the surface current.

Spreading:

The spreading process occurs quickly and for most spills, mostly within the first hour. In open waters, winds, currents, and turbulence act on and move the oil.

Spreading occurs faster for lighter and for less viscous oils in warm water temperatures and for warm oils. The slick does not spread uniformly but will often have a thick part surrounded by a larger, but thinner sheen. About 90% of the oil is found in 10% of the slick area. A spill is likely to keep spreading until a thickness of about 0.1 mm is reached. At this stage breaking up of slick into windrows is an important source of further spreading.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Vulnerable Areas in case of a spillage

Spill Volume (tones)	SW monsoon	NE monsoon	Post monsoon
700 crudes	-	Marine National Park, NAYARA & IOCL Transshipment Facility at OOT Vadinar Jetty A & B, Mangroves area, Salt Pans, NAYARA Intake.	-
25000 crudes	-	Marine National Park, NAYARA & IOCL Transshipment Facility at OOT Vadinar Jetty A & B, Mangroves area, Salt Pans, NAYARA Intake.	-
700 furnaces	-	NAYARA & IOCL Transshipment Facility at OOT Vadinar Jetty A & B, NAYARA Intake.	-
10000 furnaces	-	NAYARA & IOCL Transshipment Facility at OOT Vadinar Jetty A & B, NAYARA Intake.	-
2200 m ³ /h for 15 min	-	NAYARA & IOCL Transshipment Facility at OOT Vadinar Jetty A & B, NAYARA Intake.	-

PAST COMPARATIVE STUDY

SW Monsoon Season (Jun-October)

In the initial period of this season, the surface currents and winds are transition from Northeast to East based on the wind direction. The magnitude of the residual currents is greater than 1 knot. The slick moves transition from Northeast to East direction based on the wind forcing. The effect of wind forcing is significantly higher than surface current drift. The spills at Jetty A & Jetty B would head towards the sea. The behavior of slick movement is more or less similar in various scenarios irrespective of quantities.

NE monsoon (November-February)

In the initial period of this season, the surface currents and winds are towards South west. The magnitude of the residual currents is greater than 1 knot. The slick moves towards South west direction based on the wind and currents forcing. The effect of wind forcing is significantly higher than surface current drift. The spills at landing jetty, Jetty A & B would reach the coast within 10 minutes. The behavior of slick movement is more or less similar in various scenarios irrespective of quantities of oil spilled. The extent of landing of oil differs depending on the source quantities. Nearly 20% of oil volume has been lost due to evaporation and dissolution and remaining will reach the coast.

Post Monsoon Season (November-December)

In the initial period of this season, the surface currents and winds are towards Northeast direction. The magnitude of the residual currents greater than 1 knot. The slick moves towards Northeast direction based on the wind forcing. The effect of wind forcing is significantly higher than surface current drift. The spills at Jetty A & Jetty B would reach to shore within 10 minutes. The behavior of slick movement is more or less similar in various scenarios irrespective of quantities of oil spilled.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

SHORE LANDING AND SPILL IMPACT AREAS

The quantity of the spill reaching to the coast and affected areas for various seasons for various hydrological and meteorological conditions and predicted BY use of Hyrodyn-OILSOFT software is as follows.

SW monsoon

During this period, no Oil slicks will affect the coast at least for 6-12 hours. No likely areas will be impacted during these seasons for spills of various quantities.

NE monsoon

During this period Oil slicks of approximately 70% spilled at sea reach the coast within an hours after the spill. The likely areas impacted during these seasons for spills of less than 700 Ton are DPA KANDLA AND OOT VADINAR Landing JETTY, NAYARA Intake & adjoin area of jetty. For spills of higher magnitude, the impact zone may extend at NAYARA Intake, Salt Pans& mangrove areas along the coast.

Post monsoon

During this period spilled oil at Jetty A and Jetty B would not reach the coast.

In summary the likely areas affected by the oil spills from oil berths operations at jetties during various seasons are given below:

Spill Analysis: Percentage of oil spill volume reaching the coast

Spill Volume	SW Monsoon	NE Monsoon	Post Monsoon
700 t crude	-	-	70-80
25000 t crude	-	-	75-85
700 t furnace	-	-	85-90
10000 t furnace	-	-	85-90
2200m ³ /h for 15 min	-	-	90-95

Extent of oil on the coast (meters)

Spill Volume	SW Monsoon	NE Monsoon	Post Monsoon
700 t crude		-	500
25000 t crude		-	1000
700 t furnace	200	-	1200
10000 t furnace	300	-	1500
2200 m ³ /h for 15 min	350	-	2000

SHORE LENGTH AND AREA OF VADINAR

Vadinar Port is covering the **Total area of (12923.9 Sq.Km)** have been notified by the state Govt. to Conserve Biodiversity of the Wetlands.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

KPT marine facilities are located at Vadinar near Narara Bet (Lat 22 °26.9', Long 69°40.18' E) & in the Pathfinder Inlet, a Natural Creek of the Gulf of Kachchh (Hereinafter referred to as Gulf). The KPT service jetty used for securing the floating crafts, Operational for more than three decades, is located south of the VOTL Terminal. The Pathfinder Inlet is well sheltered from monsoon wags and thereby permits uninterrupted navigation for ships approaching the berths except during cyclones which rarely strike the Gujrat coast.

The Southern Shore of the Gulf in Jamnagar district with abundance of coral reefs and mangroves is demarcated as Marine National Park Sanctuaries. The Inter tidal Zones of Dwarka, Kalyanpur, Khambhalia, Lalpur, Jamnagar and Jodia Talukas along with 42 Islands in the district have been included in the marine protected area. An area of 457.92 Km² stretching from Okha to Jodiya comes under Marine National Park and Sanctuary. This area includes 148.92 Km² of small and big islands and 309 Km² intertidal zone the coast. Area of the MNP is 162.89 Km² Whereas the remaining protected areas have the status of Marine Sanctuary.

The MNP&S includes three categories of areas (noticed on 1-1-1983 and 9-11-1983), i.e. (i) 11.82 sq.km Reserve Forests, (ii) 347.90 sq.km unclassified forests notified under sec.4 of IFA 1927, and (iii) 98.20 sq.km territorial waters of India. 162.89 sq.km area of MNP is distributed amongst 37 islands and coasts whereas the remaining 295.03. Km area of the sanctuary covers 5 islands and intertidal zone from Navlakhi to Okha. Areas Mentioned under National Park, sanctuary, Reserve Forests and Unclassified Forests are scattered and mostly having no proper specific boundary. 398.40 sq.km overlapping area is notified under Port Act before 1980 for maritime activities.

A National Park and four sanctuaries viz. MNP, Jamnagar (162.9 Sq.Km Marine sanctuary (295 sq.km), Khijadia Bird sanctuary (6.1 Sq.km), Wild Ass sanctuary in the Little Rann (4953.7 Sq.km), and Kachchh desert wild life sanctuary (7506.2 Sq.km),



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Annexure-16
(Refer Para-9.5
, Page-60)

INCIDENT LOG

INCIDENT INFORMATION

Incident Title (Name of Vessel) -----

Incident Number (Sq number/ dd /mm/ yyyy) -----

1. DETAILS:

Time of recording ----- (24 hr. format) Day ----- Date -----

Person / Organization reporting incident

Name ----- Designation ----- Contact number -----

2. INCIDENT:

Name of VESSEL ----- Location -----

Position (if not alongside) Latitude ----- Longitude-----

Sounding -----

Incident details

Time ----- (Of incident, 24 hrs format) Date -----

Cause of spill -----

Type of oil -----

Estimated quantity of spill -----

Details of damage to vessel / installation -----

3. COMMENTS:

1. Recorded by:

Name -----

Time -----

Note: FOUR COPIES OF INFORMATION ARE TO BE RECORDED. RETAINING ONE FOR OFFICE RECORD, THREE COPIES ARE TO BE CIRCULATED ONE EACH TO -

- **CHIEF INCIDENT CONTROLER**
- **OSC / RESPONDER/ INCIDENT CONTROLER**
- **VESSEL MASTER**



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-17
(Refer Para-9.5, Page-60)

PERSONAL LOG (ALL MEMBERS OF SPILL RESPONSE ORGANISATION)

Incident Title -----Number----- (as per)
Date -----

Name -----Designation (as per C P) -----

Time of Rx / Forwarding Info	Activity requested by/ demanded of other Member/s
Observations on day's operations: -	

Note – Copy of Personal Log is to be handed over to COC daily or as earliest as possible on completion of a schedule.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-18 (Refer Para -5, Page-77)

CONTACT DETAILS OF LOCAL ADMINISTRATION – OOT Vadinar

Sr. No.	DESCRIPTION	STD CODE	TELEPHONE NO.	
			OFFICE	Mobile
1	Head DPA OOT VADINAR (COM)	0288	2573001	9819999227
2	Head HSEF, Refinery	02833	662405	9909908685
3	Coast Guard Station, Vadinar	0288	256560	
4	CG PRT (NW), Vadinar	02833	256601	
5	DPA Control Tower, Vadinar	0288	2573009	9825212359
6	Municipal Fire Station, Jamnagar	0288	2672208	9909011502
7	Marine Police, Station, Vadinar.	0288	256541	
8	District Collector, Devbhumi Dwarka, Khambhalia	02833	232805 232102	
9	GPCB, Gandhinagar	079	23237311	
10	Deendayal Port AUTHORITY	0288	2573005	
11	Gujarat Maritime Board (GMB)	0288	2712516	
12	Ministry Of Environment, Gujarat	079	23251062	
13	Principle Chief Conservator Of Forest, Gandhinagar	079	23253903 23254123	
14	Oil Industry Safety Directorate (OISD), New Delhi	011	2593800	



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

CONTACT DETAILS OF LOCAL ADMINISTRATION – DPA Kandla

Sr. No.	DESCRIPTION	STD CODE	TELEPHONE NO.	
			OFFICE	Mobile
1	Head DPA KANDLA (DC)	02836	233585	9603123449
2	Head HSEF, Refinery	02833	662405	9909908685
3	Coast Guard Station, MUNDRA	02838	271403	
4	CG PRT (NW), KANDLA	02833	256601	
5	DPA Control Tower, KANDLA	02836	270194	9825227246
6	Fire Station, Kandla	02836	270176	9825227041
7	Marine Police, Station, KANDLA.	02836	270527	
8	District Collector, Kutch	02832	2832 250650	
9	GPCB, Gandhinagar	079	23237311	
10	Deendayal Port Authority	02836	233585	
11	Gujarat Maritime Board (GMB)	0288	2712516	
12	Ministry Of Environment, Gujarat	079	23251062	
13	Principle Chief Conservator Of Forest, Gandhinagar	079	23253903 23254123	
14	Oil Industry Safety Directorate (OISD), New Delhi	011	2593800	



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-19
(Refer Para-3, Page -74)

Pollution response equipment specification and details

	<p style="text-align: center;">POWER PACK 42 KW</p> <p>COMPANY- DESMI MAKE-HATZ, TYPE-3M 41L DIMENTIONS-L-73", W-40", H-50" WEIGHT-APPROX 750 KG (EMPTY TANK), -APPROX 900KG (WITH FULL TANK) POWER INPUT-AIR COOLED,4 STROKE, DIESEL ENGINE, ENGINE POWER-42 KW,2800 RPM AIR FILTER-DRY TYPE, STARTING –ELECTRIC START BATTERY-12 V 140 AH ALTERNATER-14 V,42A (1500 RPM) AUTOMATIC STOP-IN CASE OF BROKEN V BELT, IN CASE OF TOO LOW LUBE OIL PRESSURE MAX, CONT. PRESSURE-210 BAR (3000 PSI) FLOW RANGE-0-160 L/MIN</p>
	<p style="text-align: center;">TERMINATOR / WEIR SKIMMER</p> <p>MADE-DESMI(DENMARK) DIMENSIONS-L-82.7", W-91.7", H-36.6" DRAFT-27.6" WEIGHT DRY-WITH DOP 200DUAL PUMP-160 KG (EXCL. THURSTERS)-183 KG (INCL. THURSTERS) MAX. PRESSURE-WITH DOP200DUAL MOTOR13 BAR (188 PSI) THRUSTERS-OPTIONALS FLOATS, HOPPER, AND FLOATING COLLAR-OIL RESISTANT POLYETHYLENE PLASTIC BELLOWS-OIL RESISTANT NEOPRENE RUBBER, FLOAT POIPES –STAINLESS STEEL OTHER PARTS-SS AND SEAWATER RESISTANT ALUMINIUM COATING (PUMP)-PRIMER /COMPANY PAINT MAX RECOVERY RATE - WITH DOP 200 DUAL PUMP 66 M3/H AT 1 BAR.</p>



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR



POWER PACK 15 KW

POWERPACK FOR – BOOM WITH REEL WINDER
 ENGINE TYPE-15 KW,3000 RPM
 PRESSURE -210 BAR
 GROSS WEIGHT – APPROX 250-500 KG
 FUEL TANK – 5 LTR.



POWER PACK 05 KW WITH RO VACMINI TANK

MACHINE NAME-HATZ 1B30 DIESEL ENGINE
 ENGINE TYPE-AIR COOLED FOUR STROKE DIESEL ENGINE
 START-ELECTRIC AS WELL AS RECOIL START
 PUMP DIMENSION-APPROX (L -1050 MM X W-700 MM X H-740 MM)
 NO. OF CYLINDERS-SINGLE
 VOLUME-APPROX 0.51 M3
 WEIGHT-APPROX 123 KG
 VACCUM CAPACITY-0.89 BAR @1500 RPM
 BATTERY CAP-MIN-12 V-36/60 AH
 FUEL TANK CAP-05 LTRS
 TANK STORAGE CAPACITY-
 RO VACMINI TANK DIMENSION-

	HOPPER	VACUUM HEAD	ASSEMBLED
APPROX (LxWxH mm)	590X780	950X720X550	950X720X109
VOLUME APPROX(M3)	0.21	0.34	0.67
WEIGHT APPROX (KG)	21	22	43



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR



PD75 SPATE PUMP

ENGINE TYPE-YANMAR
CAPACITY-31.8M3/H (7000 GAL/H)
MAX RPM - 1500
MAX. PRESSURE-3 BAR
WEIGHT - 92 KG
TOTAL HEAD-40 M (130FT)
DELIVERY HEAD-30.5M (100 FT)
SELF PRIMING LIFT-8.8M H₂O, (29 FT H₂O)
SUCTION LIFT-9.1 M (30 FT)
SOLIDS SIZE-6MM (0.25 INCH)





POWER PACK 3.1 KW WITH OSD SYSTEM

ENGINE DESIGN-AIR COOLED, FOUR-STROKE,
DIESEL ENGINE
START-ELECTRIC START AS WELL AS RECOIL
START
NO. OF CYLINDERS-SINGLE
ENGINE POWER-3.1 KW,3600 RPM
BATTERY CAP-MAX 12 V/60AMP/H
PUMP DIMENSION-APPROX (1120mm X
700mm X 680 mm)
PUMP TYPE-PISTON DIAPHRAGM
WEIGHT APPROX-116 KG
OSD APPLICATION RATIO-**APPROX 1:20 LTR**
ENGINE TYPE-3 KW, HATZ MODEL 1B20 WITH
ELECTRIC START
SPRAY ARMS MAT: - ALUMINIUM PIPES IN 2
OR 3 PARTS
NO. OF DISCHARGE HOSES-02 X 1 ½" WITH
PVC CAMLOCKS
SEAWATER SUCTION-01 X 1 ½" WITH PVC
CAMLOCKS
DISPERSANT SUCTION-01X 1.25" WITH PVC
CAMLOCKS



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

	POWER PACK 7.5 KW & DBD SKIMMER
	SKIMMER TYPE-DISC/BRUSH DIMENSION-L-0.93 MTR, W-1.32 MTR, H-0.66 MTR DRY WEIGHT-95 KG DRAFT-0.14 MTR DRIVE UNIT-2XOMM 50 (50CC) SPEED-0-60 RPM DISC SIZE-02 SETS OF 15 PCS (295MMX3MM) BRUSH SIZE-02 SETS OF 300MM HYDRAULIC FLOW-0-3 L/M HYDRAULIC PRESSURE-140 BAR (MAX) OUTLET-RECOVERED OIL-3" CAMLOCK

	RO BOOM WITH REEL
	BOOM TYPE- 2000 SPEED SWEEP BOOM WIDTH-2 MTR CHAMBER SECTION PITCH-4.90 MTR BUOYANCY CHAMBER LENGTH-4.50 MTR FREEBOARD-0.59 MTR DRAUGHT-1.10 MTR BALLAST CHAIN-13MM SECTION CONNECTOR MADE-ASTM VOLUME OF BUOYANCY CHAMBER-923 LTRS WEIGHT /MTR ENCL.CHAIN-15 KG EFFICIENT IN WAVES UPTO-4 MTR STABLE IN CURRENT UPTO-3 KNOT ACCESSORIES-TOW BAR, SHACKLE, BRIDLE, TOW ROPE, BUOY, VALVE COVER. BOOM MOUNTED-ON THE SHAFT A REEL WITH END FLANGED. BOOM REEL ROTATION BY-GEARBOX WITH HYDRAULIC MOTOR.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

	<p style="text-align: center;">CURRENT BUSTER BOOM WITH REEL</p> <p>BOOM TYPE-1500 SPEED SWEEP NETS/SCREENS-SCREENS ARE MADE FROM PU-COATED KEVLAR TAAPES SCREENS BUOYANCY BY-FOAM FILLED PU GLOBES BOOM WIDTH-1.50 MTR CHAMBER SECTION PITCH-3.30 MTR BUOYANCY CHAMBER LENGTH-03 MTR FREEBOARD-0.52 MTR DRAUGHT-0.72 MTR BALLAST CHAIN-13MM SECTION CONNECTOR MADE-ASTM VOLUME OF BUOYANCY CHAMBER-657 LTRS WEIGHT /MTR ENCL.CHAIN-12 KG EFFICIENT IN WAVES UPTO-3.5 MTR STABLE IN CURRENT UPTO-3 KNOT ACCESSORIES-TOW BAR, SHACKLE, BRIDLE, TOW ROPE, BUOY, VALVE COVER. BOOM MOUNTED-ON THE SHAFT A REEL WITH END FLANGED. BOOM REEL ROTATION BY-GEARBOX WITH HYDRAULIC MOTOR.</p>
	<p style="text-align: center;">RO TANK 10 TON</p> <p>MATERIALS-MADE OF SYNTHETIC, OIL AND WEATHER RESITANT RUBBER AND HAVE FOUR INNER PLYS OF POLYESTER/POLYAMIDE REINFORCEMENT FABRIC EMBEDDED IN NEOPRENE RUBBER. COLOUR-BLACK CAPACITY-10 TON FIELD SIZE-9.4X2.1X0.8MTRS HOSE CONNECTION-2X3 INCH(BSP) TANK WEIGHT-230 KG PILLOW-65 KG NUMBER OF FLOATS-2 FLOATS (ONE EACH SIDE)</p>



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR



TROIL TANK

MATERIALS-1000 GRAM PU/PVC ALLOY.
RODS-GLASS FIBRE.
PIPES AND CONNECTORS-PLASTIC
STORAGE PACKED-1300X450X250
CAPACITY-2 TON
HEIGHT ERECTED-900 MM



OIL SPILL DISPERSANT

TYPE-II/III
MANUFACTURE- FOAMTECH ANTIFIRE COMPANY
MFG.DT. – 08/2023
EXP.DT. – 08/2033
QTY. – 3000 liters.



ABSORBENTS PADS

NAME – ABSORBENT PADS
SIZE-40X50 MM
QTY-2000 NOS.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR



ABSORBENTS BOOM

NAME – ABSORBENT BOOM
SIZE-20 MM X 3CM
QTY-500MTR.



BACKPACK SPRAY

NAME – BACKPACK SPRAYER
CAPACITY- 16 LTRS.
QTY-5 NOS.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE - 20
(Refer page - 32)

Tel: 011-23074131
E-mail: dte-fe@indiancoastguard.nic.in

TATRAKSHAK MUKHYALAYA
Coast Guard Headquarters
National Stadium Complex
New Delhi - 110 001

EP/0761/OSD

04 Jun 14

M/s Rochem India Pvt Ltd
101, Dharmaj Arma
Bandra (East)
Mumbai 400 051

**APPROVAL OF OIL SPILL DISPERSANT FOR USAGE
IN INDIAN WATERS: ROCHEM OSD**

1. Refer to your letter R/O44/2014-15 dated 23 May 14 requesting issuance of Coast Guard approval/certificate for Rochem (concentrate type 3 & type 2) oil spill dispersant.

2. Taking into consideration National Institute of Oceanography, Goa certificate NIO/TSP-05/2014 dated 27 Mar 14 and OSD Data Sheet submitted by M/S Rochem India Pvt Ltd vide the letter quoted ibid and the Coast Guard Policy and Guidelines for Use of Oil Spill Dispersants in Indian Waters, 2009 the Rochem OSD (concentrate type 3 & type 2) is placed in the list of oil spill dispersant approved for use in Indian waters.

AA Hebbur
(AA Hebbur)
Deputy Inspector General
Director (FE)
for Director General

(P) *relativ*
P. SUDHAR.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ROCHEM
(INDIA) PVT. LTD.

Final Test Report

Finished Product Name: OIL SPILL DISPERSANT TYPE II

QAD No. : 193/17-18

Batch No.: C 193

Tested on : 28/06/17

Manufactured on: 28/06/17

SR.NO.	PARAMETERS	SPECIFIED VALUE	OBSERVED VALUE
1.	COLOUR	COLOURLESS	COLOURLESS
2.	CONSISTANCY	LIQUID	LIQUID
3.	SPECIFIC GRAVITY	APPROX 1.0	1.0
4.	p H	6.0 - 8.0	6.63

Note: Master Instruments used during Trials were:

- *A) Hydrometer (0.700-1.0)
- *B) Electronic pH Meter

Product Cleared for packing and dispatch.

Signature of QA Representative :

Date : 28/06/17


P. SINDHAN



Form No. 17/QA /05, Rev-00, 01/12/01



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

**ANNEXURE - 21
(Refer Page- 77)**

DETAILS OF VESSELS USED FOR OIL SPILL RESPONSE

TUG- Lotus Star

SI	Particulars	Technical Specification
01	Gross Tonnage	493 T
02	Net Tonnage	147 T
03	Bollard Pull (Steady/Sustained & Maximum)	More than 60 T
04	Year of Built	2016
05	LO.A	30.28 Meters
06	Breadth	2.41 M
07	Depth	5.30 M
08	Draft	4 Meters
09	Main Propulsion Engine	NIIGATA 6L28HX2X1654 Kw
10	Propulsion & Steering	ZP31 B(ZELLER)
11	Flag/Nationality	Indian
12	Auxiliaries	Cummins QSB7,2X164Kw
13	Speed	12 Knots
14	Fuel Capacity	225 M3
15	Fresh water capacity	91 M3
16	Towing Arrangement	1) Towing Winch- Maker-Jebsen & Jebsen, Brake Capacity-150 Tons, Double Drum Type, Pull rate at 10 T x 0-10 Mtrs/Min 2) Towing Hook- Maker-Jebsen & Jebsen, Brake Capacity-60 Tons
17	Communication	MF/HF Trans receiver with DSC & Telex VHF, Hand Held VHF Radio
18	NAvgigation Equipment	Marine Radar, AIS, Echo Sounder, Search Light, GPS, Navigates)
19	Details of External Fire Fighting Equipment with discharge capacity and throw distance of monitors	2400 Cu Mtr/Hart 125 Mtr Head
20	Manning(As per requirement of statutory Authority)	As safe manning regulation issued by MMD, India
21	Fuel Consumption Main Engine (At 100% MCR)	380.67 Lit/Hour/engine
	Main Engine (At 90% MCR)	342.20 Lit/Hour/engine
	Main Engine (At 75% MCR)	287.60 Lit/Hour/engine
	Main Engine (At 40% MCR)	159.53 Lit/Hour/engine
	DG Set (At 100% MCR)	46 Lit/hour



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

TUG- OCEAN EMPIRE

Sr No.	Particulars	Technical Specification
01	Flag	Indian
02	Port of Registry	Kochi
03	IMO No.	9658862
04	Official No.	41000638
05	MMSI NO	4056
06	CALL SING	AVGWU
07	GT	468
08	NT	140
09	LOA	31.50 M
10	LBP	28.8 M
11	BREADTH MLD	11.0 M
12	DEPTH MLD	6.1 M
13	DWT	287
14	CLASS	ABS/IRS
15	PROPULSION POWER	2 X 1654 KW@724 RPM (DERATED) (NIIGATA 6L28HX)
16	AZIMUTH THRUSTER	NIIGATA ZP-4 SRP
17	SPEED	12.0 KTS
18	BOLLARD PULL	60.25 @100 MCR
19	YEAR BUILT	AUG 2012

DUMB BARGE-ANURADHA

Sr No	Particulars	Technical Specification
01	Flag	Indian
02	Length overall	23.1 m
03	Port of Registry	Kandla
04	Breadth (MLD)	6.0 m
05	Depth (MLD)	2.9 m
06	Draft	1.5 m
07	Frame Spacing	500 mm
08	Generator	02 Nos,25 KVA,415 VAC,3 PH
09	OIL SPILLAGE RESPONSE SYSTEMS	RO-BOOM WITH REEL – 02 NOS. CURRENT BUSTER BOOM WITH REEL – 01 NOS. DBD SKIMMER-01 SET WEIR SKIMMER -01 SET POWERPACK 42 KW-01 NOS. POWERPACK 7.5 KW-01 NOS. POWERPACK 15 KW-02 NOS OSD SPRAY PUMP & ACCESSORIES-01 SET



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

TUG- VIHAAN

Sr No	Particulars	Technical Specification
1	FLAG	INDIA
2	IMO NO.	9691383
3	MMSIO NO.	419001130
4	LOA	31.5 M
5	LBP	26.8 M
6	GT/NT	470/141
7	DEAD WEIGHT	284.606 Mt.
8	LIGHT SHIP	621.4 Mt.
9	DRAFT	SUMMER:5.313 M, FREEBOARD: 1.107 M TROPICAL:5.409 M, FREEBOARD: 1.011 M
10	DECK LINE	400 MM BELOW MAIN STEEL DECK
11	HEIGHT KEEL TO TOP OF MAST	24.81 M
12	MAIN ENGINES	NIIGETA 6L26HLX-2X1838KW AT 750 RPM FP (2520MM)PROPELLER 2700MM DIA 4 BLADES- CAST NI-AL-BRONCE
13	BOLLARD PULL	70.72 MT
14	TOWING WIRE AFT	52MMX1000M
15	TOWING WIRE FOR D	52MMX220M
16	TUGGER WINCH	200MX22MM WIRE –SWL 10 MT
17	DECK CRANE	PALFINGER 1200-SWL 600KG AT 12.2M
18	RESCUE BOAT	4500MMX2000MMX850MMX1325KG-6 PERSON
19	D.O CAPACITY	235.3CuM (100%)
20	FW CAPACITY	53.1CuM (100%)
21	BALLAST CAPACITY	61 CuM (100%)
22	ANCHOR	500KG
23	ANCHOR CABLE	5 SHACKLES (PORT),6 SHACKELS(STBD)



**OIL SPILL RESPONSE CONTINGENCY PLAN
DPA KANDLA AND OOT VADINAR**

ANNEXURE - 22

(Refer Page34, Para3.7)

LIST OF APPROVED RECYCLERS

SL.NO	NAME	ADDRESS
01	M/s ALICID ORGANIC INDUSTRIES LIMITED	OFFICE NO. 35, FIRST FLOOR, GRAIN MERCHANT ASSOCIATION BUILDING, PLOT NO. 297, WARD 12/B, GANDHIDHAM-370201
02	M/s UNITED SHIPPING COMPANY	OIL & GRAIN MERCHANT ASSOCIATION BUILDING, OFFICE: NO.46, FIRST FLOOR, WARD 12-B GHANDHIDHAM, KUTCH 370201
03	M/s ALTAS ORGANICS PVT.LTD.	204/206 ELLISBRIDGE SHOPPING CENTER, OPP.TOWN HALL ASHRAM ROAD, AHMADABAD-380006
04	M/s SHANA OIL PROCESS	NEW GOOD LUCK MARKET, Nr AKSHA MASJID, CHANDOLA LAKE, NAROL ROAD, AHMADABAD-3800028
05	M/s PRIYANSI CORPORATION	H/O. MARURI PETROLEUM, SHOP NO.2, NH-8B, SHAPAR(VERAVGAL)
06	M/s. FINE REFINERS PVT. LTD.	PLOT NO.40, GIDC, CHITRA, VARTEJ, BHAVGNAGAR, BHAVGANAGAR-364060
07	M/s. KUTCH PETROCHEM PVT.LTD.	OFFICE: PLOT NO: 121, SECTOR 9/C, BEHIND ASHOK LEYLAND, POST BOX NO.166, GANDHIDHAM and KUTCH 370201.



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-23
(Refer Page-77)

LIST OF OSR PERSONNEL – DPA OOT VADINAR

SI	NAME	DESIG.	OSR QUAL.
01	Shri A. Ramasamy	Chief Operations Manager	Level-III
02	Shri Narendra Naik	ME Gr-I	Level-III
03	Shri Palash Jadafva	AE(D/T)	Level-II
04	Shri Devang Kanani	JE Gr-I (M)	Level-I
05	Shri Vaikuntah Rao	Casab	Level-I
06	Comdt. Retd. B. H Kumbhare	Sr. Manager	Level-III
07	Vysakh K K	Manager	Level-II
08	Debi Prasad Dash	Manager	Level-II
09	Debasis Sethi	Manager	Level-II
11	Keelu Vinodkumar	Manager	Level-II
12	Ashrit Mishra	Manager	Level-II
14	Rohit Girase	Responder	Level-I
15	Debendra Mohanta	Responder	Level-I
16	Bhola Singh	Responder	Level-I
17	Rajeev N.R.	Responder	Level-I
18	Jitendra Singh	Responder	Level-I
19	Shankar Singh	Responder	Level-I
20	Pintu Kumar	Responder	Level-I
21	Pawan Baryekar	Responder	Level-I
23	Anil Kumar	Responder	Level-I
28	Sunil Kumar	Responder	Level-I



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-24

LIST OF OSR PERSONNEL – DPA KANDLA

SI	NAME	DESIG.	OSR QUAL.
1	Capt. Pradeep Mohanty	Deputy Conservator	Level -III
2	Capt. Lalji ram Meena	Harbour Master	Level -III
4	Capt Shishir Pathak	Sr. Pilot	Level -III
3	Nitin Keniya	Flotilla Superdt.	Level-II
4	Vanka Krishna Rao	Serang-C	Level-II
5	Pawan Sontakke	Manager	Level-II
6	Deewansinh Jadeja	Ast. Flotilla Supervisor	Level-I
7	B. Mohan Rao	Serang-c	Level-I
8	Ghanshyam Jatav	Ast. Flotilla Supervisor	Level-I
9	Pawan Bharati	Responder	Level-I
10	Gajendra Behera	Responder	Level-I
11	Saroj Kumar	Responder	Level-I
12	Papun Behera	Responder	Level-I
13	Dilson John	OSR Manager	Level-I
14	Manoj Kumar	Responder	Level-I
15	Ishwar Giri Goswami	Serang-c	Level-I
16	Kishan D. Sodham	Lascar	Level-I
17	Harshad Danicha	Lascar	Level-I
18	Hitesh K. Thacker	Master 1st Class	Level-I
19	Jitendra Ninjar	Ast. Flotilla Supervisor	Level-I



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

20	Jaydipsinh Gohil	Berthing Supervisor	Level-I
21	Bharat Parmar	AFS	Level-I
22	Kishor Goswami	Master 1 st Class	Level-I
23	D.S. Gujar	Station Officer	Level-I
24	K.G. Khalsa	Station Officer	Level-I
25	G. Nethaji	Station Officer	Level-I
26	M. R. Vadavia	POCD	Level-I
27	Sahdev Mondal	Station Officer	Level-I
28	Kartik Raval	Responder	Level-I



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-25

MOU BETWEEN DPA VADINAR, IOCL & VOTL

The MOU between DPA Vadinar, IOCL & VOTL (Placed as an Annexure-25, Page -139). Fulfills the total requirement of OSR Personnel as per NOS-DCP circular no.03/2018. (EP/0720/circular dated 19 Dec 18).

The matter has been discussed with Local Coast Guard Authorities & it is intimated that the matter is been taken up with CGHQ to Lower the risk category of DPA port.

INDIA NON JUDICIAL
Government of Gujarat


सत्यमेव जयते

Rs.
100

Certificate of Stamp Duty

Certificate No.	: IN-GJ50945344768803R
Certificate Issued Date	: 23-Dec-2019 11:14 AM
Account Reference	: IMPACC (SH)/ gshimp17/ JAMNAGAR1/ GJ-JM.
Unique Doc. Reference	: SUBIN-GJGJSHIMP174295830096683R
Purchased by	: VADINAR OIL TERMINAL LTD
Description of Document	: Article 5(h) Agreement (not otherwise provided for)
Description	: MUTUAL AID SCHEME FOR OIL SPILL RESPONSE AND CONTROL
Consideration Price (Rs.)	: 0 (Zero)
First Party	: VADINAR OIL TERMINAL LTD
Second Party	: N A
Stamp Duty Paid By	: VADINAR OIL TERMINAL LTD
Stamp Duty Amount(Rs.)	: 100 (One Hundred only)



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OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

MUTUAL – AID SCHEME

(FOR OIL SPILL RESPONSE AND CONTROL)

MEMBER ORGANISATIONS

1. **Deendayal Port Trust**, a Major Port having its registered office at Administrative building, Tagore Road, Gandhidham, Gujarat-370201 and Offshore oil Terminal at Vadinar, Gujarat.
2. **M/s Indian Oil Corporation Ltd.**, a company registered under Companies Act, 1956 having its Registered Office at Indian Oil Bhawan, G-9 Ali Yavar Jung Marg, Bandra (East) Mumbai – 400 051 and crude oil tank farm station at Vadinar, Distt: Jamnagar - 361010 (Gujarat)
3. **M/s.Vadinar Oil Terminal Ltd. (Subsidiary of M/s.Nayara Energy Limited)** a company registered under Companies Act, 1956 having its Registered Office at Nayara Refinery Site, 39 KM stone, Okha Highway(SH-25), Khambhalia -361305

Member Organizations shall hereinafter individually referred to as "Member" and collectively as "Members"

The above members are operating in the Gulf of Kutch at Vadinar within Deendayal Port Trust Limit. All the operators have facilities for combating oil spill and are individually having oil spill response equipment. In case of oil spill; one member can take the help of another member. In order to act on the aforesaid arrangement, we the members have formulated the following Mutual Aid Scheme for this purpose.

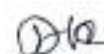
We the Members of MUTUAL – AID SCHEME hereby agree to abide by the terms and conditions mentioned below:

1. Among the Members, whenever an emergency call is received from any calling Member about the occurrence of oil spill within Vadinar Port Limit, the helping member shall immediately send the oil spill control equipment and the response team as per the request received. The call from the calling member is to be made to the Nodal officer or Control Room of the helping Member. The list of oil spill equipment which can be spared and/or used by the Members during such an emergency is annexed to this Mutual Aid Scheme as Annexure No. 1.
2. Subject to the requirement of the calling Member, any additional assistance will be reviewed by helping Member and efforts, as far as possible, will be made to send such necessary additional assistance viz., oil spill equipment, boats/vessels, medical aid, firefighting equipment etc. at the earliest, along with additional man power subject to their availability.

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OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

3. Helping member shall mobilize the committed resources as per this Mutual Aid Scheme within a period of one hour or less for the mobilization at oil spill site.
4. The entire emergency crew coming from outside for rendering their assistance will work under the On Scene Commander ("OSC"). The OSC will be appointed by the calling Member.
5. Members having Oil Spill Control Equipment will maintain them in working condition for any such emergency. The use of equipment will be provided free of charge except for any damage to the equipments during such emergency which will be paid for and/or replaced by the calling Member unless such damage is caused due to the negligence of the helping Member and/or its representative(s). The consumables used (Details mentioned in Annexure – 2) will be charged to the calling Member.
6. Calling Member representatives shall use appropriate safety equipment and safety gear and shall respond with due diligence for mitigation and containment of incident and safety of personnel and equipments including but not limited to the equipment/property of calling Member during the course of the emergency.
During emergency any damage caused to calling Member property/personnel from the helping Member actions, shall not be compensated by helping Member, if such actions were taken in good faith and after proper due diligence.
7. In case of any accident in the course of rendering assistance to the calling Member, the calling Member shall handle such situations according to its own policies. In case of any injury to any representative of the helping Member, the first-aid treatment will be given by calling member free of cost if required by helping Member.
8. Detailed log of movement of vessel's mobilization and uses of equipment/consumables and oil spill related information shall be maintained by all the Members. In case of any modification to the list of equipment/consumables the same shall be intimated to the other Members within seven (7) days of such change.
9. Coordination Meeting & Mock drill will be carried out involving all mutual aid agencies, at least once in a year and will be coordinated by Indian Coast Guard.
10. The Members are free to seek assistance from any of the partner/organization as per their requirement in case of any major exigency.
11. The actual charges for repair of equipment rendered unusable to be paid by the calling member.
12. The charges for damage to equipment rendered unusable and consumables are to be submitted within a period of 30 days and to be settled not later than 3 months from the date of such submission.

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OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

13. The Mutual Aid Scheme is valid for a term of five (5) years from the date of its execution.

List of Annexure:

Annexure – 1: List of Oil Spill Response Equipment maintained by each organization.

Annexure – 2: Detail of Charges of oil spill response consumables & equipment.

Annexure – 3: List of officer's contact detail from each organization.

Signed as token of acceptance of above terms & conditions:

Name : R K GURAV

Sign : [Signature]

Designation : C.O.M.

Organisation : D.P.T.

मुख्य प्रचालन प्रबंधक
दीनदयाल पोर्ट ट्रस्ट
अपतट तेल टर्मिनल
वाडीनार - 361010

Name : Chinmay Ghosh

Sign : [Signature]

Designation : CGM

Organisation : IOCL

चिन्मय घोष
CHINMOY GHOSH
मुख्य महाप्रबंधक
Chief General Manager
इंडियन ऑयल कॉर्पोरेशन लिमिटेड
INDIAN OIL CORPORATION LTD.
एन.ए.सी. बिल्डिंग, बॉम्बे, विड विंग्स इलाहाबाद
NCL, Mumbai - 400001. 022-26026000/022-26026001

Name : Capt Alok Kumar

Sign : [Signature]

Designation : VP & Head VOTL

Organisation : VOTL - Nayara Energy Ltd.



Sign in presence of:

Name : [Signature]

Sign : [Signature]

Designation : Executive Officer

Organization : IOCL Vadinar

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OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE-1
Oil Pollution Inventory Level- as on 23.12.2019 (Consolidated Level and Individual level)

Sr	Description of resources	DPT,Vadinar	Nayara Energy (VOTL)	IOCL,Vadinar	Total of DPT, IOCL & Nayara
1	Inflatable Booms with accessories	2000 mtrs, with 8 power packs	1150 mtrs with 4 power packs	1200 mtrs with 4 power packs	4350 m with 16 power packs
2	Skimmers(20 tph)	4	4	4	12
3	OSD Applicator with Spray arms type along with 02 nozzles systems and 02 hand lancers	6	2	3	11
4	Oil Spill chemical dispersant	10000 liters	10000 liters	11000liters	31000 liters
5	Flex Barge (10 Tons)	4	4	4	12
6	Speed Sweep System	2 nos.	Nil	Nil	2 nos.
7	Sorbent Booms (no)	300	200	100	600
8	Sorbent Pads	2000	7000	1500	10500
9	Mini Vacuum Pumps with capacity of 25m3	5	Nil	1	6
10	Portable Oil Temporary Storage Facility (10m3)	5	Nil	4	9
11	Work Boats (no)	2	2	2	6
12	Tugs (no)	4	1	1	6
13	Man power				
	IMO LEVEL -I	10	33	7	50
	IMO LEVEL -II	4	5	5	14
	OTHER / Equipment handlers	15	15	15	45

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OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE 2

Detail of Charges of oil Spill Response Consumables & Equipment.

A. CONSUMABLE CHARGES :

(Charges will be as per actual rates at the time or to be replenished by the calling organization)

S. No.	Item Description
1.	Oil Spill Dispersant /Bioremediation
2.	Absorbent pads
3.	Absorbent pillows
4.	Absorbent boom
5.	Fuel of Workboats/Tugs consumed during response period

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OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

ANNEXURE - 3

Contact detail of each Member Organization.

1. Deendayal Port Trust, OOT Vadinar

Primary Contact : Mr. R.K.Gurav, Chief Operations Manager
Mobile : +919819999227
Land Line : 02833- 257301
E-mail : com@deendavalport.gov.in

Secondary Contact : Mr. Narendra Nayak, Marine Engineer Gr-I
Mobile : +919979126681
Land Line : 02833-257333
E-mail : megr1.oot@deendavalport.gov.in

Control Room Contact: Signal Station, Vadinar
Mobile : +919825212359

2. Indian Oil Corporation, Vadinar

Primary Contact : Mr. Chinmoy Ghosh, CGM
Mobile : +919437479025
Land Line : 02833-256527
E-mail : ghoshchinmoy@indianoil.in

Secondary Contact : Mr. Anil Meghani, DGM
Mobile : +919212035510
Land Line : 02833-256984
E-mail : anilm@indianoil.in

Control Room Contact: IOCL Control Room

Land Line : 02833-256536
E-mail : controlroomvadinar@indianoil.in

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OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

3. M/s Nayara Energy Limited. (Vadinar Oil Terminal Ltd.)

Primary Contact : Capt. Alok Kumar, Head- VOTL

Mobile : +919909908611

Land Line : 02833-661385

Fax : 02833-661366

E-mail : alok.kumar@nayaraenergy.com

Secondary Contact : Mr. Sachin Shah, JGM & Lead HSEF

Mobile : +919879105470

Land Line : 02833-661376

Fax : 02833-661366

E-mail : sachin.shah@nayaraenergy.com

Control Room Contact: Marine Terminal Control Room (Shift Incharge)

Mobile : +919779868460

Land Line : 02833-661386

Fax : 02833-661366

E-mail : simo@nayaraenergy.com

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OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

Annexure 26

SENSITIVITY MAPPING, RISK ASSESSMENT STUDIES FOR MARINE OIL SPILL FOR JETTIES, CREEKS AND SPMS

The Gulf abounds in marine wealth and is considered as one of the biologically richest marine habitats along the west coast of India. It is endowed with a great diversity of natural ecosystems, of which the major systems are salt pans, intertidal zones, marine algae (seaweeds), sea grass and sand dunes, mangroves, coral reefs, creeks, and Open Ocean. The Risk Assessment Studies for Marine Oil Spill for Jetties and SPMs and sensitive mapping of (Gulf of Kutch) has been carried out by NAYARA Energy Limited, Vadinar through, 60/4, Environ Towers, 4th Floor, Hosur Main Road, Electronic City, Bangalore – 560 100. Recently in February 2024 is placed as an **Annexure -26** as the NAYARA Energy Ltd. Operations are within the area of jurisdiction of Kandla and Vadinar port in Gulf of Kutch. [sensitivity mapping GOK.pdf](#) (to open “ctrl + click”).



OIL SPILL RESPONSE CONTINGENCY PLAN DPA KANDLA AND OOT VADINAR

SUBMISSION

- It is of paramount importance to concentrate on preventing spills.
- Response to spills should seek to minimize the severity of the environmental damage.
- The response should always seek to complement and make use of natural forces to the fullest extent practicable.
- Some damage caused by specific response options may be justified if the response has been chosen for the greatest environmental and socioeconomic benefit overall.
- Offshore and near shore dispersant spraying can in some cases lead to an outcome of least environmental harm.

ANNEXURE C
Final Report of waste management plan

WASTE MANAGEMENT PLAN



A comprehensive Plan for management of Plastic Waste, Solid Waste, C&D Waste, E-waste, Hazardous Waste including Bio-medical Waste and Non-hazardous waste in the Deendayal Port Authority Area

Prepared For:
**Deendayal Port
Authority**

Prepared By:

**Gujarat Environment
Management Institute (GEMI)**

(An Autonomous Institute of Government of Gujarat)

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DISCLAIMER

This report has been prepared by Gujarat Environment Management Institute (GEMI), solely as a part of the assignment "Preparation of Plan for management of Plastic Waste, Solid Waste, C&D Waste, E-waste, Hazardous Waste including Bio-medical Waste and Non-hazardous waste in the Deendayal Port Authority Area". This report is based on the data and information furnished by DPA and GEMI is not responsible for the accuracy and correctness of the same. GEMI has taken all reasonable precautions in the preparation of this report. However, it is impossible to dismiss absolutely, the possibility of errors or omissions. GEMI therefore specifically disclaims any liability resulting from the use or application of the information contained in this report.

About this Document

Name of the Document: Plan for Management of Plastic Waste, Solid Waste, C&D Waste, E-waste, Hazardous Waste including Bio-medical Waste and Non-hazardous waste in the Deendayal Port Authority Area

Name of Client: Deendayal Port Authority

Date of issue: 11/09/2024

Reference no.: GEMI/844(1)/101/2024-25

Version: Final Report

Dedicated Team:

Overall supervision and guidance: Dr. Jaipal Singh, IFS, PCCF & Director
Dr. Nitasha Khatri, Sr. Scientific Officer & Lab Head

Project Head: Mr. Gunjan Gupta, Dy. Environmental Engineer

Project Manager: Ms. Niyati Raval, Asst. Environmental Engineer

Project Assistants: Ms. Honey Panchal, Project Assistant
Mr. Jay Italiya, Project Assistant

PART-1
WASTE MANAGEMENT PLAN

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Chapter-1

Introduction

1.1. About Kandla Port (Deendayal Port Authority, DPA)

Kandla Port, also known as the Deendayal Port is one of the major seaports on the western coast in Kutch District of Gujarat, India. It is located near the city of Gandhidham. It is situated on the west bank of Kandla creek at Latitude 23° 01' N and Longitude 70° 13' E. It is the largest port of India by volume of cargo handled. This port is operational throughout the year as it is an all-weather port. There are no adverse wave effects as it is a sheltered port situated in a creek. The rainfall is scanty in this region making the port most suitable option for handling food grains. It is well connected with the hinterland by broad gauge railway system and National Highway No. 8-A. This port handles dry bulk, break bulk, liquid bulk and container cargo. Kandla is the closest major port to the Middle East and Europe. It is also enroute port for ships calling at Karachi, Pakistan's only major port handling its seaborne cargo. Presently, the Port has total 1-16 dry cargo berths for handling dry cargo, 6 oil jetties, and one barge jetty at Bunder basin, dry bulk terminal at Tuna Tekra, barge jetty at Tuna and two SPMs at Vadinar for handling oil. The off-shore oil terminals at Vadinar, located in the Devbhumi Dwarka district, roughly 300 km away from Kandla by road and 50 nautical miles by sea, is also managed by DPA.

Since its formation in the 1950s, the Deendayal Port caters to the maritime trade requirements of Rajasthan, Madhya Pradesh, Uttar Pradesh, Haryana and Gujarat. Because of its proximity to the Gulf countries, large quantities of crude petroleum are imported through this port. About 35% of the country's total export takes place through the ports of Gujarat in which the Deendayal port has a considerable contribution. Assortments of liquid and dry cargo are being handled at DPA Port. The dry cargo includes fertilizers, iron and steel, food grains, metal products, ores, cement, coal, machinery, sugar, wooden logs, etc. The liquid cargo includes edible oil, crude oil and other petroleum products. The layout plan of DPA port at Kandla is given in Figure 1. and details of its berths and jetties is given Table 1.

Deendayal Port Authority is committed to sustainable development by taking adequate measures to maintain the Environmental well-being of the Port and its surrounding. The Ministry of Shipping started, "Project Green Ports", an effort to making the major ports across India cleaner and greener. "Project Green Ports" will have two verticals - one is "Green Ports Initiatives" related to environmental issues and second is "Swachh Bharat Abhiyaan". As a part of this initiative DPA has appointed GEMI to formulate a detailed Waste Management Plan for environmentally sound management of all types of waste generated at the Port area and other commercial and residential establishments under jurisdiction of DPA.

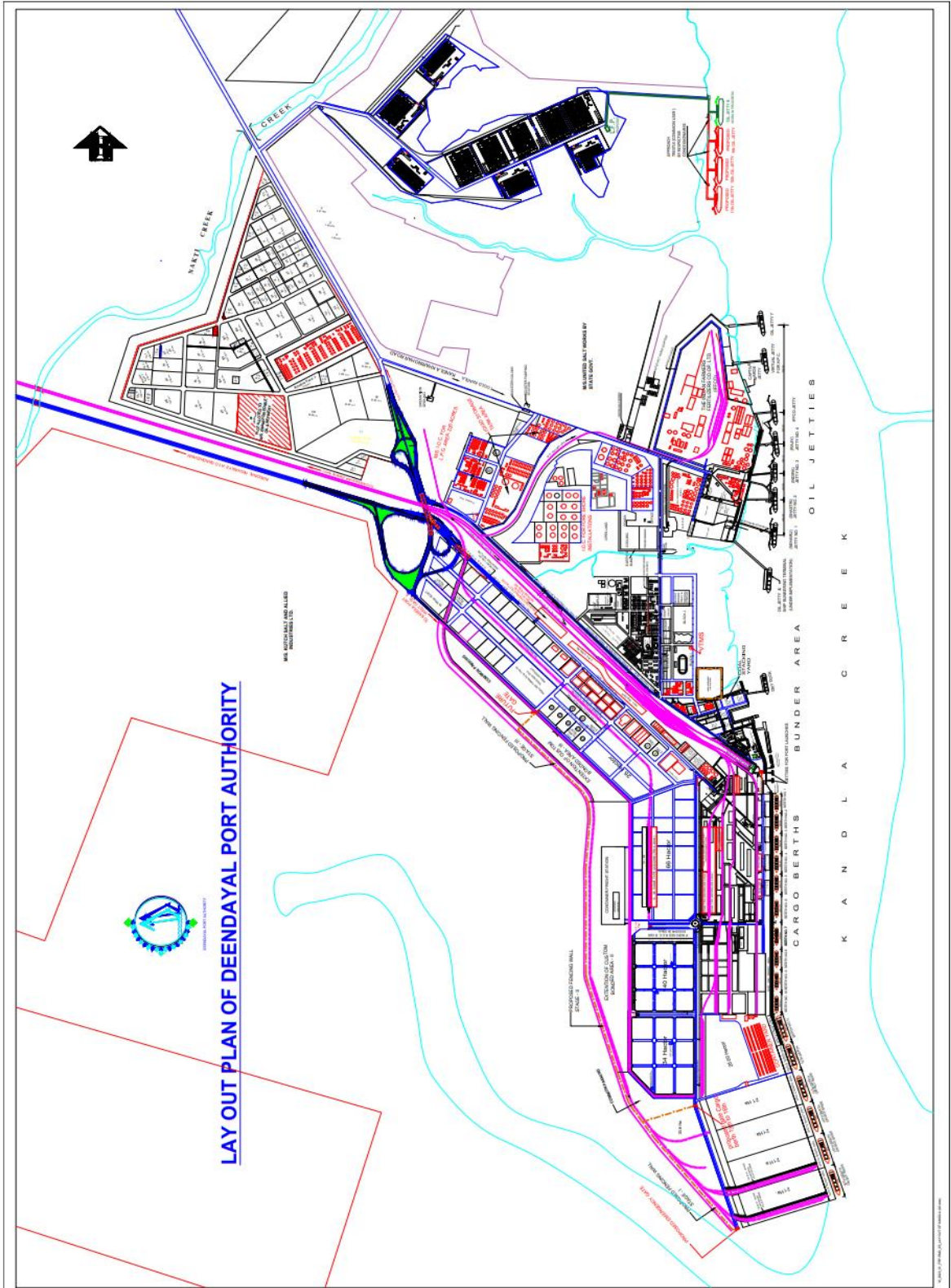


Figure 1: Layout Plan of Deendayal Port Authority (DPA)

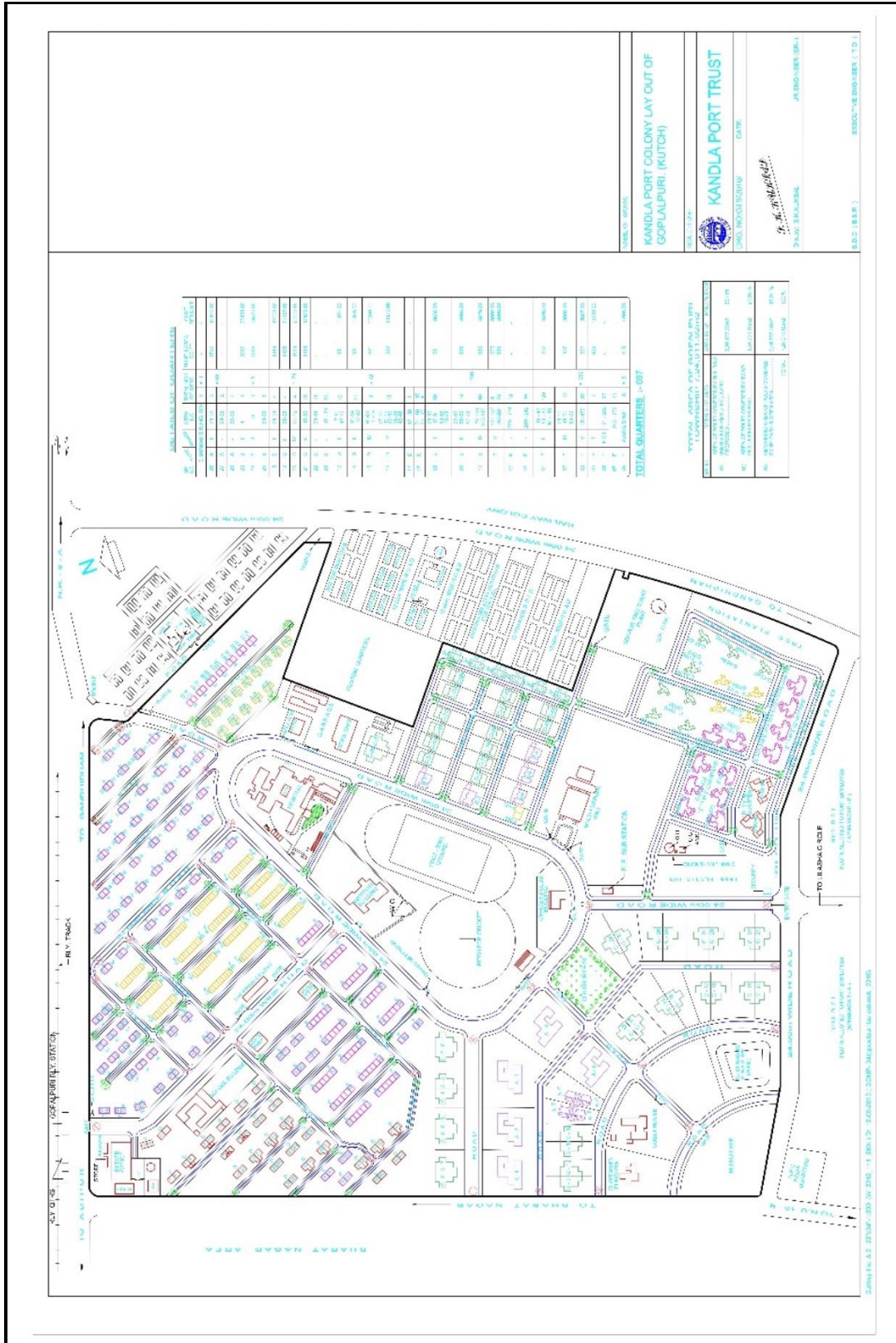


Figure 1a. Layout of Gopalpuri Colony

1.2. Details of berths at Kandla and Vadinar ports

Table 1 Details of Jetties at DPA ports

Sr. No.	Berth	No. of Berths	Name of Berth	Type of Berth	Designed/Vessel Depth (Mts) (Draught)
Kandla port					
1	Cargo Berth	16	Cargo Berth 1 to 10	Mainly Dry Bulk	10.5 to 13.50
2			Cargo Berth No. 11 and 12 (KICT)	Container Berth	13.5 to 14.0
3			Cargo Berth 13 to 16	Mainly Dry bulk/Logs	13.5 to 14.0
4	Tuna Tekra	4	Tuna Tekra (AKBPTL) (BOT) Bulk Terminal	Dry Bulk	15.0 (Front) 13.0 (Back)
5	IIFCO Barge Jetty	1	IIFCO Barge Jetty (BOT)	Fertilizer (Captive)	4
6	Oil Jetties	7	Oil Jetty (OJ1)	LPG and Chemicals	10
7			Oil Jetty (OJ2)	Chemicals	10
8			Oil Jetty (OJ3)	Chemicals	9.8
9			Oil Jetty (OJ4)	Chemicals	10.7
10			IIFCO Jetty (OJ5)	Gas Carrier/ Chemicals	9.5
11			IOC Jetty (OJ6)	Petroleum products	10.1
Vadinar Port (SBMs and POL Product jetties)					
12	S.B.M.	3	1 st and 2 nd SBM: M/s IOCL 3 rd SBM: M/s Essar Oil Ltd.	Crude oil	33 m draft
13	Nayra Jetty 1	1	Nayra Jetty 1	Crude oil	-
14	Nayra Jetty 2	1	Nayra Jetty 2	Crude oil	-

1.3. Need for the Waste Management Plan

Having a comprehensive waste management plan, in place, that incorporates all applicable provisions laid by regional and national legislations for the types of wastes generated within its boundary, enables an organization to manage its wastes (generated within its boundary) in environmentally sound manner, from on-site storage, segregation to its final disposal. It acts as a

standalone document guiding the organization in making policy level decisions regarding its overall waste management. Appropriate implementation of the waste management strategies detailed in the plan also helps in ensuring protection of the marine environment by reducing discharges into the sea of ship generated wastes and cargo residues, to improve the availability and use of reception facilities and strengthen the enforcement regime.

1.4. Objectives of the Waste Management Plan

The objectives of the waste management plan are as below:

For non-shipping waste viz. Municipal Solid Waste (MSW), Plastic Waste (PW), E-waste, Bio-medical Waste (BMW), and Construction & Demolition (C&D) Waste:

1. Understand the current waste management scenario at DPA followed by identification of opportunities for improvement in the same.
2. Document the legal requirements pertaining to different types of wastes.
3. Formulation of action plan for an efficient and robust waste management system.
4. Preparation of a training module for capacity building aimed at effective waste management.

For shipping waste

1. Understand the current waste management scenario at DPA followed by identification of opportunities for improvement in the same.
2. Identification and categorization of wastes produced at Kandla and Vadinar ports w.r.t MARPOL and applicable Indian legislations.
3. Assess the requirement of Port Reception Facility (PRF) for ship-generated waste w.r.t the identified ship wastes.
4. Suggest suitable Waste Management System for environmentally sound waste management based on available case studies and Standard Operating Procedures.

1.5. Scope of Work

1. Identification & categorization of various Wastes, into hazardous & non-hazardous Biodegradable wastes, Solid wastes including C & D Wastes, Biomedical Waste, plastic

waste, E- waste etc. with assessment of quantity & disposal.

2. Separate identification of Ship waste into hazardous, non-hazardous & Biodegradable waste as per the MARPOL 73/78 (as amended) and other conventions of IMO as applicable for Port and Harbour.
3. Preparation of Training Module for Port officers & Employees.
4. Provide comprehensive reception and safe disposal facilities plan with subsequent monitoring plan including provision for engagement external agencies/private operators.
5. List out requirement of obtaining necessary clearance/license from statutory authorities under respective category of waste management rules.
6. Review Procedure with respect to Audits/Inspection reports of licensed contractors.
7. Provide consultation to DPA in implementation of waste management plan during the period of contract.
8. Preparation of detailed waste management plan for all wastes as per the provisions of covered under Environment Protection Act, EPA 2006.

Chapter-2

Municipal Solid Waste

2.1. Applicable laws and rules

Solid Waste Management Rules, 2016 (SWM Rules, 2016)

2.2. Responsibility of DPA as per Rules:

Definition of Bulk waste generator as per SWM Rules, 2016

“Bulk Waste Generator” means and includes buildings occupied by the Central Government Departments or undertakings, State Government Departments or Undertakings, Local Bodies, Public Sector Undertakings or Private Companies, Hospitals, Nursing Homes, Schools, Colleges, Universities, other Educational Institutions, Hostels, Hotels, Commercial Establishments, Markets, Places of Worship, Stadia and Sports Complexes etc. having an average waste generation rate exceeding 100 kg per day (of all waste streams put together).

Rule 4 of Solid Waste Management Rules, 2016 - Duties of waste generator

- Segregate and store the waste generated in three separate streams namely bio-degradable, non-biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorized waste pickers or waste collectors as per the direction or notification by the local authorities from time to time.
- Wrap securely the used sanitary waste like diapers, sanitary pads etc., in the pouches provided by the manufacturers or brand owners of these products or in a suitable wrapping material as instructed by the local authorities and shall place the same in the bin meant for dry waste or non- bio-degradable waste.
- Store separately construction and demolition waste, as and when generated, in his own premises and shall dispose of as per the Construction and Demolition Waste Management Rules, 2016.
- store horticulture waste and garden waste generated from his premises separately in his own premises and dispose of as per the directions of the local body from time to time.
- No waste generator shall throw, burn or burry the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.
- All waste generators shall pay such user fee for solid waste management, as specified in the bye-laws of the local bodies.
- No person shall organize an event or gathering of more than one hundred persons at any unlicensed place without intimating the local body, at least three working days in advance

and such person or the organizer of such event shall ensure segregation of waste at source and handing over of segregated waste to waste collector.

- The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

2.3. Handling and Management of Waste

2.3.1. Identification of sources, Quantification and Inventory of waste

Based on the population data provided by DPA for its residential, port and slum establishments at Gandhidham, Kandla and Vadinar, MSW is quantified as per provisions stated in Central Public Health and Environmental Engineering Organization (CPHEEO) Manual.

As per CPHEEO Manual guidelines:

- For residential zones MSW generation rate is 0.3 kg per capita per day.
- For commercial zones MSW generation rate is 0.2 kg per capita per day.
- For Floating population MSW generation rate is 0.2 kg per capita per day.

Note: Factor of commercial zone assumed for port area

The factor of 0.125 kg/per capita/per day as outlined in the research paper titled "Solid Waste Disposal Practices in an Urban Slum Area of South India", is assumed for calculation of MSW by slum population at DPA.

The projection of MSW in next 5 and 10 years is calculated based on the assessment finding reported in CPHEEO manual that states that per capita waste generation increases by about 1.3% per year.

The estimated quantity of Solid waste generation for the area is given in Table 2 below.

Table 2 MSW generation at DPA establishment

Sr. No.	Locality	Population (nos.)	Quantity of waste in kg/day		
			Current	Projected after 5 Years	Projected after 10 Years
For Gandhidham and Kandla					
Residential					
1.	Gopalpuri colony	5000	1500	1600	1700

2.	Port colony (Occupied HH + Barracks)	744**	223.2	238.08	252.96
3.	Slum	500*	100	108	115
Commercial					
1.	A.O. office	1577	315.4	331.17	362.71
2.	Port (employees + workers)	505	101	106.05	116.15
3.	Floating	100*	20	21.6	23
Total for Gandhidham and Kandla		-	2259.6	2404.9	2569.82
For Vadinar					
1.	Residential	600	180	190	207
2.	Commercial	50	10	10.5	11.5
3.	Floating	100*	20	21.6	23
Total for Vadinar		-	210	226.8	241.5

**Assumed values; ** calculated based on no. of HH / rooms by applying factor adopted from Ministry of Statistics and Program Implementation, GoI¹*

2.3.2. Segregation

Current scenario: At present, MSW generated at various DPA establishments at Kandla as well as Vadinar like residential colony, administrative offices, Port offices, slum areas etc., is not segregated into wet or dry waste. Dustbins have been provided at various DPA campuses however there is need for providing different colored bins for collection of wet and dry waste to promote waste segregation at source.



Figure 2: Dustbins provided in DPA office premises, Gandhidham



Figure 3: Concrete bins at Gopalpuri colony campus, Gandhidham

¹ Ministry of Statistics and Program Implementation (<https://shorturl.at/8F40z>)

2.3.3. Collection

Current scenario: Door to Door collection of waste is practiced at Gandhidham, Kandla and Vadinar DPA establishments on daily basis. Private agencies have been contracted for collection, transportation and disposal of MSW at these locations. The agencies contracted for this purpose at various locations are given in Table 3.

Table 3 Waste Management Agency appointed at DPA ports

DPA establishments	Waste Management Agency
Gopalpuri and KDLB Colony	M/s Patel Construction Co.
New Port Colony, New Kandla	M/s Acer Infra Trade
Vadinar	M/s. Jay Chamunda Enterprise



Figure 4: Door-to-door waste collection

2.3.4. Storage (on-site and centralized)

Door to Door collection is practiced on daily basis at Gandhidham, Kandla and Vadinar hence there is no requirement of designated onsite storage area for MSW. The collected MSW from each household and offices is directly transferred into the bin loaded on the vehicle.

2.3.5. Intramural transportation and transfer

Depending on requirement, trip length and vehicle capacity, intramural transportation and

transfer of waste is carried out by the agency.

2.3.6. Pre-treatment / Pre-processing

No pre-treatment or processing is carried out at present

2.3.7. Disposal

- At Gandhidham, MSW is disposed at a designated site allotted by Gandhidham Municipality.
- At Vadinar, there is a provision of dumpsite behind port colony for dumping of MSW. Here, 12-13 ft. deep trenches are dug into which the MSW is dumped. Once the trench is completely filled, it is systematically covered with layer of top soil.

2.4. Record keeping

There is no statutory requirement of record keeping for MSW, however it is a good practice to maintain the records of MSW generated at various locations and collect the waste receipts for the quantum of waste collected. At DPA establishments record keeping is maintained in terms of no. of trips (for MSW collection) by waste collecting agency.

2.5. Procedure adopted for engagement of external agencies/private operators

The selection of agency is through tendering procedure. The work is a comprehensive maintenance contract for all sanitation works which includes collection, transportation and disposal of MSW, street sweeping etc. The work is awarded to the bidder who meets the minimum eligibility criteria and who has submitted the lowest bid. The contract is usually for a period of 2 years.

2.6. Obtaining Authorization/Clearance/License

DPA is not required to obtain any Authorization/Clearance/License for MSW

2.7. Strategy for management of MSW at DPA

Management of MSW can be broadly categorized into the following steps:

- a) Segregation at source
- b) Collection
- c) Transportation
- d) Sorting and Processing
- e) Recycling (of recyclable items)

f) Disposal

In the subsequent section, detailed plan for segregation, sorting and processing has been provided. Collection and transportation is already carried out by a dedicated agency.

2.7.1. Segregation at source:

Estimation of no. of bins:

2 different colored bins, Green for wet waste and Blue for dry wastes etc. shall be made available to all households and offices, and awareness be made, encouraging segregating of wastes into designated bins. The provision for collection of waste generated from floating population has been covered under provision of bins made for administrative offices for Gandhidham, Kandla and Vadinar locations, as the bins calculated to be put up on sides of roads inside the colony will suffice, receiving the waste quantum from incoming-outgoing floating population of residential colonies. The bins that are two to be placed along internal roads, DPA may choose to install any of the following type of bins:

- a) Conventional bins of 50L capacity OR
- b) Smart underground bins of 100L capacity with sensors that sends alert when bins are almost full



Figure 7: Wet and Dry waste collection bins

a) For Kandla and Gandhidham

The current quantum of MSW generation estimated at Gopalpuri is 1.5 tons/day. The calculation

of bins to be provided for MSW collection is done for the projected increase after 10 years i.e 1.7 tons/day. Similarly, for Administrative Office the current MSW generation is 0.35 tons/day and projected quantity after 10 years is 0.4 tons/day. For calculation of no. of bins 0.4 tons/day quantum is considered.

Gopalpuri colony, Gandhidham

- a. Waste Quantity (W) =1.7 tons/day
- b. As per CPHEEO manual bulk density (D) of MSW is 0.5 tons/m³
- c. Total Volume of Waste = $W \div D = 1.7 \div 0.5 = 3.4 \text{ m}^3/\text{day}$

To accommodate 3.4 m³/day of generated MSW total of 340 bins would be required. However, since there are approx. 1100 households, 2200 bins are recommended (2 bins, for wet and dry waste at each HH).

The approximate length of internal major roads inside the Gopalpuri colony calculated through GIS tool is 6132 m. (Approx 6 kms.). Adopting the provision of providing 1 set of 2 bins (for wet and dry waste) at a distance of 75 m along the length of roads², 82 bins are proposed to be provided along the length of all major internal roads of Gopalpuri.

Port colony, Kandla

Waste Quantity – W=0.25 tons/day

- As per CPHEEO manual bulk density(D) of Municipal solid waste is 0.5 ton/m³

- Total Waste Quantity is Volume = $W \div D = 0.25 \div 0.5 = 0.5 \text{ m}^3/\text{day}$

Assuming 0.01 m³ bins on 25 Location (50 Bins), so total waste collected will be $50 \times 0.01 = 0.5 \text{ m}^3$. So, total waste collected will be around $0.5 \times 0.5 = 0.25 \text{ tons/day}$. Waste collection can be increased if more waste deposited in bins.

The approximate length of internal roads inside the port colony, Kandla is 2148 m. (Approx 2.1 kms.). 58 set of 2 bins (for wet and dry waste) at 29 locations at a distance of 75m are proposed to be provided on all major internal roads.

Administrative Office, Gandhidham

Waste Quantity – W=0.36 tons/day

² Optimal Location and Proximity Distance of Municipal Solid Waste Collection Bin Using GIS: a Case Study of Coimbatore City (<https://shorturl.at/FPDF4>)

- As per CPHEEO manual bulk density(D) of Municipal solid waste is 0.5 ton/m^3

- Total Waste Quantity is Volume = $W \div D = 0.36 \div 0.5 = 0.72 \text{ m}^3/\text{day}$

Assuming 0.01 m^3 bins at 40 office rooms (80 Bins), so total waste collected will be $80 \times 0.01 = 0.8 \text{ m}^3$. So, total waste collected will be around $0.8 \times 0.5 = 0.4 \text{ tons/day}$, sufficing the waste generation of $0.72 \text{ m}^3/\text{day}$.

The approximate length of internal roads inside the AO office at Kandla is 522.4 m. (Approx 0.5 kms.). 07 set of 2 bins (for wet and dry waste) are proposed to be provided on all major internal roads.

Port office (employees + workers), Kandla

Waste Quantity – $W=0.12 \text{ tons/day}$

- As per CPHEEO manual bulk density(D) of Municipal solid waste is 0.5 ton/m^3

- Total Waste Quantity is Volume = $W \div D = 0.12 \div 0.5 = 0.24 \text{ m}^3/\text{day}$

Assuming 0.01 m^3 bins on 12 Location (24 Bins), so total waste collected will be $24 \times 0.01 = 0.24 \text{ m}^3$. So, total waste collected will be around $0.24 \times 0.5 = 0.12 \text{ tons/day}$. Waste collection can be increased if more waste deposited in bins.

The approximate length of internal roads inside the port office, Kandla is 380 m. (Approx 0.3 kms.). 10 set of 2 bins (for wet and dry waste) at 5 locations at a distance of 75m are proposed to be provided on all major internal roads.

Unorganized slum area, Kandla

As per Solid Waste Management Rules, 2016, it is the responsibility of DPA to arrange for door-to-door collection of segregated MSW from all its establishments including slums and informal settlements. 200 bins are proposed to be distributed at these places. In addition, 50 nos. of hand carts are proposed.



Figure 8: Handcart for collection of MSW from slum areas

b) For Vadinar

The current quantum of MSW generation reported at Vadinar port colony is 0.19 tons/day. The calculation of bins to be provided for MSW collection is done for the projected increase in MSW generation after 10 years i.e 0.2 tons/day. Similarly, for administrative office at Vadinar the current MSW generation is 0.02 tons/day and projected quantity after 10 years is 0.023 tons/day. For calculation purpose 0.023 tons/day quantum is considered.

Residential colony

d. Waste Quantity (W)= 0.2 tons/day

e. As per CPHEEO manual bulk density (D) of MSW is 0.5 ton/m³

f. Total Volume of Waste to be handled = $W \div D = 0.2 \div 0.5 = 0.42 \text{ m}^3/\text{day}$

Since there are around 150 households in the colony, 300 bins would be required.

The approximate length of internal major roads inside the port colony at Vadinar, calculated through GIS is 3687.2 m. (Approx 4 kms.). 50 set of bins (for wet and dry waste) are proposed to be provided on all major internal roads of Gopalpuri.

Administrative Office

g. Waste Quantity (W) = 0.023 tons/day

h. As per CPHEEO manual bulk density (D) of MSW is 0.5 ton/m³

i. Waste Volume = $W \div D = 0.023 \div 0.5 = 0.046 \text{ m}^3/\text{day}$

A provision of total 50 bins has been estimated.

The approximate length of internal roads inside the AO office at Vadinar is 856 m. 12 set of 2 bins (for wet and dry waste) are proposed to be provided internal roads of the office.

Summary of total no. of bins required is given in Table 4.

Table 4 Summary of total no. of bins required

DPA establishments generating MSW	No. of bins to be provided	Capacity of bin	Identified locations for bins	Remarks (If any)
Gandhidham and Kandla				
Residential				
Gopalpuri colony, Gandhidham	2200	10L (0.01m ³)	1100 HH in the colony	2 bins at each HH: 1 Green (wet waste) and 1 Blue (dry waste)
	82	50 or 100 L	6 km long Internal roads and parks of the colony	bin to be provided at a distance of 75m
Port colony, Kandla	840	10L (0.01m ³)	120 (currently occupied) HH and 300 barracks	2 bins at each HH and barrack: 1 Green (wet waste) and 1 Blue (dry waste)
	58	50 or 100 L	2.1 km long Internal roads and parks of the colony	1 bin to be provided at a distance of 75m
Commercial				
Administrative office, Gandhidham	80	10L (0.01m ³)	2 bins in each office rooms	--
	07	50 or 100 L	On 0.5 km long internal roads inside AO premises	1 bin to be provided at a distance of 75m
Port office, Kandla (Marine + Nirman bhavan)	24	10L (0.01m ³)	2 bins in each office rooms	--
	10	50 or 100 L	On 0.4 km long internal roads inside AO premises	1 bin to be provided at a distance of 75m
Slum				
Unorganized slum, Kandla	50 Handcarts	--	--	--
	200	10L (0.01m ³)	Around 100 HH	2 bins at each HH: 1 Green and 1 Blue
Vadinar				

Port colony	300	10L (0.01m ³)	21 HH in the colony	2 bins at each HH: 1 Green and 1 Blue
	50	50 or 100 L	3.6 km long Internal roads and parks of the colony	1 bin to be provided at a distance of 75m
Administrative office, Vadinar	50	10L (0.01m ³)	2 bins in each office rooms	--
	12	50 or 100 L	On 1 km long internal roads inside AO premises	1 bin to be provided at a distance of 75m
<p>Grand Total: 10 L bins: 3344 nos. for Gandhidham and Kandla and 350 nos. for Vadinar Handcarts: 50 nos. for unorganized slum at Kandla port 50 or 100 L bins: 157 nos. for Gandhidham and Kandla and 62 nos. for Vadinar</p>				

HH- Households in the colony



Figure 9: Indicative sizes of 50L and 10L green and blue bins



Salient features of smart underground roadside bins:

- Fitted inside a concrete bunker below the ground
- Sensor-fitted to send alert when bins are 75-90% full
- Waterproof- these units have rubber fittings to make them waterproof
- Bins are established a few inches above the ground level to ensure that there is no flooding of the bins during the rainy season

Figure 9a: Smart underground roadside bins

2.7.2. Door-to-Door collection:

DPA has outsourced door-to-door collection of wastes from residencies and offices by appointing an agency on annual renewal basis. As per current scenario, the agency dumps the MSW collected from door-to-door to a designated site allotted by Gandhidham Municipality without processing. This gap could be addressed by introducing an on-site Material Recovery Facility (MRF), enabling proper segregation of MSW into Organic and Inorganic sections. Thereby the MSW collected from every household and office will get diverted to the MRF.

The characterization of MSW is an important aspect as the composition will determine the applicability of waste processing technology. On an average, garbage is composed of 40-45% of organic fraction and 20-30% inert fraction, rest being plastics, paper, rags and other components.

NEERI's study "Assessment of Status of Municipal Solid Wastes Management in Metro Cities and State Capitals" in 2004-2005 assessed 59 cities (35 metro cities and 24 state capitals). Studies have revealed that waste generation rate varies from 0.12 to 0.60 kg/capita/day. Analysis of physical composition indicates that total compostable matter in the waste is 40%-60%, while recyclable fraction is 10%-25%. The moisture content in the MSW is 30%-60%, while the C/N

ratio is 20–40. Typical Fractions of Municipal Solid Waste Generated in DPA is given in Table 5

Table 5 Typical fractions of Municipal Solid Waste Generated in DPA

Sr. No.	Type of Waste	Quantity of Waste Generated (kg/day)					
		Gandhidham		Kandla		Vadinar	
		R	C	R	C	R	C
1.	Biodegradables	711	149.49	105.79	11.85	85.32	4.74
2.	Paper	121.5	25.54	18.08	2.025	14.58	0.81
3.	Plastic	138	29.01	20.53	2.3	16.56	0.92
4.	Metal	7.5	1.57	1.11	0.13	0.9	0.05
5.	Glass	15	3.15	2.23	0.25	1.8	0.1
6.	Rags	66	13.87	9.82	1.1	7.92	0.44
7.	Other	60	12.61	8.92	1	7.2	0.4
8.	Inerts	376.5	79.16	56.02	6.27	45.18	2.51
Total		1500	315.4	223.2	25	180	10
Total Waste Generation		1840.4		248.2		190	

R- Residential; C- Commercial

The calorific value of garbage will help to identify the treatment technologies like Waste-to-Energy and other thermal processes. For secondary segregation MRF is proposed as follows for DPA establishments at Gandhidham.

2.7.2.1 Staff requirement for MSW collection

Manpower requirement for various premises as per provisions given under CPHEEO Manual and Swachh Bharat Mission's Standard Operating Procedures (SOPs) is tabulated below:

Table 6: Staff requirement-MSW collection

Area	No. of cleaning staff to be deployed (Illustrative)		Remarks
MSW collection	Gopalpuri colony, Gandhidham (2 LCVs)	2 drivers and 4 laborers	Manpower is calculated based on recommended nos. of LCVs (Light Commercial Vehicle) of 500-700 kg capacity, for waste collection, as per provisions of CPHEEO Manual for collection of MSW.
	Port colony, Kandla (1 LCV)	1 driver and 2 laborers	
	AO office, Gandhidham (1 LCV)	1 driver and 2 laborers	
	Port admin offices, Kandla (1 LCV)	1 driver and 2 laborers	

	Entire Vadinar premises (1 LCV)	1 driver and 2 laborers	
Street sweeping	Gopalpuri colony, Gandhidham	12 sweepers	Calculation based on the street sweeping norms for medium density roads i.e., 1 person per 500 running meters of road length, as per provisions of CPHEEO Manual for collection of MSW.
	Port colony, Kandla	04 sweepers	
	AO office, Gandhidham	01 sweepers	
	Port admin offices	01 sweepers	
	Residential premises, Vadinar	07 sweepers	
	Commercial premises, Vadinar	02 sweepers	
Office/hospital corridors	Typically, 1 staff per floor for 1-2 corridors		As per manpower provision made under SOPs for Swachh Resident Welfare Associations and Offices.
Common toilets	Typically, 1 staff per toilet block		
Gardens and parks	Appropriate number as may be needed		
Common utilities like Parking, Gym, Library, Clubs, open spaces etc.			
Additionally, dedicated supervisors should be engaged depending on number of cleaning staff, and number of physically disparate locations (e.g. 1 supervisor per wing/floor).			

Note: No. of LCVs proposed could be optimized considering the scenario where a single LCV makes multiple trips for waste collection instead of multiple LCVs or as per DPA's discretion.

Staff requirement should be assessed on annual basis by the Waste Management Cell taking into account following particulars for each DPA establishments:

- Area of the building (Offices, Residential, Recreational etc.)
- Number of rooms
- Area of the open/common spaces like garden, parking etc.
- Number of common toilet blocks
- Number of canteen spaces

2.7.3. Material Recovery Facility (MRF)

A Material Recovery Facility (MRF) is an infrastructure to receive, sort, process and store recyclable/non-recyclables/ RDF and inert materials, with the aim to maximize the quantity of recyclables processed, while producing materials that will generate the highest possible revenues in the market and maximize the reuse of other segregated fraction in different processes/ industries. Schematic of a typical MRF facility is given below:

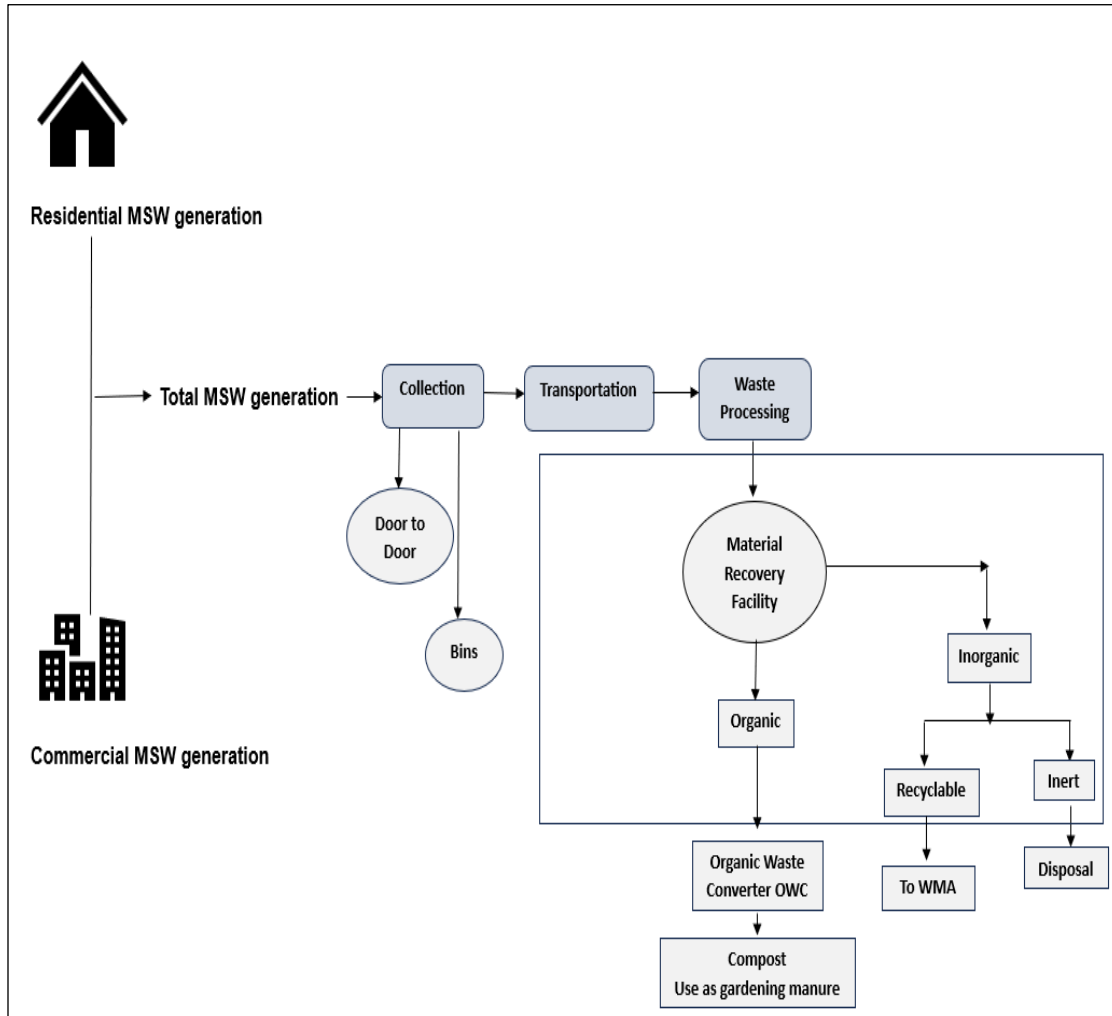


Figure 10: A schematic of proposed MRF for Kandla, Gandhidham

DPA in collaboration with Gandhidham Municipality has proposed to install solid waste processing facility for managing waste of Gandhidham town and DPA premises. There is a provision for a material recovery facility (MRF) to ensure maximum utilization of reusable portion of MSW and minimum waste to be landfilled. The specifications of proposed MRF for Gandhidham are as below:

Table 7 MRF specifications for Gandhidham

MRF Component	Indicative value
Design Capacity	100 tons/day
Infrastructure requirement	Composting shed MRF center Livelihood center
Total area requirement	6 acres

2.7.4. Organic Waste Converter (OWC)

About 40-60% of MSW is comprised of compostable materials. Assuming 50% quantum of MSW to be biodegradable, the calculated biodegradable content in MSW generated from Gopalpuri colony and AO office are 600 kg/day and 200 kg/day respectively. Similarly, for Vadinar, the biodegradable component in MSW is 90kg/day and 10 kg/day for colony and AO office respectively. The nos. and specifications of OWC proposed for DPA establishments at Gandhidham, Kandla and Vadinar are as below:

The following process flow diagram illustrates how organic waste is converted into compost within 30 to 45 days.

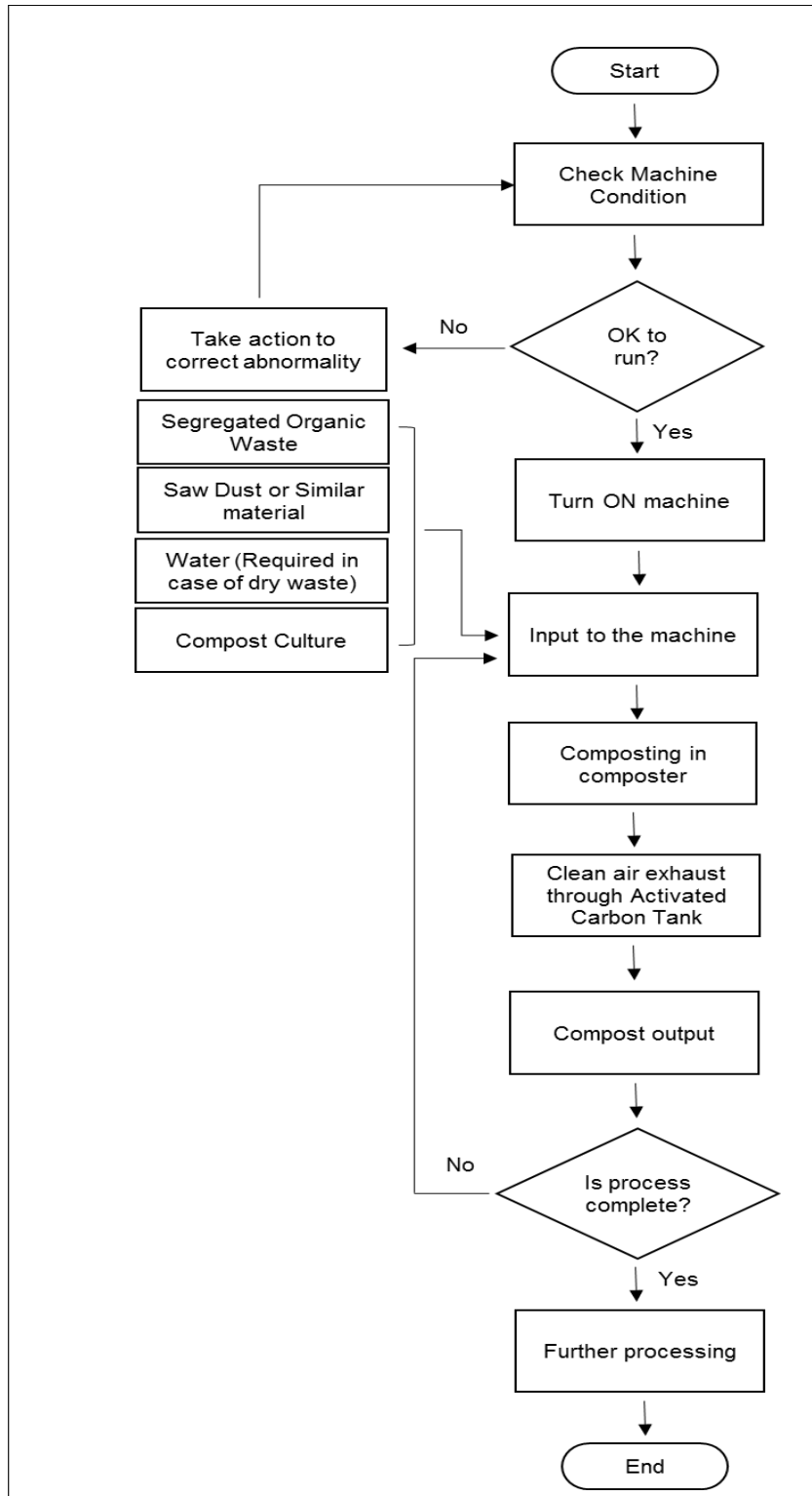


Figure 16: Process flow of Organic Waste Converter

The image of a typical OWC is shown in Figure 17



Figure 17: Typical Organic Waste Converter

A non-exhaustive list of OWC dealers have been provided at Annexure I. The specifications of the OWC proposed for DPA is given in Table 8.

Table 8 Specifications of OWC proposed for DPA

Sr. No.	Location	Design capacity kg/day	Nos. of OWC proposed	Approx. Space requirement for 1 OWC (m x m X m)	Energy Requirement for 1 OWC Units/day
1	Gopalpuri colony	800	1	3.4×2.3×2.4	57-65
		OR			
		200	4	1.98×1.16×1.68	16-18
2	Kandla AO	200	1	1.98×1.16×1.68	16-18
3	Vadinar colony and AO premises	100	1	5×3×3.5	13-15

2.8. Financial outlay for proposed MSW management

The estimated financial outlay for the proposed provision of MSW management has been given in Table 9. This outlay consists of only capital and recurring cost of items/equipment and does not include manpower and other costs.

Table 9 Financial outlay for proposed MSW management

Sr. no.	Particulars of proposed provisions for management of MSW	Cost per unit in ₹	Capital cost in ₹	Recurring cost per year in ₹
For Kandla and Gandhidham				
1	Waste collection bins HH 10 L capacity	100/-	3,34,400/- (for 3344 bins)	1,00,000/- (considering replacement of around 1000 bins/year due to wear and tear)
2	Waste collection bins (roadside) 50 L capacity 100 L capacity (smart bins)	600/- 15000/-	94200/- (50L) 23,55,000/- (100L) (for 157 bins)	30,000/- (considering replacement of around 50 bins/year due to wear and tear)
3	MRF facility	--	1,50,00,000/-	*
4	OWC units of 800 kg/day for Residential	14,50,000/-	14,50,000/-	145,000/-
5	OWC units of 200 kg/day for Commercial	6,00,000/-	6,00,000/-	60,000/-
6	Handcarts for slum area	8000/-	4,00,000/- (for 50 handcarts)	40,000/- (considering replacement of around 5 handcarts/year due

				to wear and tear)
7	Door-to-door waste collection	As per contract		
Total			1,77,16,800/- + unaccounted cost*	20,75,000/- + unaccounted cost*
For Vadinar				
8	Waste collection bins of 10 L capacity	100/-	35000/- (for 350 bins)	5,000/- (considering replacement of around 50 bins/year due to wear and tear)
9	Waste collection bins of 50 L capacity	600/-	37,200/- (for 62 bins)	3000/- (considering replacement of around 05 bins/year due to wear and tear)
10	OWC units of 100 kg/day	3,50,000/-	3,50,000/-	35,000/-
11	Door-to-door waste collection	As per contract		
Total			4,22,200/- + unaccounted cost*	43,000/- + unaccounted cost*
Grand Total (for Gandhidham, Kandla and Vadinar)			1,81,39,000/- + unaccounted cost*	21,18,000/- + unaccounted cost*

*Note: The costs of proposed units have been adopted based on current market price; *unaccounted costs include costs of tendering; costing of roadside smart bins and recurring cost pertaining to MRF.*

2.9. Other recommendations:

The Integrated Solid Waste Management (ISWM) hierarchy states 5 approaches for managing wastes.

- Tier 1: Source reduction or waste prevention, which includes reuse, considered the best approach
- Tier 2: Recycling
- Tier 3: Composting of organic matter of waste.
- Tier 4: Energy recovery- the components of waste that cannot be prevented or recycled can be processed for recovering energy
- Tier 5 is disposal of waste in sanitary landfill, which is the least preferred option.

For DPA, Tier 1, 2, 3 and 4 approaches are proposed for management of MSW

Tier 1 & 2: Practicing minimalistic lifestyle by avoiding purchase and use of unnecessary goods/things used in daily lives. Ensuring the usage of goods used in day to day lives for its full

designed period or till end of life thereby avoiding accumulation that ultimately results into MSW

Tier 3: Composting of organic waste produces a good manure that can find utility in gardens, recreational parks and kitchen gardening. Proper segregation of MSW in to wet biodegradable and Dry non-biodegradable waste is key to achieve this. To ensure segregation at source, provision shall be made to provide two separate bins at all households in the colonies and other places for discarding of wet and dry wastes thus enabling waste segregation at the source of generation itself.

- Ensure active participation of the community in reducing overall quantities of waste. The different waste reduction strategies, such as take-back, deposit-refund system, etc. should be promoted.
- Promote source reduction programs in the community and encourage handover of recyclable material to sustainable recycling facilities through informal sector, NGOs, etc.
- Campaign for reducing the use of specific non-recyclable, non-reusable, or toxic material. Practice and promote material substitution where possible.
- Generate awareness among people to avoid littering.
- Sensitize citizens to segregate waste at their premises into biodegradable, dry, and special waste and hand over the segregated waste to the collectors.
- Ensure awareness on existing recyclable collection systems, including dedicated collection points. Enforce extended producer responsibility (EPR) initiatives.
- Management shall hold regular meetings among the MSWM staff and other stakeholders to ensure successful uptake of such programs.
- Ensure active participation of the community for successful implementation of primary and secondary collection systems.
- Generate awareness on bye-laws on waste collection and management system as well as user charges levied on different waste fractions.
- The consumer shall wrap the sanitary waste using self-wrapping straps or keep the sanitary waste in leak-proof pouches provided by producer and dispose the same along with dry waste or keep the waste in separate bin provided at the time of door-to-door collection. In case separate bin is not provided by authorized waste picker, the wrapped/pouched sanitary waste should be placed in dry-waste bin for collection by authorized waste picker.

Chapter-3

PLASTIC WASTE

3.1. Applicable laws and rules

Plastic Waste Management Rules, 2016 and subsequent amendments in 2018, 2021, 2022 and 2023.

3.2. Responsibility of DPA as per PWM Rules

Rule 8 of Plastic Waste Management Rules, 2016

Responsibility of waste generator

- Take steps to minimize generation of plastic waste and segregate plastic waste at source in accordance with the Solid Waste Management Rules, 2000 or as amended from time to time.
- Not litter the plastic waste and ensure segregated storage of waste at source and handover segregated waste to urban local body or gram panchayat or agencies appointed by them or registered waste pickers', registered recyclers or waste collection agencies.
- All institutional generators of plastic waste, shall segregate and store the waste generated by them in accordance with the Municipal Solid Waste (Management and Handling) Rules, 2000 notified vide S.O 908(E) dated the 25th September, 2000 under the Act or amendments and handover segregated wastes to authorized waste processing or disposal facilities.
- All waste generators shall pay such user fee or charge as may be specified in the bye-laws of the local bodies for plastic waste management such as waste collection or operation of the facility thereof, etc.

3.3. Current Scenario - Handling and Management of Waste

3.3.1. Identification and Quantification

At all premises of DPA, plastic waste is not segregated from municipal solid waste. Therefore, for estimation of plastic waste quantum, Central Public Health and Environmental Engineering Organization (CPHEEO) manual has been referred. It states that Plastic waste forms approximately 6.92% of the total MSW. Applying this factor to the quantity of MSW generated at the respective locations, estimated PW generation at Gandhidham, Kandla and Vadinar is calculated as below:

Table 10: Estimated quantum of Plastic waste generation for DPA establishments

Location	Waste Quantum in kg/day			
	Current MSW	Estimated Plastic waste (current)	Estimated Plastic waste (after 5 yrs)	Estimated Plastic waste (after 10 yrs)

Gandhidham and Kandla (Colony + AO + Port + Slum)	2259.6	156.36	166.41	177.83
Vadinar (Colony + AO + Port)	210	14.53	15.69	16.71

3.3.2. Sources of waste

Plastics have become an integral part of human day to day life. All type of establishments, residential, commercial, institutional, health care etc. generate plastic waste in varying quantities. At Gandhidham, Kandla and Vadinar, plastic waste is generated from residential areas (residential colonies), Administrative offices, Port area (including ships and vessels) and slum areas.

3.3.3. Segregation

Segregation of waste at source and its timely collection ensures proper utilization and cleanliness of the area. However, to ensure source segregation, proper awareness activities, and strict compliance system is necessary. Presently the segregation of plastic waste at source is not practiced at locations i.e Gandhidham, Kandla and Vadinar. On-site segregation could be encouraged by:

- Providing different colored bins in households/offices: It is recommended that different bins for wet and dry waste be provided at all sources of waste generation.
- Create awareness on benefits and procedure of segregation.
- Regular monitoring of percentage of segregation in each DPA premises.
- Since source segregation of plastic waste is difficult, an alternative is manual / mechanized segregation at centralized storage area or material recovery facility once door to door collection of waste is done.

3.3.4. Recycling / Processing and Disposal

Recycling of plastic is not practiced at present.

3.4. Record keeping

The PWM Rules do not mandate any record keeping requirement for plastic waste generators, however it is a good practice to regularly collect receipts and maintain records of quantum of PW collected by the registered Waste Management Agency.

3.5. Procedure adopted for engagement of external agencies/private operators

Currently DPA has not engaged any plastic waste management agency for environmentally sound management of the plastic waste generated in its premises. It is imperative for DPA to engage such agency registered with GPCB to ensure sound management of plastic waste. The criteria suggested for appointing a waste management agency is it should be holding a valid authorization from GPCB during the tenure of tie-up with DPA. A non-exhaustive list of Plastic Waste Collection and Recycling Agencies has been provided in Annexure III.

3.6. Obtaining Authorization/Clearance/License

The provisions under PWM Rules do not mandate PW generator to obtain any Authorization, Clearance or License.

3.7. Recommendations and strategies

- Avoid use of single use polyethylene (SUP) packaged bottles and other single use cutlery items at events, meetings, seminars etc. Reusable bottles and cutlery shall be encouraged. It is recommended to issue an office order in this regard to ensure compliance.
- Avoid any kind of packaging products made of SUPs.
- Display posters across various locations to avoid and minimize plastic usage especially SUPs.
- DPA shall tie up with GPCB recognized plastic waste collection and processing agency for recycling of its plastic waste.

3 Rs – Refuse, Reduce and Reuse shall be practiced for plastic waste minimization. It is responsibility of individuals in colonies and offices of DPA to limit the use of plastics in day to day lives by encouraging attitudes like carrying a cloth bag to markets, making use of stainless steel/earthen water bottles, making use of recyclable goods used in day to day lives etc. General Do's and Don'ts regarding plastic usage is as below:

Table 11 Do's and Don'ts regarding plastic usage

S. No.	Do's	Don'ts
1	Permit only use of plastic carry bags/ sheet/ or other with size >50µm	Use of <50 µm plastic carry bags/sheets
2	Practice use of Virgin plastic carry bags for storing/ packaging/ food stuffs.	Use of colored & recycled for storing/ packaging/ food stuffs.
3	Promote recycling of plastics 2-3 times before disposing it to landfill	Littering and unorganized dumping of PW

4	Segregation of PW from MSW	Mixing of PW with bio-degradable waste.
5	Recycling PW for use in co-processing in cement kilns, construction of roads etc.	Burning of PW in open.

- The Plastic Waste Management Amendment Rules, 2021, identified certain Single Use Plastics (SUPs) which have low utility and high littering potential for curbing pollution caused by littered and unmanaged plastic waste. The use of these SUPs as listed in Annexure II shall be strictly banned at all DPA premises.
- For the fourth R – Recycle – it is imperative that plastic waste is segregated from MSW.
- The following action points are recommended for effective plastic waste management system:

Table 12 Action points for effective plastic waste management

Sr. No.	Action points	Infrastructure/ actions required	Priority level
1.	Segregation of plastic waste from municipal solid waste	<ul style="list-style-type: none"> • Provision of separate bins for PW and MSW at households and offices • Segregation at proposed Material Recovery Facility 	Immediate
2.	Setting-up of Plastic Waste Management system for safe collection, transport, recycling and disposal of PW.	<ul style="list-style-type: none"> • Engaging with GPCB registered PW recycling agency. 	As soon as possible
3.	Create awareness among all employees and their families about their responsibilities towards minimizing the use of plastics.	<ul style="list-style-type: none"> • Through social media, campaigns, co-curricular school activities, hoardings etc. 	As soon as possible
4.	Ensure that open burning of plastic waste is not permitted	<ul style="list-style-type: none"> • Constitution of Vigilance Squad 	Immediate

- Community awareness is the best means to reduce and manage plastic waste. DPA should organize activities and competitions in its school and community gatherings to engage its residents especially children to create “Best out of Waste” items. A few ideas are given below:

	
<p>Bird-feeder made of PET bottle</p>	<p>Planter made of PET bottle</p>
	
<p>Flower pot made of PET bottle</p>	<p>Pen-stand made of PET bottles</p>
	
<p>Sculpture made of PET bottles</p>	<p>Eco-bricks made from plastic waste' filled in PET bottles</p>
	
<p>Bench made from eco-bricks</p>	<p>Brooms made from yarn made of PET bottles</p>

Figure 11: Best out of Waste

Chapter-4

E-WASTE

4.1. Applicable laws and rules

E-Waste (Management) Rules, 2022

4.2. Responsibility of DPA as per Rules:

Rule 8- Responsibilities of consumer or bulk consumer

Bulk consumers of electrical and electronic equipment listed in Schedule I shall ensure that e-waste generated by them shall be handed over only to the registered producer, refurbisher or recycler.

List of electrical and electronic equipment (E&EE) listed in Schedule I of the Rules are mentioned in the Training Manual.

4.3. Handling and Management of Waste

4.3.1. Identification, Quantification and Inventory of waste

A 'bulk consumer' means "any entity which has used at least one thousand units of electrical and electronic equipment listed in Schedule I, at any point of time in the particular Financial Year and includes e-retailer". Based on this definition, DPA falls under the category of a bulk consumer.

The E-waste inventory of Gandhidham, Kandla and Vadinar ports is tabulated below:

Table 13 E-waste inventory for DPA Ports

S.No.	Name of Port	Collection agency	E-waste	Quantity in nos.
1	Gandhidham, Kandla	Under process on MSTC portal	PC	121
			Printer	32
			CPU	40
			Monitor	41
			UPS	18
Total				252 units
2	Vadinar	*	Monitor	5
			CPU	3
			Typewriter	2
			Printer	13
			Fax	1
			Keyboard	10
Total				34 units
Total E-waste in storage at DPA				252+34 = 286 Units

* E-waste collected from Vadinar is sent to Gandhidham for onward disposal.

4.3.2. Sources of waste:

Major sources of E-waste are Large Household Appliances, IT and Telecom and Consumer Equipment. At DPA, the E-waste to be managed is of IT and Telecom type generated from administrative and port offices at Gandhidham, Kandla and Vadinar. Another major source is E-waste generated from households in colonies.

4.3.3. Segregation

E-waste at Gandhidham AO is separately stored but there is no mechanism for its segregation at Gopalpuri colony. A methodology for E-waste segregation for DPA is covered in the Training Module.

4.3.4. Storage (on-site)

At Gandhidham AO, the discarded electronic equipments are stored at EDP store. The E-waste from Vadinar is brought to Gandhidham AO for onward disposal as per procedure. Currently 252 and 34 units of obsolete PCs, Monitors, Printers etc. at Kandla and Vadinar respectively are stored until the agency appointed through MSTC collects and channelizes the waste for environment-friendly disposal.

4.3.5. Collection

The responsibility of collecting the stored e-waste is of the agency appointed through MSTC portal. As an alternative to the MSTC portal, a non-exhaustive list of E-waste recyclers registered with GPCB is provided at Annexure V.

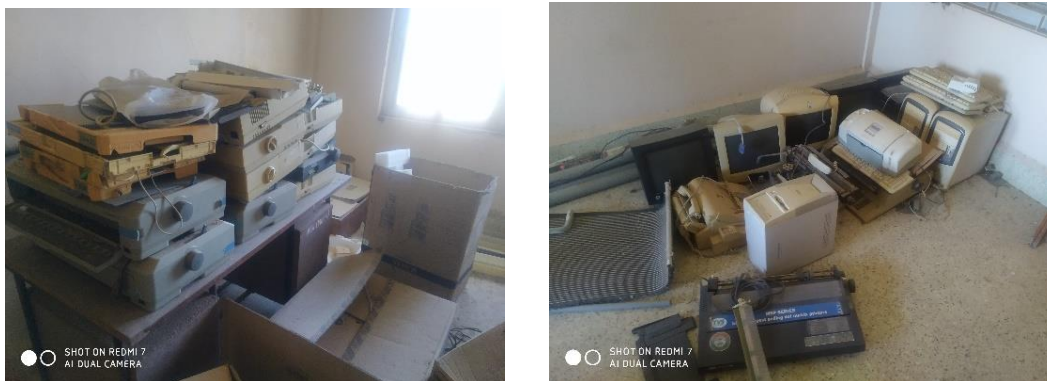


Figure 12: E-waste storage room at Vadinar

4.3.6. Disposal

The authorized agency appointed through MSTC is responsible for environment-friendly disposal of DPA's E-waste. As on June 2024, the list of scrap items to be disposed through MSTC

portal is attached at Annexure XI.

4.4. Record keeping

The E-Waste rules do not mandate any record keeping requirement for E-waste consumers however it is a good practice to collect receipts and maintain record of E-waste generated on-site and quantity collected by appointed Waste Management Agency. This is being done by Store Department at Gandhidham Administrative Office.

4.5. Procedure adopted for engagement of external agencies/private operators

DPA has entered in agreement with MSTC Ltd. Vadodara for selling / auction of all scrap items including e-waste. This agreement is valid till February, 2025 or until one of the two parties give 1-month notice in writing for termination of the agreement. DPA is in process to engage an E-waste collecting vendor through MSTC Ltd.

4.6. Recommendations and strategies

- It is recommended to maintain records of e-waste generated by them.
- DPA should consider the option of returning the end-of-life electronic items to the producer through its pick up or take back services or through its collection points.
- Create awareness at office as well as residential colonies regarding hazards and harmful environmental impacts of E-waste and not mix E-waste with general waste.

Chapter-5

Bio-medical Waste

5.1. Applicable laws and rules

Bio-Medical Waste Management Rules, 2016 and subsequent amendments in 2018 and 2019.

The biomedical wastes categories and their segregation, collection, treatment, processing and disposal options as per Schedule I of the Rules are specified in Annexure VI

5.2. Responsibility of DPA as per BMWM Rules:

- *It shall be the duty of every occupier (DPA) to*
- Take all necessary steps to ensure that bio-medical waste is handled without any adverse effect to human health and the environment and in accordance with the rules stated above.
- Make a provision within the premises for a safe, ventilated and secured location for storage of segregated biomedical waste in colored bags or containers to ensure that there shall be no secondary handling, pilferage of recyclables or inadvertent scattering or spillage by animals and the bio-medical waste from such place or premises shall be directly transported in the manner as prescribed in the rules to the common bio-medical waste treatment facility.
- Pre-treat the laboratory waste, microbiological waste, blood samples and blood bags through disinfection or sterilization on-site and then sent to the Common bio-medical waste treatment facility for final disposal.
- Phase out the use of chlorinated plastic bags (excluding blood bags) and gloves
- Dispose of solid waste other than bio-medical waste in accordance with the provisions of respective waste management rules made under the relevant laws and amended from time to time.
- Avoid mixing of treated bio-medical waste with municipal solid waste.
- Provide training to all its health care workers and others, involved in handling of bio medical waste at the time of induction and thereafter at least once every year and the details of training programs conducted, number of personnel trained and number of personnel not undergone any training shall be provided in the Annual Report.
- Immunize all its health care workers and others, involved in handling of bio-medical waste for protection against diseases including Hepatitis B and Tetanus that are likely to be transmitted by handling of bio-medical waste
- Establish a Barcode System for bags or containers containing bio-medical waste to be sent out of the premises or for the further treatment and disposal
- Ensure segregation of liquid chemical waste at source and ensure pre-treatment or

neutralization prior to mixing with other effluent generated from health care facilities.

- Ensure treatment and disposal of liquid waste in accordance with the Water (Prevention and Control of Pollution) Act, 1974
- Ensure occupational safety of all its health care workers and others involved in handling of biomedical waste by providing appropriate and adequate personal protective equipments.
- In case of bedded health care units, maintain and update on day-to-day basis the bio-medical waste management register and display the monthly record on its website according to the bio-medical waste generated in terms of category and colour coding
- Report major accidents including accidents caused by fire hazards, blasts during handling of biomedical waste and the remedial action taken and the records relevant thereto to the prescribed authority and also along with the annual report; make available the annual report on the web-site; inform the prescribed authority immediately in case the operator of a facility does not collect the bio-medical waste within the intended time or as per the agreed time;
- In case of bedded health care facilities (any number of beds), make available the annual report on its web-site
- Maintain all record for operation of incineration, hydro or autoclaving etc., for a period of five years;

5.3. Handling and Management of Waste

5.3.1. Identification of sources and Quantification of waste

There are 3 healthcare facilities at Gandhidham and Kandla of which one is a 55 bedded hospital located in Gopalpuri colony and two dispensaries, one each at Kandla port and Adipur village.

There is one operational healthcare facility at Vadinar named Shree Samarpan Wellness Pvt Ltd.



Figure 13: Gopalpuri hospital at Gandhidham

The category wise waste generation details for the identified BMW sources is tabulated below:

Table 14 BMW generation at DPA HCFs

Sr. no	Name of the HCF	Category-wise BMW quantity in kg/month			
		Yellow	Red	White	Blue
DPA HCFs in Gandhidham/Kandla					
GPCB consented quantity as per BMW Authorization		250	170.3	15.5	98.1
Average BMW generated in kg/month					
1	Gopalpuri Hospital	47	30	1.6	33
2	Kandla dispensary	02	--	--	--
3	Adipur dispensary	0.5	--	--	--
HCF at Vadinar port area					

GPCB consented quantity as per BMW Authorization		6.0	5.0	0.5	2.0
4	Shree Samarpan Wellness Pvt. Ltd.	2.6	0.57	--	0.45

At Goapluri HCF the BMW quantity generated is within the consented quantity as per BMW Authorization provided by GPCB.

At Shree Samarpan Wellness Pvt Ltd. in Vadinar, the BMW quantity generated is within the consented quantity as per BMW Authorization provided by GPCB

5.3.2. Segregation:

Segregation at source into different colored bins for different category bio medical waste is imperative for efficient management of Bio-medical waste management system. Following are the observations for Gopalpuri hospital and HCF at Vadinar:

- Waste is being segregated at the point of generation of source.
- Needles and syringes are destroyed at the working desk or collected in puncture proof containers for treatment at CBWTF.
- Posters/ placards for bio-medical waste segregation are provided near bins and in waste storage area.
- Adequate number of colour coded bins / containers and bags are available at the point of generation of bio-medical waste.
- PPEs have been provided to the bio-medical waste handling staff.



Figure 14: Color-coded bins at Gopalpuri Hospital



Figure 15: Color-coded bins at Shree Samarpan Wellness Pvt. Ltd., Vadinar

5.3.3. Storage (on-site and centralized)

At Gopalpuri Hospital, a designated storage room for the generated BMW is provided. The Distormed Kutch Services Pvt. Ltd. directly collects the waste from this storage room. At Shree Samarpan Wellness hospital, Vadinar, the quantum of waste generated is less hence there is no

dedicated storage room.



5.3.4. Collection and Intramural Transportation

Ward-wise collection and intramural transportation of BMW is done through trolleys and sent to designated storage room for storage until the waste is picked up the agency.

The GPCB authorized CBWTFs i.e Distorted Kutch Services Pvt. Ltd. and Dev Biomedical Waste Management Services for Gopalpuri and Vadinar respectively have been engaged for collection, transportation and disposal of BMW. The details are as below:

Table 15 Details of CBWTF appointed for DPA HCFs

Sr.no	Name of the CBWTF	Name of HCF
For Gandhidham and Kandla		
1	Distromed Kutch Services Pvt. Ltd.	Gopalpuri Hospital
2		New Kandla Port Hospital
3		Kandla Port Dispensary
Vadinar		
4	Dev Biomedical Waste Management Services	Shree Samarpan Wellness Pvt Ltd

The CBWTFs are responsible for collection, transport, processing, recycling and disposal of BMW. The CBWTFs are mandated to use the vehicles that are specially designed vehicles as per CPCB guidelines and are properly labeled with symbol indicating biohazard, for transporting BMW.

5.3.5. Disposal

The BMW is disposed by CBWTF in accordance with the norms and criteria prescribed in the BMW Rules and CPCB guidelines.

5.4. Record keeping

The Bio-medical Waste Management Rules, 2016 and subsequent guidelines prescribes the below requirements as far as record-keeping is concerned:

- Maintain category-wise records of bio-medical waste generation and its treatment disposal on a daily basis in Annexure VII: Format for Bio-Medical Waste Register / Record
- Category-wise quantity of waste generated from the facility must be recorded in Bio Medical Waste Register/logbook being maintained at the central waste collection area under the supervision of one designated person.
- A weighing machine as per the specifications given in CPCB guidelines for bar code system needs to be kept in central waste collection centre of the HCF having 30 or more than 30 nos. of beds for weighing the quantity of Bio Medical Waste.
- HCFs having less than 30 beds shall maintain records of receipts printed by the CBWTF.
- Records on Annual Report on bio-medical waste management and Accident Report including preventive and corrective actions taken by the HCFs in relation to such accidents shall be submitted to GPCB

- Records shall be maintained on training on BMW Management including both Induction and in service training records.
- Maintain records for Annual Health check-up and Immunization of all the employees.
- Records of testing of Effluent generated from health care facility
- Record of recyclable waste (plastic/glass) handed over to the authorized recycler in kg/annum. The records related to the handling of BMW by healthcare facilities needs to be retained for a period of five years.

The list of information and necessary formats for record keeping have been covered in the Training Manual for Bio-Medical Waste.

5.5. Procedure adopted for engagement of external agencies/private operators

The CBWTFs Association of Gujarat based on CPCB guidelines and in coordination with GPCB have earmarked regions/districts that each CBWTF can cater to. Based on which, no other agency except M/s Distromed Kutch Services Pvt. Ltd. can cater to Kutch district. Same is the case for Devbhumi Dwarka district (HCF at Vadinar). Hence DPA or any other HCF has no choice when it comes to selection of CBWTFs for these regions. All these agencies are registered with GPCB.

5.6. Obtaining Authorization/Clearance/License

Below table 16 lists the requirements for obtaining authorization under Bio-Medical Waste Management Rules, 2016.

Table 16 Requirements of obtaining authorization for HCFs as per BMW Rules

Type of HCF	Type of authorization	Granting authority	Validity	Applicability and status w.r.t DPA's HCFs
Bedded HCF	Fresh authorization and its timely renewal	GPCB	Validity in synchronization with the validity of: Consent under Air (Prevention and Control of Pollution) Act, 1981 and Water (Prevention and Control of Pollution) Act, 1974	Both Hospitals at Gopalpuri and Vadinar are having valid licenses (BMW 364004 & BMW 361012). The licenses need to be updated from time to time as per the Act and applicable Rules.
Non-bedded HCF	One-time authorization*		Deemed valid until amendment sought	It, is applicable to Both the dispensaries at

				Kandla and Adipur and authorization should be done as per the rules.
HCFs situated within 75 km reach of CBWTF	Agreement with Common Bio Medical Waste Treatment Facility (CBWTF)	Monitored by GPCB	Generally, for 3 years or varies as per different CBWTF facility	<p>Bedded HCF</p> <p>Both Hospitals at Gopalpuri and Vadinar are having valid agreements with the CBWTF for a period of one year.</p> <p>Non bedded HCF</p> <p>Both the dispensaries at Kandla and Adipur are having valid agreements with the CBWTF for a period of one year. However, all the bedded and non-bedded HCFs need to renew the agreements from time to time.</p>
HCFs beyond 75 km reach from CBWTF but its operator willing to provide required services	Agreement with Common Bio Medical Waste Treatment Facility (CBWTF)			Not Applicable

* In case there is any change or variance in relation to the activities of HCF, these HCFs have to apply for a fresh authorization to amend earlier authorization

5.7. Recommendations and strategies

At DPA HCFs, Bio-Medical Waste is managed in a sound manner. For further improvement of this system, following points are suggested:

- The substances in bio-medical waste might contain viable microorganism such as bacterium, virus, parasite or fungus that may cause disease in humans or animals.

Therefore, packaging of such bio-medical waste shall be done in triple packaging system comprising of three layers of packaging.

- Exhaust fans should be provided in the waste storage room for ventilation.
- The entrance to the storage room must be labelled with “Entry for Authorized Personal Only”.
- DPA shall develop a separate page/web link in its website for displaying the information pertaining to their Gopalpuri hospital. The list of Information for updating on website is provided on Annexure VIII.
- HCF must ensure that a comprehensive health check-up of each employee and other staff involved in BMW handling is carried out at the time of induction and also as a mandatory procedure is followed every year for every employee.
- Concerned HCF authority shall ensure the occupational safety of the healthcare workers and other staff involved in handling of Bio medical waste in the healthcare facility.
- HCF shall impart training to the staff handling BMW in accordance with the Training Manual and maintain Training records in Annual Report (Annexure VII).
- Submit an annual report to the prescribed authority in Form-IV, on or before the 30th June of every year (Annexure VII) for each HCF.

Chapter-6

Construction and Demolition Waste

6.1. Applicable laws and rules

Construction and Demolition Waste Management Rules, 2016.

6.2. Responsibility of DPA as per various Conventions, Acts and Rules:

Rule 4-Duties of the waste generator

- Every waste generator shall prima-facie be responsible for collection, segregation of concrete, soil and others and storage of construction and demolition waste generated, as directed or notified by the concerned local authority in consonance with these rules.
- The generator shall ensure that other waste (such as solid waste) does not get mixed with this waste and is stored and disposed separately.
- Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar and shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodeling work and keep the concerned authorities informed regarding the relevant activities from the planning stage to the implementation stage and this should be on project to project basis.
- Every waste generator shall keep the construction and demolition waste within the premise or get the waste deposited at collection center so made by the local body or handover it to the authorized processing facilities of construction and demolition waste; and ensure that there is no littering or deposition of construction and demolition waste so as to prevent obstruction to the traffic or the public or drains.
- Every waste generator shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities; Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall have to pay for the processing and disposal of construction and demolition waste generated by them, apart from the payment for storage, collection and Transportation. The rate shall be fixed by the concerned local authority or any other authority designated by the State Government.

6.3. Handling and Management of Waste

Since the construction / demolition work is contracted to a civil contractor by DPA, the entire responsibility of transportation, management and disposal of C&D waste lies with the contractor.

6.4. Procedure adopted for engagement of external agencies/private operators

Since the responsibility of handling C&D waste lies with the civil contractor, DPA does not engage any external agency for processing / disposal of C&D waste.

6.5. Recommendations and strategies

- Proper segregation of C&D waste should be practiced to avoid mixing with bio-degradable waste destined for MSW treatment facilities / landfill.
- Explore the possibility of reusing C&D waste materials in construction related activities (Refer Table), thereby decreasing the quantum to be landfilled.
- The Delhi government has issued an advisory on the use of products made out of recycled C&D waste by the Public Works Department (PWD). All Delhi government agencies will be required to incorporate a clause in their tenders that mandates use of a minimum of 2 per cent recycled products from construction waste in all future contracts for building works and 10 per cent recycled products for road works. (Ref. CSE August 26, 2015).
- Filling of low-lying areas, reclamation of land, trenches etc. should be done using C&D wastes.
- Necessary measures to control dust and fugitive emissions must be taken including:
 - Use of water sprinklers
 - Transportation of C&D wastes should be done in covered vehicles to prevent fugitive dust emission

Table 17 Potential uses of C&D waste

C & D waste	Potential use of C & D wastes
Concrete	The utilization of recycled aggregate is particularly very promising as 75% of concrete is made of aggregates.
Bricks	If deconstructed properly, bricks can be reused after removal of mortar. Broken bricks can be used for refilling or for manufacturing debris paver blocks or debris blocks.
Stone	Stone can be reused for plinth formation, masonry construction, landscape purpose, ledges, platforms, window sills, coping etc. depending upon the form of available stones.
Timber	Timber elements from deconstructed building may have aesthetic and antique value. Opportunity: Whole timber arising from construction and demolition

	works can be utilized easily and directly for reused in other construction projects after cleaning, de-nailing and sizing.
Plywood and other timber based boards	Plywood and other timber-based boards can be either reused for interior works in new construction or it can be recycled for manufacturing of timber-based boards.
Gypsum	<p>In India, over 10 about of waste gypsum such as phosphor-gypsum, Fluro-gypsum etc., are being generated annually.</p> <p>Opportunity: Plaster developed from this waste gypsum has showed improved engineering properties without any harmful effect. Phosphor-gypsum and lime sludge can be recycled for manufacture of Portland cement, masonry cement, sand lime bricks, partition walls, flooring tiles, blocks, gypsum plaster, fibrous gypsum boards, and super-sulphate cement.</p>
Metals & metal alloys-	<p>Ferrous Metals are the most profitable and recyclable material. Scrap steel is almost totally recycled and allowed repeated recycling. Structural steel can be reused as well as 100% steel can be recycled to avoid wastage at construction site.</p> <p>Advantage: Generally sold to a scrap metal dealer at a specified price. Metals like scrap iron can be mixed with the virgin metal in the foundry. In India more than 80% scrap arising is recycled.</p>
Nonferrous metal	<p>The main nonferrous metal collected from construction and demolition sites are aluminum, copper, lead and zinc.</p> <p>Opportunity: In India aluminum and copper are recycled and are valuable resources</p>
Debris	Construction debris can be recycled to manufacture paver blocks which can be used in light traffic areas and masonry blocks. Other uses of processed debris include use in lean concrete for leveling purpose, as mortar for masonry, as bedding mortar for pavement tiles and used for land filling materials is comparable with new materials.
Composite materials	The plastic wastes are best for recycling if these materials are collected separately and cleaned. Recycling is difficult if plastic wastes are mixed with other plastics or contaminants. Plastic may be recycled and used in products specifically designed for the utilization of recycled plastic, such as street furniture, roof and floor, PVC window noise barrier, cable ducting, panel.

Chapter-7

Shipping Waste

7.1. Applicable laws and rules

The list of international and local legislations applicable to the ports (Port at Kandla and Vadinar) managed by Deendayal Port Authority (DPA) are listed below:

1. MARPOL 73/78 – Consolidated Edition 2002
2. MARPOL 73/78 – Consolidated Edition 1997.
3. Indian Ports Act 1908 (Act No. 15 of 1908)
4. The Merchant Shipping Act 1958 (Act No. 44 of 1958) (2000)
5. International Convention on the Control of Harmful Anti-fouling Systems on Ships
6. Ballast Water Management Convention
7. The Environment (Protection) Act, 1986 and the Environment (Protection) Rules 1986
8. Hazardous and Other Wastes (Management & Handling) Rules, 2016
9. Annex VI of MARPOL 73/78 – Regulation for the Protection of Air Pollution from ships & MOX Technical code.
10. Provision concerning the Reporting of incidents involving harmful substances, under MARPOL 73/78 (1999 Edition)
11. SOLAS consolidated Edition 2001.
12. The Water (Prevention and Control of Pollution) Act, 1974 and Rules 1975
13. The Major Port Trust Act

7.2. Definitions

Important terminologies reflecting in MARPOL documents and other related to shipping wastes have been produced below for ready reference:

- 1 **Waste from ships** means all waste, including cargo residues, which is generated during the service of a ship or during loading, unloading and cleaning operations and which falls within the scope of Annexes I, II, IV, V and VI to MARPOL Convention, International Convention for the Control and Management of Ships Ballast Water and Sediments (BWM Convention), International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS Convention), as well as waste such as expired medicines, pyrotechnics etc.
- 2 **Port Reception Facility, (PRF)** means any facility which is fixed, floating or mobile and capable of providing the service of receiving the waste from ships;
- 3 **Port Authority:** Organizations, either public or governmental, that manages the operations of a port, in whole or part.

- 4 **Cargo residues:** remnants of any cargo material which are not covered by Annexes I, II, IV and VI of the MARPOL convention and which remain on the deck or in holds following loading or unloading, including loading and loading excess or spillage, whether in wet or dry conditions or entrained in wash water but not including cargo dust remaining on the deck after sweeping or dust on the external surfaces of the ship. Dry bulk cargo residues may include substances that are harmful to the marine environment.
- 5 **Grey water** means drainage from dishwater, shower, laundry, bath and washbasin drains. It does not include drainage from toilets, urinals, hospitals and animal spaces, as defined in regulation 1.3 of MARPOL Annex IV (sewage) and drainage from cargo spaces. Grey water is not considered garbage in the context of MARPOL Annex V.
- 6 **E-waste:** means electrical and electronic equipment used for the normal operation of the ship or in the accommodation spaces, including all components, subassemblies and consumables, which are part of the equipment at the time of discarding, with the presence of material potentially hazardous to human health and the environment.
- 7 **Garbage:** means all kinds of food wastes, domestic wastes and operational wastes, all plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes to the MARPOL Convention. Garbage does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities which involve the transport of fish including shellfish for placement in the aquaculture facility and the transport of harvested fish including shellfish from such facilities to shore for processing.
- 8 **Anti-fouling system** means a coating, paint, surface treatment, surface, or device that is used on a ship to control or prevent attachment of unwanted organisms.
- 9 **Ballast Water** means water with its suspended matter taken on board a ship to control trim, list, draught, stability or stresses of the ship.
- 10 **Sediments** means matter settled out of Ballast Water within a ship.

7.3. Responsibility of DPA as per various Conventions, Acts and Rules:

This section details the regulatory requirements for Ports mandated under MARPOL, Anti Fouling Convention, Ballast Water Management Convention and Merchant Shipping Act and Rules.

7.3.1. Regulatory Requirements under MARPOL

- i. **Regulation 38 of Annex I:** In Annex I, strict requirements are outlined for the storage and discharge of oil from ships. These covers wastes like Oily bilge water, Oil residues, Oil tank washings, Dirty Ballast water, Scale and sludge from tank cleanings. According to Annex I Regulation 38, Parties to the Convention are required to provide facilities for receiving oily mixtures in the following ports:
 - All ports and terminals where crude oil is loaded into oil tankers that have completed a ballast voyage of not more than 72 hours or 1,200 nautical miles before arrival.;
 - All ports and terminals where oil other than crude oil in bulk is loaded at a rate of more than 1,000 tonnes per day on average;
 - All ports having ship repair yards or tank cleaning facilities which are crucial for conducting efficient and safe maritime operations;
 - All ports and terminals that are involved in the handling of ships must possess oil residue (sludge) tanks that comply with regulation 12 of Annex I;
 - All ports with regard to oily bilge waters and other wastes that cannot be discarded in accordance with Regulations 15 and 34 of Annex I; and
 - All bulk cargo loading ports for combination carriers' oil residues that are not permitted to be discharged in accordance with Annex I's regulation 34.
- ii. **Regulation 12 of Annex IV** states that all Party States have to ensure adequate facilities in ports and terminals for receiving wastewater/sewage without causing delays for ships, which are adequate to serve the needs of the ships.
- iii. **Annex V** This section mentions the provision of a port recycling program for separating recyclable from non- recyclable garbage. The segregation practices on ship should match the requirements of the recycling program of the port. Information concerning recycling programs and their requirements should be passed to the ships. This makes the re-use or recycling of the waste streams effective.
- iv. **Regulation 17 of Annex VI:** According to this provision each Party shall undertake to provide facilities for the reception of ODS or equipment containing such substances, washing water from scrubbers and sediment from treatment plants on board. Ports shall provide to meet for:
 - Ships utilizing its repair ports are required to receive ODS and equipment containing such substances when they are removed from the ships for repairs

- Ships using its ports, terminals, or repair ports for the purpose of receiving exhaust gas cleaning residues from an exhaust gas cleaning system;

7.3.2. Regulatory requirements under Anti-Fouling Convention

- A party shall take appropriate measures to ensure that wastes from the application or removal of an anti-fouling system are collected, handled, treated and disposed of in a safe and environmentally sound manner to protect human health and the environment.

7.3.3. Regulatory requirements under Ballast Water Management Convention

- Party shall ensure that, in ports and terminals where cleaning or repair of ballast tanks occur, adequate facilities are provided for the reception of Sediments, such reception facilities shall operate without causing undue delay to ships and shall provide for the safe disposal of such Sediments that does not impair or damage their environment, human health, property or resources or those of other States

7.3.4. Regulatory requirements under Merchant Shipping Act, 1958

- i. **Section 356-I** states that the powers of the port authority shall include the power to provide reception facilities. However, where the Central Government is satisfied that there are no reception facilities at any port in India or that the facilities available at such port are not adequate for enabling ships calling at such port to comply with the requirements of the Convention, the Central Government may, after consultation with the port authority in charge of such port, direct, by order in writing, such authority to provide or arrange for the provision of such reception facilities as may be specified in the order. **Chapter VI of Merchant Shipping (Prevention of Pollution by Oil from Ships) Rules, 2010** deals with reception facilities and the requirements related to provision of reception facilities, in line with MARPOL Annex I requirements.
- ii. **Chapter VIII** of Merchant Shipping (Control of Pollution by Noxious Liquid Substances in Bulk) Rules, 2010 deals with reception facilities and the requirements related to provision of reception facilities are in line with MARPOL Annex II requirements.
- iii. **Rule 9 of Merchant Shipping (Control of Anti-fouling System) Rules, 2016** states that the waste from the application or removal of anti-fouling system are collected, handled, treated and disposed of in a safe and environmentally sound manner in accordance with Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 as notified by the

Central Government in the Ministry of Environment and Forests, vide notification number S.O. 2265 dated the 24th September, 2008”.

7.3.5. Regulatory requirements under The Hazardous and Other Wastes Management Rules, 2016

- I. DPA shall be responsible for safe and environmentally sound management of hazardous and other wastes.
- II. The hazardous and other wastes generated and received at DPA Ports shall be sent or sold to an authorized actual user or disposed of in an authorized disposal facility.
- III. The hazardous and other wastes shall be transported from DPA Ports to an authorized actual user or to an authorized disposal facility in accordance with the provisions of the rules.
- IV. If DPA intends to get its hazardous and other wastes treated and disposed of by the operator of a treatment, storage and disposal facility shall give to the operator of that facility, such specific information as may be needed for safe storage and disposal.
- V. DPA shall take all the steps while managing hazardous and other wastes to-
 - a) contain contaminants and prevent accidents and limit their consequences on human beings and the environment; and
 - b) provide persons working in the site with appropriate training, equipment and the information necessary to ensure their safety.

7.3.6. Regulatory Requirement under The Plastic Waste Management Rules, 2016

- I. Take steps to minimize generation of plastic waste and segregate plastic waste at source
- II. Not litter the plastic waste and ensure segregated storage of waste at source and handover segregated waste to agencies appointed for collection of waste.

7.4. Handling and Management of Waste

At every port, for provision of waste collection from ships, its storage, treatment and disposal, an authorized official is appointed to whom the captain of the ship could get in touch regarding wastes generated on the ship.

The captains of the ships that embark at the ports intimates the authorized agencies engaged by DPA for collection of Hazardous and Non-hazardous wastes generated by the ships. This communication is facilitated through Swachh Sagar Portal. There are 22 such agencies, 11 for

collection of Non-hazardous wastes and other 11 for collection of Hazardous wastes received at the Kandla and Vadinar ports. These agencies are listed in Table 4 in subsequent section.

7.4.1. Source Identification, Quantification and Inventory of waste at Kandla & Vadinar

The shipping waste being received at the ports of Kandla and Vadinar from the ships have been categorized based on the waste categories identified under below tabulated Law/Rule/Convention.

Table 18 General type and source of wastes generated on ships

Law/ Rule/ Convention	Category	Source and Type of waste
MARPOL	Annexure I	Oily bilge water, Oil residues (Sludge), Oil tank washings, Dirty ballast water, Scale and sludge from tank cleanings.
	Annexure II	Category X, Y Z and Other of Noxious Liquid Substances discharged from tank cleaning or de-ballasting operations
	Annexure IV	Sewage that includes drainage and other wastes from any form of toilets and urinals; drainage from medical premises via wash basins, wash tubs and scuppers located in such premises; drainage from spaces containing living animals; or other waste waters when mixed with the drainages defined above
	Annexure V	All kinds of garbage like Plastics, Food wastes, Domestic wastes, cooking oil, Incinerator ashes, Operational wastes, Cargo residues, Animal carcass(es), Fishing gear, E-waste
	Annexure VI	Ozone-depleting substances (ODS) as defined in Montreal Protocol of 1987. Major sources of ODS are refrigeration equipment; air conditioning equipment and fire extinguishing equipment.
Anti-fouling system	Article 5	coating, paint, surface treatment, surface, or device that is used on a ship to control or prevent attachment of unwanted organisms
Ballast Water Management Convention	Article 5	Matter settled out of Ballast Water
HOWM Rules, 2016	Schedule I	Used Spent Oil (Category 5.1) Waste Residue Containing Oil (Category 5.2)

The inventory of Hazardous as well as Non-hazardous waste generation at Kandla and Vadinar ports for 2022-23 is presented in below Table 19. The generated waste has also been categorized

as per the categorization under MARPOL and applicable national legislation i.e., Hazardous Waste Management Rules, 2016.

Table 19 Type and quantum of waste generated at DPA ports

Sr.no	Waste Generated	Waste categorization as per		Waste Generated (MT/ year) during FY 2022-23	Disposal
		HWM Rules	MARPOL		
Hazardous waste quantum received at Kandla and Vadinar ports					
1.	Sludge oil, Used Spent Oil, Slop/Sludge	5.2	Annex I	13,736.37	Collected by authorized agency
2.	Waste Residue containing Oil	5.1	Annex V		
Non-hazardous waste quantum received at Kandla and Vadinar ports					
3.	Garbage including Soild waste, Mooring rope, Drums, Wood etc.	-	Annex V	2,473.19	Collected by authorized agency

The total quantity of Hazardous waste received at Kandla and Vadinar ports per year is 13736.37 MT/year and DPA has a tie-up with agencies for handling Hazardous waste that collectively have GPCB authorization for handling of more than 20,000 MT of waste. Thus, DPA ports have enough provision to cater to the shipping wastes received at its ports.

Similarly, total quantity of Non-hazardous waste received at Kandla and Vadinar ports per year is 2473.19 MT against which the agencies engaged by DPA have a collective provision to cater 2,00,000 MT of waste, thus there is surplus provision to handle non-hazardous waste as well.

7.4.2. Collection, Transport, Processing and Disposal

DPA has a tie-up with 22 agencies that are responsible for management of shipping waste generated from both, Kandla and Vadinar ports. All these agencies are authorized by GPCB for handling of wastes. 11 agencies deal with non-hazardous waste and rest 11 with hazardous waste. Collection, handling, transport and disposal of wastes is the responsibility of these agencies which are listed below.

Table 20 List of Waste Management Agencies operating at Kandla and Vadinar ports

Sr. no	Name of waste collecting agency	Address/Contact of the Agency	Type of waste collected	Name of waste with category	Waste category as per MARPOL	Valid up to
1	M/S. Harish. A. Pandya*	16, Brahm samaj bldg., Plot No. 106, Sector-8, B/H Oslo Cinema, Gandhidham Kutch Gujarat-370205. Mobile- 9426218125, 8000008999 E-mail- info@harishpandya.com	Haz	Waste Residue containing oil (5.1) Used Spent Oil (5.2)	Annexure I	30-05-2023
			Non Haz	Garbage	Annexure V	
2	M/S. Chitrakut Trading & Industries *	Factory Address: 56 to 63 Survey No. 323/1, 323/2, Ghanshyam Park, Village: Kukma Tal: Bhuj (Kutch) Guj. India. Postal Address: 15, Brahm Samaj Building, Plot No. 106, Sector No. 8, B/H Oslo Cinema, Gandhidham (Kutch) India. Mobile no- +919426218125 E-Mail - info@chitrakutshippingservices.com	Haz	Waste Residue containing oil (5.1) Used Spent Oil (5.2)	Annexure I	-
			Non Haz	Garbage, Waste Scrap, Mooring rope, Empty Drums		
3	Vishwa Trade Link Inc.	Plot No. 170/2/A, T.P.-3, Anjar (Kutch), Gujarat -370110	Haz	Waste Residue containing	Annexure I	03-11-2023

				oil, Used Spent Oil		16-11- 2022
			Non Haz	Scrap, Dunnage Wood, Garbage other (Dry, Solid, Ordinary, Non- hazardous) Wet Garbage	Annexure V	
4	Revolution Petrochem LLP.*	Office No. C-214, 2nd Floor, Shop no. 234- 235, Kutch Arcade "Platinum", Mithirohar, Gandhidham- 370201 Mobile no: 98795955087 E-mail: revolutionpetrochem @gmail.com	Haz	Waste Residue containing oil (Haz waste/waste oil/sludge) Used Spent Oil	Annexure I	31-03- 2023
			Non Haz	1) Container, Scrap, Dunnage Wood, Garbage other (Dry, Solid, Ordinary, Non- hazardous) 2) Wet Garbage	Annexure V	
5		Office No. 2, Plot no. 106, Sector 8,	Haz	Used Oil	Annexure I	-

	Omega Marine Services	Braham Samaj Building, Gandhidham, Kutch Gujarat 370201 Mobile no: +919537329203, 9727589185 E-mail: operations@omega marineservices.com, omegamrn@hotmail. com, accounts@omegama rineservices.com	Non Haz	1) Dry garbage 2) Wet Garbage	Annexure V	
6	United Shipping Company	Plot no 42, 2nd floor. Opp. Old Court, Sector 1/A. Gandhidham, Kutch T: +912836226555 E-mail: unitedshipping46@g mail.com	Haz	Waste Residue containing oil (5.1 Sludge oil) Used spent oil (5.2)	Annexure I	
			Non Haz	Dry garbage	Annexure V	
7	Green Earth Marine Solutions*	Office No. 202, Plot No. 578, Ward 12-C, Shakti Avenue, Gandhidham, (Kachchh) GUJARAT -370201 Mobile no: 9537824948 E-mail: operation@greenear thmarine.com	Haz	Used Oil (nil)	Annexure I	
			Non Haz	Dry Garbage, Scrap Dunnage, Wood garbage, Other (nil)	Annexure V	
8	New India Marine Works *	Plot no:16, Sector 10A, Industrial Area OSLO GIDC, Gandhidham KUTCH-370201 Mobile no: +919879072262 E-mail: sludgeoil16@yahoo.i n	Haz	Waste Residue containing oil (5.1 Sludge oil)	Annexure I	19-02- 2024
9	Naaz Shipping Service	Office no-35, 1st Floor GMA building, Plot no-297, Ward no-12/B, Grain	Haz	1) Waste Residue containing oil	Annexure I	31-07- 2023

	Enterprise *	Merchant Association Building, Nr Old Court Gandhidham Mobile no: 9825724120, 9427277088 E-mail: naazshippingservice@yahoo.com nasir.khan685@gmail.com		2) Used Spent Oil		
			Non Haz	1) Dry Garbage-Scrap Dunnage Wood Garbage other 2) Wet Garbage	Annexure V	
10	Alicid Organic Industries Ltd*	207/208, Hanumant Henduva, Opp Gujcomasal, near Khari River Highway, Post- Palavasana, Mehsana -02 (Gujarat) Mobile no: 9825604120 E-mail: aligidorganic@gmail.com	Haz	1) Waste Residue containing oil 2) Used Spent Oil	Annexure I	05-01-2024
			Non Haz	1) Dry Garbage-Scrap Dunnage Wood Garbage other(nil) 2) Wet Garbage	Annexure V	
11	Shana Oil Process	New Good Luck Market, nr Aksha Masjid, Chandola Lake, Narol Road, Ahmedabad-3800028 Mobile no: +919824286952, +919879986952 E-mail: shanaoil0891@gmail.com	Haz	1) Waste Residue containing oil 2) Used Spent Oil	Annexure I	05-01-2024
			Non Haz	1) Dry Garbage-Scrap Dunnage Wood Garbage other (Dry, Solid, Ordinary, Non-hazardous) 2) Wet Garbage	Annexure V	
12		Kidana Nirmal Nagar, Survey no 133, Plot	Haz	1) Waste Residue	Annexure I	30-05-2023

	Golden Shipping Services*	no 83, Gandhidham-Kutch, Gujarat Mobile no: 9638808551 E-mail: bharat.ahir8686@gmail.com		containing oil (5.1) 2) Used Spent Oil (5.2)		
			Non Haz	1) Dry Garbage-Scrap Dunnage Wood Garbage other	Annexure V	
13	K M Enterprise*	Plot no-13, Sector-8, Near BM Petrol Pump, Opp. Sharma Motors, Gandhidham, Kutch Mobile no: 9510514287, 9879986952 or Shop No. 2, Plot No. 16, Sector 1/A, Shakti Nagar Road, Gandhidham-Kutch Mobile no: 8141380555 E-mail: kmenterprise kandla@gmail.com	Haz	1) Waste Residue containing oil 2) Used Spent Oil	Annexure I	
			Non Haz	1) Dry Garbage-Scrap Dunnage Wood Garbage other (Dry, Solid, Ordinary, Non-hazardous) 2) Wet Garbage	Annexure V	
14	Atlas Organics Pvt. Ltd.	Office 204/206, Ellis Bridge Shopping Center, Opp. Town hall, Ashram Road, Ahmedabad - 380006 Mobile no: +919909723532, +918980989015 Email id: atlasorganics@yahoo.com info@sludgeoilindia.com	Non Haz	1) Dry Garbage-Scrap Dunnage Wood Garbage other 2) Wet Garbage	Annexure V	
					Annexure V	
15	Glorious Marinefuels Pvt. Ltd.		Haz	1) Used oil 2) Waste oil	Annexure I	

16	Priyansi Corporation	C1 804-8096, GIDC, BAMANBORE, TA: CHOTILA, DIST-SURENDRANAGAR MOBILE NO: 9825226095, 9825785270 E-mail:: operation.priyansicorporation@gmail.com	Haz	Sludge oil (5.2)	Annexure I	21/04/2024
17	Amar Hydrocarbon Pvt. Ltd *	FF-12, Sahara Complex, B/h, Navajivan Hotel S.G. Highway, Sarkhej, Ahmedabad - 3822210 Mobile no: 9328334205 E-mail: operations@amarhydrocarbon.com amarhydrocarbon@gmail.com	Haz	1) Used oil 2) Waste oil	Annexure I	30/06/2024
18	Aditya Marine Ltd	Room no 11,12,13, Dhiraj Chambers, Plot No. 36, Sector 9/A, Gandhidham, Kutch 37020, Gujarat, India email: info@adityamarine.com Phn no: +912836222053	Haz	1) Used oil 2) Waste oil	Annexure I	-
19	Fine Refiners Pvt. Ltd.	Plot no. 40, Vartej GIDC, Tal. Bhavnagar, Dist. Bhavnagar	Haz	1) Used oil 2) Waste oil	Annexure I	30/09/2022
20	Mahalaxmi Asphalt Pvt. Ltd.	Survey no. 343, Village: Bandhadi, Tal. Bhachau, Dist. Kutch	Haz	Waste oil	Annexure I	21/09/2027
21	M/s. Kutch Energies Pvt. Ltd.	Plot no. 72, shop no. 1,2,3 and 4, Hotel Bansal Building, Sector- 9/C, Gandhidham, Kutch.	Haz	Sludge	Annexure I	27/03/2025

		Email: shree_shree_in2004 @yahoo.com Mob. 9998237716 9879072262				
22	M/s. Bhavya Engineering Works and Multiservices	Near Tee Bhanushali nagar, Bhuj-Kutch- 370001 Email: bhavyaengineeringw orks21@gmail.com Mob. 9427704592 9824682718	Non Haz	Garbage	Annexure V	27/05/ 2025

**Waste agencies also operating at Vadinar port*

7.4.3.Storage:

The shipping waste of ships calling at DPA ports is directly picked up by Waste Management Agencies in timely manner hence there is no requirement and provision for storage of waste on-site

7.4.4.Intramural transportation

Intramural transportation of any kind of waste is not required as the agency collects the waste from the ships directly, offloads and transfers it through agency's vehicle itself.

7.5. Record keeping

As per HWM Rules, 2016,

- a. DPA Ports shall maintain a record of hazardous and other wastes received at ports and collected from port by WMA in a specified Form 3
- b) Prepare an annual return containing the details specified in a specified Form 4 and submit it to the Gujarat Pollution Control Board on or before the 30th June following the financial year to which that return relates.

The guidelines for filling of Forms as mandated under the HOWM Rules have been covered in detail in Training Manual.

7.6. Procedure adopted for engagement of external agencies/private operators

DPA has appointed 22 Waste Management Agencies for management of its shipping waste management. It yearly renews the contract of these agencies. The selection criteria of the WMA, as followed by DPA includes:

- The agency dealing in Hazardous wastes shall hold a valid authorization from GPCB
- The agency shall obtain No Objection Certificate (NOC) from DPA customs department and Public Health Officer, Kandla
- The agency shall have required equipments and incinerator installed for environmentally sound management of wastes.
- The waste shall be collected, transported and disposed in timely manner
- The agency should be certified as collector, transporter and actual user. Further uploading on Swachh Sagar Portal with be in-line with entries of hazardous waste collected from each ship to be made in relevant Form (3) and to be uploaded on Swachh Sagar Portal. Form 4 maintained by occupier and pages of passbook required to be maintained by actual user to be uploaded on Swachh Sagar portal annually by 30th June every year.

7.7. Obtaining Authorization/Clearance/License

- DPA is required to and has obtained authorization under Hazardous and Other Waste Management Rules, 2016 from the Gujarat Pollution Control Board as an occupier. The details of Authorization obtained by DPA from GPCB are given below:

Table 21 Details of Authorization

Consent order no.	Date of Issue	Validity	Hazardous waste (HW) at the ports	Consented quantity of HW MT/year
AWH-110594	22/01/2021	21/07/2025	Used spent oil	4250
			Waste residue containing oil	8500

7.8. Recommendations and strategies

- Various types of garbage are received at ports from ships. These wastes differ in type, size and hazardousness. It is recommended that a port recycling program be developed for sustainable management of shipping garbage. The garbage can be segregated into streams like:
 - **Non-recyclable;** Plastics and plastics mixed with non-plastic garbage
 - **Recyclable:** Cooking oil, glass, wood, metal, paper, cardboard, Styrofoam plastic etc.
 - **Potentially Hazardous garbage:** oily rags, light bulbs, acids, batteries, chemicals, medical waste etc.

- **E-waste generated on ships:** electronic cards, gadgets, instruments, equipment, computers, printer cartridges, etc.
- Information of such recycling programs and their requirements should be communicated to the ships. This would enhance the reuse or recycling of the waste streams.
- A procedure for annual assessment should be put in place to assess the need for capacity expansion in terms of employment of various agencies for waste collection, taking into account possible changes in traffic in the upcoming years and data collected from Swachh Sagar portal.
- DPA should formulate and disburse a document describing the procedures for advance notification by ships in accordance with Swachh Sagar requirements and the reception and collection of waste from ships through the Swachh Sagar Portal.
- DPA should have in place the procedure followed for approval and re-approval of agencies for Hazardous waste, taking into account the points mentioned below:
 - i. The waste receipts shall be collected from each agency which should contain particulars regarding the type and quantity of the waste substances, the means of transport and details regarding the producer or generator, carrier and party attending to the disposal. In this manner, the route taken by the waste material becomes evident step by step for the competent authorities and also for the companies involved.
 - ii. A storage facility should be provided at port area as a provision of waste storage on account of untimely waste collection by the agencies. These areas should be such that they do not create unhygienic and insanitary conditions around it. Following criteria shall be taken into account while establishing and maintaining storage facilities, namely:
 - Storage facilities shall be created and established by taking into account quantities of waste generation and densities. A storage facility shall be so placed that it is accessible to users; Its design should be such that the wastes stored are not exposed to open atmosphere and shall be aesthetically acceptable and user-friendly.
 - Storage facilities or bins shall have 'easy to operate' design for handling, transfer and transportation of waste. Bins for storage of bio-degradable wastes shall be painted green, those for storage of recyclable wastes shall be printed white and those for storage of other wastes shall be printed black.
 - Manual handling of waste shall be prohibited. If unavoidable due to constraints, manual handling shall be carried out under proper precaution with due care for safety of workers.

- The vehicles used by the agencies for transportation of wastes to authorized processing facilities shall be covered. Waste should not be visible to public, nor exposed to open environment preventing their scattering.
 - The storage facilities set up shall be daily attended for clearing of wastes. The bins or containers wherever placed shall be cleaned before they start overflowing.
 - Transportation vehicles shall be so designed that multiple handling of wastes, prior to final disposal, is avoided.
 - In case the agency responsible for disposal do not provide a receipt of waste collected from transporter, a means for tracking transporting vehicle shall be employed.
 - In case of oil spill accidents provisions stated in Oil Spill Management Plan shall be strictly adhered to
- Specific recommendations for waste categories defined under MARPOL are as below:

MARPOL Annexures	Recommendations
Annex I	Oily-water mixture collected from an incident to be transferred directly to Reception Facility Area for storage and disposed through Port authorized recycler
	The Waste material containing oil like oil-soaked rags, overalls, sand, saw dust, absorbent pads, absorbent booms etc., collected during an Incident to be disposed to the authorized recycler for incineration
	The authorized recycler must take the permission from the Port and Custom for the disposal of Waste material containing oil etc. generated from an oil spill incident
	The authorized recycler must submit the detailed information on authorized GPS vehicle and details of authorized drivers.
	After collecting the material, the authorized recycler must declare to the Port and Custom as per category of Hazardous waste management rules 2016 schedule I along with Quantity
	E-manifest entries and Form-10 will be generated and it shall be given to authorized recycler for transportation.
	After the incineration the final disposal certificate and pass book copy for the same to be submitted to DPA
	The following documents has to be submitted by the authorized recycler Drive, License Number Vehicle fitness letter Emission certificate

	<p>GPS Number Weigh bridge receipt Form-10 Final Disposal Certificate</p>
Annex V	<p>Through Swachh Sagar Portal, the master/ steamer agent on behalf of vessel to intimate the garbage collecting agency approved by the Port for collection of garbage about the category of waste in order to arrange necessary receptacles and vehicles for proper collection without undue delay.</p>
	<p>On the request from the vessel, the garbage collecting agency has to obtain necessary permission from the Port Authority & Customs for each vessel in order to board the vessel for collection of garbage in each case.</p>
	<p>The garbage should be collected by the designated Agency duly following the terms and conditions of the work order issued by the Port and Segregation of the garbage to be carried out as per the Municipal Solid Waste Rule, no mixing of garbage is allowed at any point of time.</p>
	<p>The copy of waste delivery receipt to be submitted/forwarded to the concerned department after collection of garbage from each and every ship.</p>
	<p>Copies of the Waste Delivery Receipt, Permission letter obtained from the Port/Customs and any other documents as required at the gate are to be produced while going out from the Port.</p>
	<p>The Garbage Collecting Agency of the Port shall provide copies of following to the Port: Permission letters issued by the port/customs for clearing of waste/garbage along with type and quantity. Waste Delivery Certificate signed by the Master of the vessel and issued to the vessel.</p>
Annex V	<p>Through Swachh Sagar Portal the master/ steamer agent on behalf of the vessel to intimate the collecting agency designated by the Port for collection of wastes such as used cooking oil, expired medicine, Fishing Gear, e-waste and used batteries in order to arrange necessary receptacles and vehicles for proper collection before vessel berthing.</p>
	<p>On the request from the vessel, the collecting agency has to obtain necessary permission from the Port & Customs for each vessel in order to board the vessel for collection of cooking oil, expired medicine, Fishing Gear, e-waste and used batteries.</p>
	<p>A standard format of waste delivery receipt provided by the D.G. Shipping to be filled up and signed by the vessel and garbage collecting</p>

	agency for collection of used cooking oil, fishing gear, expired medicine, e-waste and used batteries.
	The copy of waste delivery receipt to be submitted/forwarded to the concerned department by the collecting agency soon after collection for every ship.
	Fishing Gear, used cooking oil, E-waste and used batteries has to be declared to the Customs. Collecting agency has to obtain the bill of entry with applicable duty paid if any or otherwise declaration of customs may be submitted to the concerned department.
	Copies of the Waste Delivery/ Receipt, Permission letter obtained from the Port/Customs and any other documents required at the port gate are to be produced while going out from the Port.

7.8.1 Provision of an Effluent Treatment Plant (ETP)

An effluent treatment plant (ETP) is proposed to be installed at the port to treat the following types of wastes / effluent:

- Wastewater, waste oil or any liquid waste from any ship (Only in case of exigency situation when the waste collection agency is unable to collect waste timely resulting the ship to remain docked and causing delays)
- Effluents from proposed Green Hydrogen plants (salts, waste from electrolysis etc.)
- Waste oil from routine maintenance of tugs, cranes, crafts etc.

The following unit operations and processes are proposed for the ETP:

1. Preliminary Treatment

- **Screening:** to remove large particles and debris from the wastewater.
- **Equalization Tank:** to balance the flow rate and homogenize the wastewater composition as two streams of wastewater from the ships/port and Green Hydrogen unit are to be treated in the ETP.
- **Dissolved Air Flotation (DAF):** for oil removal

2. Primary Treatment

- **Neutralization:** Use acid dosing (e.g., hydrochloric acid) to neutralize the high pH caused by alkaline salts.

- **Coagulation and Flocculation:** Adding coagulants (like aluminum sulfate) to agglomerate suspended particles and trace metals.

3. Secondary Treatment

- **Chemical Precipitation:** Adding agents (such as lime or sulfides) to precipitate heavy trace metals like nickel, iron, and chromium.
- **Sedimentation:** Settling tanks to remove the precipitated metals and other suspended solids.

4. Tertiary Treatment

- **Reverse Osmosis (RO) or Electrodialysis:** to reduce TDS and conductivity. These processes will help in removing dissolved salts and metals.
- **Deaeration:** To remove dissolved gases like oxygen and hydrogen, typically using vacuum deaeration or stripping.

5. Advanced Treatment

- **Ion Exchange:** To further remove specific ions (e.g., Na⁺, K⁺).
- **Adsorption (Activated Carbon):** For any remaining organic contaminants or trace metals.

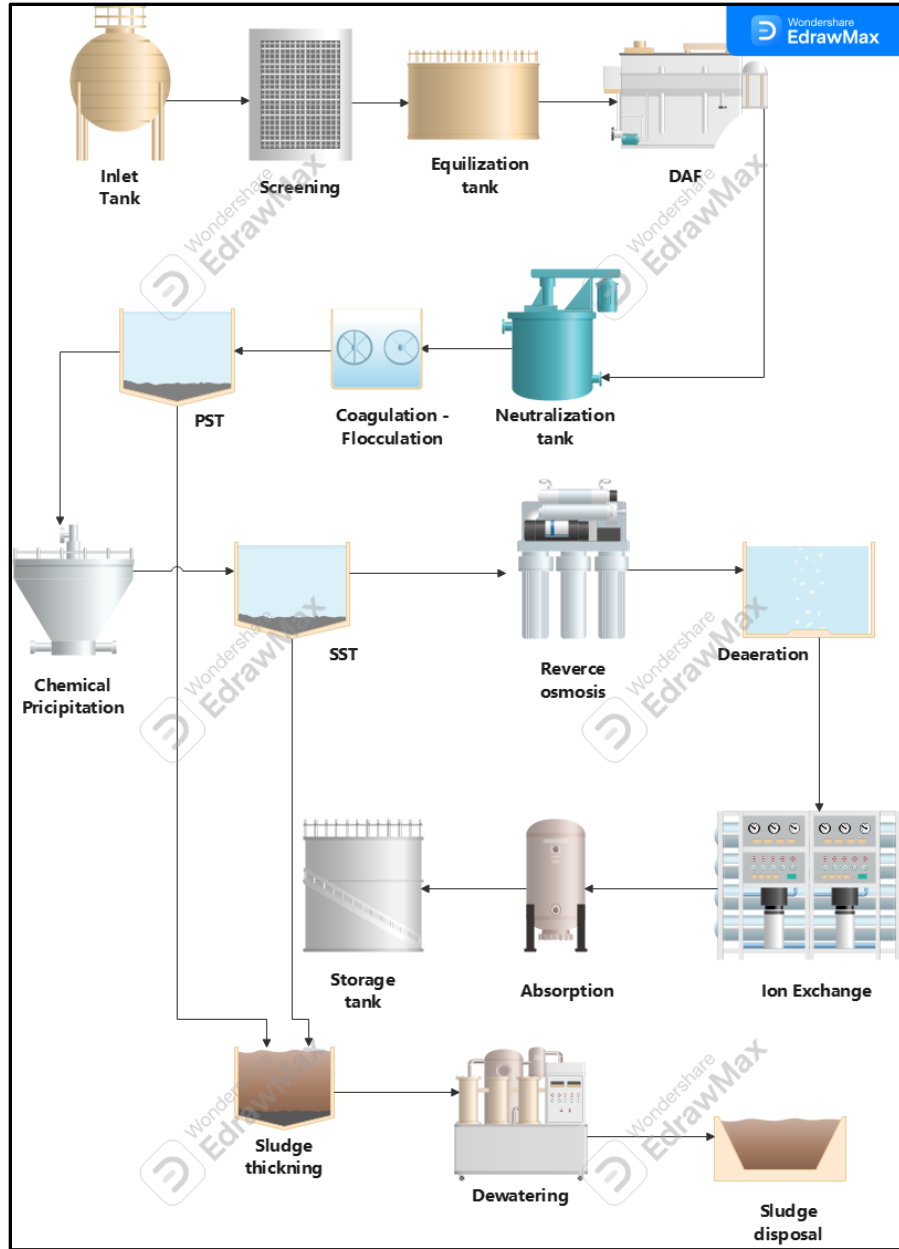
6. Final Treatment

- **pH Adjustment:** Ensuring that the final effluent is within the acceptable pH range for discharge.

7. Sludge Handling

- **Sludge Thickening:** To reduce the volume of sludge.
- **Dewatering:** Use of filter presses or centrifuges to further reduce sludge volume.
- **Sludge Disposal:** Depending on the composition, sludge may be disposed of in landfills or incinerated.

Schematic of proposed ETP is as below:



The proposed ETP, its capacity and treatment processes need to be carefully designed after taking into consideration the following factors:

- Estimated quantity of wastewater to be treated
- Quality of the wastewater to be treated
- Outlet quality of the effluent to be achieved

ANNEXURES

Annexure I: Non-exhaustive list of Organic Waste Converter (OWC) dealers

Sr. no.	Name	Location	Contact number	Capacity range of available OWC in kg/day	Quantity of Compost produced kg/day
1	Green-era Engineering LLP	Ahmedabad	8048955688	15-1000	10-15 %
2	Greenautics Solution		6353318966	50-700	
3	Unique Industries		9998600358	25-225	
4	Aaspa Equipment Pvt. Ltd.		9898341024	15-1000	
5	Envipure		9998319355	10-1000	
6	Envcure Technocrate LLP		7874757199	15-1000	
7	Envicare Solutions Pvt. Ltd.	Kheda	9727678804	5-2000	

Annexure II: List of Single Use Plastic items banned under the Plastic Waste Management Rules, 2016 (and subsequent amendments)

Sr. no	List of banned Plastic items
1	Plastic Sticks for Balloons
2	Plastic Flags
3	Candy Sticks
4	Ice Cream Sticks
5	Polystyrene (Thermocol) for Decoration
6	Plastic Plates, Cups, Glasses
7	Cutlery Such as Forks, Spoons, Knives, Straw, Trays
8	Wrapping or Packing Films Around Sweet Boxes
9	Invitation Cards
10	Cigarette Packets
11	Plastic or PVC Banners Less Than 100 micron
12	Plastic Stirrers.
13	Plastic carry bags having thickness less than 120 micron

Annexure III: Non-exhaustive list of GPCB approved plastic waste management agencies (Recyclers)

Sr No.	Name & Address of recyclers	Name of Product	Quantity (MT/M
1.	Imperial overseas Pvt Ltd. (U-2)Shed No-93-96, Sec-1, KASEZ, Ta-Gandhidham, Dist.- Kutch	Recycled Agglomerates/Granules	300
2.	Add polymer Pvt Ltd, (U-2) Plot No-3, Sec-2, KASEZ, Ta- Gandhidham, Dist.- Kutch	Recycled Agglomerates/Granules	202
3.	Prasar Enterprises Shed No-335, A-II, MarshalingYard, KASEZ, Ta- Gandhidham, Dist.- Kutch	Recycled Agglomerates/ Granules/ Flakes/ Lumps/ Palltes/ Powder/ Shreddings	500
4.	Harish Processors Ltd.,Shed No- A/305, 408, Marshelling Yard, KASEZ, Ta-Gandhidham, Dist.- Kutch	Recycled Agglomerates/Granules	285
5.	Kutch Polymers (U-1), Shed No- A/1, 180, 181, Sec- 1, KASEZ, Ta-Gandhidham, Dist.- Kutch	Recycled Agglomerates/	250
6.	Kutch Polymers (U-2), Shed No- 334, Sec- 2, KASEZ, Ta- Gandhidham, Dist.- Kutch	Recycled Agglomerates/ Granules	250
7.	Plasto fine Industries (U-1), Plot No-271, 276, Sec-3, KASEZ, Ta-Gandhidham, Dist- Kutch	Recycled Agglomerates/ Granules	300
8.	Luckystar International Pvt Ltd., Shed No-336, Sec-1, KASEZ, Ta-Gandhidham, Dist- Kutch	Plastic agglomerates /Granules /Grindings/Offcuts/Sheets/Extruded Product/Blow Film/Molded Articles & plastic products	400
9.	Lucky star International Pvt Ltd., Plot No-23, 24, 33, 34, Sec-1, KASEZ, Ta-Gandhidham, Dist- Kutch	Plastic Agglomerate s/ Granules/ Grindings/ Offcuts/ Sheets/ Extruded product/ Blow Film/ Molded Articles & plastic products	900
10.	Mokshstar International, Shed No-337, 338, Sec-1, KASEZ, Ta-Gandhidham, Dist- Kutch	Plastic Agglomerates/ Granules/ Grindings/ Offcuts/ Sheets/ Extruded Product / Blow Film/ Molded Articles & Plastic Products	850
11.	Shreeji Polymers, Plot No-8A, Sec-2, KASEZ, Ta- Gandhidham, Dist- Kutch	Plastic Agglomerates/ Granules/ Grindings/ Offcuts/ Sheets/ Extruded Product/ Blow Film/ Molded Articles & Plastic Products	750
12.	Polyrec Processors Pvt. Ltd., Plot	Recycled Agglomerates/ Granules	250

	No-278, 279, Sec- 3, KASEZ, Ta-Gandhidham, Dist- Kutch		
13.	Oswal Polymers, Plot No-4 & 11, Sec-2, KASEZ, Ta-Gandhidham, Dist-Kutch	Recycled Agglomerates/ Granules	200
14.	Balze International, Shed No- 292, Sec-2, KASEZ, Ta-Gandhidham, Dist-Kutch	Recycled Agglomerates/ Granules	300

Annexure IV: Non-exhaustive list of GPCB approved E-waste Recyclers

Sr. no.	Details of WMA	Services provided	Contact details	Capacity MT/Year	Validity
1	Pruthvi E-recycle Pvt Ltd. Survey No.160/1, Plot no: 12, Tirupati Estate, Lothada-360002, Rajkot- 360002	Collection, Segregation, Transportation, Dismantling, & Primary Processing	9825196768, 9909138598 pruthvirecycle@ymail.com	6600	05/01/2028
2	Galaxy Recycling Sr. no: 36/P1, P2, 37/P2, 38/P2, Plot no: 52 & 53, Near Tirth agro. Pvt. Ltd., At: bharudi, Tal: Gondal, Rajkot	Collection, Segregation, Dismantling, Recycling, transportation	9328259627 galaxyrecyclng@gmail.com	521	25/09/2026
3	Star Recycling, Survey no: 44 P1P1 44P1P2 & 46, Plot no: 45, R K Industrial Zone-09, Kuwadva-Wankaner Road, Ranpur- 360023, Tal & Dist: Rajkot	Collection, Transportation, Storage, Dismantling, Recycling	9925116383 Starrecycling2018@gmail.com	629	10/03/2025
4	GL Recycling LLP, Survey No. 108, Village: Soliya, Ta.:Kotda Sangani, Dist.: Rajkot-360030	Collection, Transportation, Storage, Dismantling, Recycling) Of Items Covered Under Schedule-I Of Except Fluorescent And Other Mercury Containing Lamp	9016864546 info@glrecycling.co.in	14500	27/05/2026
5	Reart Recycling Private Limited., Plot No.365, Survey No.111p1, Golden Green Industrial Park (phase- D), Khambha-360311, Tal:Lodhika, Dist:Rajkot	Collection, Segregation, Transportation, Shredding, Crushing, Grinding Etc. I.E. Primary Processing For PCBs Only	9023566456, 9426320055 cmsavsani@gmail.com	300	23/06/2026

6	Unity E-Recycling Co, Sr. No: 310/p, Plot No: 4, Danilimda, Ahmedabad-380028	collection, transportation, Storage, Dismantling, Recycling) Of Items Except CRT / LCD / Plasma TV, Fluorescent and Other Mercury Containing Lamp	9726810910 unityerecyclingco@gmail .com	383	31/12/2025
7	Mahaarana Industries Pvt. Ltd., Survey No. 466 & 475, Village: Timba, Ta: Daskroi, Dist; Ahmedabad	Collection, Transportation, Storage, Dismantling, Recycling) Of Items Except Fluorescent and Other Mercury Containing Lamp	8866025118 ewastemanagement216@ gmail.com	16585	15/05/2026
8	Kalpana E-Recyclers, Plot No. 2486, Madhuban Industrial Park, Village: Kuha, Ta: Daskroi, Dist: Ahmedabad	Collection, Storage, Segregation, Dismantling, Transportation, Refurbishing, Repairing, Shredding, Cutting, Recycling	9998680123 prakashnagora1822@gm ail.com	876	22/01/2026
9	E -Ali Recyclers, (GPCB ID: 89636) Plot No.:730, Survey No. 730, Plot No. 3, Village: Paldi Kankaj, C448, Ta. : Daskroi, Dist.: Ahmedabad - 382425	Collection, Transportation, Storage, Dismantling, Recycling) Of Items Except Fluorescent and Other Mercury Containing Lamp	7096969252 ealirecyclers22@gmail.com	730	31/12/2027
10	Mangalam ECS Environment Pvt. Ltd., (Unit -2) Block No 24 Paiki, Vautha, Tal : Dholka, Dist.:	Collection, Transportation, Storage, Refurbishing of items ITEW1, ITEW2, ITEW3	8980005008 8980005066 hardik.mandora@ecscorp oration.com	4999.92	30/09/2027

	Ahmedabad-387810	and ITEW4 as per EPR except Fluorescent and other mercury containing lamps			
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Annexure V: List of items to be disposed through GeM portal as on June 2024

Sr.	Items / Lot Description	Qty.	UOM
1	M.L. Mrignayani Mooring Launch	1	No
2	M.L. Megha Mooring Launch	1	No
3	ML Parijatham	1	No
4	M.L. Arali Mooring Launch	1	No
5	Tank Lorry GJ 12G 8128	1	No
6	Tata Xenon Pick Up Van GJ-12-1388	1	Nos.
7	Fire Fighting Pumps - Dismantled condition (As per list)	1	Nos.
8	Fire Fighting Pumps - 02 Nos. Dismantled condition (As per list)	1	Lot
9	Water cum foam Monitor (Mobile)	2	Nos.
10	Trolley Mounted DCP Unit	3	Nos.
11	Workshop Machines	1	Lot
12	Hospital Items	1	Lot
13	Old M.S Propeller hollow shaft (Assorted size)	11	Nos.
14	Old S.S Propeller shaft (Assorted size)	51	Nos.
15	Old engine (Assorted)	5	Nos.
16	Old Propeller Brass (Assorted size)	13	Nos.
17	Empty Mobile Grease/Oil Drums (i.e. 39 (Store) & 50 (Elect. division))	89	Nos
18	Waste Oil (Transformer/Hydraulic Oil)	5000	Ltrs
19	Uniform Cloths	1	Lot
20	Unserviceable Ceiling Fan	1600	Nos.
21	Electronic waste	7	MT
22	Aluminium & Die Cast Light Fittings (Assorted Sizes)	8	Ton
23	Assorted Marine Steel Scrap	1.5	Ton
24	Plastic Scrap	3.112	MT
25	Rubber Scrap	31.75	MT
26	U/s A.c and Water Cooler Scrap	2.45	MT
27	MS Scrap Assorted	16	Ton
	i. Stainless Steel Feeder Piller -02 Ton		
	ii. Control Gear Box with Choke - 05 Ton		
	iii. Iron Cable Drum - 03 Ton		
	iv. Operator Cabin -06 Ton		
28	Aluminium Cable Scrap	5	Ton
29	Wooden Cable Drum	5	Ton

30	Brass Scrap	455	Kgs
31	Slew Bearing	3	Ton
32	Wire Rope	4	Ton
33	Tyre	50	Nos.
34	Water Tender No. 1 GJ-12G-8125	1	Nos.
35	Foam Tender No. 1 GJ-12G-8124	1	Nos.
36	Water Tender No. 1 GJ-12G-8126	1	Nos.
37	Distilled Water Plant (SS) Cap: 4 to 5 Ltr	1	Nos.
38	Water Mist and CAF Fire Extinguisher Back Pack	1	Nos.
39	Air Compressor (BA Set Cylinder)	1	Nos.

Annexure VI

Biomedical wastes categories and their segregation, collection, treatment, processing and disposal options as per Schedule I of BMW Rules, 2016

Category	Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
(1)	(2)	(3)	(4)
Yellow	(a) Human Anatomical Waste: Human tissues, organs, body parts and fetus below the viability period (as per the Medical Termination of Pregnancy Act 1971, amended from time to time).	Yellow coloured non-chlorinated plastic bags	Incineration or Plasma Pyrolysis or deep burial*
	(b) Animal Anatomical Waste: Experimental animal carcasses, body parts, organs, tissues, including the waste generated from animals used in experiments or testing in veterinary hospitals or colleges or animal houses.		
	(c) Soiled Waste: Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs and bags containing residual or discarded blood and blood components.		Incineration or Plasma Pyrolysis or deep burial* In absence of above facilities, autoclaving or micro-waving/ hydroclaving followed by shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery

	<p>(d) Expired or Discarded Medicines: Pharmaceutical waste like antibiotics, cytotoxic drugs including all items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc.</p>	<p>Yellow colored non-chlorinated plastic bags or containers</p>	<p>Expired cytotoxic drugs and items contaminated with cytotoxic drugs to be returned back to the manufacturer or supplier for incineration at temperature >1200 °C or to common bio-medical waste treatment facility or hazardous waste treatment, storage and disposal facility for incineration at >1200°C Or Encapsulation or Plasma Pyrolysis at >1200°C.</p> <p>All other discarded medicines shall be either sent back to manufacturer or disposed by incineration.</p>
	<p>(e) Chemical Waste: Chemicals used in production of biological and used or discarded disinfectants.</p>	<p>Yellow coloured containers or non-chlorinated plastic bags</p>	<p>Disposed of by incineration or Plasma Pyrolysis or Encapsulation in hazardous waste treatment, storage and disposal facility.</p>
	<p>(f) Chemical Liquid Waste: Liquid waste generated due to use of chemicals in production of biological and used or discarded disinfectants, Silver X-ray film developing liquid, discarded Formalin, infected secretions, aspirated body fluids, liquid from laboratories and floor washings, cleaning, house-keeping and disinfecting activities etc.</p>	<p>Separate collection system leading to effluent treatment system</p>	<p>After resource recovery, the chemical liquid waste shall be pre-treated before mixing with other waste water. The combined discharge shall conform to the discharge norms given in Schedule- III.</p>

	<p>(g) Discarded linen, mattresses, beddings contaminated with blood or body fluid, routine mask and gown.</p>	<p>Non-chlorinated yellow plastic bags or suitable packing material</p>	<p>Non-chlorinated chemical disinfection followed by incineration or Plazma Pyrolysis or for energy recovery.</p> <p>In absence of above facilities, shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery or incineration or Plazma Pyrolysis.</p>
	<p>(h) Microbiology, Biotechnology and other clinical laboratory waste: Blood bags, Laboratory cultures, stocks or specimens of micro-organisms, live or attenuated vaccines, human and animal cell cultures used in research, industrial laboratories, production of biological, residual toxins, dishes and devices used for cultures.</p>	<p>Autoclave or Microwave or Hydroclave safe plastic bags or containers;</p>	<p>Pre-treat to sterilize with non-chlorinated chemicals on-site as per as per World Health Organisation guidelines on Safe management of Waste from healthcare activities and WHO Blue Book, 2014 and thereafter sent for incineration;</p>
Red	<p>Contaminated Waste (Recyclable) (a) Wastes generated from disposable items such as tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles and <i>fixed needle syringes</i>) and vaccutainers with their needles cut) and gloves.</p>	<p>Red coloured non-chlorinated plastic bags or containers</p>	<p>Autoclaving or micro-waving/ hydroclaving followed by shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent to registered or authorized recyclers or for energy recovery or plastics to diesel or fuel oil or for road making, whichever is possible.</p> <p>Plastic waste should not be sent to landfill sites.</p>

<p>White (Translucent)</p>	<p>Waste sharps including Metals: Needles, syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades, or any other contaminated sharp object that may cause puncture and cuts. This includes both used, discarded and contaminated metal sharps</p>	<p>Puncture proof, Leak-proof, tamper-proof containers</p>	<p>Autoclaving or Dry Heat Sterilization followed by shredding or mutilation or encapsulation in metal container or cement concrete; combination of shredding cum autoclaving; and sent for final disposal to iron foundries (having consent to operate from the State Pollution Control Boards or Pollution Control Committees) or sanitary landfill or designated concrete waste sharp pit.</p>
<p>Blue</p>	<p>(a) Glassware: Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes.</p>	<p>Puncture proof and leak proof boxes or containers with blue colored marking;</p>	<p>Disinfection (by soaking the washed glass waste after cleaning with detergent and Sodium Hypochlorite treatment) or through autoclaving or microwaving or hydroclaving and then sent for recycling.</p>
	<p>(b) Metallic Body Implants</p>	<p>Puncture proof and leak proof boxes or containers with blue colored marking</p>	<p>Implants</p>

Annexure VII

ANNUAL REPORT (Form – IV) of BMW Rules, 2016

Sr. No.	Particulars		
1.	Particulars of the Occupier	:	
	(i) Name of the authorised person (occupier or operator of facility)	:	
	(ii) Name of HCF or CBMWTF	:	
	(iii) Address for Correspondence	:	
	(iv) Address of Facility		
	(v) Tel. No, Fax. No	:	
	(vi) E-mail ID	:	
	(vii) URL of Website		
	(viii) GPS coordinates of HCF or CBMWTF		
	(ix) Ownership of HCF or CBMWTF	:	(State Government or Private or Semi Govt. or any other)
	(x). Status of Authorisation under the Bio-Medical Waste (Management and Handling) Rules	:	Authorisation No.: valid up to
(xi). Status of Consents under Water Act and Air Act	:	Valid up to:	
2.	Type of Health Care Facility	:	
	(i) Bedded Hospital	:	No. of Beds:
	(ii) Non-bedded hospital (Clinic or Blood Bank or Clinical Laboratory or Research Institute or Veterinary Hospital or any other)	:	
	(iii) License number and its date of expiry		
	Details of CBMWTF	:	

3.	(i) Number healthcare facilities covered by CBMWTF	:				
	(ii) No of beds covered by CBMWTF	:				
	(iii) Installed treatment and disposal capacity of CBMWTF:	:	_____Kg per day			
	(iv) Quantity of biomedical waste treated or disposed by CBMWTF	:	_____Kg/day			
4.	Quantity of waste generated or disposed in Kg per annum (on monthly average basis)	:	Yellow Category:			
		:	Red Category:			
		:	White:			
		:	Blue Category:			
		:	General Solid waste:			
5.	Details of the Storage, treatment, transportation, processing and Disposal Facility					
	(i) Details of the on-site storage facility disposal facilities	:	Size :			
		:	Capacity:			
		:	Provision of on-site storage : (cold storage or any other provision)			
			Type of treatment Equipment	No of units	Capacity kg/day	Quantity treated or disposed in kg per annum
	Incinerators Plasma Pyrolysis Autoclaves Microwave Hydroclave Shredder Needle tip cutter Or Destroyer Sharps Encapsulation or concrete pit Deep burials pit: Chemical					

		Disinfection: Any other treatment equipment:			
	(iii) Quantity of recyclable wastes sold to authorized recyclers after treatment in kg per annum.				
	(iv) No of vehicles used for collection and transportation of biomedical waste				
	(v) Details of incineration ash and ETP sludge generated and disposed during the treatment of wastes in Kg per annum	Incineration Ash ETP Sludge	Quantity generated	Where disposed	
	(vi) Name of the Common Bio- Medical Waste Treatment Facility Operator through which wastes are disposed of				
	(vii) List of members HCF not handed over bio-medical waste.				
6.	Do you have bio-medical waste management committee? If yes, attach minutes of the meetings held during the reporting period				
7.	Details trainings conducted on BMW				
	(i) Number of trainings conducted on BMW Management.				
	(ii) number of personnel trained				
	(iii) number of personnel trained at the time of induction				
	(iv) number of personnel not undergone any training so far				
	(v) whether standard manual for training is available?				
	(vi) any other information)				
8	Details of the accident occurred during the year				

	(i) Number of Accidents occurred		
	(ii) Number of the persons affected		
	(iii) Remedial Action taken (Please attach details if any)		
	(iv) Any Fatality occurred, details.		
9.	Are you meeting the standards of air Pollution from the incinerator? How many times in last year could not met the standards?		
	Details of Continuous online emission monitoring systems installed		
10	Liquid waste generated and treatment methods in place. How many times you have not met the standards in a year?		
11	Is the disinfection method or sterilization meeting the log 4 standards? How many times you have not met the standards in a year?		
12	Any other relevant information	:	(Air Pollution Control Devices attached with the Incinerator)

Certified that the above report is for the period from

.....

Name and Signature of the Head of the Institution

Date:

Place

Annexure VIII: List of Information related to HCFs to be updated on website

Sr. no.	List of Information to be updated on website
1.	Contact Address and details of the Healthcare Facility:
2.	No. of beds:
3.	Details of: a) Authorisation under BMWM Rules, 2016: b) Consent under Water (Prevention and Control of Pollution) Act, 1974 and Air(Prevention and Control of Pollution) Act, 1981:
4.	Quantity of bio-medical waste generation (in kg/day):
5.	Mode of disposal of bio-medical waste (through CBWTF or through captivetreatment facility):
6.	Name and address of the CBWTF through which waste is disposed off (as applicable)
7.	In case, HCF is having captive treatment facility, a) bio-medical waste treated (in kg/day) b) Details of treatment equipment c) Total nos. and capacity of each treatment equipment (in kg/day) d) Operating parameters of the treatment equipment as per BMWM Rules, 2016
8.	8 Monthly records of bio-medical waste generation (category wise):
9.	No. of trainings conducted on Bio-medical Waste Management in the current year: Stats of immunization of Health Care Workers involved in handling of BMW:

Annexure IX: Potential Uses of C & D Wastes

C & D waste	Potential use of C & D wastes
Concrete	<p>The utilization of recycled aggregate is particularly very promising as 75 per cent of concrete is made of aggregates.</p> <p>Opportunity: The enormous quantities of demolished concrete can easily be recycled as aggregate and used in concrete. Research & Development activities have been taken up all over the world for proving its feasibility, economic viability and cost effectiveness.</p> <p>Work on recycled concrete has been carried out at few places in India by CBRI and CRRRI, but waste and quality of raw material produced being site specific, tremendous inputs are necessary if recycled material has to be used in construction for producing high grade concrete.</p>
Bricks	<p>If deconstructed properly, bricks can be reused after removal of mortar. Broken bricks can be used for refilling or for manufacturing debris paver blocks or debris blocks.</p>
Stone	<p>Stone can be reused for plinth formation, masonry construction, landscape purpose, ledges, platforms, window sills, coping etc. depending upon the form of available stones.</p>
Timber	<p>Timber elements from deconstructed building may have aesthetic and antique value.</p> <p>Opportunity: Whole timber arising from construction and demolition works can be utilized easily and directly for reused in other construction projects after cleaning, de-nailing and sizing.</p>
Plywood and other timber based boards	<p>Plywood and other timber-based boards can be either reused for interior works in new construction or it can be recycled for manufacturing of timber-based boards.</p>
Gypsum	<p>In India, over 10 about of waste gypsum such as phosphor-gypsum, Fluro-gypsum etc., are being generated annually.</p> <p>Opportunity: Plaster developed from this waste gypsum has showed improved engineering properties without any harmful effect. Phosphor-gypsum and lime sludge can be recycled for manufacture of Portland cement, masonry cement, sand lime bricks, partition walls, flooring tiles, blocks, gypsum plaster, fibrous gypsum boards, and super-sulphate cement.</p>
Metals & metal alloys-	<p>Ferrous Metals are the most profitable and recyclable material. Scrap steel is almost totally recycled and allowed repeated recycling. Structural steel can be reused as well as 100% steel can be recycled to avoid wastage at construction site.</p> <p>Advantage: Generally sold to a scrap metal dealer at a specified price. Metals like scrap iron can be mixed with the virgin metal in the foundry. In India more than 80% scrap arising is recycled.</p>
Nonferrous metal	<p>The main nonferrous metal collected from construction and demolition sites are aluminum, copper, lead and zinc.</p> <p>Opportunity: In India aluminum and copper are recycled and are valuable resources</p>

<p>Debris</p>	<p>Construction debris can be recycled to manufacture paver blocks which can be used in light traffic areas and masonry blocks. Other uses of processed debris include use in lean concrete for leveling purpose, as mortar for masonry, as bedding mortar for pavement tiles and used for land filling materials is comparable with new materials.</p> <p>Opportunity: Market potential on an average in Pune city estimates about 40 crores of bricks in a year.</p>
<p>Composite materials</p>	<p>The plastic wastes are best for recycling if these materials are collected separately and cleaned. Recycling is difficult if plastic wastes are mixed with other plastics or contaminants. Plastic may be recycled and used in products specifically designed for the utilization of recycled plastic, such as street furniture, roof and floor, PVC window noise barrier, cable ducting, panel.</p> <p>Constraint: The third largest consumer of composite materials is construction sector, automobile and aeronautics being first two largest consumers. Composite materials like thermoplastics are not only using non-renewable resources, they are non-biodegradable products. Thermoplastics (Polycarbonate, polyethylene, polypropylene, PVC etc.) can be recycled, but recycling involves high costs, whereas thermosets (Epoxy adhesives) are difficult to recycle. The lack of adequate markets, high recycling cost, and lower quality of the recyclates are the major commercialization barriers in recycling of composite materials. PVC-U sourced mostly from window and door fabricators is being recycled into wiring accessories and cable management systems including skirting and trunking. Composite materials can be down-cycled.</p>
<p>Ref : https://www.researchgate.net/publication/256677141 construction and demolition waste management with reference to case study of Pune</p>	

Annexure X: Proposed responsibility and constitution of the Waste Management Cell (WMC) for DPA

Note: DPA managed premises mentioned herein refers to all residential, commercial and other area under the control of DPA in Gandhidham, Kandla and Vadinar.

The broad scope of work for proposed WMC are as below:

1. Develop, implement and manage Waste Management Systems for all types of wastes i.e., Municipal Solid, Plastic, Bio-medical, Construction & Demolition, e-waste and Shipping wastes in accordance with the Waste Management Plan.
2. Co-ordinate with all departments of DPA and maintain records pertaining to all generated wastes in designated format.
3. Monitor the segregation and storage of all types of wastes generated at all DPA premises.
4. Monitor the activities like collection, transport and disposal by all Waste Management Agencies appointed by DPA.
5. Maintain all documentation (Waste inventories/Forms/Records/Receipts etc.) as per the requirements mentioned in the Waste Management Plan.
6. To coordinate and comply with all applicable statutory requirements.
7. Prepare and submit documents (Forms/ Returns/ Compliances etc.) to concerned authority.
8. Conduct regular visits, in and surrounding all DPA premises for reviewing implementation and updating of the waste management systems.
9. Training and capacity building of waste management staff from time to time.
10. Assist concerned DPA officials in legal and regulatory matters pertaining to waste management.
11. Remain up to date with any new legal or other requirement pertaining to waste management.
12. Organize awareness programs/ campaigns and other IEC activities from time to time, relating to waste management.

Constitution of WMC

Sr. No	Category of professionals	Qualification	Experience
1.	Manager (Waste): 02 personnel	A Post-graduate in Environmental Sciences/ Environmental Engineering/ Coastal/Marine Environmental Science and Marine Science	Minimum 02-years' experience in waste management and in-depth knowledge about environmental regulations pertaining to all types of wastes i.e., (Municipal Solid, Plastic, Bio-medical, Construction & Demolition, battery, Shipping and E-waste)
2.	Assistant (Waste) :- 04 personnel	A Graduate in Environmental Sciences/ Environmental Engineering/ Coastal/Marine Environmental Science and Marine Science	Minimum 01-year experience in areas like Inventorization, audit, EPR and awareness programs related to waste management.

PART-2
TRAINING MANUAL

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Chapter-1

Municipal Solid Waste

1.1. Introduction

Waste (or wastes) is unwanted or unusable material. Waste is any substance which is discarded after primary use, or is worthless, defective and of no use. A by-product by contrast is a joint product of relatively minor economic value. A waste product may become a by-product, joint product or resource through an invention that raises a waste product's value above zero.

Municipal solid waste (MSW) includes waste from households, non-hazardous solid waste from industrial, commercial and institutional establishments (excluding bio-medical waste in present context), market waste, yard waste, agricultural wastes and street sweepings. Industrial and community hazardous waste and infectious waste, is not considered as MSW and should be collected and processed separately. MSW (Management and Handling) Rules 2000 defines MSW as “*commercial and residential wastes generated in municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes*”. MSW management encompasses the functions of collection, transfer & transportation, processing & recycling, and disposal of MSW. Safe and cost-effective management of MSW is a significant environmental challenge for modern society. Inadequately managed waste disposal has the potential to affect the health and environment. Ideally MSW management should incorporate the principles of waste minimization, recycling, resource recovery as well as an integrated processing & disposal facility, leading to effective service delivery in a sustainable manner

1.2. Different categories of Wastes

- **Municipal Solid waste:** Municipal solid waste includes commercial and domestic wastes generated in municipal or notified areas or either solid or semi-solid form excluding industrial hazardous wastes but including treated biomedical wastes.
- **Domestic Waste:** Domestic waste is one of the most important components of MSW. Domestic wastes include food waste, paper, glass, metals, plastics, textiles, etc. A large part of domestic waste consists of plant and animal waste such as vegetables, fruit peel, bone and meat waste etc. which are considered wet wastes. Paper, cardboard, old newspapers, books, plastic items, disposable dishes, toys, metal, glass cans obsolete items etc. also make up another large portion of domestic dry waste.
- **Commercial Waste:** Commercial waste consists of waste from premises used mainly for the general purposes of a business or trade or recreation, education, sport, or entertainment. It does not include household, agricultural, or industrial waste as a result of construction activities. It doesn't matter whether the waste is generated in a residential

or a commercial area. For example, the waste generated by a lawn-mowing company on the premises of the client's home is commercial waste. Commercial waste is non-hazardous

- **Industrial solid waste including Hazardous waste:** The term industrial waste describes toxic waste from industrial operations including mining, refining the metallic and non-metallic resources and using these resources in the manufacturing processes to produce different intermediates of products. Sectors like food processing industries, metallurgical, crude petroleum refining, chemical and pharmaceutical operations, fertilizer, cement, and breweries among other sectors produce industrial waste. The most affected is the health of people residing nearby the dumping sites. Industrial waste causes harm to the water bodies causing the destruction of fish, pollution of groundwater and release of foul odors.

Hazardous waste: Any waste that poses a threat to human health and the environment if not handled or managed properly. For this reason, many countries have strict regulations on the storage, collection and treatment of hazardous waste. The Basel Convention and the OECD Decision include lists of waste streams, characteristics and components that fall within the definition of hazardous waste. Most hazardous waste originates from industrial production.

- **Agricultural Waste:** The waste generated by agriculture includes waste from crops and livestock. Some of the waste is produced by agro-based industries viz. rice milling, tobacco etc. Agricultural wastes include rice husk, stubble/parali, degasses, ground nut shells and straws of cereals etc.
- **Biomedical Waste:** It is a form of infectious waste and involves waste from the treatment of diseases in humans and animals. This type of waste usually consists of medicines, sharp objects, bandages, chemicals, pharmaceuticals, body fluids and body parts (from amputations and surgery). Healthcare waste may be infectious, toxic or radioactive.
- **Plastic Waste:** Plastic is the general common term for a wide range of synthetic or semi-synthetic organic amorphous solid materials derived from oil and natural gas. The word 'Plastic' is derived from the Greek word 'Plastikos' meaning fit for moulding & 'Plastos' meaning moulded.
- **E-waste:** E-waste is a generic term for waste originating from out of life electric and electronic equipment, such as computers, televisions mobile phones and home appliances etc. Some component of E-waste is categorized as hazardous waste due to their toxic

components, such as lead, quicksilver, cadmium, mercury and brominated flame retardants. These materials can cause health damage if not treated properly.

- **Construction and Demolition waste:** Construction and demolition (C&D) waste is generated from construction, renovation, repair, and demolition of houses, large building structures, roads, bridges, piers, and dams. C&D waste is made up of wood, steel, concrete, gypsum, masonry, plaster, metal, and asphalt. C&D waste is notable because it can contain hazardous materials such as asbestos and lead. Estimates vary, but a commonly accepted estimate is that between 15 per cent and 20 per cent of municipal solid waste comes from construction and demolition projects.

1.3. Training on Municipal Solid Waste Management for various stakeholders

There is an urgent need to train and enhance the capacities of all stakeholders involved in MSW management activities to ensure efficient implementation of MSW management system from handling at the point of generation to its disposal. The following are all stakeholders involved in capacity building in MSWM as shown in figure 1

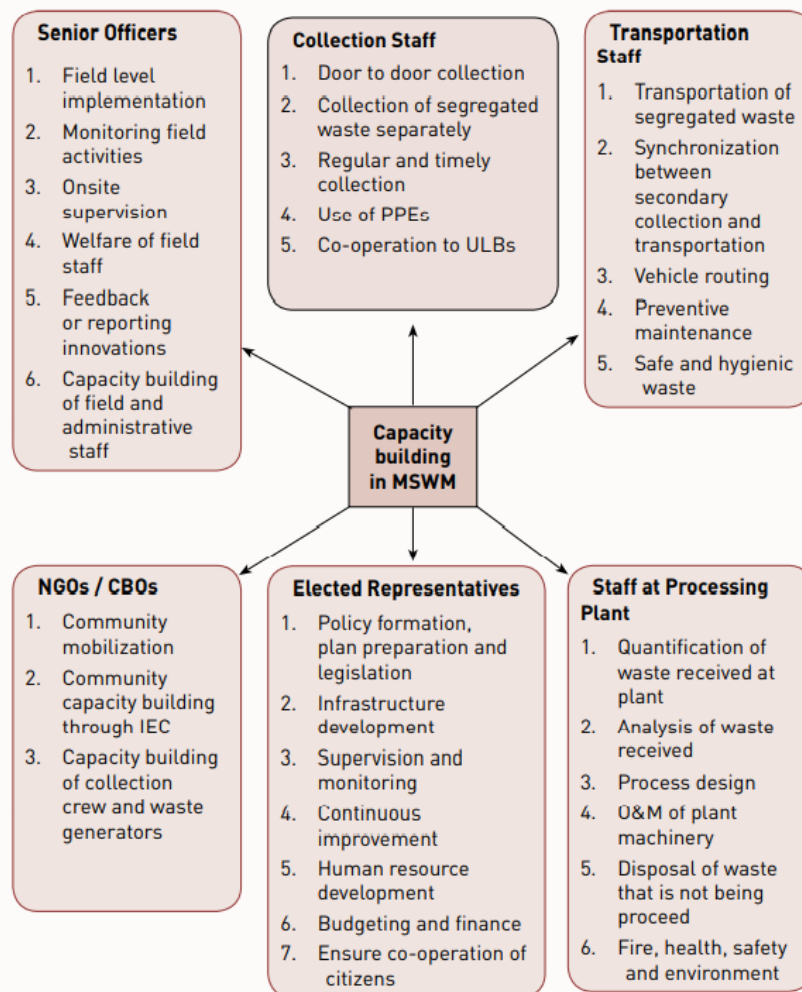


Figure 1 Capacity building in MSWM

Target audience: Citizens (Residents, office and port staff)

Citizen’s involvement in MSW management is key to its effective implementation. One of the important role that the citizens can play is minimization and segregation of waste at the source of segregation.

Household-level Storage of Segregated Waste

- At the household level, dry waste, wet waste, and domestic hazardous waste should be stored in separate garbage bins, of appropriate capacity and color. The colour of the garbage bins should be as follows: Wet waste is to be placed in a covered green bin and dry waste in a covered blue bin.
- The general guidelines regarding which waste item to be placed in which bin is shown in Table 1.

BASIC SEGREGATION					
Wet waste (green bin)	Dry waste (Blue bin)				Domestic Hazardous ⁷
	With further sub-segregation BASIC+				
Food wastes of all kinds, cooked and uncooked, including eggshells and bones, flower, fruit and waste including juice, vegetable peels and household garden/plant wastes. Soiled tissues, food wrappers, paper towels; fish and meat	Paper cardboard and cartons	Containers & packaging of all kinds excluding those containing hazardous materials Compound packaging (tetrapak, blisters etc.) Plastics	Rags Rubber Wood Discarded clothing Furniture	Metals Glass (all kinds) Inerts House sweepings and inerts (not garden, yard or street sweepings)	E-waste* Hazardous wastes** Household medical waste*** Batteries from flashlights and button cells. Lights bulbs, tube lights and Compact Fluorescent Lamps (CFL) Car batteries, oil filters and car care products and consumables
<p>* E-waste: Printer & printer cartridges, electronic parts and equipment and others</p> <p>** Hazardous wastes: Chemicals and solvents and their empty containers, paints, oil, lubricants, glues, thinners and their empty containers, insecticides, pesticides and herbicides and their empty containers, photographic chemicals, bleaches and household kitchen & drain cleaning agents</p> <p>*** Household Medical Waste: Thermometers and other mercury containing products, discarded medicines, injection needles and syringes after destroying them both, sanitary wastes and diapers (should be collected daily)</p>					

Table 1 Basic Segregation

1.3.2. Responsibility and duties of Senior officials

The officials dealing with waste management shall endeavour to create awareness among the citizens regarding adverse impacts of mismanaged MSW along with by implementation and monitoring of the Waste Management Plan.

Rule 4 of Solid Waste Management Rules, 2016 - Duties of waste generator

- Segregate and store the waste generated in three separate streams namely bio-

degradable, non-biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorized waste pickers or waste collectors as per the direction or notification by the local authorities from time to time.

- Wrap securely the used sanitary waste like diapers, sanitary pads etc., in the pouches provided by the manufacturers or brand owners of these products or in a suitable wrapping material as instructed by the local authorities and shall place the same in the bin meant for dry waste or non- bio-degradable waste.
- Store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016.
- store horticulture waste and garden waste generated from his premises separately in his own premises and dispose of as per the directions of the local body from time to time.
- No waste generator shall throw, burn or burry the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.
- All waste generators shall pay such user fee for solid waste management, as specified in the bye-laws of the local bodies.
- No person shall organize an event or gathering of more than one hundred persons at any unlicensed place without intimating the local body, at least three working days in advance and such person or the organizer of such event shall ensure segregation of waste at source and handing over of segregated waste to waste collector.
- The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body. The general dry waste items that can be segregated in MRF are listed in Table 3.

Table 2 Checklist for periodic verification of premises of bulk waste generators

S. No	Activities	Yes / No
1.	Is segregation done as per SWM Rules, 2016	
2.	Are all the Segregated wastes being stored in separate bins, containers or bags etc.?	
3.	Has a separate space for the segregation, storage of municipal solid waste in society, gated community, offices etc. been demarcated	
4.	Is storing of Construction and Demolition waste practiced separately?	
5.	Is storing of the Garden and Horticulture waste practiced separately?	
6.	Is recyclable waste handed over to the authorized waste picker or recycler?	

S. No	Activities	Yes / No
7.	Is processing bio-degradable (wet) waste done on-site?	
8.	Mention the process of composting or bio-methanation or any other.	
9.	Is the residual waste from processes handed over to the waste collector or identified agency?	
10.	Has the bulk waste generator tied up for authorized agency for collection of segregated waste?	

1.3.3.Target audience: Staff involved in collections of MSW

Imparting awareness and training regarding good practices of MSW management will not only build the capacities of workers to perform more effectively and efficiently in the existing conditions, but will also inculcate a sense of responsibility and pride towards their profession.



Figure 2 Wet Waste and Dry Waste Segregation

- The work force involved with door-to-door collection of MSW shall be educated and trained to collect dry and wet waste separately as shown in the figure 2.
- The staff shall be educated regarding ideal MSW storage at various locations

Storage of Municipal Solid Waste in Public Places or Parks

With a view to ensure that streets and public places are not littered with waste, litter bins may be provided at important streets, markets, public places, bus and railway pick up stations, commercial complexes, etc. at a distance ranging from 25m to 250m depending on the local

conditions. The collection from these bins should be segregated into wet and dry waste that has been shown in figure 2.

Storage of Yard Waste or Garden Waste

Horticulture waste from parks and gardens should be collected separately and treated on-site to make optimum use of such wastes and also to minimise the cost of its collection and transportation.

Storage and Processing of Special Wastes Including Domestic Hazardous Waste

Special wastes including domestic hazardous wastes can pose a substantial or potential threat to health and environment because of their constituents which may be hazardous. A municipal waste component is hazardous if it contains one of the following characteristics: (i) ignitability, (ii) corrosivity, (iii) reactivity, and (iv) toxicity.

Care must be taken to not mix special waste including domestic hazardous waste with either the wet waste or dry waste and store such wastes separately and hand-over to the special waste collection centres, established by the urban local bodies or to collection schemes through retail trade.

1.3.4. Responsibility of MRF Operating Staff

Unloading of Incoming Waste

- Unload dry waste in the waste receiving area
- Weigh the incoming dry waste
- Remove wet/inert waste if any

Weighbridge and Weighing Scales:

- Weighing of large quantities of incoming waste
- Weighing of incoming waste and sorted recyclables

Segregation and Sorting:

- The staff is responsible for segregating and sorting non-biodegradable or recyclable solid waste collected from the doorstep into different streams of waste fractions such as paper, plastic, packaging paper, and bottles.

Table 3 Categories of dry waste that can be segregated in MRF

S. No	Paper	Plastic Items (non-PVC)	Plastic items (PVC)
1	Glass Items	Rubber Items	Metal Items (Ferrous)

2	Leather Items	Thermocol	Aluminum Coated Paper
3	Wooden Items	X-ray Films	Clothes
4	Cardboards	Jute bags	Electronic Items
5	Aluminum Coated Plastic	Metal Items (Non-ferrous)	Medical Waste/ Tablet Cover

Recovery of Recyclable Waste:

- Recovering various components of recyclable waste from the incoming waste materials for resale to intermediaries who supply bulk material to the recycling industries.

Bundling & Storage of Sorted Waste:

- Bale and pack the sorted waste in large bags or keep it bundled in the waste storage area
- MRF operating staff are responsible for managing large storage spaces to temporarily store sorted recyclables, which can be made available to recyclers in bulk for improved resale value

Weighing of Waste

- Weigh the bundled or packed waste daily and record it
- The sorted waste should be weighed at the MRF only

Maintain Safety and Personal Hygiene

- Wear personal protective equipment before starting the work
- Maintain personal hygiene. Wash your hands and legs with soap before and after your daily work
- Regular maintenance of personal protective equipment
- Proper storage of PPE

Regular Cleaning of Waste Sorting Area

- Clean the MRF area daily

1.3.5. Sound Practices in operating the MRF

Do's

1. A regular check on the working, performance and maintenance etc, of the processing machinery shall be done once in a month.

2. Indoor air quality and adequate lighting shall be monitored continuously for healthy working environment
3. Provision of suitable exhausts/vents/scrubbers, etc.
4. Adequate fire protection measures
5. All workers covered under social security and insurance scheme's
6. Compulsory use of Protection gears
7. Good Hygiene and Sanitation practices including safe drinking water
8. MRF kept Clean and Tidy
9. Ensure Proper Segregation and Low Rejects
10. Periodic Meetings of workers for drills, training
11. Keeping detailed logbook of MRF
12. Good housekeeping and cleaning all machinery after use
13. First Aid

Don'ts

1. No Inflammable objects in premise
2. No Smoking
3. No Child Labor
4. Pregnant women to avoid operating machinery
5. Avoid Water and Electricity Wastage
6. No Discrimination
7. No Littering
8. No animals allowed
9. Do not Burn Waste
10. No explosives or firearms in MRF
11. Keep hands away from moving parts of machinery
12. Do not wear loose clothing around machinery
13. Avoid long term storage of RDF

➤ **Safety Practices adopted at MRF**

The process of collection, segregation, transportation and recycling involves exposure to contaminants and hazardous waste. The safety aspects to be considered are mentioned below:

Table 4 Safety Practices

Sr.No	Hazard	Precaution	Cure
1.	Cuts and injuries due to presence of broken glass, sharps, needles which may lead to septic wounds and tetanus	Use of Safety Gloves	Medical help should be immediately sought in case of injury
2.	Exposure to fumes causing irritation of nose, throat and lungs.	Suitable masks should be used by the Safaii Mitra while working at Swachhta	Medical help should be immediately sought
3.	Contact with faecal matter and the risk of contracting gastrointestinal diseases and worm infestations	Along with wearing gloves, sanitizers should always be carried and used	Medical help should be immediately sought
4.	Vulnerable to blood borne diseases if hospital waste is collected	Gloves should be worn and direct contact with any waste (especially faecal matter and hospital waste should be avoided)	Medical help should be immediately sought
5.	Exposure to sun, radiation and rain	Areas with radiation should be avoided.	In case of contact with any radioactive waste, they should immediately contact a doctor
6.	Callosities on the fingers observed		Should immediately contact a doctor
7.	Health problems like body ache, leg ache due to long distances travelled	Can be provided with a garbage truck to pick up waste	

➤ **Hygiene Practices**

It is mandatory to provide a safe working environment for staff, working personnel and any other occupants or visitor at the MRF.

- Keep the MRF dry & clean always
- Keep sorting & storage area dry and free from pest & flies
- Regularly spray disinfection liquid as better prevention practices
- All working personnel and any other occupant at the MRF must use reusable safety gloves, boots and mask. It is advisable to wear uniform while working.
- Use disposable mask & gloves for visitors.
- Make provision for hand wash and disinfectant, hands must be washed with soap before

eating/ leaving the MRF.

- Monthly cleaning & Pest-Control Treatment routine has to be fixed within the MRF and should be followed without ignorance.

➤ **First Aid Box**

This is only for designing a basic first aid kit and its components and should not be taken as a first aid procedure or training. It is important to have a well- stocked first aid kit at the MRF to deal with minor accidents and injuries. The first aid kit should be kept in a cool and dry place out of the reach of children.

A basic first aid kit should contain:

Emergency telephone numbers for emergency medical services 1092/102/108

- Bandages in a variety of different sizes and shapes
- Small, medium and large sterile gauze dressings
- A box of adhesive bandages
- Crêpe rolled bandages
- Safety pins
- Disposable sterile gloves
- Tweezers, scissors
- Micro-porous, sticky tape
- Thermometer (preferably digital)
- Cream or spray to relieve insect bites and stings
- Antiseptic cream
- Directions for requesting emergency assistance.

➤ **Safety Photo Illustration for MRF**

The following photos provide specific comment on safety issues related to those operations.

Training Manual: Municipal Solid Waste



Photo 1

Hand sorting operations may require additional safety attention to include high visibility clothing, training on ergonomics and possibly job rotation.

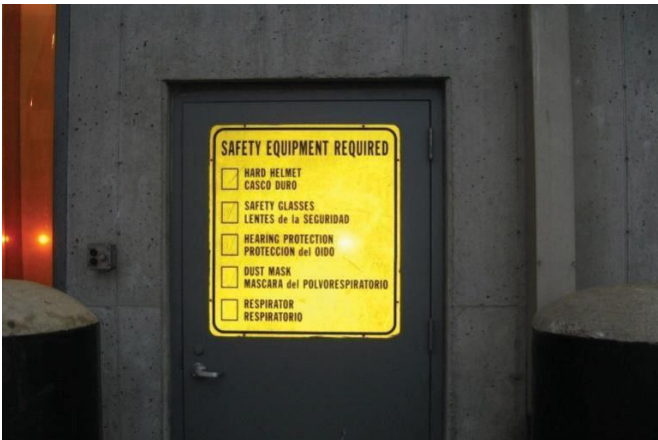


Photo 2

An example of safety signage indicating required personal protective equipment.

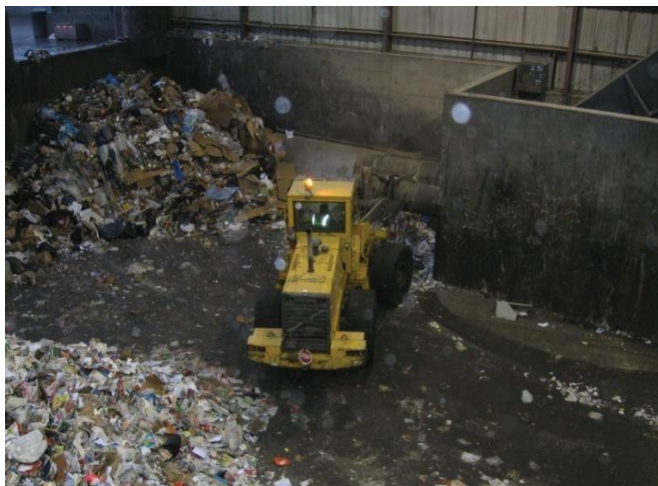


Photo 3

Safe operation of heavy equipment requires constant attention to avoid contact with fixed objects and minimizing personnel foot traffic.



Photo 4

An illustration of labeling on an electrical disconnect identifying the affected equipment.



Photo 5

Fire extinguishers should be located throughout the facility with clear access paths maintained.

The proper type of fire extinguisher should be evaluated based on fire exposures.

Figure 3 Safety Photo Illustration for MRF

1.4. Other Important Guidelines

- The entrance and exit should be kept clear always
- The emergency exits should be kept clear always and should never be used for any temporary/ permanent activity
- A minimum safe distance between two machineries as advised by the manufacturer.
- From maintenance perspective, min 1-metre clearance around each equipment.
- Shed should be constructed with the stipulated structural stability and always keep out rains
- The MRF should be certified by a structural engineer/local ULB engineer and the fire department as per rules.

Awareness Posters



2.1. Introduction

The rapid rate of urbanization and development has led to increase in consumption of plastic products vis-à-vis plastic waste generation. It is a fact that plastics waste constitutes a significant portion of the total municipal solid waste (MSW) generated in India. Plastics are non-biodegradable and remains on earth for thousands of years. The burning of plastics waste under uncontrolled conditions lead to generation of different hazardous air pollutants (HAPs), depending upon the type of polymers and additives used. However, the end-of-life plastics can be recycled into a second life application but after every thermal treatment/recycling deterioration in quality of recycled plastic products. Thus, plastic waste can be recycled only 3-4 times. The visibility of huge quantity of plastic waste has been perceived as a serious problem and made plastics a target in the management of solid waste. Different types of plastics and their uses are given in figure 4.

Plastics are generally categorized into two types:

- **Thermoplastics:** Thermoplastics or Thermosoftening plastics are the plastics which soften on heating and can be molded into desired shape such as PET, HDPE, LDPE, PP, PVC, PS, etc.
- **Thermosets:** Thermoset or thermosetting plastics on heating, but cannot be remolded or recycled such as Sheet Molding Compounds (SMC), Fiber Reinforced Plastic (FRP), Bakelite etc. are the examples of the same.

For efficient management of plastic waste, the Government of India has superseded with the earlier Plastic Waste (Management & Handling) Rules, 2011 and notified Plastic Waste Management (PWM) Rules, 2016 on 18th March, 2016. These rules shall apply to every Waste Generator, Local Body, Gram Panchayat, Manufacturer, Importer, Producer and Brand Owner throughout India.






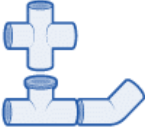








The 7 Types Of Plastics			
 PETE	Polyethylene terephthalate	soda bottles, water bottles, peanut butter jars, salad dressing bottles, medicine containers and vinegar bottles	
 HDPE	High-density polyethylene	milk jugs, laundry detergent bottles, shampoo/conditioner bottles, and bleach bottles	
 PVC	Polyvinyl chloride	pipes, shower curtains, clear medical tubing, vinyl records, cooking oil bottles, seat covers, and coffee containers	
 LDPE	Low-density polyethylene	sandwich bags, shrink wrap, grocery bags, squeezable condiment bottles and bread bag	
 PP	Polypropylene	yogurt cups, ketchup bottles, syrup bottles, plastic bottle caps and 'microwave-safe' plastic containers	
 PS	Polystyrene or Styrofoam	disposable cups, take-out food containers, packing peanuts, egg cartons and Styrofoam insulation	
 Other Plastics	Other plastic including polycarbonate & biodegradable plastic	baby bottles, sippy cups, water cooler bottles, polycarbonate plastic food containers, and car parts	

Figure 4 Type of Plastics and its Uses



Figure 5 Types of Plastic

2.2. Environmental impacts of plastic waste

- Littering of plastic waste is a major environmental issue. It makes the land infertile, choke the drains, causes death of cattle when ingested, and gives an ugly look to the area. Open burning of plastic waste is a major health and environmental issue, as it emits toxic gases such as dioxin, furan and phthalates
- Leaching impact on soil, underground water, etc. due to improper dumping of plastic waste (contains metals and phthalates).
- Release of harmful gases such as carbon monoxide, formaldehyde, etc. during product manufacturing.
- Leaching of toxic metals into underground water such as lead and cadmium pigments due to indiscriminate dumping of plastic waste on land.
- Sub-standard plastic carry bags, thin packaging films, etc. pose problem in collection, recycling and reuse.

2.3. Responsibility of waste generator (as per PWM Rules, 2022)

- Take steps to minimize generation of plastic waste and segregate plastic waste at source

in accordance with the Solid Waste Management Rules, 2000 or as amended from time to time.

- Not litter the plastic waste and ensure segregated storage of waste at source and handover segregated waste to urban local body or gram panchayat or agencies appointed by them or registered waste pickers', registered recyclers or waste collection agencies.
- All institutional generators of plastic waste, shall segregate and store the waste generated by them in accordance with the Municipal Solid Waste (Management and Handling) Rules, 2000 notified vide S.O 908(E) dated the 25th September, 2000 under the Act or amendments and handover segregated wastes to authorized waste processing or disposal facilities.
- All waste generators shall pay such user fee or charge as may be specified in the bye-laws of the local bodies for plastic waste management such as waste collection or operation of the facility thereof, etc.













2.4. Banned Single Use Plastic (SUP) Items:

The following identified single use plastic items, which have low utility and high littering potential, have been prohibited, with effect from 1st July, 2022, vide Plastic Waste Management Amendment Rules, 2021:

- Ear buds with plastic sticks, plastic sticks for balloons, plastic flags, candy sticks, ice-cream sticks, polystyrene [Thermocol] for decoration;
- Plates, cups, glasses, cutlery such as forks, spoons, knives, straw, trays, wrapping or packing films around sweet boxes, invitation cards, and cigarette packets, plastic or PVC banners less than 100 micron, stirrers.
- Carry bags or recycled bags with thickness less than 120 microns. Below table 5 provides list of SUP items banned and their alternatives

Table 5 Banned SUPs items and its alternatives

Sr. no.	SUPs	Banned SUPs	Alternate to SUPs
1	Polystyrene [thermocool] for decoration		

2	Packing films around sweet boxes, invitation cards, and cigarette packets		
3	Ear buds with plastic sticks, plastic sticks for balloons, plastic flags, candy sticks, ice - cream sticks	 	
4	Plates, cups, glasses, cutlery such as forks, spoons, knives, straw, trays, wrapping, stirrers		 
5	Plastic or PVC banners less than 100 micron		
6	Carry bags or recycled bags with thickness less than 120 microns		

2.5. The 3R principle for Plastic Waste

3 Rs- Refuse, Reduce and Reuse should be practiced for plastic waste minimization. It is responsibility of the individuals in colonies and offices of DPA to practice this by limiting the use of plastics in day to day lives like carrying a cloth bag to markets, making use of stainless steel/earthen water bottles, making use of recyclable goods used in day to day lives etc. General Do's and Don'ts regarding plastic usage are as below:

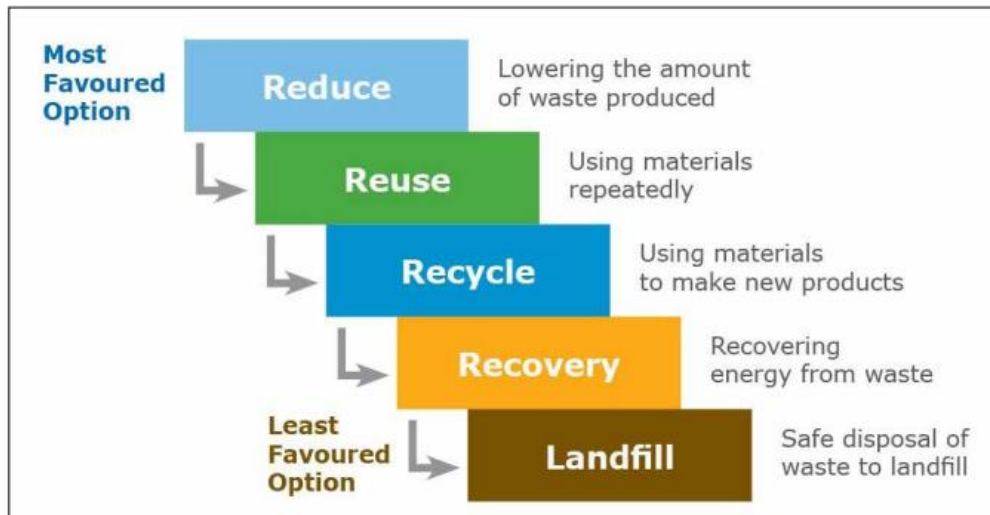


Figure 6 3 R's- Refuse, Reduce and Reuse

2.6. Compostable Plastic

2.6.1. Background and legal provisions

As per the Rule 3(e)(Definitions) of PWM Rules, 2018 “compostable plastics” mean plastic that undergoes degradation by biological processes during composting to yield CO₂, water, inorganic compounds and biomass at a rate consistent with other known compostable materials, excluding conventional Petro-based plastics, and does not leave visible, distinguishable or toxic residue.

As per the Rule 4(h) (Conditions) of PWM Rules, 2018, the manufacturers or sellers of compostable plastic carry bags/products shall obtain a certificate from the CPCB before marketing or selling compostable carry bags/products. Every compostable plastic carry bag manufacturer/seller shall comply following provisions under PWM Rules, 2018:

- **Rule 4(h) (Conditions):** The provision of minimum thickness of 50 micron shall not be applicable to carry bags made up of compostable plastic. Carry bags made from compostable material or plastics shall conform to the Indian Standard: 1S:17088 (as amended from time to time) titled as ‘Specifications for Compostable Plastics’.
- **Rule 10 (Protocols for compostable plastic material):** Determination of the degree of

degradability and degree of disintegration of plastic material shall be as per the protocols of the Indian Standards 1S/ISO: 17088 (as amended time to time).

- **Rule 11 (Marking or labelling):1(c):** shall have the following information printed in **English** and local **languages** namely; name and certificate number in case of carry bags made from compostable plastic. Each carry bag made from compostable plastics shall bear a label **“compostable”** and shall conform to the Indian Standard: 1S/ISO-17088 (as amended from time to time) titled as “Specifications for Compostable Plastics”.

2.6.2. How to identify compostable plastic?

- Plastic products or materials meeting all the requirements specified in 1S/ISO:17088 may be labeled as "compostable" or "biodegradable during composting".
- The labelling shall conform to international, national, regional or local regulations.
- The name of the country where the plastic product or material is to be marketed or recycled by composting shall be indicated.
- Each carry bag made from compostable material or plastic shall bear a label **“COMPOSTABLE” IS/ISO:17088** titled as Specifications for “Compostable Plastic” in English & regional language. Each carry bag shall also have printed code: and Certificate Number of **“MANUFACTURER/SELLER”**.



Figure 7 Compostable Plastic Bags

2.7. Information, Education and Communication (IEC)

- DPA should organize awareness campaigns for residents and office staff to educate them about environmental pollution, its health effects caused due to littering plastics and solutions to these problems. The residents and office staff shall be made aware of Single Use Plastics (SUPs), banned SUPs and environmental damage caused by use of SUPs.
- Segregation of PW from MSW at household and office level could substantially streamline the implementation of PW management system. Residents and office staff should make an effort at bringing a behavioral change in dumping wet and dry (plastic) waste separately at its source of generation itself.
- Efforts should be made for use of plastic free day to day items like earthen wares, cotton bags, steel bottles etc.
- Community awareness is the best means to reduce and manage plastic waste. DPA should organize activities and competitions in its school and community gatherings to engage its residents especially children to create “Best out of Waste” items.
- **Recyclable plastics:** The staff involved with segregation of PW at MRF shed shall be educated and trained about the plastics that are recyclable and non-recyclable. The image given below shows the various types of recyclable plastics and day to day items made from these plastics.

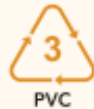
UNDERSTANDING DIFFERENT TYPES OF PLASTIC AND THEIR USES



➤ Converted back to polymer and used for making apparel



➤ Converted to pellets and used to produce new HDPE



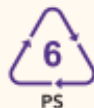
➤ These are used to produce new PVC or as feed for other manufacturing processes or as fuel for energy recovery



➤ Converted to pellets and used to produce new LDPE



➤ Converted to pellets and used to produce new PP



➤ Not recyclable



OTHERS

➤ Not recyclable – However, multilayer packaging could be crushed and turned into sheets and boards for roofing, using adhesives

Awareness posters



**SAY A
BIG NO
TO
SINGLE
USE PLASTIC
CARRY BAGS!**

Note : Plastic carry bags with less than thickness of 120 microns are banned w.e.f 31st December 2022

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**Say No To
Single Use Plastics**

कहीं भी आप पतली पॉलीथिन बैग (120 माइक्रोन से कम) का उत्पादन, भंडारण, बिक्री अथवा प्रयोग होते हुए देखे तो तुरंत **SUP Grievance App** पर शिकायत दर्ज करें

ऐप डाउनलोड करने के लिए QR कोड को स्कैन करें

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**Turn 'Single Use'
Into 'No-Use'**

Lower the environmental impact of Single Use Plastics by avoiding products made of SUPs.

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DO YOU KNOW WHAT THESE PLASTIC SYMBOLS MEAN?

 <p>PET Polyethylene Terephthalate</p>  <p>Bottles, film, food packaging, synthetic insulation</p>	 <p>HDPE High-Density Polyethylene</p>  <p>Containers, toys, house wares, industrial wrapping and film, gas pipes, shampoo bottle</p>	 <p>PVC Polyvinyl chloride</p>  <p>Window frames, pipes, flooring, wallpaper, cling film, gutters, credit cards, medical products</p>	 <p>LDPE Low-Density Polyethylene</p>  <p>Film, bags, toys, coatings, containers, pipes, cable insulation</p>
 <p>PP Polypropylene</p>  <p>Film, battery cases, microwave containers, crates, car parts, electrical components</p>	 <p>PS Polystyrene</p>  <p>Electrical appliances, thermal insulation, tape cassettes, caps, plates, thermocool, Biodegradable plastics</p>	 <p>OTHER Other</p>  <p>Polycarbonate eyeglasses, baby & sports bottles, electronics, lighting fixtures, clear plastic cutlery, multilayer plastics</p>	

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EASY WAYS TO REDUCE PLASTIC POLLUTION

-  Prefer metal/ glass bottle bottles instead of plastic bottles
-  Use cotton/paper/jute bags in place of plastic bags
-  Refuse plastic decorative items for family gatherings/parties
-  Choose eco-friendly alternatives over single-use-plastics made products



#SolutionsToPlasticPollution 

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Chapter-3

E-Waste

3.1 Introduction

3.1.1 What is E- Waste?

The E-Waste (Management) Rules, 2022 defines E-waste as any electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment and repair processes.

'**Bulk consumer**' means bulk users of electrical and electronic equipment such as Central Government or State Government Departments, public sector undertakings, banks, educational institutions, multinational organizations, international agencies, partnership and public or private companies that are registered under the Factories Act, 1948 (63 of 1948) and the Companies Act, 2013 (18 of 2013) and health care facilities which have turnover of more than one crore or have more than twenty employees. As per this definition, AO offices and Gopalpuri colony come under bulk e-waste consumers.

This manual covers topic on environmentally sound management of the e-waste at administration, consumer and waste handling levels.

3.1.2 Characteristics of E-Waste

- Electronic waste or e -waste is any broken or unwanted electrical or electronic appliance.
- E-waste includes computers, consumer electronics, phones, medical equipments, toys and other.
- Items that have been discarded by their original users.
- E-Waste also includes waste which is generated during manufacturing or assembling of such equipments.

3.1.3 Objective of Module

Creating awareness: People residing in colonies and working staff at offices shall be made aware regarding types of e-wastes and the nuisances created by e-waste. Efforts shall be made to educate people about e-waste potential to create positive impact if collected and attended in environmentally sound manner. This will encourage public participation in collection of e-wastes.

3.2 Background of E-Waste

3.2.1 Categories of E-waste according to E-Waste (Management) Rules, 2022

Categories of electrical and electronic equipment including their components, consumables, parts and spares covered under the rules



Figure 8 E-Waste Categories

Table 6 Categories and products of electrical and electronic equipment

Sr. No.	Categories of electrical and electronic equipment	Electrical and electronic equipment code
i.	Information technology and telecommunication equipment:	
	Centralized data processing: Mainframes, Minicomputers	ITEW1
	Personal Computing: Personal Computers (Central Processing unit with input and output devices)	ITEW2
	Personal Computing: Laptop Computers (Central Processing unit with input and output devices)	ITEW3
	Personal Computing: Notebook Computers	ITEW4
	Personal Computing: Notepad Computers	ITEW5
	Printers including cartridges	ITEW6
	Copying Equipment	ITEW7

	Electrical and Electronic Typewriters	ITEW8
	User terminal and Systems	ITEW9
	Facsimile	ITEW10
	Telex	ITEW11
	Telephones	ITEW12
	Pay telephones	ITEW13
	Cordless telephones	ITEW14
	Cellular telephones	ITEW15
	Answering System	ITEW16
	Products or equipment of transmitting sound, images or other information by telecommunications	ITEW17
	BTS (all components excluding structure of tower)	ITEW18
	Tablets, I-PAD	ITEW19
	Phablets	ITEW20
	Scanners	ITEW21
	Routers	ITEW22
	GPS	ITEW23
	UPS	ITEW24
	Inverter	ITEW25
	Modems	ITEW26
	Electronic data storage devices	ITEW27
ii.	Consumer Electrical and Electronics and Photovoltaic Panels:	
	Television sets (including sets based on Liquid Crystal Display and light Emitting Diode Technology)	CEEW1
	Refrigerator	CEEW2
	Washing Machine	CEEW3
	Air- Conditioners excluding centralised air conditioning plants	CEEW4
	Fluorescent and other Mercury containing lamps	CEEW5
	Screen, Electronic Photo frames, Electronic Display Panel, Monitors	CEEW6
	Radio sets	CEEW7
	Set top Boxes	CEEW8
	Video Cameras	CEEW9
	Video Recorders	CEEW10
	Hi-Fi Recorders	CEEW11
Audio Amplifiers	CEEW12	

	Other products or equipment for the purpose of recording or reproducing sound or images including signals and other technologies for the distribution of sound and image by telecommunications	CEEW13
	Solar panels/cells, solar Photovoltaic panels/cells/modules.	CEEW14
	Luminaires for fluorescent lamps with the exception of luminaires in households	CEEW15
	High intensity discharge lamps, including pressure sodium lamps and metal halide lamps	CEEW16
	Low pressure sodium lamps	CEEW17
	Other lighting or equipment for the purpose of spreading or controlling light excluding filament bulbs	CEEW18
	Digital camera	CEEW19
iii.	Large and Small Electrical and Electronic Equipment	
	Large cooling appliances	LSEEW1
	Freezers	LSEEW2
	Other large appliances used for refrigeration, conservation and storage of food	LSEEW3
	Clothes dryers	LSEEW4
	Dish Washing Machines	LSEEW5
	Electric cookers	LSEEW6
	Electric stoves	LSEEW7
	Electric hot plates	LSEEW8
	Microwaves, Microwave Oven	LSEEW9
	Other large appliances used for cooking and other processing of food	LSEEW10
	Electric heating appliances	LSEEW11
	Electric radiators	LSEEW12
	Other large appliances for heating rooms, beds, seating furniture	LSEEW13
	Electric fans	LSEEW14
	Other fanning, exhaust ventilation and conditioning equipment	LSEEW15
	Vacuum cleaners	LSEEW16
	Carpet sweepers	LSEEW17
	Other appliances for cleaning	LSEEW18
	Appliances used for sewing, knitting, weaving and other processing for textiles	LSEEW19
	Iron and other appliances for ironing, mangling and other care of clothing	LSEEW20

	Grinders, coffee machines and equipment for opening or sealing containers or packages	LSEEW21
	Smoke detector	LSEEW22
	Heating Regulators	LSEEW23
	Thermostats	LSEEW24
	Automatic dispensers for hot drinks	LSEEW25
	Automatic dispensers for hot or cold bottles or cans	LSEEW26
	Automatic dispensers for solid products	LSEEW27
	Automatic dispensers for money	LSEEW28
	All appliances which deliver automatically all kinds of products	LSEEW29
	Indoor air purifier	LSEEW30
	Hair dryer	LSEEW31
	Electric shaver	LSEEW32
	Electric kettle	LSEEW33
	Electronic display panels/board/visual display unit	LSEEW34
	Electrical and Electronic Tools (With the exception of large-Scale Stationary Industrial Tools)	
iv.	Drills	EETW1
	Saws	EETW2
	Sewing Machines	EETW3
	Equipment for turning, milling, sanding, grinding, sawing, cutting, shearing, drilling, making holes, punching, folding, bending or similar processing of wood, metal and other materials	EETW4
	Tools for riveting, nailing or screwing or removing rivets, nails, screws or similar uses	EETW5
	Tools for welding, soldering, or similar use	EETW6
	Equipment for spraying, spreading, dispersing or other treatment of liquid or gaseous substance by other means	EETW7
	Tools for mowing or other gardening activities	EETW8
	Toys, Leisure and Sports Equipment	
v.	Electrical trains or car racing sets	TLSEW1
	Hand-held video games consoles	TLSEW2
	Video games	TLSEW3
	Computers for biking, diving, running, rowing, etc.	TLSEW4
	Sports equipment with electric or electronic components	TLSEW5
	Coin slot machines	TLSEW6

vi.	Medical Devices (With the Exception of All Implanted and Infected Products)	
	Radiotherapy equipment and accessories	MDW1
	Cardiology equipment and accessories	MDW2
	Dialysis equipment and accessories	MDW3
	Pulmonary ventilators and accessories	MDW4
	Nuclear Medicine Equipment and accessories	MDW5
	Laboratory equipment for in vitro diagnosis and accessories	MDW6
	Analysers and accessories	MDW7
	Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET) Scanner, Computed Tomography (CT) Scanner, & Ultrasound Equipment along with accessories	MDW8
	Fertilization tests equipment and accessories	MDW9
	Other electric appliances/equipment/kits used for preventing, screening, detecting, monitoring, evaluating, reviewing, examining, investigating, probing, treating illness sickness, disease, disorder, affliction, infection, injury, trauma, abuse or disability including the Mobiles, Tablets or any other device with the features having the potential of sex selection and their accessories	MDW10
vii.	Laboratory Instruments	
	Gas analyser	LIW1
	Equipment having electrical and electronic components	LIW2

3.2.2 Resources embedded in e-waste

The electronic and electrical item consists of more than 1000 different substances which can fall under hazardous and non-hazardous categories. The resources embedded in e-waste are very diverse and contains products across different categories. As shown in the below picture, the major constituents are ferrous and non-ferrous metals, plastics, glass and plywood, printed circuit boards, concrete and ceramics, rubber and other items.

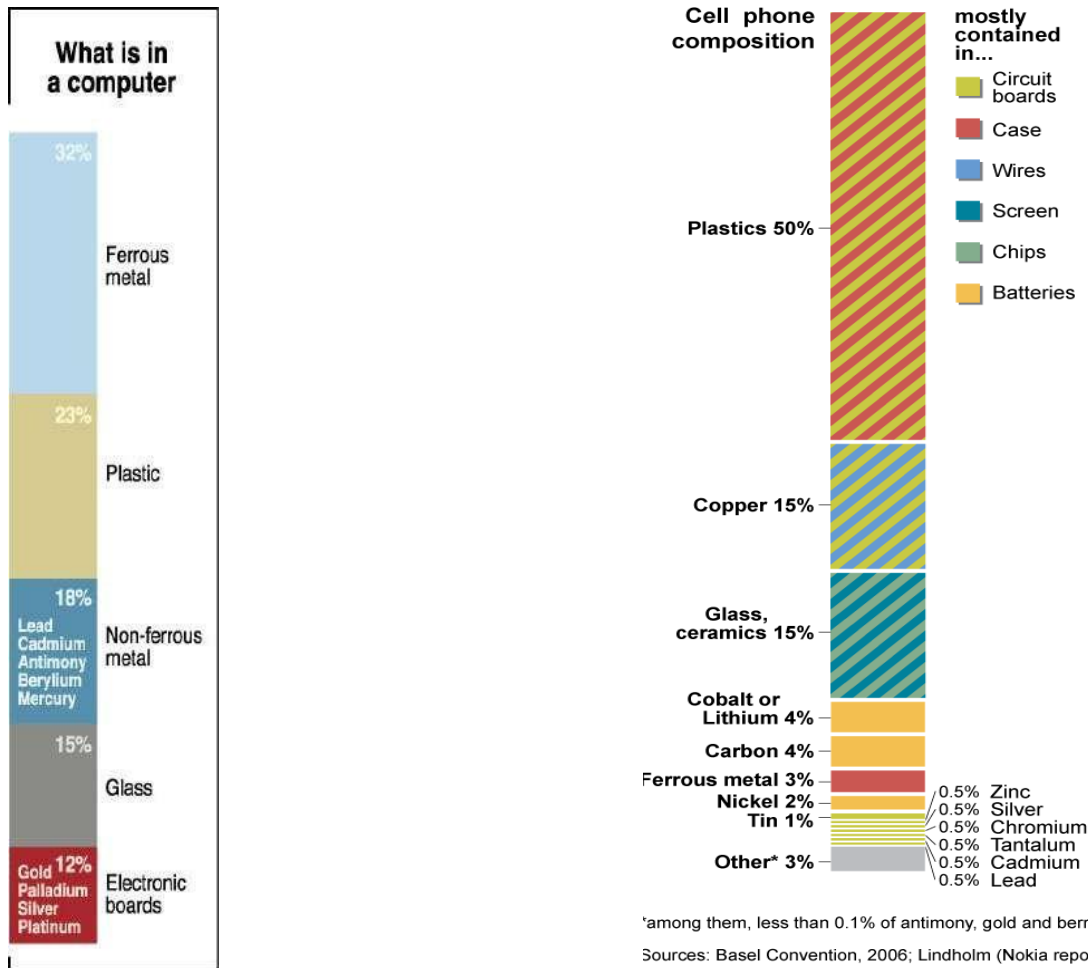


Figure 9 Resources embedded in e-waste

Source: UNEP

3.2.3 Hazards Substances in E-waste

Electronic waste is filled with a variety of toxic materials, which creates a serious risk for human health and the environment if they are released during processing, recycling or disposal. The major constituents are ferrous and non-ferrous metals, plastics, glass and plywood, printed circuit boards, concrete and ceramics, rubber and other items. Iron and steel constitute about 50% of the WEEE followed by plastics (21%), non-ferrous metals (13%) and other constituents. Non-ferrous metals consist of metals like copper, aluminium and precious metals like silver, gold, platinum, palladium etc. Other than these resources heavy metals and organic compounds are also found which contains in e-waste such as lead, cadmium, mercury, arsenic, beryllium, polyvinyl chloride (PVC), Brominated Flame Retardants (BFRs) and phthalates.

Table 7 Possible hazardous substances in WEEE/E-waste components

Component	Possible Hazardous Content
Metal	-
Motor/compressor	-
Cooling	ODS
Plastic	Phthalate plasticize, BFR
Insulation	Insulation ODS in foam, Asbestos, refractory ceramic fiber
Glass	-
CRT	Lead, antimony, mercury, phosphors
LCD	Mercury
Rubber	Phthalate plasticizer, BFR
Winning/electrical	Phthalate plasticizer, lead, BFR
Concrete	-
Transformer	-
Circuit Board	Lead Beryllium, antimony, BFR
Fluorescent Lamp	Mercury, Phosphorus, Flame retardants
Incandescent Lamp	-
Healing element	-
Thermostat	Mercury
BFR – containing plastic	BFRs
Batteries	Lead, lithium, Cadmium, Mercury
CFC, HCFC, HFC, HC	Ozone depleting substances
External electric cables	BFRs, plasticizers
Electrolyte capacitors (over L/D 25mm)	Glycol, other unknown substances

Source: Central Pollution Control Board

Among the substances mentioned in the table 7, of most concern are the heavy metals such as lead, mercury, cadmium and chromium (VI), halogenated substances (e.g. CFCs), polychlorinated biphenyls, plastics and circuit boards that contain brominated flame retardants (BFRs). BFR can give rise to dioxins and furans during incineration. Other materials and substances that can be present are arsenic, asbestos, nickel and copper. These substances may act as a catalyst to increase the formation of dioxins during incineration.

Many of these pollutants are embedded in e-waste and are the constituents of complex materials, e.g. flame retardants in plastics, or are hidden inside electrical components, such as

mercury in switches, therefore these materials are difficult to isolate and separate from the other components. The material fusions with equipment's make the recycling of e-waste complicated and costly. Pollutants or toxins in E-waste are concentrated in circuit boards, plastics, batteries and LCDs (Liquid crystal displays). To avoid serious environmental pollution and human exposure, adequate treatment of e-waste is crucial; particularly considering the huge amounts of e-waste we are producing globally.

Table 8 Pollutants and their occurrence in WEEE

Pollutant	Occurrence
Arsenic	Semiconductors, diodes, microwaves, LEDs (light emitting diodes), solar cells
Barium	Electron tubes, filler for plastic and rubber, lubricant additives
Brominated flame –proofing agent	Casing, circuit boards (plastic), cables and PVC cables
Cadmium	Batteries, pigments solder, alloys, circuit boards, computer batteries, monitor cathode ray tubes (CRTs)
Chrome	Dyes/pigments, switches, solar
Cobalt	Insulators
Copper	Conducted in cables, copper ribbons, coils, circuitry, pigment
Lead	Lead rechargeable batteries, solar, transistors, lithium batteries PVC (polyvinyl chloride) Stabilizers, lasers, LEDs, thermoelectric elements, circuit boards
Liquid crystal	Displays
Lithium	Mobile telephones, photographic equipment, video equipment (batteries)
Mercury	Components in copper machines and steam irons; batteries in clocks and pocket calculators, switches, LCDs
Nickel	Alloys, batteries, relays, semiconductors, pigments
PCBs (Polychlorinated biphenyls)	Transformers, capacitors, softening agent for paint, glue plastic
Selenium	Photoelectric cells, pigments, photocopiers, fax machine
Silver	Capacitors, switches (contacts), batteries, resistors
Zinc	Steel, brass, alloys, disposable and rechargeable batteries, luminous substances.

Source: Raiya Sabha Secretariat 2011

The major hazards associated with the harmful elements in the composition of WEEE are listed in the table 9. As shown in the table 9, toxic substances are found in components of the electronic or electrical products, which release highly toxic dioxins, furans and acid when burned to retrieve metals from the product. Many of these substances are toxic and carcinogenic. The materials are complex and have been found to be difficult to recycle in an environmentally sustainable manner even in developed countries.

Table 9 Hazards from E-waste substances

Metal	Danger
Lead	A neurotoxin that affects the kidneys and the reproductive system, high quantities can be fatal. It affects mental development in children. Mechanical breaking of CRTs (cathode ray tubes) and removing solder form microchips release lead as powder and fumes.
Plastic	Found in circuit boards, cabinets and cables, they contain carcinogens. BFRs or Brominated flame retardants give out carcinogenic Brominated dioxins and furans. Dioxins can harm reproductive and immune systems. Burning PVC, a component of plastics, also produces dioxins. BFR can leach into landfills. Even the dust on computer cabinets contains BFR.
Chromium	Used to protect metal housings and plates in a computer from corrosion, inhaling Hexavalent chromium or chromium 6 can damage liver and kidney and cause bronchial maladies including asthmatic bronchitis and lung cancer.
Mercury	Affect the central nervous system, kidneys and immune system. It impairs fetus growth and harms infants through mother's milk. It is released while breaking and burning of circuit boards and switches. Mercury in water bodies can form methylated mercury through microbial activity. Methylated mercury is toxic and can enter the human food chain through aquatic.
Beryllium	Found in switch boards and printed circuit boards. It is carcinogenic and causes lung diseases.
Cadmium	A carcinogen. Long-term exposure causes Itai-Itai disease, which causes severe pain in the joints and spine. It affects the kidneys and softens bones. Cadmium is released into the environment as powder while crushing and milling of plastics, CRTs and circuit boards. Cadmium may be released with dust, entering surface water and groundwater.
Acid	Sulphuric and hydrochloric acids are used to separate metals from circuit board's furnaces contain chlorine and Sulphur dioxide, which cause respiratory problems. They are corrosive to the eye and skin.

E-waste typically contains complex combinations of materials and components down to microscopic levels. The wastes are broken down not just for recycling but for the recoverable materials such as plastic, iron, aluminum, copper and gold. However, since e waste also contains significant concentration of substances that are hazardous to human health and the environment, even a small amount of E-waste entering the residual waste will introduce relatively high number of heavy metals and halogenated substances. Such harmful substances leach into the surrounding soil, water and air during waste treatment or when they are dumped in landfills or left to lie around near it. Sooner or later, they would adversely affect human health and ecology.

Table 10 Typical pathways for the release of pollutants from e-waste

Heavy metals	Dioxins and Furans	Acids
<ul style="list-style-type: none"> • Dust generated during mechanical treatment, for example, the dismantling and crushing of WEEE. • Flue gas released during thermal treatment, for example, the release of metals from compounds during the incineration of plastic. • Vaporization where in metals are released from compounds in an acid bath 	<ul style="list-style-type: none"> • Dioxins and furans are emitted during the thermal treatment of WEEE, for example during- • The combustion of cable insulation containing PVC in order to recycle copper wiring • The incineration of epoxy resin containing flame retardant from circuit boards in order to recycle the metal they contain 	<ul style="list-style-type: none"> • Released in the form of vapor when metals are released from compounds. May also get disturbed throughout the surrounding area in the following ways • Factory air and dust being blown into the vicinity • Leaching through waste water and seepage • Release of flue gas into the atmosphere as a result of open incineration of furnace combustion

Table 11 Constituents of E-Waste

E-Waste Source	E-Waste Component	Environmental Hazard	Effects on Human
CRTs (used in TVs, Monitors, ATM, Video Camera, etc.) Batteries, PBC cables, Paints	Lead, barium & other heavy metals	These metals leaching into the ground water and release of toxic phosphorus	Anemia, Renal Toxicity, Insomnia
Batteries, Housing & Medical Equipment	Mercury	Air emissions as well as discharge into rivers of glass dust	Renal Toxicity, Muscle tumors, Mental retardation, Cerebral palsy
Plastic from printers, keyboard, monitors, etc.	Plasticizer bisphenol-A (or BPA), as well DEHP and DBA, plastic compounds known as phthalates	Chlorinated plastics release harmful chemical into the surrounding water resources which cause serious harm to the species that drink this water.	Risk in developing heart problems, obesity, reproductive disease
PVC & polymer, Paints inks, Electrical transformers & capacitors	Polychlorinated Biphenyls (PCBs)	Include extreme pollution from production, toxic chemical exposure during use, hazards from fires	Suppression of immune system; Damage to the liver, nervous and reproductive systems

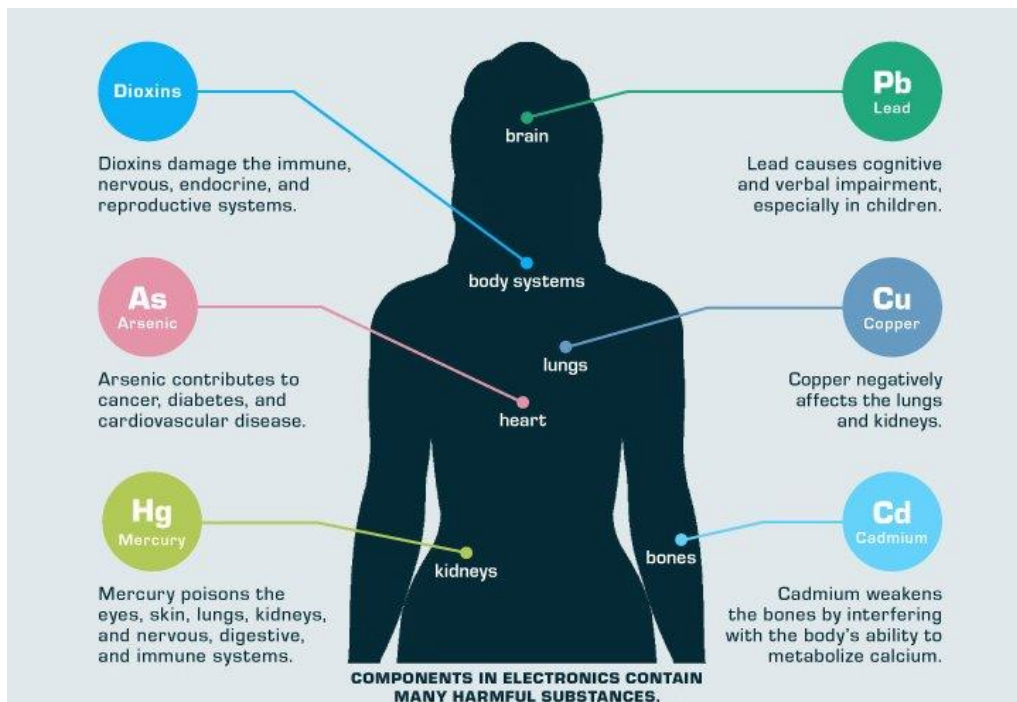


Figure 10 Adverse Impact of e-waste

3.3 Policies for E-Waste Management

3.3.1. Responsibilities of bulk consumer

Bulk consumers of electrical and electronic equipment listed in **Table 12** shall ensure that e-waste generated by them shall be handed over only to the registered producer, refurbished or recycler.

3.3.2. Formulation of a system

For channelization of e-waste from generation source to storage area until collected by authorized agency or GPCB registered e-waste recyclers/refurbishers or dismantlers. DPA shall organize e-waste collection drive once in a year at office and residencies by setting up e-waste collection booths.

The collection points/bins can be at designated places where e-waste can be collected from residential areas, office complexes, commercial complexes and educational institutions.

Mobile collection vans can be used for door-to-door collection of e-waste from and such vans shall be linked to collection booths

During the e-waste collection drive following information shall be communicated to the residents in colonies and office staff:

- Share information pertaining to e-waste collection booths like booth location, timings, etc.
- Toll free number for query resolution to be available during working hours (10 A.M. to 6 P.M.)
- Details of dealers, retailers, collection points/bins/pick up vans linked to collection booths for depositing of e-waste, if they are part of the take-back system.
- Details of any incentive scheme for consumers for returning of e- waste

Collection booth should have weighing equipment for weighing each delivery received by it and maintain a record in this regard.

Collection booths shall store e-waste products category wise.

3.3.3. Record keeping

Since the e-waste generated at Vadinar port and offices is sent to EDP store at AO, Gandhidham office, the concerned official at AO Gandhidham shall keep a record of below listed information to be furnished in Form 2 as per E-waste Management Rules, 2016.

- Name & Address: Producer /Collection Centre/Dismantler/Recycler/ Bulk consumer
- Date of Issue and Validity of Authorization

- Category, description & Quantity of e- waste handled/generated
- Category, description & Quantity of e- waste stored in storage area
- Category, description & Quantity of e- waste handed over to authorized collection center/registered recycler/ dismantler etc.
 - **If e-waste is sent to refurbished:** Name, address and contact details of the destination of refurbished materials
 - **If e-waste is sent to dismantler/recycler or for disposal:** Name, address and contact details of the destination (dismantler/recycler/ dismantling/ recycling or disposal facility)
- Category, description & Quantity of e- waste treated & disposed

3.3.4. Guideline for storage of e-waste

Every manufacturer, producer, refurbisher and recycler may store the e-waste for a period not exceeding **one hundred and eighty days (180)** and shall maintain a record of sale, transfer and storage of e-wastes and make these records available for inspection and the storage of the e-waste shall be done as per the applicable rules or guidelines for the time being in force:

Provided that the Central Pollution Control Board may extend the said period up to **three hundred and sixty-five days (365)** in case the e-waste needs to be specifically stored for development of a process for its recycling or reuse.

Storage of end-of-life products may be done in a manner which does not lead to breakage of these products and safe to workers handling such products.

The storage where refrigerator and air conditioners are also stored should have adequate facilities for managing leakage of compressor oils, coolant/refrigerant gases such as CFCs/HFCs and mercury from end of life fluorescent and other mercury containing lamp etc. Spills involving broken fluorescent lamps, Oils spills should first be contained to prevent spread of the material to other areas. This may involve the use of dry sand, proprietary booms/absorbent pads, stabilizing chemicals etc. for subsequent transfer of hazardous waste to TSDFs.

During storage of e-waste care may be taken:

- To avoid damage to refrigerators and air-conditioner so as to prevent release of refrigerant gases such as CFC, HFS, HCFC etc. and to prevent spillage of oils (mineral or synthetic oil) and other emissions.

- To avoid damage to Cathode Ray Tube
- To avoid damage to fluorescent and other mercury containing lamps
- To avoid damage to equipment containing asbestos or ceramic fibers to avoid release of asbestos or ceramic fibers in the environment.

After collection of fluorescent and other mercury containing lamps, it should be sent only to a recycler or to a TSDF in case no recycler is available.

Loading, transportation, unloading and storage of E-Waste/ end of life products should be carried out in such a way that its end use such as re-use after refurbishing or recycling or recovery is unaffected.

The storage area should have fire protection system in place.

The storage capacity of the collection/storage area should be in accordance with volume of operations (weight and numbers) and category of E-waste. Space needed for storage of different category of e-waste is given in table 12 below:

Table 12 Space needed for storage

Sr. no	Categories of electrical and electronic equipment	EEE Code	Storage area requirement in m³/tonne
1.	Centralized data processing: Mainframe Minicomputer Personal Computing: Personal Computers (Central Processing Unit with input and output devices) Laptop Computers (Central Processing Unit with input and output devices) Notebook Personal/Notepad Computers Printers including cartridges	ITEW1 to ITEW6	4.0
2.	Monitors (CRT)	Monitors (CRT)	5.0
3.	Copying equipment Electrical and electronic type writers, User terminals and systems, Facsimile	ITEW7 to ITEW10	5.0
4.	Telex Telephones Pay telephones Cordless telephones	ITEW11 to ITEW14	3.0
5.	Cellular telephones Feature phones Smart phones	ITEW15	1.0
6.	Answering systems	ITEW16	3.0
7.	Television sets (including sets based on (Liquid Crystal Display and Light Emitting Diode technology)	CEEW1	6.5
8.	Refrigerator	CEEW2-	10.0

9.	Washing Machine	CEEW3	7.5
10.	Air-conditioners excluding centralized air conditioning plants	CEEW4	6.0
11.	Fluorescent and other Mercury containing lamps	CEEW5	1.0

3.3.5. Questions to Ask

What questions should you ask the manufacturers when you do bulk procurement of electrical and electronic goods? What conditions can you introduce in your tender specification to enable easy disposal of e- waste?

The questions that can be asked from the manufacturers and conditions that can be introduced in tender are:

1. Ask whether 'Extended Producer Responsibility - Authorization' is available with the manufacturer. It means a permission given by Central Pollution Control Board to a producer, for managing Extended Producer Responsibility with implementation plans and targets outlined in such authorization including detail of Producer Responsibility Organization and e-waste exchange, if applicable. This can be a mandatory condition in tender.
2. Ask if manufacturer has submitted the 'Extended Producer Responsibility Plan' means a plan submitted by a producer to Central Pollution Control Board, at the time of applying for Extended Producer Responsibility - Authorization in which a producer shall provide details of e-waste channelization system for targeted collection including detail of Producer Responsibility Organization and e-waste exchange, if applicable. This can be a mandatory condition in tender.
3. Ask if manufacturer has 'facility' or any location wherein the process incidental to the collection, reception, storage, segregation, refurbishing, dismantling, recycling, treatment and disposal of e-waste are carried out. This can be a mandatory condition in tender.
4. Ask if the manufacturer has set up 'deposit refund scheme' means a scheme whereby the producer charges an additional amount as a deposit at the time of sale of the electrical and electronic equipment and returns it to the consumer along with interest when the end-of life electrical and electronic equipment is returned. This can be a mandatory condition in tender.
5. Ask regarding tie up with dismantlers and recyclers. This can be a mandatory condition

in tender.

What questions should you ask the e-waste collector/ dismantler/ recycler when you dispose of your e-waste?

The following questions can be asked from the e-waste collector/ dismantler/ recycler:

1. Does the organization have authorization from the CPCB or SPCB for collecting, dismantling or recycling the e-waste.
2. Does it have safe working conditions, tools and equipment to ensure safe treatment and disposal of e-waste.

How can you organize a collection drive for e- waste in your organization? Which agencies can support you in organizing such a collection and awareness drive? How to set up a collection centre?

A collection drive for e-waste can be organized by contacting manufacturer or dealers who would then refer to the authorized collector, dismantler and recycler of e-waste. A record of each item collected in the drive should be maintained and provided to the collector, dismantler and recycler. The local pollution control board officer can be informed about the drive and the e-waste collected during the drive so that they can audit if safe recycling of the collected e-waste has been conducted.

All manufacturers, dealers and government's environment department could support collection and awareness drive. In addition, national, international and local environmental NGOs can be partners for such a drive.

Setting up a collection centre for e-waste:

As per the e-waste management and handling rules to set up a collection center there is a need to apply for authorization from the State Pollution Control Board or Pollution Control Committee as per FORM – 1(a). There is a need to have agreements with producers who are willing to get the e-waste covered under their EPR collected at your center as well as with dismantlers and recyclers who will be taking the e-waste from the collection center for further processing. It should be ensured that systems for record keeping and training for safe handling and storage of e-waste is provided to the people who will be managing the collection center.

Responsibilities of Collection Centres include:

1. Ensure that the facilities are in accordance with the standards or guidelines prescribed by the Central Pollution Control Board from time to time;

2. The e-waste collected by them is stored in a secured manner till it is sent to registered dismantler or recycler as the case may be;
3. Ensure that no damage is caused to the environment during storage and transportation of ewaste;
4. Maintain records of the e-waste handled in Form 2 and make such records available for scrutiny by the State Pollution Control Board or the Pollution Control Committee concerned.

3.4. Battery waste

3.4.1. What is a Battery?

Battery Waste Management Rules, 2022 defines Battery as a new or refurbished cell and/or Battery and/or their component, including accumulator, which is any source of electrical energy generated by direct conversion of chemical energy and includes disposable primary and/or secondary battery.

Many different types and shapes of batteries can occur in IT appliances. Small batteries (i.e. button cells) are used to cover the permanent low energy supply for alarm and computer system (clock, memory backup, etc.). In contrast, bigger batteries (e.g. laptop batteries) allow to run the whole device. Most modern devices do not need the small batteries anymore because the permanent energy demand for the system is reduced on the one hand. On the other hand, the remaining energy demand can be covered by the capacitors.

3.4.2. Responsibilities of User

Under Battery Waste Management Rules, 2022, DPA shall be responsible for the following:

- Ensure that the Waste Battery is collected separately from other waste streams especially from mixed waste and domestic waste streams
- Ensure the disposal of waste batteries in an environment friendly manner by handing it over to an entity engaged in its collection or refurbishment or recycling or under EPR to the entity from which batteries are purchased.

3.4.3. Toxic substances in Batteries

Heavy metals such as cadmium (Cd), nickel, (Ni), and to some extent zinc (Zn). Organic solvents, etc. are some toxins present in batteries.

3.4.4. Localization in appliance

Batteries are very diverse in terms of characteristics, composition, form, size, colour, etc. Almost every IT-equipment contain at least one battery. Rechargeable accumulators can be

found in mobile phones, laptops, toothbrush or electrical razors. Appliances like torches, portable CD players, etc. can be operated using rechargeable and non-rechargeable batteries. Small (button) cell batteries are often used as a backup battery to the main battery; it provides an independent energy supply for processors, timers, security backup, etc. in computers. It is commonly located on the PWB.

3.4.5. Handling Aspect

Caution during dismantling

NEVER CRUSH OR OPEN A BATTERY

There is usually no difficulty or risk to separate the batteries from their support if they are in good condition. Use gloves, and wash hands and throw the gloves away after contact with substances from defective and leaking batteries.

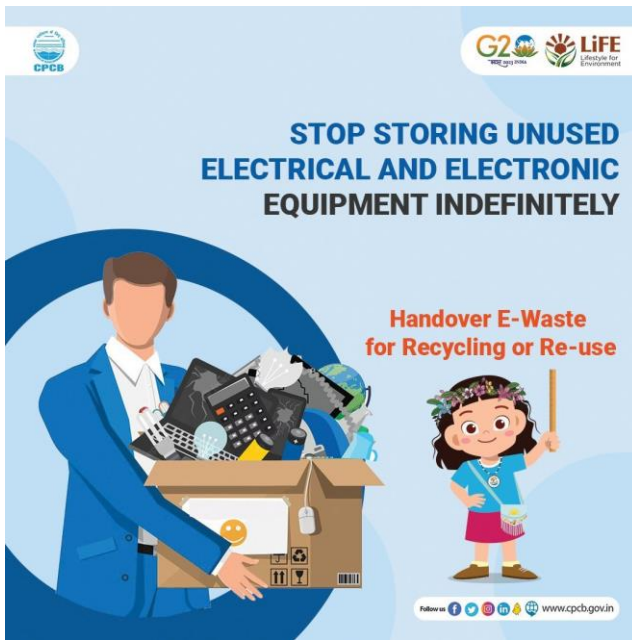
3.4.6. Requirement for storage and transport

Avoid long time storing. Batteries are subject to corrosion and cell rupture, which could release reactive hazardous substances (heavy metal oxide, organic solvents, sulphuric acid). Lithium-ion batteries can easily rupture, ignite, or explode when exposed to high temperatures, or direct sunlight.

Avoid fire risk and contact with heat sources. All batteries must be stored in acid-resistant barrels. They should be stored in a dry and sheltered place.

Batteries should be treated in an adequate plant for recovery or disposal. In any case, they should not be incinerated in an open fire or with municipal waste.

Awareness Posters





Chapter-4

Bio-Medical Waste

4.1. Introduction

The term 'Bio-medical waste' includes any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereon, or in the production or testing of biologicals or in health camps, including the categories mentioned in Schedule 1 of the Biomedical Waste Management Rules, 2016. In addition, biomedical waste includes similar kind of waste that are generated at household level, due to health care offered at household level e.g., dialysis at home, self-administration of insulin injections and restorative care.

General waste or non-hazardous waste constitutes to 75 to 90% of waste generated at health care facilities. Administrative, housekeeping, packaging, kitchen and maintenance activities of the facilities contribute to the general waste or non-hazardous waste. The remaining 10 - 25% of waste is considered hazardous and can pose threat to human and environmental health.



Figure 11 Showing Proportion of Infectious and Hazardous Waste

Bio-medical waste and its management is a comprehensive issue, encompassing occupational health and safety, environmental health and safety, and injury and incident prevention.

Training healthcare personnel to adopt 'Good Work Practices' will go a long way in Promoting the safe management of bio-medical waste so that the environment is protected

4.2. Classification of Bio-Medical Waste

Table 13 Classification of Bio-Medical Waste as Per BMW Rules 2016

Colour Coding	Type Of Waste	Examples
Yellow	. Human anatomical waste	Human tissues, organs, body parts, fetus
	. Animal anatomical waste	Experimental animal carcasses
	. Soiled waste	Cotton contaminated with blood and other body fluids, plaster casts
	. Expired or discarded medicines	Discarded tablets and capsules
	. Chemical waste	Used or discarded disinfectants, chemicals used in biologicals
	Chemical liquid waste	Laboratory reagents, X ray film developer, disinfectants, floor washings, formalin
	. Discarded linen, mattresses, beddings contaminated with blood or body fluid	Bedsheets, blankets, mattresses contaminated with blood or body fluids
	Microbiology, biotechnology and other clinical laboratory waste	Culture plates, blood bags, vaccines
Red	Contaminated waste (recyclable)	Plastic tubing, urine bags, vacutainers, gloves, catheters, Ryle's tube
White	Waste sharps including metals	Hypodermic needles, auto-disabled syringes, syringes with fixed needles, scalpels, knives, blades, lumbar puncture needles and intravenous needles.
Blue	Glassware	Used glass bottles
	Metallic body implants	Body implants, Plates and screws

4.3. Hazards of Improper Bio-Medical Waste Management

Who are at risk?

Individuals who would be at risk would include anyone working in proximity with biomedical waste, that would be,

Generators - all individuals working in health care facilities who generate biomedical waste

Handlers - who handle biomedical waste at health care facilities or at treatment and disposal facilities

Exposed group - who are exposed to hazardous biomedical waste due to consequence of careless actions of generators and handlers.

Main groups at risk are:

- Nurses, doctors, allied health care personnel (laboratory technicians)
- Patients receiving care either at hospital or at home

- visitors to health care facilities
- General public if biomedical waste is managed improperly
- Personnel in support services like; cleaners, laundry services,
- Personnel working in waste treatment/management or disposal facilities
- Personnel involved in transporting biomedical waste.

Table 14 Hazards From Various Categories of Bio-Medical Waste

Sr. No	Type Of Waste	Hazard from the Waste	Impact from the Waste
1.	Infectious waste and sharps	<ul style="list-style-type: none"> • Cuts • Abrasions • Infections 	<ul style="list-style-type: none"> • Percutaneous infections with Hepatitis B, Hepatitis C, HIV
2.	Chemical and pharmaceutical waste	<ul style="list-style-type: none"> • Intoxication by acute or Chronic exposure • Physical injury • Chemical burns • Injury to skin • Injury to eye • Injury to mucous membrane of airways • Respiratory disease • Skin disease 	<ul style="list-style-type: none"> • Harmful to wildlife Evolution of antibiotic resistance in bacterial. • The chemicals can also cause contamination of water bodies and soil. When large quantities of Disinfectant are released into sewers, they can bring down the efficiency of the sewage treatment plant.
3.	Genotoxic waste	<ul style="list-style-type: none"> • Irritant • Dizziness • Nausea • Headache • Dermatitis 	<ul style="list-style-type: none"> • Spontaneous abortions
4.	Radioactive waste	<ul style="list-style-type: none"> • Headache • Dizziness • Vomiting • Fatal 	<ul style="list-style-type: none"> • Can expose the public as well as healthcare workers to the risk of loss of fetus in the first three months of pregnancy death
5.	Healthcare waste-treatment methods	<ul style="list-style-type: none"> • Flue gases from improperly functioning waste incinerators • Physical injuries • Leachate release into water • Burning leads to heavy metal release 	<ul style="list-style-type: none"> • Flue gases released • Water pollution • Air pollution • Release of pathogens and toxic pollutants into the environment.
6.	Public sensitivity	Sensitivity to vision of anatomical parts	<ul style="list-style-type: none"> • Disposal of anatomical waste inappropriately such as dumping in a landfill is unacceptable.



Figure 12 Hazards of Healthcare Waste

4.4. Training Manual for Bio-Medical Waste (BMW)

First five steps: Segregation, Collection, Pre-treatment, Intramural Transportation and Storage is the exclusive responsibility of Health Care Facility. To ascertain a systematic implementation of these steps following is recommended for identified target audiences.

4.4.1. Target audience: Nursing and BMW handling staff

- **Mandatory use of PPEs:** The Nursing and BMW staff at DPA HCFs shall make use of below listed PPEs while dealing with or handling BMW.



Personal Protective Equipment (PPE) includes:

- Heavy Duty Gloves (Workman's Gloves)
- Gum Boots or safety shoes for waste collectors
- Face mask
- Head Cap
- Splash Proof Gowns or aprons etc.
- Disposal gloves for waste handlers

Follow Good practices for Segregation of BMW:

Bio- medical waste generated from a HCF is required to be segregated at the point of generation as per the color coding stipulated under Schedule-I of BMWM Rules, 2016 presented in Table 15.

Collection of BMW:



- Bio-medical waste should be collected on daily basis from each ward of the hospital at a fixed interval of time depending upon the waste quantum generated in each ward.
- In an IPD ward where the morning routine begins with the changing of dressings, infectious waste could be collected mid-morning to prevent soiled bandages remaining in the area for longer than necessary
- General waste collection, must be done immediately after the visiting hours of the HCFs, as visitors coming to facility generate a lot of general waste and in order to avoid accumulation of such general waste in the HCF. The collection timings must enable the HCF to minimize or nullify the use of interim storage of waste in the departments



- The collection timeline should be such that the disposal of human anatomical waste, animal anatomical waste, soiled waste and biotechnology waste is done within 48 hours of its generation.

Packaging:

- Bio-medical waste bags and sharps containers should be filled to no more than three quarters full.
- Plastic bags should be tied or sealed with a plastic tag or tie and not stapled.
- Replacement bags or containers should be readily available at each waste-collection location so that full ones could immediately be replaced.

Table 15 Color coding and type of containers for BMW

Sr. No.	Category	Type of waste	Colour & Type of storage container
1.	Yellow	Human Anatomical Waste Animal Anatomical Waste Soiled Waste Discarded or Expired Medicine Microbiology, Biotechnology and other clinical laboratory waste Chemical Waste Chemical Liquid Waste	Yellow coloured non-chlorinated Plastic Bags  Note: Chemical waste (yellow-e) comprising of un-used, residual or expired liquid chemicals including spent hypo of X-Ray, should be stored in yellow container
2.	Red	Contaminated Waste (Recyclable)	Red Colored Non-Chlorinated Plastic Bags (having thickness equal to more than 50 µ) and Containers 
3.	White	Waste Sharps including metals	White Coloured translucent, puncture proof, leak proof, Temper Proof containers

			
4.	Blue	Glassware Metallic Body Implants	<p>Puncture proof, leak proof boxes or containers with blue colored marking</p>  <p>Cardboard Box with Blue marking</p>

Labelling

All the bags/ containers/ bins used for collection and storage of bio-medical waste, must be labelled with the Symbol of Bio Hazard or Cytotoxic Hazard as the case may be in accordance with the BMWM Rules, 2016.

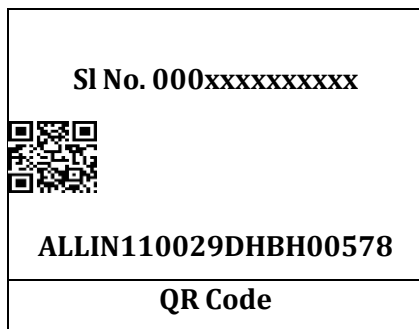


Bio-Hazard Label



Cyto-Toxic Label

Bio-medical waste bags / containers are required to be provided with bar code labels in accordance with CPCB guidelines for “Guidelines for barcode System for Effective Management of Biomedical Waste”.



Intramural transportation:

In house transportation of BMW from wards to central waste collection room, within the premises of the hospital must be done in closed trolleys / containers preferably fitted with wheels for easy maneuverability.

- Patient trolleys must not be used for BMW transportation.
- Size of such waste transport trolleys should be as per the volume of waste generated from the HCFs.

The route selection for intramural transportation should be in accordance with the below listed points:

- Transportation does not occur through high-risk areas.
- Supplies and waste are transported through separate routes.
- Waste is not transported through areas having high traffic of patients and visitors.
- Central Waste collection area can be easily accessed through this route.
- Safe transportation of waste is undertaken to avoid spillage and scattering of waste.

Storage:

- Exhaust fans should be provided in the waste collection room for ventilation.
- It is to be ensured by the health care facility that such central storage room is safety inspected for potential fire hazard and based on such inspection preventive measure has to be taken by the health care facility like installation of fire extinguisher, smoke detector etc.
- There should also be provision for water supply adjacent to central waste storage area for cleaning and washing of this station and the containers. The drainage from the storage and washing area should be routed to the Effluent Treatment Plant.
- Sign boards indicating relevant details such as contact person and the telephone number should be provided.
- The entrance of this station must be labelled with “Entry for Authorized Personnel Only”.

4.5. Training manual for HCF Administration

Following criteria pertaining to BMW management shall be put in place by the administration of HCFs at Gopalpuri, Gandhidham, Port area, clinic in Adipur and HCF in Vadinar. The nursing and other BMW management staff shall be educated and trained in systematic implementation of BMW management system.

Training of BMW staff and its record keeping:

As per Bio Medical Waste Management Rules, 2016, it is mandatory for all the employee of the healthcare facility to be trained on handling of biomedical waste management and handling.

- The HCF administration shall formulate a Training Plan and a Training calendar comprising of two parts:
- Induction training to new joiners
- Annual training to Nursing and BMW management staff.
- The ‘Guidelines for Management of Healthcare Waste as per Biomedical Waste Management Rules, 2016’, can be used as a training manual. The guidelines have been attached at Annexure X
- The HCF administration shall maintain training records and furnish them to GPCB on or before 30th June, every FY. The Training records shall mandatorily include following details.
- Total Number of trainings conducted along with the date of imparting the training
- Total number of participants of each training
- Attendance Record
- Total Number of staff trained on BMW Handling
- Total number of staff trained on BMW handling at the time of Induction
- Total number of staff, not undergone any sought of training on BMW Handling

Regulatory requirements

i. Authorization as mandated under BMW rules, 2016 and its timely renewal

The DPA HCFs at Kandla and Vadinar have obtained the authorization from GPCB for operation of HCFs at Kandla, Vadinar and Adipur. Its amendment and renewal from time to time is to be taken under consideration. Also, if any Hospital is converted to a dispensary, its amendment is to be done as per defined procedure under BMW rules.

ii. Information requirements for making a fresh application for amendment

- Particulars of Health Care Facility: Name, Address, Contact Details etc.
- Validity of Consents under Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 (in case of bedded HCFs)
- Detail of HCF: Number of beds, Average number of patients treated per month
- Category wise Quantity of Waste Generated or disposed by the health care facility

- Detail of any treatment facility available in the premises of health care facility

iii. Information requirements for making a renewal application

- Name of the Applicant
- Name of the health care facility (HCF)
- Address for correspondence
- Activity for which authorization is sought (Generation, segregation, Collection, Storage packaging Reception Transportation Treatment or processing or conversion Recycling Disposal or destruction use offering for sale, transfer Any other form of handling)
- Previous authorization number and date:
- Address of the health care facility (HCF) mentioning GPS coordinates of the facility
- Number of beds of HCF
- Number of patients treated per month by HCF
- Quantity of Biomedical waste handled, treated or disposed as per below format

Table 16 Details of waste

Category	Type of Waste	Quantity Generated kg/day	Method of Treatment and Disposal
Yellow	(a) Human Anatomical Waste:		
	(b) Animal Anatomical Waste:		
	(c) Soiled Waste:		
	(d) Expired or Discarded Medicines:		
	(e) Chemical Solid Waste:		
	(f) Chemical Liquid Waste:		
	(g) Discarded linen, mattresses, beddings contaminated with blood or body fluid.		
	(h) Microbiology, Biotechnology and Other clinical laboratory waste:		
Red	Contaminated Waste (Recyclable)		
White (Translucent)	Waste sharps including Metals:		
Blue	Glassware:		
	Metallic Body Implants		

- Brief description of arrangements for handling of biomedical waste
 - i. Mode of transportation (if any) of bio-medical waste:
 - ii. Details of treatment equipment as per table 17

Table 17 Details of treatment equipment

Treatment equipment	No. of units	Capacity of unit
Incinerators		
Needle tip cutter		
Plasma pyrolysis		
Microwave:		
Autoclaves:		
Hydroclave:		
Shredder:		
Sharps encapsulation or concrete pit:		
Deep burial pits:		
Chemical disinfection		
Any other treatment equipment		

- Details of directions or notices or legal actions if any during the period of earlier authorization

iv. Reporting to Gujarat Pollution Control Board

Annual Reporting as per the Form IV, BMWM, Rules, 2016

HCF is required to submit the Annual Report to the GPCB on or before 30th June every year, for the period from January to December of the preceding calendar year.

- The information list for filling Annual return is detailed below:
- Particulars of HCF
- Quantity of waste generated in kg/annum
- Details of storage, treatment, transportation, processing and disposal facility
- Details of training conducted on Bio Medical Waste Management
- Details of accident Occurred
- Details Emission and Effluent testing
- Training imparted to the Health Care Workers involved in handling of bio-medical waste
- Minutes of Meeting of BMW Management Committee
- Details of Accident Occurred during one year, along with the remedial steps taken
- Records of testing of Emission of DG Sets / boilers
- Records of Effluent generated and its characteristics from health care facility

- Records of pre-treatment of specified waste categories Record of recyclable waste handed over to the authorized recycler in kg/annum (where captive treatment facility is allowed by the GP)
- Records of health status of the Health Care Workers involved in handling of bio- medical waste
- Records of immunization of Health Care Workers involved in handling of bio- medical waste
- Each healthcare facility must also ensure that the annual report submitted to the GPCB is also published in its website

Table 18 Format for Bio Medical Waste Register/Record

NAME & ADDRESS OF HEALTH CARE FACILITY										
BIO MEDICAL WASTE REGISTER/ RECORD FORMAT										
Sr.no.	Date of Generation	Quantity of BMW Generated (in KG) Color Coding and Category					Date of collection by Waste Collection Agency	Time (in AM/ PM)	Name & Signature of Waste Collector	Name & Signature of HCF Staff
		Yellow (1)	Red (2)	White (3)	Blue (4)	Total				
1.										
2.										
3.										
4.										
5.										

Format for Accident reporting as per Form I BMWM, Rules, 2016

HCF shall report major accidents including accidents caused by fire hazards, blasts during handling of biomedical waste and the remedial action taken and the records relevant thereto. In the manner described below

The list of information required for filing Accident reporting form is as below:

1. Date and time of accident
2. Type of Accident
3. Sequence of events leading to accident

4. Has the Authority been informed immediately
5. The type of waste involved in accident
6. Assessment of the effects of the accidents on human health and the environment:
7. Emergency measures taken
8. Steps taken to alleviate the effects of accidents
9. Steps taken to prevent the recurrence of such an accident
10. Does facility have an Emergency Control policy? If yes give details:

Awareness Posters



Segregate general waste from infectious biomedical waste

Mixing of both can lead to greater spread of infections and epidemics



#Biomedical Waste Management

Follow us www.cpcb.gov.in



Segregate the hospital waste in designated colored dustbins

Grey bin



Metal sharps

Blue bin



Recyclable
General waste

Red bin



Contaminated
plastic waste

Black bin



Hazardous and
Other waste

Green bin



Biodegradable
General waste

Blue bin



Glass waste and
metallic implants

Yellow bin



Anatomical waste, chemical waste,
soiled waste, chemotherapy waste,
discarded linen & medicines
and laboratory waste

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Chapter-5

Construction and Demolition (C&D) Waste

5.1. Introduction

5.1.1 Objective

The objective of the training manual is to educate and inform the DPA on the severity of problem caused by Construction and Demolition (C&D) waste on the environment and serve as a reference manual providing detailed information towards management of C&D waste in an environmentally sustainable manner. It is intended that the manual be used for the purpose of training various DPA staff involved with civil construction and management of C&D waste. The sections of the training manual can be formed as training modules for providing necessary knowledge that an individual DPA staff will require to effectively and efficiently perform their respective duties with regards to implementation of C & D waste management rules (2016).

5.2. Background on Construction and Demolition (C&D) waste

5.2.1 Objective of the section

Management of Construction and Demolition waste is a relatively new term in India and so is the need for it. The urbanizing trend leading to lack of availability of land and resource shortage in construction sector has led to the notice, importance of C&D waste management in India which has brought about policy changes which specifies that all local governing bodies manage their C&D waste and also all polluters are responsible for the waste they generate.

Upon successful completion of the session, the participants should:

- Have an insight on what is C&D waste and what is it composed of
- Knowledge on estimation of C&D waste quantities in Indian cities
- Understanding on the flow of C&D waste in India
- What C&D waste can be recycled / reused for?
- Be familiar with the process of collection and transport of C&D waste

5.2.2 What is C&D waste?

Construction and demolition (C&D) waste is generated from construction, renovation, repair, and demolition of houses, large building structures, roads, bridges and dams.

C&D waste is made up of:

- Concrete
- Soil
- Steel, Wood and Plastics

- Other materials – bricks and mortar

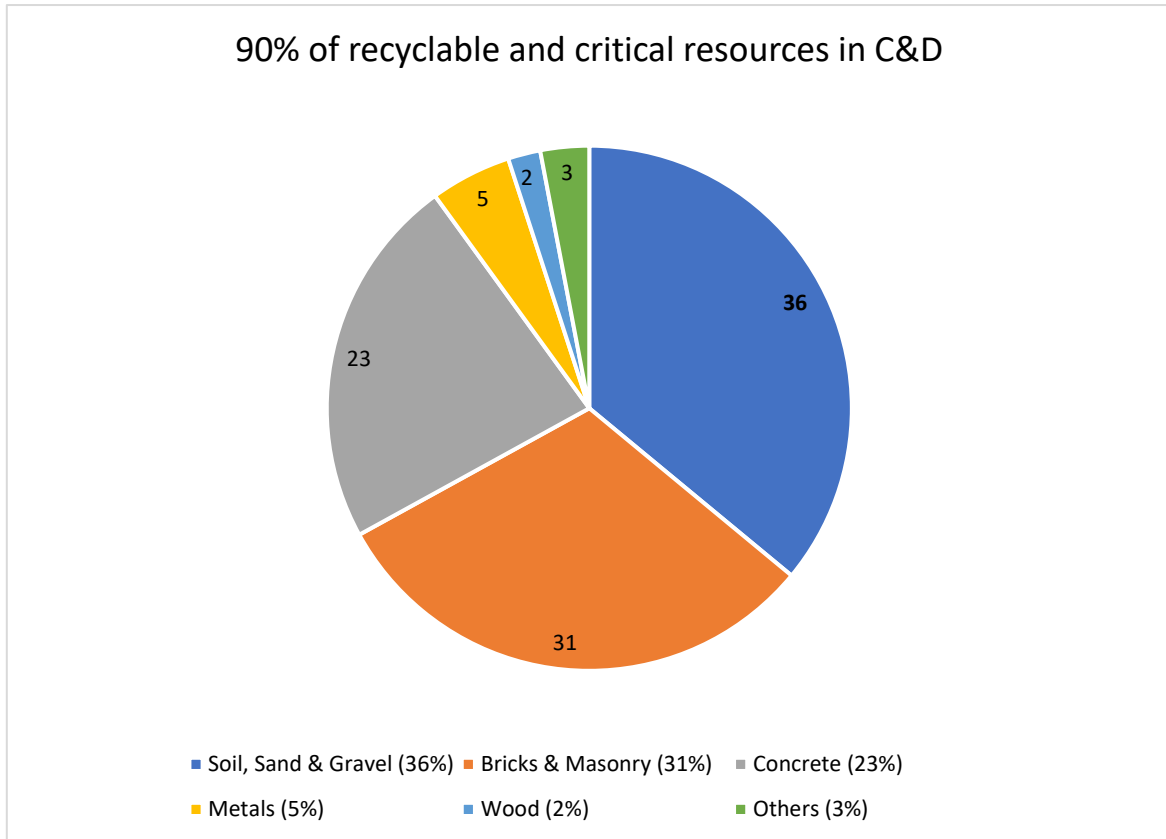


Figure 13 Typical composition of C&D waste (Source: TIFAC,2001)



Figure 14 Components of C&D waste

5.2.3 Why does C&D waste need to be managed?

The importance of C&D waste management is not lost among the stakeholders especially in large cities, where impacts have already been felt. But still effective management of C&D waste is hampered by several challenges and implementation is far from ideal.

The improperly managed and waste heaps impact the system and the environment in multiple aspects which could broadly be classified into the following aspects

Social

- Huge heaps of C&D waste on footpaths, carriage ways, alleys is a common scene in Indian cities turning the surrounding unaesthetic.
- The C&D debris usually could not be removed by normal street sweeping or household waste collection staff as they usually do not carry the equipment neither enough capacity in the collection vehicle nor enough manpower.
- Usually, the polluters tend to dump other municipal solid waste on the heap making it a mix of waste further creating an unsanitary situation.
- The C&D waste is also stealthily dumped in open drains, water channels, and even riverbeds. The debris clog the drains and create water logging. Reports of water logging of drains turning to source for spread of epidemics is common in India
- Clearing drain silts is a major challenging activity for local governing bodies and a major percentage is consisted of by C&D.
- The C&D waste also consists of several kinds of materials which include sharps, broken glasses, boulders, broken wooden logs, rusted metal, broken ceramics etc. which create a hazardous environment when dumped on unfenced open places.



Figure 15 Unauthorized Dumping

Environmental

- C&D waste is also a source of environmental pollution: The C&D debris over course of time forms fine dust creating air pollution, and reducing visibility.
- The leachate and fine chemical particles degrade the soil leading to land pollution and in addition materials like paints, oil and asbestos sheets are common components of C&D waste which are bio-hazardous in nature having potential to endanger health of workers handling the waste, civilians and any living organism
- Formation of silt deposits when dumped in wetlands and water bodies damaging the water ecosystem

Economic

- C&D waste usually gets mixed up with other municipal solid waste also during the process of transfer or at the collection site.
- C&D waste is very difficult to segregate. Separate labor has to be employed for manual segregation or it has to be performed using earth moving machine, in addition the processing efficiency also get reduced due to the presence of C&D waste which is mostly inert.
- The huge mass and volume of C&D waste results in occupying a large volume of landfills and dump-yards resulting in governing bodies to find alternate space and creation of more landfills, again leading to economic inefficiency in the system.



Figure 16 Mixing with municipal solid waste

Resource shortage - India is witnessing a boom in construction industry due to the urbanization which leads to over exploitation of primary resource to match the demands. For instance, almost 100% in case of cement and bricks, 40-60% of steel, 85% of paint and 70% of glass produced in India goes into the construction sector. The anticipated growth of the sector in the near future exerts added pressure on limited stocks

Secondary Raw Material

A secondary raw material can be raw material waste from another industry or an alternate building material available in nature that can be used in place of critical primary resources. The material could partially or completely be replaced in a product

of resources especially sand, soil, stone and limestone which have been identified as most critical resources. Therefore, use of secondary materials needs to be promoted to supplement the use of primary materials and recycled C&D waste is one of the best available options available as secondary raw material.

5.2.4 C&D waste management Rules in India

The Ministry for Environment and Forests notified Construction & Demolition waste management rules in 2016 to regulate the handling of C&D waste being generated. According to the new rules, the various stakeholders involved in C&D waste management have been assigned a specific role to be played in the process. Salient features of Construction & Demolition Waste Management Rules, 2016 are covered in detail as separate chapters.

5.2.5 How to implement a proper C&D waste management system?

A cradle to grave approach has to be adopted for proper management of C&D waste according to the national standards (C&D Waste Management Rules, 2016) where a properly implemented system exists. The system should contain proper collection of segregated C&D waste from the polluter, proper transportation of waste, storage of waste occurs at designated transfer stations or collection points followed by proper processing of waste into recycled or reusable products that have market value and where minimal rejects are produced which get deposited in designated landfills. A properly implemented management system also needs to contain proper quantification and classification system for C&D waste at different stages of handling and a properly implemented monitoring system with a neat documentation process.

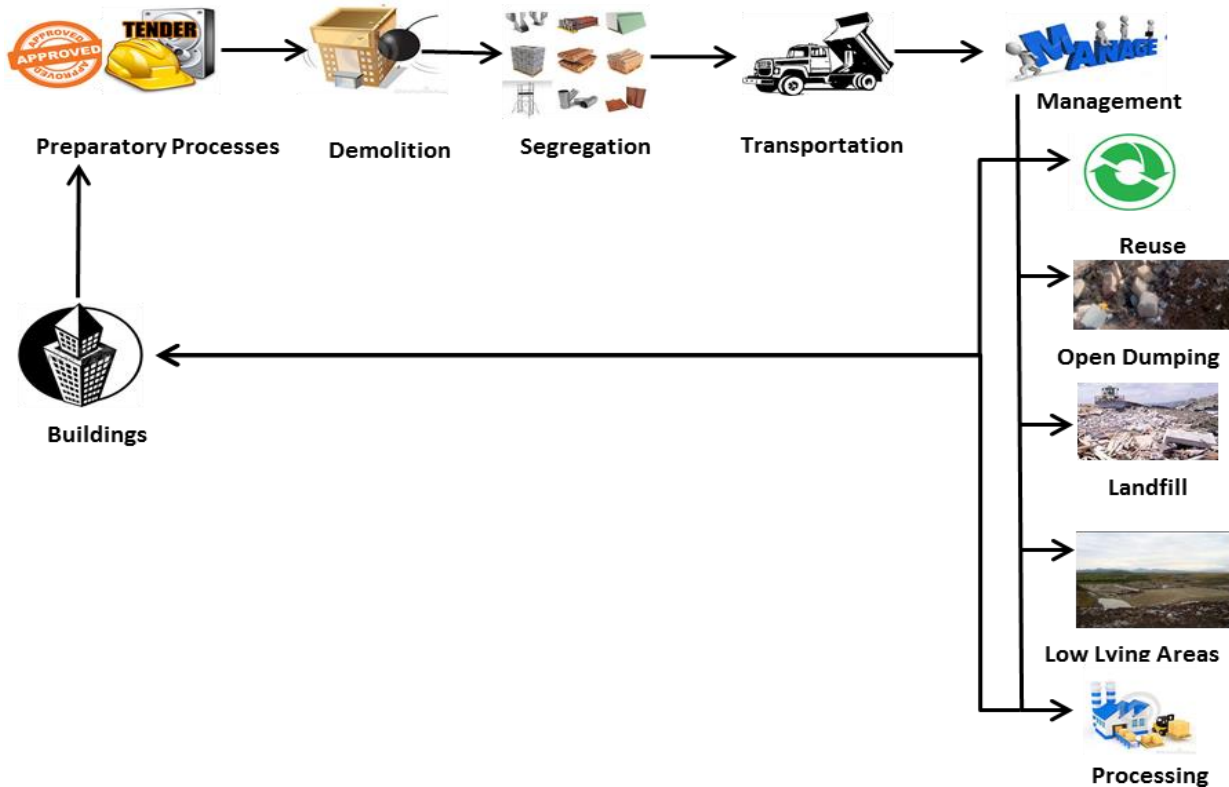


Figure 17 Schematic of current C&D Waste Management Processes in India

5.2.6 What can C&D waste be recycled / reused for?

C&D waste could be recycled and reused for multiple purposes depending on the composition and characteristics of the waste. The major applications of C&D waste which is practiced is listed below:

- **Granular Sub Base (GSB)** – Crushed C&D waste could be used as GSB layer for road constructions, regardless of the type of construction. The granular sub-base layer is formed by piling and compacting C&D aggregates of different sizes one over the other directly below the pavement surface. This acts as the load bearing and strengthening component of the pavement structure, in addition it provides drainage for the pavement structure and protects the structure from frost.
- **Recycled Concrete Aggregates (RCA)** – Concrete waste could be recycled to make aggregates of different standard sizes to replace natural aggregates in construction processes. According to Indian standards RCA could be used in any kind of structural and non-structural applications
- **Recycled Aggregates (RA)** – Crushed aggregates of standard size made from a mix of different C&D waste materials is termed as Recycled Aggregates. RA could be used for partial replacement of natural aggregates for construction of non-load bearing structures.

According to Indian standards, it could replace 20% in plain cement concrete and upto 30% replacement in road construction but only if backed up by proven laboratory test results. RA could also be used for construction of prefabricated molded structures like paver blocks, kerb stones, concrete pots and RCC Sculptures.

Table 19 C&D waste and its potential use

Material	Process	End Use
Plain Concrete	Crushed	Aggregate
Fresh Concrete	Washed to remove cement & recover aggregate	Aggregate
Reinforced Concrete	Crushed & Steel bars removed Steel recycled	Crushed Concrete reused as aggregate
Brick	Cleaned & crushed	Aggregate & Filling material

- **Manufactured Sand (M-Sand)** – Manufactured sand is also produced by crushing of C&D waste, but is much finer materials which could replace natural sand in construction activities of non-load bearing structures. According to Indian standards only materials of sieve size between 0.075mm – 4.750mm is considered classified as M-sand and much finer particles are classified as dust particles, suitable only for daily cover for MSW.
- **Backfilling** – The most common reuse practice for C&D waste in India is as a backfilling material. The C&D was as such can be dumped in pits, trenches etc and compacted for backfilling or used to increase elevation or to make top layer of surface even for construction
- **Reusing** – Materials of reuse value like wood, unbroken bricks and ceramics are being used and could be used in secondary market for construction of temporary structures or if treated properly could be used for permanent structures as well
- **Other applications** – C&D waste is also applicable in other minor applications like carrier material in preparing fertilizers, filler material in roofing constructions, wall decorative chips etc.

Table 20 Demand for soil and sand and potential generation from C&D waste

Soil	Stone (Aggregates)
Demand for soil in brick making - 884 million tons/annum	Demand for stone as coarse aggregates in concrete – 1.1 billion tons/annum Demand for stone as coarse aggregates in roads – 5 million tons/annum
Soil waste generated from C&D waste - 213 million tons/annum	Aggregates generated from C&D waste - 254 million tons

5.2.7 Importance of Recycling of C&D Waste

- a. Re-use and recycling ‘wastes’ has been promoted in all the waste rules.
- b. With the increasing demand for built spaces and scarcity of land, a trend of re-development projects is expected. With increased urbanization and increased housing demands, there will be a shortage of aggregates to the extent of 55,000 million cu.m in housing sector, whereas the road sector requires an additional 750 million cu.m. of aggregates. This emphasizes the need of C & D waste management in India. The cost of construction materials is increasing enormously. In India, the cost of cement during 1995 was Rs. 125/kg and in 2012 the price increased to Rs. 330/bag. In case of bricks, the price was Rs. 0.66 per brick in 1995 and the present rate is Rs. 6 per brick in 2012. With the environmental hazards caused by excessive and illegal extraction of river sand, the mining of river sand was banned since April 1, 2012 (Ref. Report (May 2008) report on practices in C & D waste management in some Asian (includes India) by AIT Thailand).
- c. Recycling of C & D waste is important as it helps to reduce the dependence on natural resources and eliminates adverse environmental impacts ex. mining which is energy intensive activity. Recycling of C & D wastes has the additional advantage of controlling the quantum of C & D waste destined for disposal at landfills besides reducing transportation costs.
- d. When opportunities for reuse or salvage are exhausted, recycling is the next level. C & D waste materials that can be recycled include acoustical ceiling tiles, asphalt, asphalt shingles, carpets, concrete, drywall, fluorescent lights, land clearing debris (vegetation, stumpage, dirt), metals and metal alloys, structural steel, plastic film (sheeting, packaging), glass, wood etc.
- e. The list of reuse and salvage materials include appliances, bathroom fixtures, bricks, blocks, masonry stone, structural steel, cabinets, carpeting, ceiling tiles, timber and

timber based boards, door and window frames and shutters, flooring tiles, stone tiles/platforms, insulation, landscaping materials, lighting fixtures, metal framing including for partitions and ceiling, paneling, pipes, antique moldings, accessories and hardware of furniture, PVC water tanks, roofing sheets used for garages, outdoor areas, fabric of tensile structures etc.

- f. From recyclability, building materials can be specified which will encourage recycling of building materials. The list of recycled content building materials include carpet, floor mats, flooring, cellulose insulation, ceiling tile, ceramic/porcelain tile, concrete masonry units, countertop, ductwork, fences/posts, fibre board, fiberglass, insulation, pilings, roofing, structural steel, wallboard, asphalt, concrete, drainage or backfill aggregate.
- g. C & D and other inert waste may be utilized for making bricks, pavement blocks, construction materials such as aggregates etc. There are several plants of various capacities in India to make bricks, paver blocks, aggregates, etc. out of such waste material.
- h. The Hon'ble Court's intervention on the controversy over sand mining in some states has focused the need to explore options for recycle, reuse and substitute naturally sourced building material (example sand) hence the spotlight on C & D waste management.
- i. See **ANNEXURE I: Potential uses of C & D wastes**

5.3. C & D Waste Management Rules, 2016

5.3.1 Why separate rules for Construction and Demolition (C&D)

Government of India in the erstwhile Ministry of Environment and Forest published Municipal Solid Wastes (Management and Handling) rules, 2000 which was amended from time to time. However, the central government after reviewing the existing rules considered it necessary to make separate rules for management of construction and demolition waste due following reasons,

- To give thrust to segregation, recovery, reuse and recycle
- To emphasis roles and accountability of waste generators and other stakeholders related to waste management

5.3.2 Definitions in the Rules

The rules specifically define terms relevant to implementation of its implementation. The important elements of the definitions are highlighted for better understanding of the reader.

Construction

Process of erecting or alternation of building or built facility or other structure, or building of infrastructure

Construction and Demolition Waste

Waste comprising of building materials, debris and rubble resulting from construction, remodeling, repair and demolition of any civil structure

De-construction

Planned selective demolition in which salvage, re-use and recycling of the demolished structure is maximized.

Demolition

Breaking down or tearing down building and other structures either manually or using mechanical force (by various equipment) or by implosion using explosives

Local Authority

Urban local authority such as municipal corporation, municipality, nagar palika, nagar Nigam, nagar panchayat, municipal council including notified area committee, gram panchayat

Waste Generator

Person or association of persons or institution, residential and commercial establishments including Indian Railway, Airport, Port and Harbour and Defence establishments who undertakes construction or demolition

5.3.3 The Rules promote C & D waste utilization

The Construction and Demolition (C & D) Waste Management Rules, 2016 promotes C & D waste utilization.

Under Rule (6) under Duties of Local Authority, the following sub-rules states:

- i. sub-rule (9) 'shall device appropriate measures in consultation with expert institutions for management of construction and demolition waste generated including processing facility and for using the recycled products in the best possible manner';
- ii. sub-rule (10) 'shall create a sustained system of information, education and communication (IEC) for construction and demolition waste through collaboration with

expert institutions and civil societies and also disseminate through their own website’;

- iii. sub-rule (11) ‘shall make provision for giving incentives for use of material made out of construction and demolition waste in the construction activity including in non-structural concrete, paving blocks, lower layers of road pavements, colony and rural roads.

Under Rule (7) mentions the ‘Criteria for storage, processing or recycling facilities for construction and demolition (C & D) waste and application of construction and demolition waste and its products’.

Under Schedule I (Rule (7) (1)): ‘Construction and demolition waste shall be utilized in sanitary landfill for municipal solid waste of the city or region as mentioned under Schedule I’.

- a. The Rule (7) sub-rule (3) gives Application of materials made from construction and demolition waste in operation of sanitary landfill shall be as per the criteria given in Schedule II.
- b. The Rule (9) sub-rule (4) mentions that the ‘Procurement of materials made from construction and demolition waste shall be made mandatory to a certain percentage (say 10-20%) in municipal and Government contracts subject to strict quality control’.
- c. Rule (11) under Duties of Bureau of Indian Standards (BIS) and Indian Roads Congress (IRC) ‘The Bureau of Indian Standards and Indian Roads Congress shall be responsible for preparation of code of practices and standards for use of recycled materials and products of construction and demolition waste in respect of construction activities and the role of Indian Road Congress shall be specific to the standards and practices pertaining to construction of roads.

5.3.4 Type of C & D wastes products proposed under Rules

The C & D wastes products suggested under the Construction and Demolition (C & D) Waste Management Rules, 2016 are as follows:

- i. Under Rule (6) under Duties of Local Authority: sub-rule (11) ‘shall make provision for giving incentives for use of material made out of construction and demolition waste in the construction activity including in non-structural concrete, paving blocks, lower layers of road pavements, colony and rural roads.
- ii. Under Schedule I (Rule (7) (1)): ‘Construction and demolition waste shall be utilized in sanitary landfill for municipal solid waste of the city or region as mentioned under Schedule I’. The Rule (7) sub-rule (3) gives Application of materials made from

construction and demolition waste in operation of sanitary landfill shall be as per the criteria given in Schedule II.

- iii. The Rule (9) sub-rule (4) mentions that the 'Procurement of materials made from construction and demolition waste shall be made mandatory to a certain percentage (say 10-20%) in municipal and Government contracts subject to strict quality control'.

5.3.5 Duties of stakeholders

Stakeholders mentioned and defined in the rules are,

- Waste Generator
- Service providers and their contractors
- Local authority

The rules define duties each of the above-mentioned stakeholders.

Duties of waste generator

- Waste generators as defined in the rules are responsible for,
 - Collection
 - Storage of C&D waste generated within their premises
- Ensure Solid waste does not get mixed with C&D waste
- **Deposit C&D waste to collection centers OR processing facilities** as designated and authorized by local body.
- Ensure that there is **no littering or deposition of C&D waste** to prevent obstruction of traffic, public and the drains



1. Concrete



2. Soil



3. Steel



4. Wood and Plastics



5. Bricks & Mortar

Figure 18 Segregate waste into 5 streams

- Waste generators who generate **more than 20 tons per day OR 300 tons per project in a month** shall,
 - Submit **waste management plan and approval from local authority** before starting construction, demolition or remodeling work.
 - **Pay relevant charges** for collection transportation, processing and disposal as notified by local authority.

Duties of service providers and their contractors

- Prepare **comprehensive C&D waste management plan** for area within their jurisdiction
- **Clean C&D waste** in the work area every day in a reasonable timeframe depending on the duration of work and quantity and type of waste generated. This should be done in consultation with local authority.
- **Tie up with authorized agencies** for cleaning of C&D waste if logistics support is not available.

Duties of local authority

- **Issue direction for management of C&D waste** as per the rules within their jurisdiction and seek detailed plan or undertaking as applicable from generator of C&D waste.
- **Chalk out stages, methodology, equipment required, material** involved in the activities required after Construction and Demolition.
- **Safely dispose C&D waste contaminated with hazardous, toxic or nuclear material**
- after consultation with concerned authority.
- **Make arrangement for collection of C&D waste** and ensure that clean-up is done at regular intervals.
- Get the collected C&D waste transported to appropriate sites for disposal or processing.
- **Give incentives to generator** for salvaging, processing and or recycling C&D waste preferably in-situ.
- **Examine and sanction waste management plan of generators** within one month or within date of submission and approval of building plan, whichever is earlier.
- **Establish C&D waste generation database** and update once a year.
- **Device appropriate measures for management of C&D waste and use of recycled products** in best possible manner.in consultation with expert institutions,
- **Create sustained system of IEC activities for C&D waste management** through collaboration with expert institutes and civil society organizations and also disseminate through their own website.
- **Give incentive for use of products made with recycled C&D waste** in construction activities

5.4. Inventorization of C&D waste in the DPA

5.4.1 Why to do Inventorization of C&D waste?

Inventorization of C&D waste is crucial for following purposes:

- Decision making on capacity and technology of C&D waste processing plant that should be installed.
- Decision making on products that can be made from C&D waste
- Decision making on amount of funds that need to allocated for management of C&D waste
- Decision making on management practices to be adopted for C&D waste

5.4.2 How to estimate the generation of C&D waste in the DPA

The first step towards management of Construction and Demolition (C&D) waste is to determine and quantify the amount of C&D waste generated. Waste quantification models which have been utilized all over the world and other models available from literature review are presented here for better understanding and implementation for quantifying C&D waste. However, the accurate estimation of C&D waste depends on the availability and accessibility of data.

Site visit method

This methodology requires investigators to visit the construction or demolition sites for a realistic survey. Measurements are conducted through weighing C&D waste directly on site where onsite interviews are conducted with professionals for fine tuning the estimated generation. Although this method is very practical and suitable for measuring waste produced from all of the waste generation activities, it not appropriates for estimating the C&D waste generation at a regional level because of the high requirement of time, labor and money.

Per-capita multiplier

Per-capita multiplier is one of the earliest methodologies developed from methodologies that were used to quantify municipal solid waste (MSW). Per-capita multiplier is an easy way to quantify C&D waste as this method is based on population statistics of the region. This type of estimation is less reliable as it often leads to more than 10 folds' variation in the quantity estimated.

Waste Generation rate model

Waste generation rate model is widely used by researchers around the world to estimate the quantity of waste generated in the city. In this method, the amount of construction and

demolition activity happening in the sector has to be estimated and an appropriate activity specific waste generation rate has to be multiplied with the quantum of activity to get the total estimate. Statistical data such as number and the area of waste generation has to be collected for estimation in this model.

Estimation based on waste generation model

$$Q = \sum_{K=1}^m \sum_{j=1}^l \sum_{i=1}^n A_i * q_{jk} * p_k$$

Where,

Q is the total quantity of demolition waste generated in a region (in kg);

A_i refers to the total amount of demolition activity in the *i*th part of the region;

l is the number of parts or zones in the region;

q_{jk} is the waste generation rate of *j*th type of major material from *K*th type of building;

m is the number of major materials

p_k refers to the proportion of the *k*th type of building in the region; and

n is the number of different types of building in the region

Quantification of Construction and Demolition waste is regarded as a pre-requisite for successful implementation of C&D waste management in a city. The selection of most appropriate method is recommended based on the quantification objectives and region-specific conditions.

According to the Technology Information, Forecasting and Assessment Council's, or TIFAC's, thumb rule, a new construction generates 40-60 kg of C&D waste per sq m, then taking an average of 50 kg per sq m. The waste produced per sq m of demolition is 10 times that generated during construction and for building repair/renovation TIFAC estimated that it produces 40-50 kg per sq m of waste. Therefore, the estimates of waste generation can be calculated depending on the type of activity such as Construction, Demolition and renovation.

5.5. Collection, Transportation and Disposal of C&D waste

5.5.1 How to Collect and transport C&D waste?

Collection

Existing Practices – C&D waste in most ULBs is not collected or transported in an orderly manner. The waste is either collected by a random transportation contractor and used for backfilling elsewhere or dumped on unfenced land which is mostly illegal. Some municipalities have designated landfills for disposal, where the polluter has to

Weighbridge

Weighbridge is a device in form of a platform used to weigh very heavy objects like trucks. The weight of trucks is mostly weighed on a loaded and unloaded situation in order to measure the load it carried

dump waste at his own arrangements which in most cases is not practiced since it is either far away on outskirts of city or the designated area is not known to the polluter due to improper communication by the ULB. Among the ULBs which have a collection yard a few have a proper tracking system by means of weigh bridges.

Changes to be adopted - As per the national standards C&D waste need to be kept in the generator's compound and then transported to designated disposal site prescribed by the local governing body.

Transportation

The C&D waste need to be stored in a segregated manner and transported to the designated location on self-arrangements or through local governing bodies system, which ever exist in the ULB. Either way both the generator and the transporting body needs to maintain records of the quantum of waste transported to the dumping area. The local governing body could also provide fenced transfer stations as designated dumping units to facilitate easy transport of waste for the generator. The waste reaching the designated transfer stations of the ULB needs to be recorded and from transfer stations, the waste needs to be transported by the governing body to the dumping site or processing site.

C&D waste is transported from the site by trucks or tractors to disposal sites by paying a minimal fee to the transporters. These transporters can be private or empaneled with the ULB. The ULB transports the waste to the disposal site from these points or contracts with private contractors to do so. The transport of C&D waste needs to be in a covered truck (or any vehicle) to avoid dust, air pollution and spilling of debris on roads. Large scale waste quantum (more than 2 Tons) should be transported only by empaneled trucks which to be registered with the ULB and the registered trucks need to be available to the public to utilize. The trucks empaneled for transportation of generated waste can be enabled with GPS devices for tracking of waste flow from the collection points or demolishing site to the waste processing facilities. The waste needs to be quantified at disposal or processing site also by

proper weighing of trucks.

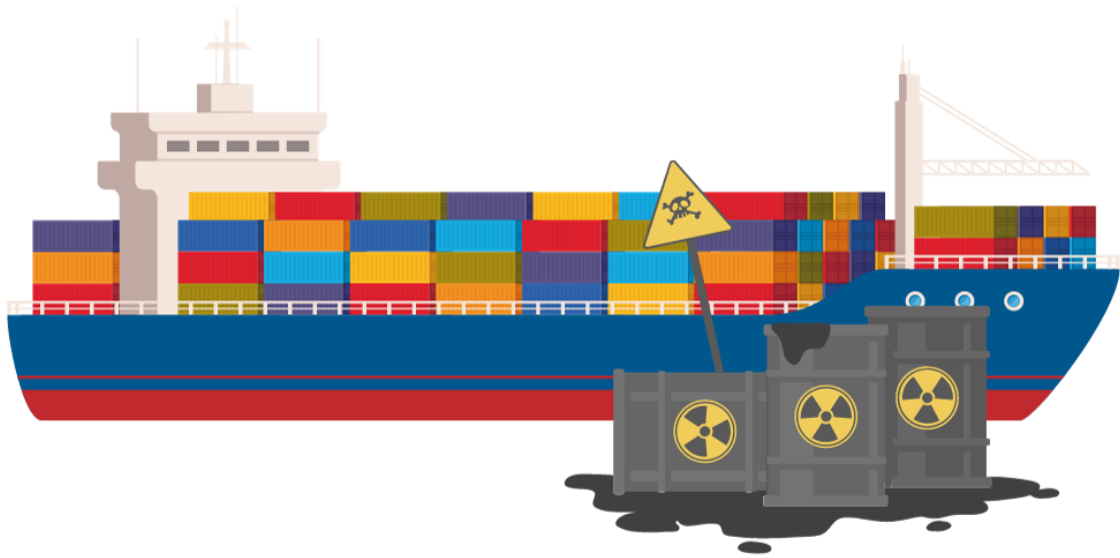
Disposal

Existing practices – C&D waste is mostly being disposed in on plain land, but it is also used as daily cover in MSW landfills. In many Municipalities it is also filled inside MSW landfill, in which case it occupies huge spaces and reduces capacity of the landfill.

Changes to be adopted – The C&D waste that comes out as a waste product after processing need to dumped into a separate sanitary landfill and should not be mixed with other MSW. The hazardous C&D waste need to be dumped in a hazardous waste landfill.

C&D waste should not be allowed to be dumped in the landfills before recovering useful materials from the waste stream.

Even for cities which do not have dedicated recycling facilities, the C&D waste debris should be disposed at designated dumping sites which provides an opportunity for recycling them in the future.



Chapter-6 Shipping Waste

6.1 Introduction of Shipping waste

6.1.1 What is shipping waste

Shipping waste means all types of waste, including sewage, and residues other than cargo residues, which are generated during the service of a ship, and fall under the scope of Annexes I, IV and V to MARPOL 73/78, and cargo associated waste, which is (not limited to): spillage during loading/ unloading, separation materials, fastening pallets, packing and casing materials, plywood, paper, cardboard, wires and steel bands (as defined in the Guidelines for the implementation of Annex V to MARPOL 73/78);

6.1.2 Objective of Manual

Target audience: Deputy Conservator Office and Marine Department, DPA

1. Creating awareness on Ocean pollution

The awareness shall be made amongst all stakeholders regarding the adverse impacts of oil spills and dumping of other wastes into the ocean. Below image in brief states the type of wastes that pollute oceans and adversely impacts Ocean ecosystems.

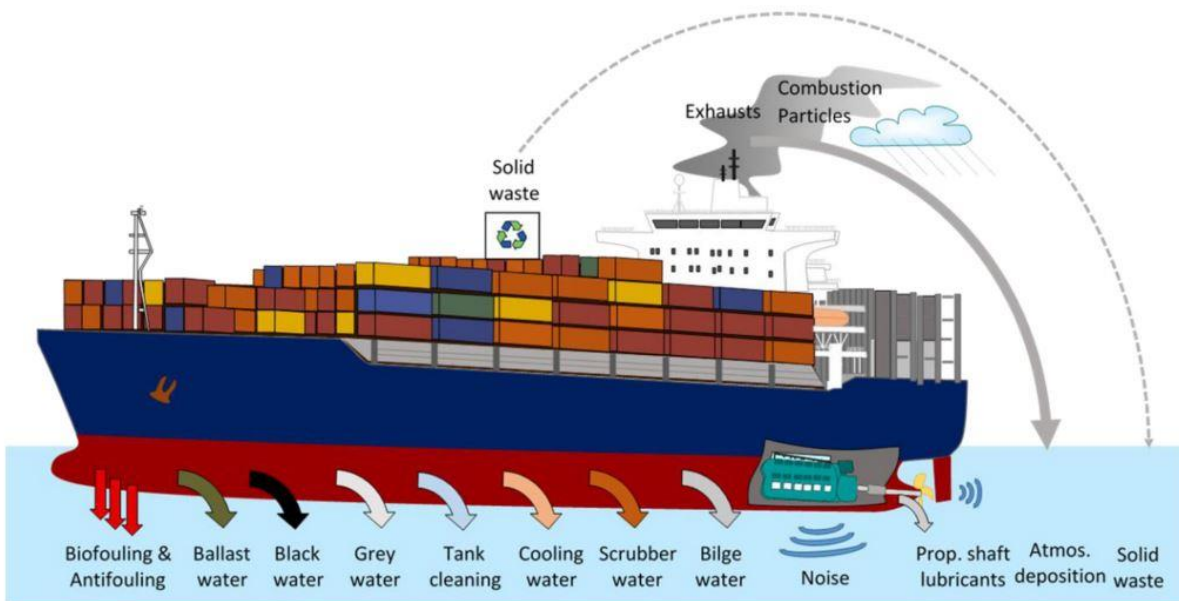


Figure 19 Effect of shipping waste on Ocean

6.2 Legal requirement

As per **Hazardous and Other Wastes (Management and Transboundary) Rules, 2016** DPA shall adhere to the provisions made for waste received from ships calling at the DPA ports as per MARPOL and Hazardous Waste Handling and Management Rules, 2016.

6.2.1 Maintaining records

The standard format for maintaining records of Hazardous and other wastes received at the ports from various ships as per Form 3

List of details required for filling up this format are:

- Name and address of the facility
- Date of issuance of Authorization from GPCB and its reference number
- Description of hazardous and other wastes handled (Generated or Received)

Record keeping format tabulated in Table 21 could be followed for systematic compilation of Waste generated and received from ships calling at the ports.

Table 21 Inventory of waste generated/received at Port

Waste reception date	Received from	Received at (Berth no.)	Waste category as per HWM rules	Waste category as per MARPOL	Total quantity (Metric Tons)	Method of Storage	Destined to
dd/mm/yy	Name of the ship generating waste	Give details of berth receiving the shipping waste	As specified under HWM rules	Whether waste falls under purview of Annex I, II, IV or V		Details of any on-site waste storage if applicable	Details of agency assigned for waste collection

6.2.2 Annual return

Annual return is to be submitted to Gujarat Pollution Control Board by 30th June every year for the preceding period April to March

List of information required for filling the annual return are:

- Name and address of the facility:
- GPCB Authorization No. and Date of issue:
- Name of the authorized person and full address with telephone, fax number and e-mail
- Total quantity of waste generated category wise to be maintained as per format indicated in Table 22
- Date wise description of management of hazardous and other wastes including products sent and to whom in case of recyclers or pre-processor or utilizer. The record keeping of the movement of waste from port to Waste Managing Agency (WMA) either for processing/reuse or disposal shall be facilitated by the record keeping format shown in Table 22

Quantity dispatched

1. To disposal facility
2. To recycler or co-processors or pre-processor
3. Others

based on frequency of collection of waste by the agency

Table 12 Details of waste collection by agency

Date	Type of waste	Total quantity (Metric Tons)	Details of Agency	Method of disposal
Date of waste collection by agency	Details of waste collected: Name of waste Category of waste	Quantity collected by agency	Name, address and contact details of agency collecting the waste	Mention if waste is Recycled or Reused or Reprocessed and used as raw material or Disposed if disposed; mention the method of disposal i.e Landfilled, incinerated etc.

Quantity in storage at the end of the year

Waste quantity if not collected by agencies due to any circumstances has to be placed in a designated storage area that is protected from sunlight, wind or rain and in an environmentally sound manner. The record keeping of wastes under storage could be done as per format tabulated below in Table 23.

Table 23 Format for waste under storage

Name and type of waste	Quantum of waste (per year)	Reason for non-disposal	Method of storage
		Give brief detail on the reason for non-arrangement of disposal of the stated waste	Mention whether stored in storage room or shed or any other provision ensuring environmentally sound conditions

6.3 Adequacy of Port Reception Facilities

Through its Annexes MARPOL states the requirement for a Port Reception Facility (PRF) to be adequate to meet the needs of ships normally visiting the port and cause not any undue delay.

In the Guidelines for ensuring the adequacy of port waste reception facilities (resolution MEPC.83(44)) “adequate” is described as: “To achieve adequacy the port should have regard to the operational needs of users and provide reception facilities for the types and quantities of wastes from ships normally visiting the port”.

“Adequate facilities” are described as those which:

- Mariner's use;
- Fully meet the need of ships regularly using them;
- Do not provide mariners with a disincentive to use them; and
- Contribute to the improvement of the marine environment.

The provided PRF must meet the needs of the ships normally using the port and allow for the ultimate disposal of ship-generated wastes and residues to take place in an environmentally appropriate way.

According to the 2017 Guidelines for the implementation of MARPOL Annex V (resolution MEPC.295(71)) the methodology for determining the adequacy of a reception facility should be based on:

- The number and types of ship calling at the port,
- The waste management requirements of each type of ship
- As well as the size and location of a port.

When selecting the most appropriate type of reception facility for a particular port, attention should be given to alternative methods available:

- Mobile facilities, such as trucks, can enhance a cost-efficient way of collecting ships' wastes.
- Floating facilities, such as barges, might be considered more effective, in particular where access by road is not practicable.

Timely assessment of the need for updating the Port Waste Management Plan (PWMP) shall be done by following:

- Assessing the demand for expanding Port Reception facility, based on waste categories and its quantities being received and requested by users
- Ensure whether information regarding waste categories for which reception facilities like Name of contact person/contractors/fees to be charged on port web-site/ Swachh Sagar Portal or by any other means are readily available to visiting ships prior their arrival
- Address the complaints registered on IMO GISIS Web-site
- Ensuring that the reception facilities provided fully meet the need of ships visiting the ports
- Ensuring that a fee charged to avail the port reception facilities does not act as a dis-incentive to use the facilities
- Ensure whether categorization and separation of ship waste into hazardous and non-

hazardous waste in accordance with hazardous and other waste rules, 2016 is practiced.

- Ensuring whether disposal of hazardous and non-hazardous waste is in accordance with hazardous waste Rules 2016 and port procedures. Also ensure whether waste not defined under hazardous waste rules is disposed in accordance with relevant rules like Plastic Waste in accordance with Plastic Waste Management Rules, e-waste in accordance with E-waste Management Rules and likewise.

6.4 Segregation of wastes on the ship

Target audience: Staff handling waste

PRF and/or port authorities might promote or (financially) incentivize the onboard separation of wastes for its environmentally sound management. The captain of the ship could be educated for waste segregation of ship generated wastes on the ship itself to avoid undue delay.

Table 24 Components of waste

Waste components	
Non-recyclable plastics and plastics mixed with non-plastic garbage	Wood
Rags	Metal
Recyclable wastes	Plastics (including extruded polystyrene or other similar plastic material)
Cooking oil	E-wastes such as electronic cards, equipment, computers, printer cartridges, etc.
Glass	Garbage that might present a hazard to the ship or crew (e.g. Oily rags, light bulbs, acids, chemicals, batteries, etc.)
Aluminum cans	Damaged/unwanted fishing gear
Paper, cardboard, corrugated board	

6.4.1 Segregation of ship generated waste

Segregation of waste generated or received at the ports from the ships calling at ports shall be encouraged as segregation is the building block of waste management system. The wastes shall be segregated into below listed components.

Table 25 Components of waste to be segregated

Waste components	Waste items
Food wastes	E.g. Animal-derived products and by-products because of risk of animal diseases
Cooking oil	Animal-derived products and by-products because of risk of animal diseases
Plastics	All typed of day-to day plastics in use like cutlery, bottles etc.
Domestic waste, operational waste and recyclable or reusable material	Paper, cardboards etc.
Special items like medical waste, outdated pyrotechnics and fumigation remnants	Medicines, drugs etc.
Animal wastes, including used bedding from the transport of live animals (due to risk of disease) but excluding drainage from spaces containing living animals	Animal-derived wastes
Cargo residues	Packaging etc.
E-waste	Such as electronic cards, gadgets, equipment, computers, printer cartridges, etc.

Chapter-7

References

1. Annual Report of Deendayal Port Authority, 2021-22.
2. Solid Waste Management Rules, 2016, Ministry of Environment, Forest and Climate Change, April 2016.
3. A step-by-step Guidance for Bulk waste generators for Waste Management, Ministry of Housing and Urban Affairs, November 2017.
4. Municipal Solid Waste Management Manual – Part II, Central Public Health and Environmental Engineering Organization (CPHEEO), Ministry of Urban Development, Government of India, 2016.
5. Overview of Plastic Waste Management, CPCB, June 2013.
6. Plastic Waste Management Rules, 2016, Ministry of Environment, Forest and Climate Change, March 2016 and its Amendments.
7. Plastic Waste Management (Amendment) Rules, 2022 Ministry of Environment, Forest and Climate Change, February 2022.
8. Manual: Plastic Waste Management, July 2021, Department of Drinking Water and Sanitation, Ministry of Jal Shakti.
9. Toolkit: Plastic Waste Management, June 2021, Department of Drinking Water and Sanitation, Ministry of Jal Shakti.
10. Consolidated Guidelines for Segregation, Collection and Disposal of Plastic Waste, September 2017, Central Pollution Control Board.
11. E- Waste Management Rules, 2022.
12. Manual: E Waste Awareness for Government Official, 2016, Ministry of Electronics & Information Technology.
13. Battery Waste Management Rules, 2022, Ministry of Environment, Forest and Climate Change, August 2022.
14. Manual: E – Waste Training, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
15. Guidelines on Implementation of E-Waste (Management) Rules, CPCB, 2016.
16. Bio-Medical Waste (Management and Handling) Rules and its Amendment thereof , Ministry of Environment, Forest and Climate Change, March 2016.
17. Guidelines for Management of Healthcare Waste as per Biomedical Waste Management Rules, 2016.
18. Toolkit: Bio-Medical Waste Management Rules, 2016.
19. Construction & Demolition Waste Rule, 2016, Ministry of Environment, Forest and Climate Change, March 2016.

20. Manual: Construction and Demolition Waste Management in India for Cities and Towns, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
21. Guidelines on Environmental Management of Construction & Demolition (C&D) wastes, CPCB, March 2017.
22. Draft circular on Port Reception Facilities, Director General of Shipping, Government of India.
23. Consolidated Guidance for Port Reception Facility providers and users, international maritime organization (IMO).
24. Draft circular on Port Reception Facilities, Director General of Shipping, Government of India.
25. Consolidated Guidance for Port Reception Facility providers and users, international maritime organization (IMO).



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ANNEXURE D
Detail of CSR activity

YEAR WISE ACTUAL WORK COSTING OF CSR WORKS APPROVED BY BOARD

1) CSR Works executed during the year 2011 – 2012 and year 2012 – 2014. (Upto Dec'21)

<u>Sr. no</u>	<u>Name of work</u>	<u>Actual cost (Rs in Lakhs)</u>
1.	(a).Road from Dr. Baba Saheb Ambedkar Circle to N.H. 8-A (Via Ganesh Nagar).	Rs.482.65 Lakhs
	(b)Road from S.T. Bus Stand (N.H. 8 – A) to Sunderpuri Cross Road Via Collector Road.	
	(C)Road from N.H. 8 –A Railway Crossing to Maninagar (Along Rly Track).	
	(d)Road from Khanna Market Road (Collector Road) to Green Palace Hotel.	
2.	Construction of Internal Roads at "Shri Ram" Harijan Co-op. Housing Society Ltd. (Nr. Kidana).	
3.	(a)Construction of Cremation Ground and kabrastan with other facilities at Vadinar.	Rs 19.44 (Lakhs)
4.	(b)Providing Cement Concrete internal roads in village Vadinar Stage –I.	Rs 16.16 (Lakhs)
	(a)Approach Road provided for developing the Tourism at village Veera near Harsidhi Mata Temple where lot of tourists & Pilgrims visit.	Rs. 4.65 (Lakhs)
	(b)Water Tank along with R.O. provided near by developing Tourism area.	Rs. 30,000 (Thousand)
	(c)Creating facility of flooring and steps surrounding the lake to stop the soil erosion and attract the tourists, at Village Veera.	Rs. 4.80 (Lakhs)
	<u>Total Rs</u>	<u>528 Lakhs</u>

2) CSR Works for the year 2014-2015.

<u>Sr. no</u>	<u>Name of work</u>	<u>Actual cost (Rs in Lakhs)</u>
1.	Construction of Community Hall-cum school at Maheshwari Nagar, G'dham	Rs 51.90 Lacs
2.	Renovation of "Muktidham" at Kandla	Rs 10.65 Lacs
3.	Sunderpuri-1 valmiki community hall	Rs 5.00 Lacs
	Sunderpuri-2 valmiki community hall	Rs 5.00 Lacs
	Ganeshnagar Community Hall	Rs 10.00 Lacs
	JagjivanMaheshwari community hall	Rs 10.00 Lacs
	Various works of Road of Sapanagar	Rs 99.19 Lac
4.	Construction of compound wall in the Dam of Jogninar village	Rs 14.48 lacs
5.	In addition above 30 Lakhs as committed in Public Hearing meeting held on 18/12/2013 an amount Rs 30 Lakhs shall also be contributed for the CSR works to be carry out at villages Tuna, Vandi , Rampar, Veera etc.	Rs 30.00 Lacs
	<u>Total Rs.</u>	<u>Rs 236.22 Lacs</u>

3) CSR Works for the year 2015-2016.

<u>Sr. no</u>	<u>Name of work</u>	<u>Actual cost (Rs in Lakhs)</u>
1.	Construction of toilets for Girls / Ladies at Khari Rohar village	Rs. 3.00 Lakhs
2.	Construction of Toilets for Girls manatMathak Primary School, Mathak Village	Rs. 3.00 Lakhs
	Total	Rs.6.00 Lakhs

4) CSR Works for the year 2016-2017.

<u>Sr. no</u>	<u>Name of work</u>	<u>Actual cost (Rs in Lakhs)</u>
1.	RCC Community Hall at Harshidhi Mata Temple, Veera village, AnjarTaluka	Rs.19.00 Lakhs
2.	Fabricated Community Hall at Sanghad village, AnjarTaluka	Rs.21.00 Lakhs
3.	CSR Works for Shri MaheshwariMeghavadSamaj, Gandhidham at Grave Yard , Behind Redison Hotel.	Rs.8.00 Lakhs
4.	CSR works for ShirDhanrajMatiyadevMuktiDham, Sector-14 , Rotary Nagar, Gandhidham	Rs. 30.50 Lakhs
5.	CSR works for NirvasitHarijan Co-operative Housing Society, Gandhidham.(Health Cum Education Centre)	Rs. 41.00 Lakhs
6.	CSR works for Shri Rotary Nagar Primary school, Gandhidham.	Rs. 2.80 Lakhs
7.	CSR works at NU -4 , NU-10(B) Sapnanagar& Saktinagar, Golden Jublee Park, at Gandhidham	Rs. 18.00 Lakhs
	Total	Rs 140.30 Lakhs

5) CSR Works for the year 2017-2018.

<u>Sr. no</u>	<u>Name of work</u>	<u>Actual cost (Rs in Lakhs)</u>
1.	CSR works at Shri Ganesh Nagar Govt High School, Gandhidham	38.30
2.	Grant Financial contribution for facility of Army cantonment for 50 air coolers at Kutch Border Area.	15.00
3.	CSR works at Tuna & Vandi villages (providing drainage lines under Swachh Bharat Abhiyan)	39.80
4.	CSR works for S.H.N Academy English School (Managed by Indian Institute of Sindhology –Bharati Sindhu Vidyapeeth), Adipur	40.00
5.	Construction of Internal Road at Bhaktinagar Society, Kidana	
	Total	148.10

6) CSR Works for the year 2018-19

<u>Sr. no</u>	<u>Name of work</u>	<u>Actual cost (Rs in Lakhs)</u>
1.	CSR work to Donate 100 Nos of Computers to Daughters of Martyred Soldiers in the country under the "BETI BACHAO BETI PADHAO" program by Atharva Foundation, Mumbai	Rs 24.00 Lakhs
2.	CSR work to Donate ONE (40 Seater) School Bus for Deaf Children Students for the Institute of Mata Lachmi Rotary Society, Adipur	Rs 18.00 Lakhs
3.	CSR work to Providing One R.O Plant with Cooler at Panchyat Prathmik Sala, Galpadar Village for the ANARDE Foundation, Kandla & Gandhidham Center.	Rs 1.50 Lakhs
4.	CSR work for Providing Drainage Line at Meghpar Borichi village, Anjar Taluka	Rs 25.00 Lakhs
5.	CSR work for Construction of Health Centre at Kidana Village	Rs 13.00 Lakhs
6.	CSR work to provide 4 Nos. of Big Dust Bin for Mithi Rohar Juth Gram Panchayat	Rs 3.40 Lakhs
7.	CSR work for Renovation & construction of shed at Charan Samaj, Gandhidham -Adipur.	Rs 10.00 Lakhs
8.	CSR Work for Renovation/Repairing of Ceiling of School Building at A. P Vidhyalay, Kandla	Rs 10.00 Lakhs
9.	CSR work for Construction of Over Head Tank & Providing 10 Nos of Computers (for students) of Navjivan Viklang Sevashray, Bhachau, Kutch	Rs 9.50 Lakhs
10.	CSR work to Provide Books & Tuition fees for Educational facilities to weaker section children of ValmikiSamaj, Kutch	Rs 2.00 lakhs
11.	CSR work to provide Water Purifier & Cooler for the ST. Joseph's Hospital, Gandhidham	Rs 1.50 Lakhs
12.	CSR work for Construction of Second Floor (Phase - I) for Training Centre of "GarbhSanskran Kendra" "Samarth Bharat Abhiyan" of Kutch KalyanSangh, Gandhidham	Rs 37.00 Lakhs
	<u>Total cost</u>	<u>Rs 154.90 Lakhs</u>

7) CSR Works for the year 2019-20

<u>Sr. no</u>	<u>Name of work</u>	<u>Actual cost (Rs in Lakhs)</u>
1.	CSR activities for Providing Drainage line at Nani Nagalpar village.	3.00
2.	CSR activities for Development of ANGANWADI Building at School no- 12 at Ward no 3 & 6 at Anjar.	7.00
3.	CSR activities for Improving the facilities of Garden at Sapna Nagar(NU-4) & (NU-10 B),Gandhidham.	18.00
4.	CSR activities for development of School premises of Shri Guru Nanak Edu. Society, Gim.	30.00
5.	CSR activities for the improvement of the facilities at St JOSEPH Hospital &Shantisadan at Gandhidham	20.00
6.	Consideration of Expenditure for running of St Ann's High School at Vadinar of last five years 2014 to 2019 under CSR.	825.00
7.	CSR activities for development of school premises of Shri Adipur Group Kanya Sala no-1 at Adipur	6.50
8.	CSR activities for development of school premises of ShriJagjivan Nagar PanchyatPrathmiksala, Gandhidham	16.50
9.	CSR activities for development of school premises of Ganeshnagar Government high school, Gandhidham	9.00
10.	CSR activities for improving greenery, increase carbon sequestration and beat Pollution at Kandla, DPA reg.	352.32
11.	CSR activities for providing infrastructures facilities at "Bhiratna Sarmas Kanya Chhatralaya" under the Trust of SamajNav- Nirman at Mirjapur highway, Ta Bhuj.	46.50
	<u>Total cost</u>	<u>1333.82</u>

8) CSR Works for the year 2020-21

<u>Sr. no</u>	<u>Name of work</u>	<u>Actual cost (Rs in Lakhs)</u>
1.	CSR Proposal for earmarking of 15% Funds for National Marintime Heritage Complex, Lothal, Gujarat (NMHC) from allocated CSR Fund of Rs 3.46 Cr	51.90
	<u>Total</u>	<u>51.90</u>

9) CSR Works for the year 2021-22

<u>Sr. no</u>	<u>Name of work</u>	<u>Actual cost (Rs in Lakhs)</u>
1.	CSR Activities for providing Water supply pipe line for drinking water facilities for poor people & Fishermen at VANDI Village.	20
2.	CSR activities for providing facilities in Girls Hostel of Kasturba Gandhi Balika Vidhyalay, Gandhidham. Cost for Construction of compound wall, entrance gate, girls toilets)	30
3.	CSR works for Construction of Auditorium Hall at RSETI (Rural Self Employment Training Institute) at Bhujodi-Bhuj.	16
4.	CSR works for the providing of SOLAR POWER SYSTEM and other facilities for Othe JEEV SEVA SAMITI at Gandhidham.	9.3
5.	CSR Activities for providing HD projector for KANYA MAHA VIDYALAYA, Adipur	1.5
6.	CSR works for Construction of New Building for Setting up of skill development centre at Rajkot (Sewa Gujarat).	250
7.	CSR Works for Ladies Environment Action Foundation (LEAF) Trust for providing infrastructure to the primary school at Gandhinagar District	46.5
8.	CSR works for Providing of Furniture for the School "Shri Galpadar Panchayat Prathmic Kumar group Sala" at Galpadar village, Taluka:Gim	5
	<u>Total Cost</u>	<u>378.3</u>

10) CSR Works for the year 2022-23

<u>Sr. no</u>	<u>Name of work</u>	<u>Actual cost (Rs in Lakhs)</u>
1.	CSR work for providing One Bore hole with construction one room along with Motor pump at Village MOTI NAGALPAR, Anjar.	18
2.	CSR work for Construction of Shamashan bhoomi (Crematorium) at Gandhidham.	49.5
3.	CSR work for providing metallic sheet DOME in Community Hall at Old Sunderpuri for Shri Juni Sundarpuri Maheshwari Samaj at Gandhidham.	15
4.	CSR Activities for construction of Samajwadi at village: Rampar, Taluka:Anjar.	15
5.	Financial assistance under CSR for providing basic facilities at Gandhidham GSRTC bus station.	25
6.	CSR Activities for construction of School Building for physically disabled, deaf & mute children, Shri & Shrimati Chhaganlal Shyamjibhai Virani Behera Munga Shala Trust, Virani Deaf School at Rajkot.	5
7.	CSR work for construction of new Administrative staff block for the Maitri Maha Vidhyalaya, Adipur.	64.65
8.	Financial support under CSR for providing 60 seater school bus for "Aadhaar Sankul", Manav Seva Trust, Gandhidham.	25
9.	CSR work for extension of Night shelter cum old age home for "DADA BHAGWANDAS ADVANI TRUST" Adipur.	78
10.	Financial assistance under CSR for Rooftop Solar System & Afforestation under clean energy & sustainable development in 10 villages around DPA	63.72
	<u>Total Cost</u>	<u>358.87</u>

11) CSR Works for the year 2023-24 till September

Sr. no	Name of work	Actual cost (Rs in Lakhs)
1.	CSR works for Shree Kachchh Mahila Kalyan Kendra, Bhuj-Kutch	55
2.	CSR Activities for Installation of 125 no. Sanitary Pad Vending Machines at Women Hostels,NGOs etc, in Kutch District	15
3.	CSR Fund for Vadinar Village & surrounding	128.54
4.	CSR Activities for Girls Hostel at Kasturba Gandhi Balika Vidhyalaya At Shinay, Taluka:Gim.	33.25
5.	CSR request for Allotment of fund for construction of Community hall at Adipur for Maheshwari Meghval Samaj.	25
6.	CSR Request for requirement of funds for renovation work in Sector-7, Gandhidham (Aryasamaj Gandhidham)	30
7.	CSR Request for providing"Antim Yatra Bus" & Mortuary Cabinet Morgue" for Adipur-Gandhidham from CSR Funds,	25
8.	CSR Request for creation of a Children park at Gandhidham Military Station, Gandhidham	15
9.	CSR Request for construction of Toilet block units for Girls & Boys NAV JIVAN VIKLANG SEVA SHREY Bhachau	3.04
10.	CSR Request for laying Synthetic Athletic track in Galpadar and to Provide One E-Kart facility for Conveyance of youths at BSF Campus, Gandhidham	75
11.	CSR request for submitted by AAS, Indore for solid waste Management at Gandhidham & Kandla.	49.93
12.	CSR request from Trikamsaheb Manav Seva Trust at Madhapar Near Bhuj for grant for Construction of Community Hall, Compound Wall etc.	40
13.	CSR Request for construction of Dome shaped shed at Rampar Village Prathmik Shala,Rampar	24
14.	CSR Fund for development of School premises of Shri Guru Nanak Education	4.5
15.	CSR Request for conducting Awareness campaigns on T.B. Prevention & treatment, Mumbai	60
16.	CSR Request for fund under CSR for Railway Institute, Gandhidham, Western	5
17.	CSR Proposal project for Sanitary Pad Making Machine for School Girls, Anjar	12.39
18.	CSR Funds for Building Construction of girl's hostel (Kanya Chhatralay) @Luni,Akhil Kutch Ganesh Sevak Sarvajanik Trust-Luni	₹ 50.00
19.	CSR request for amenities for Development of sports facilities Through CSR Funds, Navy Head Quarter Porbandar,NAVYat Navy Head Quarter, Porbandar	₹ 47.18
20.	CSR request for financial support under CSR for " Organizing Programs on Skill Development",Gandhidham Collegiate Board, Adipur	₹ 98.76
21.	CSR fund for construction work for Community hall(samajvadi for cause of human services).Kidana,Kutch Andhra Seva Trust, Gandhidham	₹ 20.00
22.	CSR funds for Karam Educational Complex@mirapar,Bhuj,Akhil Kutch MAheshwari Vikas Seva Sangh, Bhuj(Karam Sankul EDU)	₹ 50.00
23.	CSR fund for vadinar village & surrounding for prathmik shala,Vadinar prathmik shala managed by dist. Panchayat	₹ 28.47
24.	CSR fund for repairing of construction for school,Shree vadinar vadi school vadinar	₹ 16.04
25.	CSR Project proposal for Outdoor flooring and laundry Construction for mentally Disturbed women, St. Joseph's Hospital Trust-Gandhidham ,St, Joseph's Hospital trust-Gandhidham	₹ 29.16
26.	CSR request for creation of Bio Diversity Miyawaki Forest at Gandhidham Military Station, Gandhidham	₹ 57.64

27	CSR Funds request for the Construction of Hall/Dome for Indoor games at Gandhidham,Shri kutch Deshiya Saraswat Brahmin mahasthan trust-Gandhidham.	₹ 20.00
28	CSR Request for repairing of School shed, R.O. Plant, School Colour Work at Ganeshnagar Panchayat Prathmik kumar shala At Gandhidham-Kutch.,Shri Ganeshnagar Panchayat Prathmik Kumar Shala Gandhidham	₹ 8.00
29	CSR request for livelihoods Development of rural women at Kutch Area, ,BAIF Institute for Sustainable Livelihoods and development, pune	₹ 8.71
30	Improvement of village pond at Kidana, Taluka: Gandhidham.,Deputy collector & sub divisional magistrate office , anjar	₹ 72.90
31	CSR request for construction of Gym and Indoor Badminton Court as well as Synthetic Tennis Court,Anjar	₹ 77.90
32	Sanik Kaleyana Board bhuj and Jamnagar	₹ 44.00
33	NMHC Projects	₹ 605.80
	<u>Total Cost</u>	<u>Rs.1835.21 Lakh</u>

ANNEXURE E
Mitigation measure in matrix

Subject: Compliance of mitigation measures suggested in EIA report of the project “**Development of Integrated facilities (Stage II) within the existing Deendayal Port Trust (Erstwhile Kandla Port Trust) at District Kutch, Gujarat (1. Setting up of Oil Jetty No. 7 2. Setting up of Barge Jetty at Jafrabadi 3. Setting up of Barge port at Veera 4. An administrative office building at Tuna Tekra 5. the road connecting from Veera barge jetty to Tuna gate by M/s Deendayal Port Trust (Erstwhile Kandla Port Trust)**”

Reference: Specific Condition no. XXIII of Environmental and CRZ Clearance granted by MoEF&CC, GoI vide letter vide file no. 11-13/2015-IA-III dated 19/02/2020

Sr No.	Particular	Location	Quantification	Proposed Measure	Compliance
1.	Generation of particulate	Applicable to the proposed project and surrounding	Not quantified	Spraying water Reducing speed of vehicle Deploying vehicles with PUC certificate	To control dust pollution, regular sprinkling through tankers on roads and other area is being done DPA has issued circular no. TF/SH/Circulars/2022/1341 dated 04/11/2022 considering the safety norms provided for smooth and continuous operation. DPA has issued circular regarding implementation of RFID enabled access control system (e-Drishti); wherein, PUC certificate has been made mandatory for vehicle registration in e-Drishti portal to obtain valid permit for entry in the port premises.
2.	Generation of Noise	Along proposed projects	Not quantified	Restricted operation in the night time Selection of machinery generating noise less than 72 db(A) fitting on noise attenuation devices	DPA has issued circular no. TF/SH/Circulars/2022/1341 dated 04/11/2022 considering the safety norms provided for smooth and continuous operation DPA has been conducting regular Monitoring of environmental parameters since the year 2016 and the monitoring data has been regularly submitted to all the concerned authorities along with compliance reports submitted. The Environmental monitoring report, is enclosed with the EC compliance Further, routine maintenance is being carried out to keep check on the efficiency and noise
Soil & Geology					
3.	Soil erosion	Applicable to the proposed projects	Not quantified; initiates a chain of impacts	Water bars; stabilization of slopes Control of discharged water	Topography at the site location is generally flat with average ground level of about 6.5 m CD with marshy topsoil. Section 3.4.1 Topography of the EIA report (Copy attached as Annexure 1) Point noted The area falls under arid/semi-arid region, thus the

Sr No.	Particular	Location	Quantification	Proposed Measure	Compliance
				<p>Conducting construction activities in non-monsoon season</p> <p>Oil spill prevention measures</p>	<p>rainfall is very scanty</p> <p>DPA has Oil Spill Contingency Plan in place. Copy of the same is submitted with the EC compliance report submitted on 03/05/2023.</p>
hydrology					
4.	Surface water contamination	At the proposed projects Soil erosion prone area	Not quantified	Soil erosion control measures	<p>For mitigation soil erosion, DPA entrusted work of green belt development in and around the port area to the Forest Department, Gujarat at Rs. 352 lakhs (Area 32 hectares) and the work is already completed.</p> <p>For strengthening of the coastal resilience, DPA had already undertaken Mangrove Plantation in an area of 1600 Ha. till date since the year 2005. A statement showing details of the mangrove plantation and the cost incurred is already enclosed with the EC compliance report.</p> <p>DPA has been regularly monitoring environmental parameters including surface water since the year 2016 and the monitoring data has been regularly submitted to all the concerned authorities along with compliance reports submitted. The Environmental monitoring report, is enclosed with the EC compliance</p>
	Spillage and sanitary wastes			Waste management and spill control.	<p>For waste management, companies authorized by Central Pollution Control Board (CPCB) and State Pollution Control Board have been awarded the work of collection, transporting and disposal of solid waste by the DPA</p> <p>DPA has Oil Spill Contingency Plan in place. Copy of the same is submitted with the EC compliance report submitted on 03/05/2023.</p>
5.	Ground water contamination	Not expected	--	--	--
Land use Aesthetics					

Sr No.	Particular	Location	Quantification	Proposed Measure	Compliance
6.	Land use and Aesthetics	At project site At campsites At other utilities like scraper stations	Not quantifiable	Contouring of the affected areas Cleaning of stretch immediately after the construction activities are over. Restoration and re-vegetation to the best possible extent	<p>Topography at the site location is generally flat with average ground level of about 6.5 m CD with marshy topsoil. Section 3.4.1 Topography of the EIA report (Copy attached as Annexure 1)</p> <p>DPA has included clause in tender/ Concession agreement for the contractor to undertake Clearance of site on completion and environmental protection measures. Copy of the relevant page of the tender is attached herewith as Annexure 2</p> <p>DPA entrusted work of green belt development in and around the Port area to the Forest Department , Gujarat at Rs. 352 lakhs (Area 32 hectares) and the work is already completed.</p> <p>Further, DPA has appointed the Gujarat Institute of Desert Ecology (GUIDE) for "Green belt development in Deendayal Port Authority and its Surrounding Areas, Charcoal site' (Phase-I)" vide Work Order No.EG/WK/4757/Part[Greenbelt GUIDE, dated 31st May 2022.</p> <p>Further DPA has accorded the work of "Green belt development in DPA and its surrounding area (Phase II) to Gujarat Institute of Desert Ecology (GUIDE), Bhuj for the plantation of 10000 saplings of suitable species vide work order dated 23/06/2023. The same is in process</p> <p>DPA had already undertaken Mangrove Plantation in an area of 1600 Ha. till date since the year 2005. A statement showing details of the mangrove plantation and the cost incurred is again attached with EC compliance report.</p>

Biological Environment: Flora and Vegetation

7.	Due to dusting on floral cover	At project site & approach road	Limited	Sprinkling of water for dust suppression	<p>DPA has installed Mist Canon at the Port area to minimize the dust</p> <p>Further, to control dust pollution in other area, regular sprinkling of treated water through tankers on roads is being done</p>
8.	Removal of vegetation	At project site	Limited	Restoration and re-vegetation and plantation;	DPA entrusted work of green belt development in and around the Port area to the Forest

Sr No.	Particular	Location	Quantification	Proposed Measure	Compliance
				Compensatory vegetation	<p>Department, Gujarat at Rs. 352 lakhs (Area 32hectares) and the work is already completed.</p> <p>Further, DPA has appointed the Gujarat Institute of Desert Ecology (GUIDE) for "Green belt development in Deendayal Port Authority and its Surrounding Areas, Charcoal site' (Phase-I)" vide Work Order No.EG/WK/4757/Part [Greenbelt GUIDE, dated 31st May 2022.</p> <p>DPA had already undertaken Mangrove Plantation in an area of 1600 Ha. till date since the year 2005. A statement showing details of the mangrove plantation and the cost incurred is again attached with EC compliance report.</p>
9.	Due to Piling activity	At project site	Limited	Piling should be done in closed vessels to minimize the impact	DPA has included clause in tender/ Concession agreement for the contractor to undertake piling installation in accordance with IS 2911. Copy of the relevant page of the tender is attached herewith as Annexure 3
10.	Due to dredging	At project site in Sea	Not quantified	Silt curtain should be used to minimize the impact	The possibility of providing silt curtains to minimize the impacts while dredging activities in a study for "Comprehensive study for the Deepening of Navigational channel to increase the draught of Navigational channel at Deendayal Port Trust including Capital & Maintenance dredging requirements and Preparation of Technical & Commercial Feasibility Report" has been awarded to IIT, Madras
11.	Oil spillage & waste disposal from ships	Sea & creeks	Unlimited	Oily wastes and sewage should not be discharged directly; MARPOL norms should be followed	DPA issued Grant of License/Permission to carry out the work of collection and disposal of "Hazardous Waste/Sludge/ Waste Oil" from Vessels calling at Deendayal Port" through DPA contractors. Further, it is to state that, all ships are required to follow DG Shipping circulars in line with MARPOL norm regarding the reception facilities at Swachch Sagar portal
12.	Fishes & Fishery	In project area	Limited	No legal fishery is in study area, major fish landing site is far from project site	There is no fish landing centre in the study area. Sub-section D: Marine Fishes of Section 3.5.5 Fauna of the EIA report. (Copy of the relevant page is attached herewith as Annexure 4).
Fauna and Wildlife					
13.	Loss of wildlife	No wildlife habitation in proximity	Not applicable	Strictly prohibiting hunting and similar activities	It is a custom bonded area, therefore, no hunting or similar activities are permitted in the port area. Moreover, in the study area of the KPT no National Park, wildlife sanctuary or biosphere reserve is present. Section

Sr No.	Particular	Location	Quantification	Proposed Measure	Compliance
				<p>Restriction of speed of movement of vehicles</p> <p>Keeping "Trench plugs" at strategic location.</p> <p>Shifting the nests, wherever possible.</p>	<p>3.5.5.4 Occurrence of National Park/Sanctuary/ Biosphere Reserve etc. of the EIA report (Copy attached as Annexure 5).</p> <p>DPA has issued Circular No. TF/SH/Circulars/2022/1341 dated 04/11/2022 considering the safety norms provided for smooth and continuous operation</p> <p>Point noted</p> <p>There is no considerable habitat of fauna in vicinity of the project site. Section 4.3.1 Noise generation during Construction Phase (Copy attached as Annexure 6).</p>
Socio- Economic and Cultural Environment					
14.	Human habitations affected	No habitation falling within the project site	Not quantified, but critical locations are identified	Villagers in the proximity will kept informed on the project activities	DPA has already given advertisement regarding grant of Environmental & CRZ clearance in two local news papers viz. KUTCHMITRA (In Gujarati) dated 23/2/2020 and in the Indian Express (In English) dated 23/02/2020 and also forwarded to the Regional Office , MoEF&CC, Bhopal vide letter dated 28/2/2020 (Copy of the same placed with EC&CRZ compliance report submitted on 03/05/2023).
15.	Economic implications	Along the project site	Not quantified. The Implications with regard to loss of seasonal crops and plantations are identified	Compensation to the affected people; Employment, wherever possible, to the unskilled local people.	The law of the land will be followed by the BOT operators for employment. As per the guidelines issued by the Ministry of Ports, Shipping & Waterways, Government of India, the CSR activities are being carried out by the DPA (Details attached with the EC compliance report)
16.	Agriculture lands	At project site	No agriculture land involved	Restoration of the land; Management of topsoil	<p>No agriculture land is involved.</p> <p>For topsoil management, DPA entrusted work of green belt development in and around the Port area to the Forest Department, Gujarat at Rs. 352 lakhs (Area 32 hectares) and the work is already completed.</p> <p>Further, DPA has appointed GUIDE for "Green belt development in Deendayal Port Authority and its surrounding areas (Phase I) vide work order No.EG/WK/4757/Part dated 31st May 2022</p>
17.	Infrastructure	Near human habitations; Road and	Not quantified	Rehabilitation of the affected infrastructure components; leaving behind the	N/A

Sr No.	Particular	Location	Quantification	Proposed Measure	Compliance
		railway crossings		infrastructure facilities like approach roads and facilities at the campsites for the local inhabitants.	
18.	Social conflicts	Surrounding the proposed project	Not quantifiable	Keeping good relationship with the local people; Keeping them informed on the project and project development	As per the Guidelines issued by the Ministry of Ports, Shipping & Waterways, Government of India, the CSR activities are being carried out by the DPA (Details attached with the EC compliance report). DPA has already given advertisement regarding grant of Environmental & CRZ clearance in two local news papers viz. KUTCHMITRA (In Gujarati) dated 23/2/2020 and in the Indian Express (In English) dated 23/02/2020 and also forwarded to the regional office, MoEF&CC, Bhopal vide letter dated 28/2/2020
19.	Political conflicts	--	Not quantifiable	Keeping the key players informed on the pros and cons of the project	The key players shall be informed on the pros and cons of the project
20.	Historic and archaeological importance	Surrounding the 15.0 Km. radius from the proposed project	No structure on the surface possibilities are there of sub-surface structure	Inform the concerned authority in case of coming across any archaeological significance	Point noted. Further, it is relevant to mention here that, no area of cultural importance is present near the project point h of Section 2.5 Size or magnitude of operation of the EIA report. (Copy attached as Annexure 7).

ANNEXURE II
Monitoring data sheet

**Monitoring the implemental Safe guards Ministry of Environment &
Forests Regional office (WZ), Gandhinagar.
Monitoring Report (For Upto September 2024) DATA SHEET**

Sr. No.	Particulars	Reply																		
1.	Project type: River valley/ Mining/Industry/ thermal/nuclear/Other (specify)	Infrastructure and Miscellaneous Projects + CRZ																		
2.	Name of the project	Development of Integrated facilities (Stage-II) within the existing Deendayal Port Trust (Erstwhile Kandla Port Trust) at District Kutch, Gujarat. (1. Setting up of Oil Jetty No.7. 2. Setting up of Barge jetty at Jafarwadi 3. Setting up of Barge port at Veera; 4. Administrative office building at Tuna Tekra; 5. Road connecting from Veera barge jetty to Tuna gate by Deendayal Port Authority (Erstwhile: Deendayal Port Trust)																		
3.	Clearance Letter (s). OM no and date	Environmental/ CRZ Clearance accorded by the MoEF&CC vide File No. 11-13/2015-1A.III dated 19/02/2020.																		
	Location a) District (s) b) State (s) Location/latitude/longitude	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Project</th> <th style="text-align: center;">Location</th> <th style="text-align: center;">Coordinates</th> </tr> </thead> <tbody> <tr> <td>Setting up of oil jetty No. 7</td> <td>Old Kandla, Kachchh, Gujarat</td> <td>70°13'14.09" E 23°02'22.21" N</td> </tr> <tr> <td>Setting up of Barge Jetty</td> <td>Jafrawadi, Kachchh, Gujarat</td> <td>70°12'36.4" E 23°04'33.6" N</td> </tr> <tr> <td>Setting up of Barge Jetty</td> <td>Veera, Kachchh, Gujarat</td> <td>70°01'21.08" E 22°54'26.3" N</td> </tr> <tr> <td>Administrative Office Building</td> <td>Tuna Tekra, Kachchh, Gujarat</td> <td>70°06'00.0" E 22°56'02" N</td> </tr> <tr> <td>Road connecting from Veera barge jetty to Tuna Gate</td> <td>Veera Barge Jetty to Tuna Gate, Kachchh, Gujarat</td> <td>70°01'21.0" E to 22°54'26.3" N 70°05'35" E to 22°58'22" N</td> </tr> </tbody> </table>	Project	Location	Coordinates	Setting up of oil jetty No. 7	Old Kandla, Kachchh, Gujarat	70°13'14.09" E 23°02'22.21" N	Setting up of Barge Jetty	Jafrawadi, Kachchh, Gujarat	70°12'36.4" E 23°04'33.6" N	Setting up of Barge Jetty	Veera, Kachchh, Gujarat	70°01'21.08" E 22°54'26.3" N	Administrative Office Building	Tuna Tekra, Kachchh, Gujarat	70°06'00.0" E 22°56'02" N	Road connecting from Veera barge jetty to Tuna Gate	Veera Barge Jetty to Tuna Gate, Kachchh, Gujarat	70°01'21.0" E to 22°54'26.3" N 70°05'35" E to 22°58'22" N
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Setting up of oil jetty No. 7	Old Kandla, Kachchh, Gujarat	70°13'14.09" E 23°02'22.21" N																		
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5.	Address for Correspondence a) address of Concerned Project Chief Engineer (with pin code & telephone/telex/fax numbers b) Address of Executive project Engineer/manager/ (with pin code fax numbers)	Chief Engineer, Deendayal Port Authority, A.O. Building, Annex, Post Box No.-50, Gandhidham- Kutch. Gujarat Pin – 370201 Tel: 02836-233192, Fax-02836-220050. Executive Engineer (Pipeline) Deendayal Port Authority, A.O. Building, Annex, Post Box No.-50, Gandhidham- Kutch. Gujarat Pin – 370201																		
6.	Salient features a) Of the Project	1. Setting up of Oil Jetty No.7 (Capacity - 2MMTPA, Size - 110m x 12.40m, Approach - 210m - Back up area 1 Ha, Capital dredging - 72000 m3. Maintenance dredging - @15% per annum i.e. 10800 m3/year, Cost - 72 Crores). 2. Setting up of Barge jetty at Jafarwadi (On BOT Basis) (Capacity - 3.00 MMTPA, Size - 180 x 20 m, Back up area - 20 Ha., Capital Dredging – 80000 m3, Maintenance dredging - 15% per annum i.e. 12000 m3/year, Cost - 105 Crores). 3. Setting up of Barge port at Veera (On BOT Basis)																		

	b) Of the Environmental Management plan	<p>(Capacity - 6.29 MMTPA, Size - 160 x 60 m, Back up area - 20 Ha., Cost 160 Crores).</p> <p>4. Construction of Administrative office (Port Operational) building at Tuna Tekra (Build up area - 1600m², Plot Area - 15,000m², Cost - 10 Crores).</p> <p>5. Road connecting from Veera barge jetty to Tuna Gate (Length - 15500 m, Width - 7.30m, with both sides 1.50m shoulders, Cost - 48.82 Crores).</p> <p>The salient feature of the Environment management plan as specified in the Chapter 9 of the EIA report has already been Communicated with earlier compliance report submitted.</p>
7.	Production Details during compliance period and (or) during the previous financial year	It is under Infrastructure and Miscellaneous Projects + CRZ so production not involved
8.	Breakup of the project area a) Submergence area: forest & non-forest b) Others	No forest area.
9.	Breakup of the project affected population with enumeration of those loing houses/dwelling units only agricultural land & landless laborer's/artisen a) SC. ST/Adivasis b) Others (please indicate whether these figures are based on any scientific and systematic survey carried out of only provisional figures, if a survey is carried out give details and years of survey).	Nil
	<p>Financial details</p> <p>a) Project cost as originally planned and subsequent revised estimates and the year of prices reference</p> <p>b) Allocation made for environmental management plans with item wise and year wise break-up</p> <p>c) Benefit cost ratio/Internal rate of Return and the year of assessment Whether (c) includes the cost of environmental management plans so far</p>	<p>Estimated project cost: Rs. 395.82 Cr.</p> <ol style="list-style-type: none"> 1. Setting up of Oil Jetty No.7 : Cost - Rs. 72 Crores 2. Setting up of Barge jetty at Jafarwadi (On BOT Basis) Cost - Rs. 105 Crores). 3. Setting up of Barge port at Veera (On BOT Basis) : Cost - Rs. 160 Crores). 4. 4. Construction of Administrative office (Port Operational) building at Tuna Tekra : Cost – Rs. 10 Crores. 5. Road connecting from Veera barge jetty to Tuna Gate : Cost – Rs. 48.82 Crores. <p>The allocation made under the scheme of "Environmental Services & Clearance there of other related Expenditure" during BE 2024-2025 is Rs. 657 Lakhs.</p> <p>IRR: 12.5%</p>

	<p>d) Actual expenditure incurred on the project</p> <p>e) Actual expenditure incurred on the environmental management plans so</p>	<p>1. Setting up of Oil Jetty No.7 : Cost - Rs. 71.6 Crore 2. Setting up of Barge jetty at Jafarwadi (On BOT Basis) : Construction not yet started 3. Setting up of Barge port at Veera (On BOT Basis) : Construction not yet started 4. Construction of Administrative office (Port Operational) building at Tuna Tekra : Construction not yet started. 5. Road connecting from Veera barge jetty to Tuna Gate : Construction not yet started.</p> <p>The expenditure made under the scheme of "Environmental Services & Clearance thereof other related Expenditure" is Rs 172 lakhs for period of June to September 2024</p>
11	<p>Forest land requirement</p> <p>a) The status of approval for diversion of forest land for non-forestry use</p> <p>b) The status of clear felling</p> <p>c) The status of compensatory a forestation, if any</p> <p>d) Comments on the viability & sustainability of compensatory a forestation programmed in the light of actual field experience so far</p>	<p>Nil</p> <p>Nil</p> <p>NIL</p> <p>Nil</p> <p>None</p>
12.	<p>The status of clear felling in non- forest areas (such as submergence area of reservoir, approach roads), if any with quantitative information.</p>	<p>NA, no felling is required</p>
13.	<p>Status of construction</p> <p>a) Date of commencement (Actual and/or planned)</p> <p>b) Date of completion (Actual and/or planned)</p>	<p><u>Setting up of Oil Jetty No.7</u> It is under operation w.e.f January 2023.</p> <p><u>Setting up of Barge jetty at Jafarwadi</u> No work started – project under planning stage</p> <p><u>Setting up of Barge port at Veera</u> No work started - project under planning stage</p> <p><u>The administrative office building at Tuna Tekra</u> No work started - project under planning stage.</p> <p><u>A road connecting from Veera barge jetty to Tuna gate</u> No work started - project under planning stage</p>
14	<p>Reasons for the delay if the Project is yet to start</p>	<p>---</p>
15	<p>Date of site visited</p> <p>a) The dates on which the project was monitored by the regional office on pervious occasion. if any</p> <p>The date site visit for this monitoring report</p>	<p>---</p>

16	<p>Details of the correspondence with project authorities for obtaining action plans/information on status of compliance to safeguard other than the routine letters for logistic support for site visit.</p> <p>(The first monitoring report may contain the details of all the letters issued so far but the later reports may cover only the letters issued subsequently.)</p>	---
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