



Government of Odisha
DIRECTORATE OF FACTORIES AND BOILERS, ODISHA.
KHARAVEL NAGAR, UNIT-3, BHUBANESWAR-751001, PH. NO. 2396070

.....
Letter No.IV(IH)(3)-50/15/ 5430 / Dated, the 30/9/2020

To

The Occupier,
Mrs. Indian Oil Corporation Ltd.(Marketing Division)
Paradeep Lighterage Terminal,
At- Bhitaragarh, PO- Alharabanki, Paradeep.
Dist- Jagatsinghpur-754120.

Sub: Acceptance of Updated On-site Emergency Plan

Ref: Your letter Your L. No PDPTML/DF&B/DMP/01 dated 20.08.2019.

Sir,

In supersession to the office letter No.1498 dated 28.02.2017 & in pursuance of provision under Rule 12 of the Odisha Factories (C&MH) Rules, 2001, the updated On-Site Emergency Plan of your hazardous factory having identified Hazards MS,SKO,HSD,ATF,FO,HSD,ETHANOL & TRANSFORMER OIL coming U/S 2(c) of the Factories Act,1948 bearing SI. No 06/2019 is hereby provisionally accepted, subject to conditions as mentioned hereunder:-

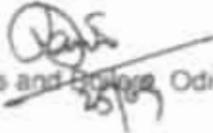
- 01 Consequent upon any modification / alteration in future the On-Site Emergency plan shall be prepared and submitted for acceptance.
- 02 The possible hazards associated with the factory and 'Dos' and 'Don'ts' shall be displayed in prominent place adjacent to main gate & conspicuous places inside the factory with the measures to be taken in case of such incident.
- 03 Each key personnel of the command structure shall be provided with a worksheet containing their duties and responsibilities.
- 04 Mock Drill shall be conducted at least once in every six months involving zonal Asst. Director of Factories and Boilers / Divisional Dy Directors of Factories and Boilers concerned & DCG members. A report in the proforma shall be furnished to the Director of Factories and Boilers, Odisha under intimation to zonal / Divisional Officers by 10th of the each succeeding month, both through hard /soft copy for review & record.
- 05 Annual report on hold of Mock Drills shall be submitted to the authorities of District Administration under intimation to Assistant Director of Factories & Boilers/Deputy Director of Factories & Boilers/Director of Factories & Boilers
- 06 Awareness programmes on hazard & mitigation shall be made amongst workers and people living in the vicinity

- 2 -

The accepted copy of the Updated On-Site Plan is sent herewith, the receipt of which may please be acknowledged and photocopy of the same be provided to the following authorities:

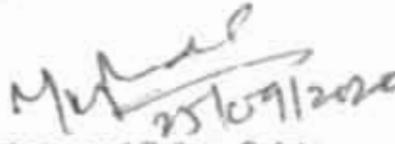
- Addl. Secretary to Govt. of Odisha, Home (Special Section)Department, Bhubaneswar
- Principal Secretary to Govt. of Odisha, Labour & ESI Department, Bhubaneswar
- Collector & District magistrate, Jagatsinghpur
- Superintendent of Police, Jagatsinghpur
- District Fire Office, Jagatsinghpur
- Chief Medical Officer, Jagatsinghpur
- Asst. Director of Factories & Boilers, Paradeep Zone
- Dy. Director Of Factories & Boilers, Cuttack Division

Yours faithfully,


Director of Factories and Boilers, Odisha
25/9/2020

Memo No. 5431 (b)
30/9/2020

Copy to Asst. Director of Factories and Boilers, Paradeep Zone / Dy. Director of Factories and Boilers, Cuttack Division for information and necessary action.


Dy. Director of Factories and Boilers, Safety
25/9/2020

(-1) copy to renewal file



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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

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ON-SITE EMERGENCY PLAN



No. 5430 dt. 30/9/2018

Director of Factories & Boilers
Odisha, Bhubaneswar

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Paradeep Lighterage Terminal

Indian Oil Corporation Limited
(Marketing Division)
Odisha State OfficeParadeep Lighterage Terminal
At-Bhittargarh, P.O.-Atharabanki,
Paradeep, Dist.-Jagatsingpur,
Odisha.
PIN - 754120.



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REVISION CONTROL SHEET

REV NO.	DATE	PAGE NO.	DESCRIPTION



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INDIAN OIL CORPORATION LIMITED,
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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED.
PARADEEP TERMINAL.



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PREFACE

This On-Site Emergency Plan has been formulated for Indian Oil Corporation Limited, Paradeep Lighterage Terminal and its associated systems under jurisdiction thereof.

Petroleum receipt, storage and distribution are designed to be a safe operation. Past experience from oil marketing companies indicates that incidents involving failure or accidents are quite low. Stringent design codes and good operating and maintenance practices ensure structural integrity of the system over a long period of time.

However, even with high quality of design and adherence to careful & strict operation & maintenance procedures, it is still possible that an improbable event may occur. It is necessary to anticipate and be thoroughly prepared to manage potentially unsafe incidents. If tackled at the early stage may avoid catastrophe involving public life and property.

This manual describes plans for controlling various emergency scenarios at the different facilities in the Paradeep Terminal. These plans are conforming to most appropriate techniques and safe practices prevalent worldwide.

This On-site Emergency Plan is prepared with objective of defining functions and responsibilities of all concerned managerial, operational, fire & safety, administration and supporting department personnel with respect to detection of emergency and effective implementation of action plan. The ultimate goal is containment of hazardous situation by appropriate mitigation measures at place of occurrence, cautioning people in adjoining affected localities, prompt rescue and medical aid to affected persons and communication to civil authorities for help.

The On-site Emergency Plan explains the hazard identification and action plans during most credible fire scenarios, organization set up, emergency command structure, available resources etc.

Plan is designed to locate specific information readily so as to save time for initiation of action in case of emergency.

Proper operation & maintenance, good housekeeping, adherence to safe working practices are necessary for maintenance of integrity of operating locations and facilities. Sincere efforts must be made towards training of personnel and conducting mock drills for periodic review and improvement of this plan.

All concerned are requested to carefully study and thoroughly familiarize with plans in order to ensure its effectiveness in times of emergency.



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CHAPTER - 1

INTRODUCTION





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1.0 INTRODUCTION

1.1 GENERAL INFORMATION ABOUT THE FACTORY

Paradeep Terminal of M/s. Indian Oil Corporation Limited is situated at Bhittargarh, P.O. Atharabanki, Paradeep, Jagatsinghpur-754120, Odisha approximately 1.9 Kms away from Paradeep Railway Station, 6.4 Kms away from the Bus Stand and 116 Kms away from Bhubaneswar Airport. The Terminal was commissioned in the year 1997 on a land of approximately 106.1 acres. The Site has geo-coordinates of Latitude 20.285243 N and Longitude 86.627122 E and has an average elevation of 11 m above mean sea level (MSL). The terminal falls under the jurisdiction of Paradeep Police Station which is approximately 6.4 Kms from the Terminal.

The Terminal is operated in accordance with the provisions of licenses/consents granted by the Chief Controller of explosive Government of India, Director of Factories & Boilers, Odisha and Odisha State pollution Control Board, as per the relevant statutory Acts and Rules of Government of India and Government of Odisha. The Terminal has been designed, operated and maintained in accordance with the statutory provisions and industry standards to ensure its safe and smooth functioning.

Paradeep Terminal of M/s. Indian Oil Corporation Limited is a major Terminal in the state of Odisha and is engaged in the receipt, storage and dispatch of Petroleum products namely Motor Spirit (MS), Furnace Oil (FO) 180 CST & Furnace Oil (FO) 380 CST, High Speed Diesel (HSD), Superior Kerosene Oil (SKO), Low Sulphur High Flash High Speed Diesel (LSHF HSD), Aviation Turbine Fuel (ATF), Ethanol & Bio Diesel. The Terminal caters to Retail Outlets in the district of Jagatsinghpur, Jajpur, Kendrapara, Keonjhar, Supplies to Bhubaneswar AFS, Supplies to Navy and Coast Guard at various locations of India. The products are stored in 19 nos. of above ground storage tanks and 6 No. of under Ground storage tanks. Currently, the Terminal has facility to receive HSD, MS, ATF and SKO through Dedicated Pipeline ex-Paradeep Refinery and HSD, MS, FO and SKO has facility to receive through Coastal Cargo Tankers Berthed at North Oil Jetty & LSHF HSD, Ethanol and Bio Diesel receive through TT.

The received products stored in aboveground storage tanks are dispatched through Tank Trucks to various districts of Odisha. Filling of Tank Trucks take place at the Tank Lorry Filling Shed which comprises of 12 loading bays. Products such as MS, SKO & HSD are also dispatched to various other locations and OMCs through Tank Wagon.

In an unlikely event of fire, the Terminal is equipped with an effective quantity of 16855 KL of water for firefighting purpose sufficient for Double fire contingency scenario with auto pressurized fire water network consisting of hydrants, monitors, water cum foam monitors (WCFM), high volume long range monitors (HVLRM) etc. covering the Terminal facilities. Dry chemical powder and CO₂ based fire extinguishers are also strategically placed. Foam required to fight petroleum fire are kept ready for instant use in case of emergency. Product tanks are provided with foam pourer and sprinkler systems. Medium expansion foam generators (MEFGs) are also available for fighting pool fire.



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INDIAN OIL CORPORATION LIMITED,
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Name & Address of the factory	M/s. Indian Oil Corporation Ltd (MD), Paradeep Lighterage Terminal At - Bhittargarh P.O- Athravanki Dist - Jagatsinghpur, PIN - 754120. Tel. No-06722-229217 / 9437496439 (M)
Regd. Office	G-9, Ali Yavar Jung Marg, Bandra(E), Mumbai-400051, Maharashtra
Name of the Occupier	Sri. Ram Oraon Dy. General Manager(T) Cell:9437496439 Email ID: ramoraon@indianoil.in
Name of the Manager	Sri. Ram Oraon Dy. General Manager(T) Cell:9437496439 Email ID: ramoraon@indianoil.in
Products Handled	Motor Spirit (MS), Furnace Oil (FO), High Speed Diesel (HSD), Superior Kerosene Oil (SKO), Low Sulphur High Flash High Speed Diesel (LSHFHSD), Aviation Turbine Fuel (ATF) Ethanol (doped with MS) & BioDiesel (doped with Diesel).
Source of Products	From Paradeep Refinery, Tank Truck(TT) and Coastal Tanker receipt from other Refineries.
Mode of Receipt	Through Tanker /Pipeline from Refinery.
Mode of Dispatch	Through Tank Truck / Tank Wagon Loading

1.2 INDUSTRIAL ACTIVITY

The main function of the Terminal is to receive petroleum products from Paradeep Refinery, Tanker/Vessels, Tank Truck (TT) and Store in storage tanks and dispatch of product to various places in Odisha & Upcountry Locations through Tank Trucks, Tank Wagons and Coastal Cargo Tankers. Blending of products like Biodiesel and Ethanol are also carried out. Beside this there are some other functions which are noted below:-

- Unloading/Loading the product from/into coastal cargo vessels.
- Receive product from Paradeep Refinery through pipeline
- Unloading of Tank Trucks.
- Store the product in the storage tanks.
- Inter Tank Transfers.
- Blending of Biodiesel and Ethanol in the storage tanks.
- Loading of the tank wagon for the upcountry locations.
- Loading the Tank Trucks at TLF shed for retail outlets/consumers
- Bunkering of the vessels at Jetty, Paradeep Port Trust.



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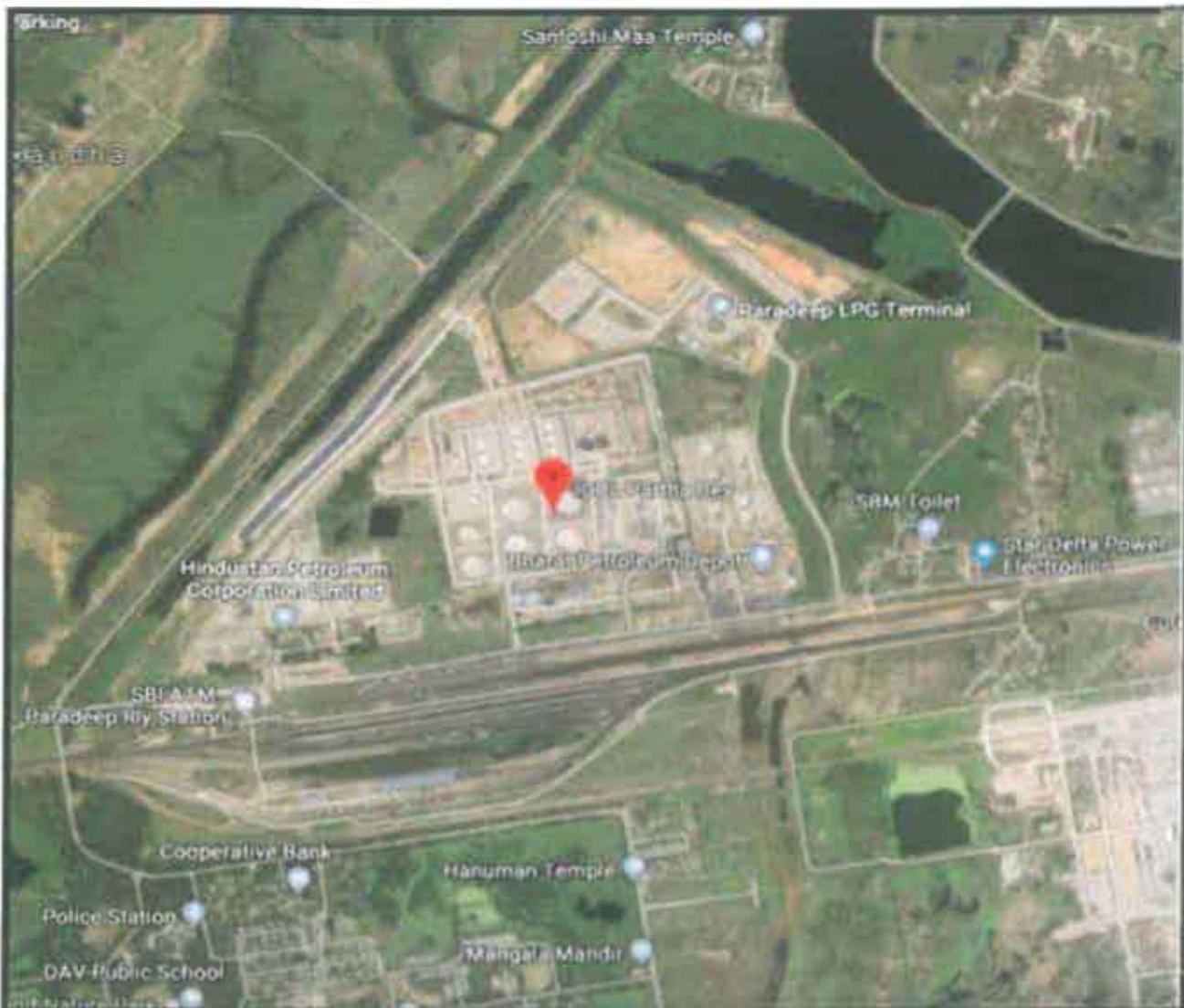
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- Loading of barge for bunkering.
 - Transfer of product to Other Marketing Companies such as HPCL & BPCL.
 - Water draining of Tanks
 - Calibration of Tank Trucks.
 - Cleaning of storage Tanks
 - Major Tank M&I.
 - Cleaning of Strainers
 - Dosing of multi-function additive and blue dye.
 - Major project works
-
- A GOOGLE MAP COVERING OF OIL / GAS INSTALLATION INCLUDING SURROUNDINGS OF 1 KM RADIUS:





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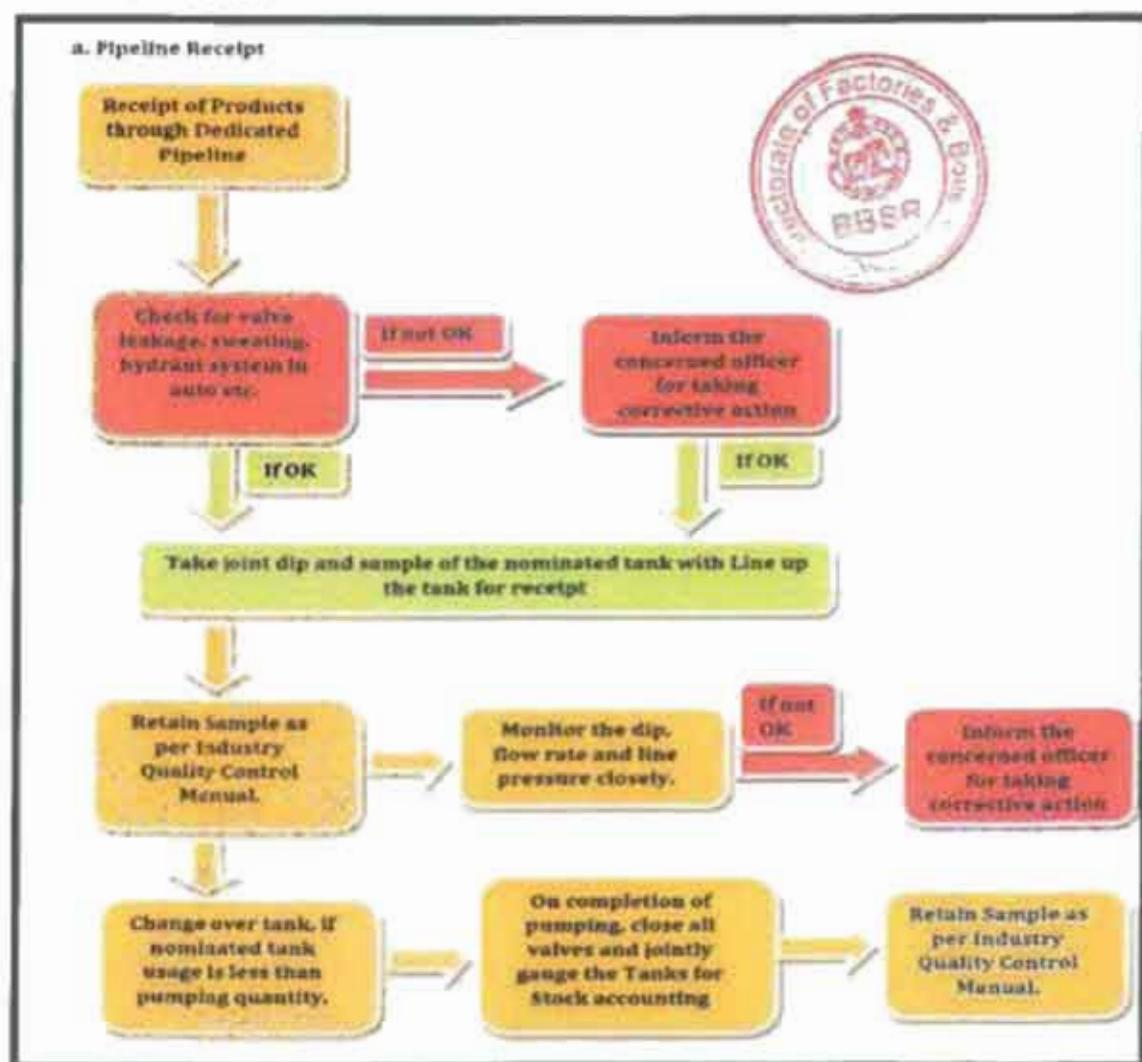
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1.3 FLOWCHART OF ACTIVITIES

There are 3 main processes/activities:

- Receipt - Currently, the Terminal has facility to receive HSD, MS, ATF and SKO through Dedicated Pipeline ex-Paradeep Refinery and HSD, MS, FO and SKO has facility to receive through Coastal Cargo Tankers Berthed at North Oil Jetty & LSHF HSD, Ethanol and Bio Diesel receive through TT.
- Storage - Product Storage is in 19 nos. of Aboveground Vertical Storage Tanks and 6 nos. of Underground Horizontal Storage Tanks.
- Dispatch - Stored products are dispatched to various districts of Odisha through Tank Trucks filled at the Tank Lorry Filling Shed which comprises of 12 loading bays. Products such as MS, SKO & HSD are also dispatched to various other locations and OMCs through Tank Wagon filled at Tank Wagon Filling Shed comprising of 102 Loading Points.

Flowchart of Process:





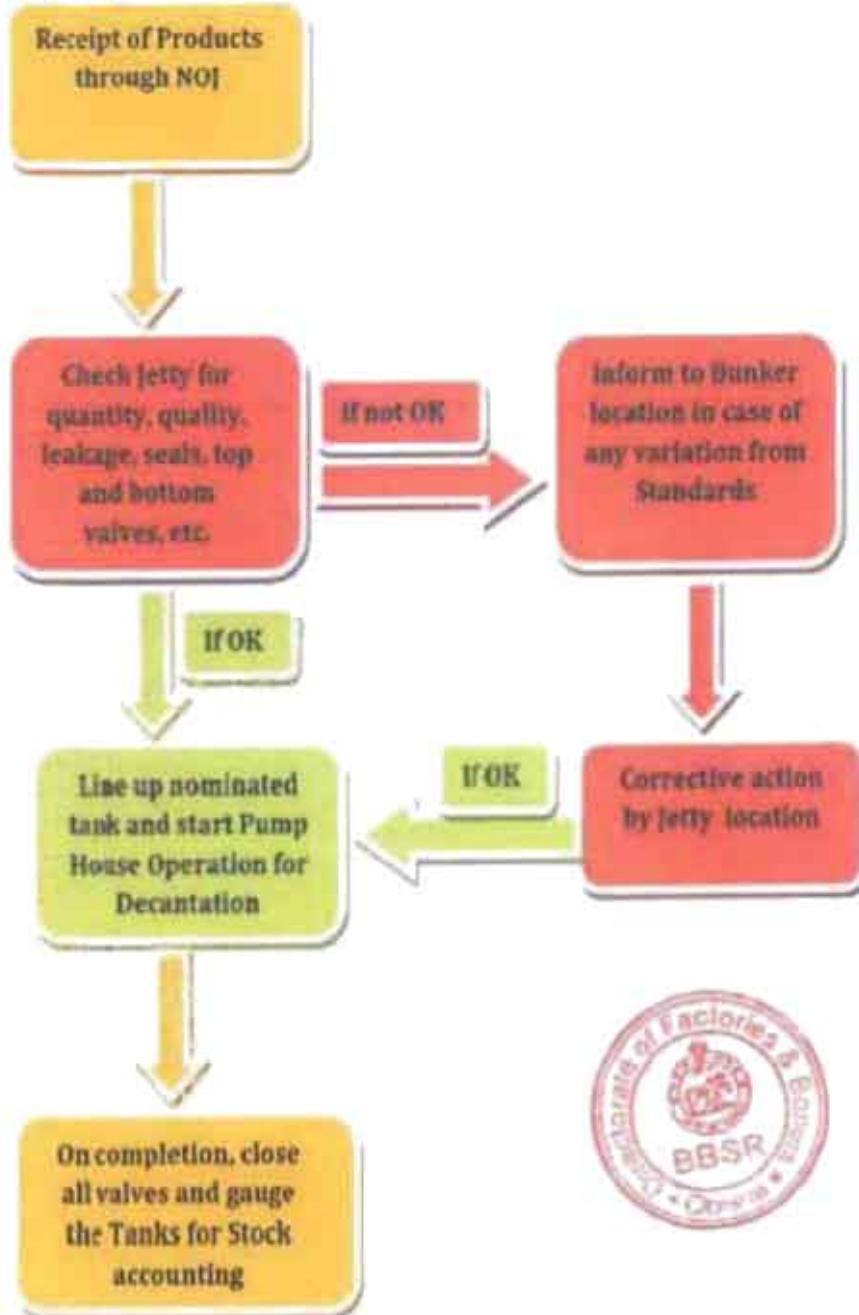
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b. North Oil Jetty Receipt





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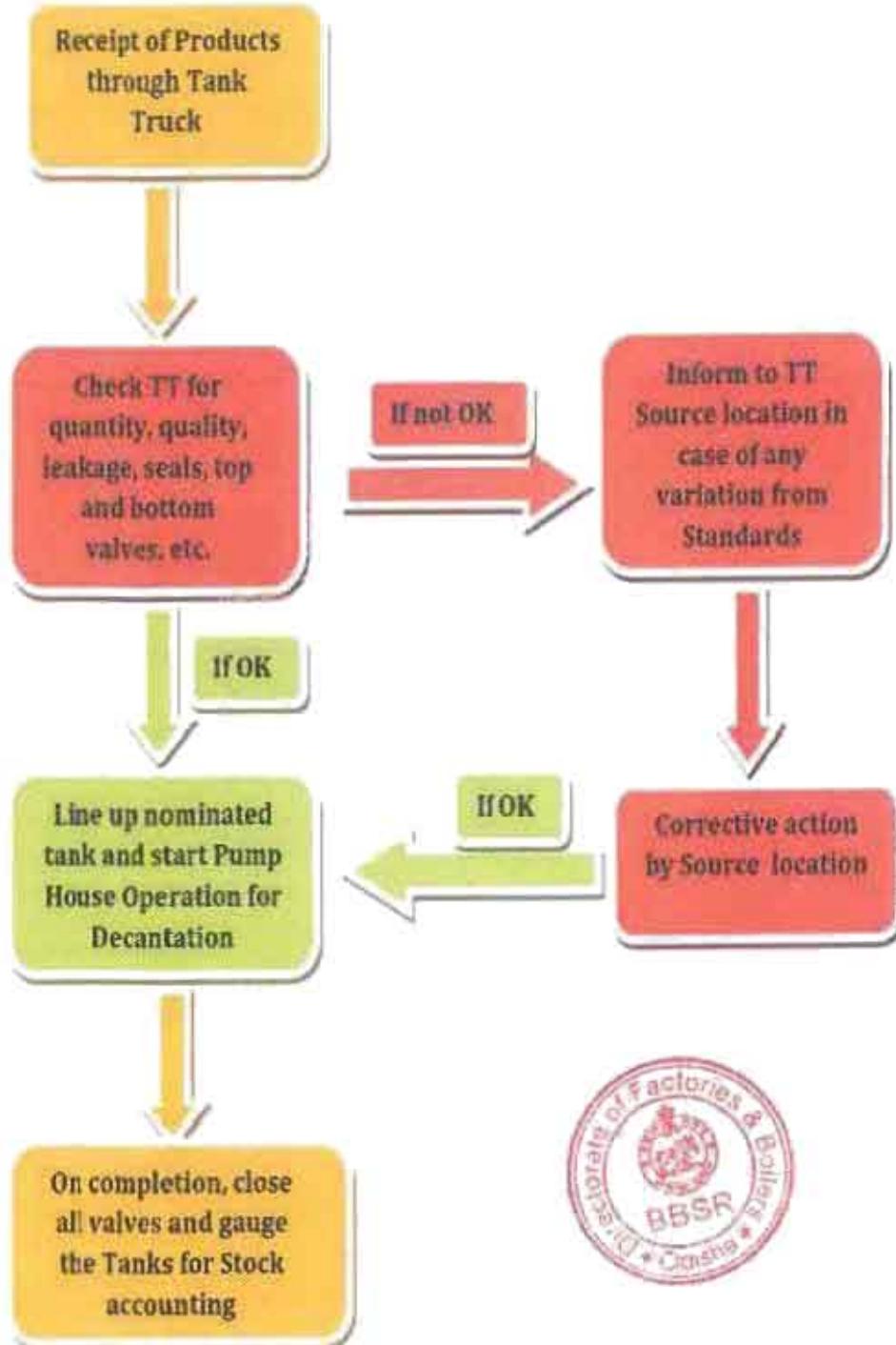
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c. Receipt of Product through Tank Truck





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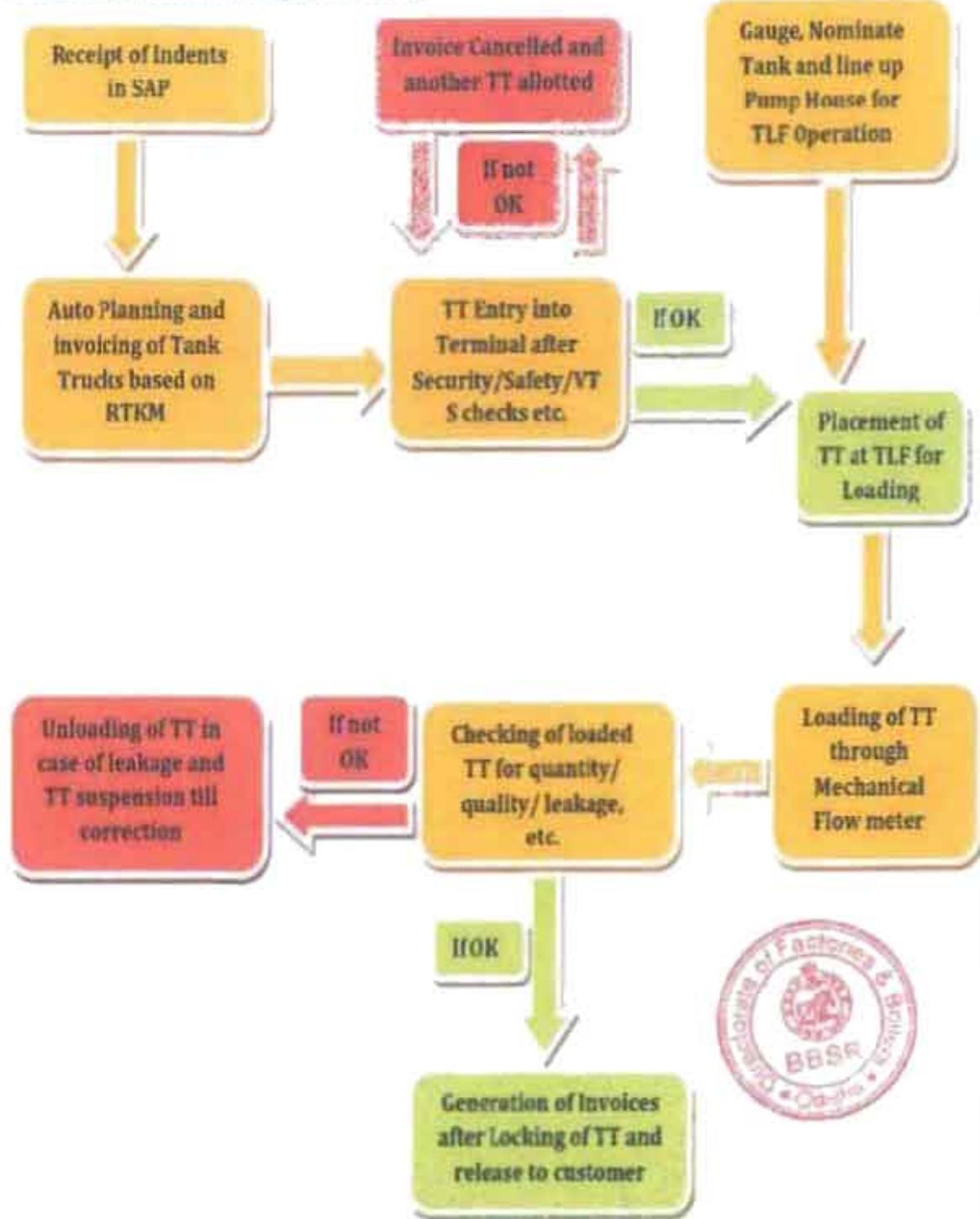
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d. Dispatch of Product through Tank Truck





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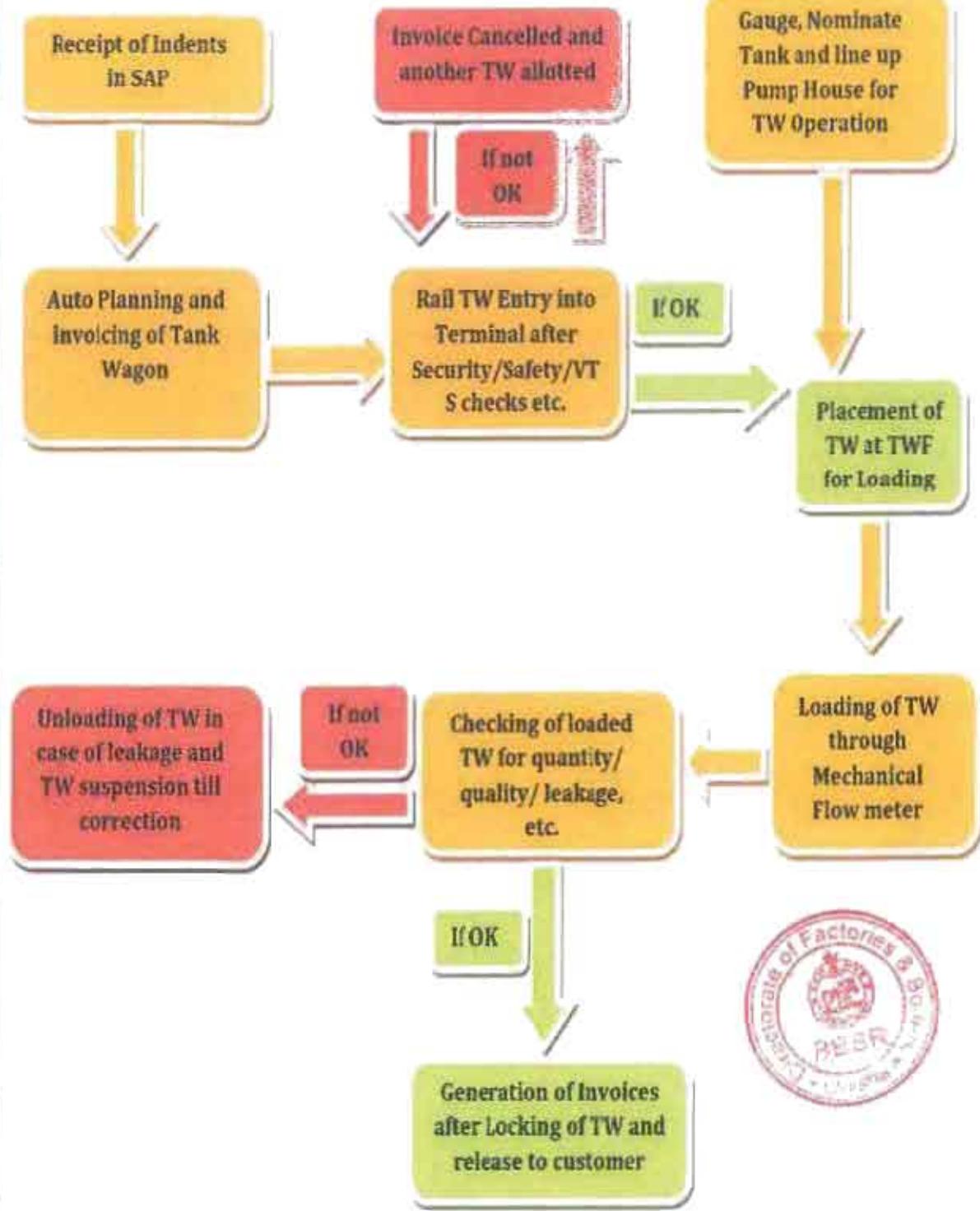
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e. Dispatch of Product through Tank Wagon





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CHAPTER - 2

ORGANISATIONAL SET UP





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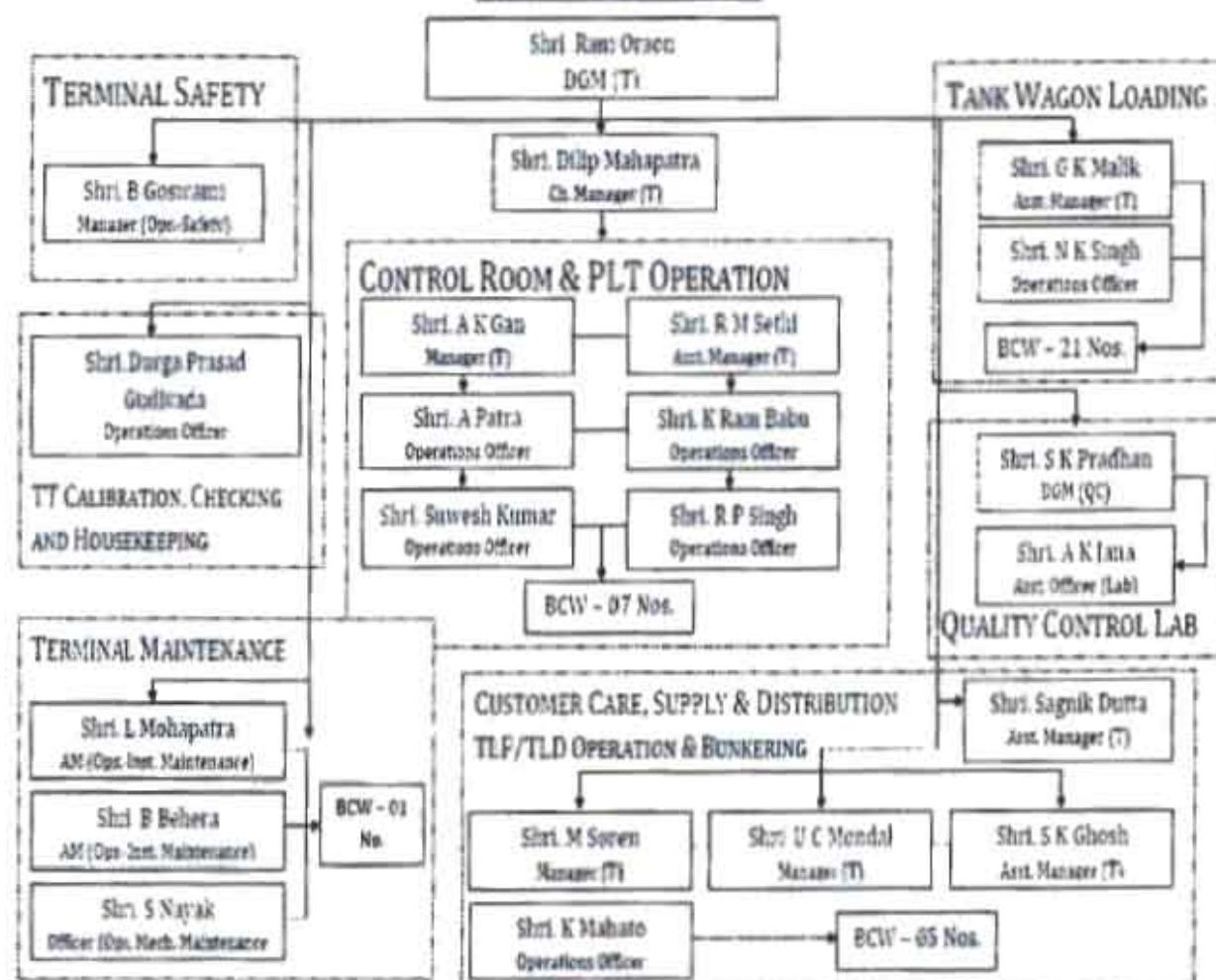
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2.0 ORGANISATIONAL SET-UP

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ORGANISATIONAL SETUP





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CHAPTER - 3

MANPOWER





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3.0 MANPOWER

a. Manpower (Employees/Contractual Workers/Security Personnel):

- Management Employees: 22
- Non-Management Employees (BCW + WCW): 35 + Nil
- Contractual Workmen (Haullage, Electrician etc.): 44
- Security Supervisor: 03
- Security Guards: 55
- Armed Guards: 14
- Lady Security Guards: 01

b. Working Hours (Timing of shift):

- General shift: 08:30 hrs. to 17:00 hrs.
(with lunch break from 13:00 hrs. to 13:30 hrs.)
- Morning Shift ('A' Shift): 06:00 hrs. to 14:00 hrs.
- Day Shift ('B' Shift): 14:00 hrs. to 22:00 hrs.
- Night Shift ('C' Shift): 22:00 hrs. to 06:00 hrs.





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CHAPTER - 4 PRODUCTS HANDLED





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4.0 PRODUCTS HANDLED**4.1 PETROLEUM PRODUCTS HANDLED**

Tank No.	Storage Type	Safe Capacity	Dia (Mtr)	Height (Mtr)	Product	Fixed Sprinkler	Fixed Foam Pumper
T-1	FRVT	13995 KL	36	14.75	MS	Yes	Yes
T-2	FRVT	13995 KL	36	14.75	MS	Yes	Yes
T-3	CRVT	24300KL	42	17.95	ATF	Yes	Yes
T-4	CRVT	23970 KL	42	17.7	SKO	Yes	Yes
T-5	CRVT	24100 KL	42	17.8	HSD	Yes	Yes
T-6	CRVT	24365 KL	42	18	HSD	Yes	Yes
T-7	IFRVT	2212 KL	16	12	MS	Yes	Yes
T-8	CRVT	5303 KL	22	14	ATF	NA	Yes
T-9	CRVT	5303 KL	22	14	ATF	NA	Yes
T-10	CRVT	4382 KL	20	14	SKO	NA	Yes
T-11	CRVT	2301 KL	14	15	SKO	NA	NA
T-12	CRVT	4382 KL	20	14	Biodiesel blended HSD	NA	Yes
T-13	CRVT	7672 KL	26	14.50	FO-380	NA	NA
T-14	CRVT	6310 KL	24	14.00	FO-380	NA	NA
T-15	CRVT	7672 KL	26	14.50	FO-180	NA	NA
T-16	CRVT	6310 KL	24	14.00	FO-180	NA	NA
T-17	CRVT	2604 KL	16	13.00	LSHF HSD	NA	NA
T-18	CRVT	2604 KL	16	13.00	LSHF HSD	NA	NA
T-19	CRVT	2604 KL	16	13.00	LSHF HSD	NA	NA
T-20	U/G	50 KL	3	7.5	ETHANOL	NA	NA
T-21	U/G	50 KL	3	7.5	ETHANOL	NA	NA
T-22	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA
T-23	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA
T-24	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA
T-25	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA

FRVT - Floating Roof Vertical Tank, CRVT - Cone Roof Vertical Tank, IFRVT - Internal Floating Roof Vertical Tank, U/G - Underground Tank, MS - Motor Spirit, HSD - High Speed Diesel, SKO - Superior Kerosene Oil, ATF - Aviation Turbine Fuel, FO - Furnace Oil/Fuel Oil, LSHFHSD - Low Sulphur High Flash HSD.

4.2 BY-PRODUCTS HANDLED

Sl. No	By- Product	Tank No.	Class	Quantity Stored	Tank Capacity	Type Of Storage
				Nil		



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CHAPTER - 5

INVENTORY OF RAW

MATERIALS





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5.0 INVENTORY OF RAW MATERIALS

IOCL, Paradeep Terminal is not engaged in processing of Raw Materials. The Raw materials are processed at various Refineries of IOCL and the finished product is received, stored and dispatched by IOCL, Paradeep Terminal. The material stored as such are as follows:

Tank No.	Storage Type	Safe Capacity	Dia (Mtr)	Height (Mtr)	Product	Fixed Sprinkler	Fixed Foam Pumper
T-1	FRVT	13995 KL	36	14.75	MS	Yes	Yes
T-2	FRVT	13995 KL	36	14.75	MS	Yes	Yes
T-3	CRVT	24300KL	42	17.95	ATF	Yes	Yes
T-4	CRVT	23970 KL	42	17.7	SKO	Yes	Yes
T-5	CRVT	24100 KL	42	17.8	HSD	Yes	Yes
T-6	CRVT	24365 KL	42	18	HSD	Yes	Yes
T-7	IFRVT	2212 KL	16	12	MS	Yes	Yes
T-8	CRVT	5303 KL	22	14	ATF	NA	Yes
T-9	CRVT	5303 KL	22	14	ATF	NA	Yes
T-10	CRVT	4382 KL	20	14	SKO	NA	Yes
T-11	CRVT	2301 KL	14	15	SKO	NA	NA
T-12	CRVT	4382 KL	20	14	Biodiesel blended HSD	NA	Yes
T-13	CRVT	7672 KL	26	14.50	FO-380	NA	NA
T-14	CRVT	6310 KL	24	14.00	FO-380	NA	NA
T-15	CRVT	7672 KL	26	14.50	FO-180	NA	NA
T-16	CRVT	6310 KL	24	14.00	FO-180	NA	NA
T-17	CRVT	2604 KL	16	13.00	LSHF HSD	NA	NA
T-18	CRVT	2604 KL	16	13.00	LSHF HSD	NA	NA
T-19	CRVT	2604 KL	16	13.00	LSHF HSD	NA	NA
T-20	U/G	50 KL	3	7.5	ETHANOL	NA	NA
T-21	U/G	50 KL	3	7.5	ETHANOL	NA	NA
T-22	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA
T-23	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA
T-24	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA
T-25	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA

FRVT - Floating Roof Vertical Tank, CRVT - Cone Roof Vertical Tank, IFRVT - Internal Floating-Roof Vertical Tank, U/G - Underground Tank. MS - Motor Spirit, HSD - High Speed Diesel, SKO - Superior Kerosene Oil, ATF - Aviation Turbine Fuel, FO - Furnace Oil/Fuel Oil, LSHFHSD - Low Sulphur High Flash HSD.



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CHAPTER - 6

INVENTORY OF HAZARDOUS SUBSTANCES





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6.0 INVENTORY OF HAZARDOUS SUBSTANCES

IOCL, Paradeep Terminal is engaged in receipt, storage and dispatch of Petroleum products such as Motor Spirit (MS), Furnace Oil (FO) 180 CST & Furnace Oil (FO) 380 CST, High Speed Diesel (HSD), Superior Kerosene Oil (SKO), Low Sulphur High Flash High Speed Diesel (LSHF HSD), Aviation Turbine Fuel (ATF), Ethanol & Bio Diesel. Petroleum Products being inflammable in nature are hazardous substances. The hazardous substances stored at IOCL, Paradeep Terminal, as such, are as follows:

Tank No.	Storage Type	Safe Capacity	Dia (Mtr)	Height (Mtr)	Product	Fixed Sprinkler	Fixed Foam Pancer
T-1	FRVT	13995 KL	36	14.75	MS	Yes	Yes
T-2	FRVT	13995 KL	36	14.75	MS	Yes	Yes
T-3	CRVT	24300KL	42	17.95	ATF	Yes	Yes
T-4	CRVT	23970 KL	42	17.7	SKO	Yes	Yes
T-5	CRVT	24100 KL	42	17.8	HSD	Yes	Yes
T-6	CRVT	24365 KL	42	18	HSD	Yes	Yes
T-7	IFRVT	2212 KL	16	12	MS	Yes	Yes
T-8	CRVT	5303 KL	22	14	ATF	NA	Yes
T-9	CRVT	5303 KL	22	14	ATF	NA	Yes
T-10	CRVT	4382 KL	20	14	SKO	NA	Yes
T-11	CRVT	2301 KL	14	15	SKO	NA	NA
T-12	CRVT	4382 KL	20	14	Biodiesel blended HSD	NA	Yes
T-13	CRVT	7672 KL	26	14.50	FO-380	NA	NA
T-14	CRVT	6310 KL	24	14.00	FO-380	NA	NA
T-15	CRVT	7672 KL	26	14.50	FO-180	NA	NA
T-16	CRVT	6310 KL	24	14.00	FO-180	NA	NA
T-17	CRVT	2604 KL	16	13.00	LSHF HSD	NA	NA
T-18	CRVT	2604 KL	16	13.00	LSHF HSD	NA	NA
T-19	CRVT	2604 KL	16	13.00	LSHF HSD	NA	NA
T-20	U/G	50 KL	3	7.5	ETHANOL	NA	NA
T-21	U/G	50 KL	3	7.5	ETHANOL	NA	NA
T-22	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA
T-23	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA
T-24	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA
T-25	U/G	70 KL	3	10.5	BIO-DIESEL	NA	NA

FRVT - Floating Roof Vertical Tank, CRVT - Cone Roof Vertical Tank, IFRVT - Internal Floating Roof Vertical Tank, U/G - Underground Tank.



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In addition to the petroleum products, IOCL, Paradeep Terminal has a total of 7 (seven) Transformers of various capacities as detailed below wherein Transformer Oil is used and contained:

Sl. No.	Area	Capacity (in MVA/KVA)	Transformer Oil Qty. (in Litres)	Total Qty. Of Transformer Oil (in Litres)
1	Transformer Yard	6 MVA	4945 Litres	14,100 Litres
2	Transformer Yard	3MVA	3730 Litres	
3	Transformer Yard	1.5 MVA	2670 Litres	
4	Transformer Yard	750 KVA	955 Litres	
5	IPH	800 KVA	1000 Litres	
6	Tank Wagon Sub-Station	1000 KVA	800 Litres	
7	Transformer Yard - HT Sub-Station	880 KVA	Dry Type	





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CHAPTER - 7

HAZARDOUS

SUBSTANCES/GASES

PRODUCED/GENERATED

DURING THE PROCESS





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7.0 HAZARDOUS SUBSTANCES/GASES PRODUCED/GENERATED DURING THE PROCESS

Since, there are no manufacturing/production activities taking place in the Terminal, generation of hazardous substances/gases is a rare possibility. The Terminal is primarily engaged in receipt, storage and dispatch of the finished petroleum products such as Motor Spirit (MS), Furnace Oil (FO) 180 CST & Furnace Oil (FO) 380 CST, High Speed Diesel (HSD), Superior Kerosene Oil (SKO), Low Sulphur High Flash High Speed Diesel (LSHF HSD), Aviation Turbine Fuel (ATF), Ethanol & Bio Diesel.

However, the product stored in the storage tanks may over a period of time form sludge/slurry at the bottom of the tank and during the periodical cleaning of the storage tanks as per laid down company norms, sludge may get generated. Terminal has been authorised by the State Pollution Control Board vide authorization no. IND-IV-HW-235/13831, dt. 13.10.2017 for storage and disposal of the Hazardous waste (Sludge) generated during periodic tank cleaning as per the following parameters:

Sl. No	Name of the hazardous Substances/ gases	Quantity	Mode of Storage/disposal
1	Oily Sludge generated during periodical cleaning of Storage Tanks.	30 KL/Annum	Stored in impervious pits/ containers under well ventilated covered shed followed by disposal in Authorised HW incinerator/ Common Hazardous Waste Treatment, Storage Disposal Facilities (CHWTSDF)





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CHAPTER - 8

IDENTIFICATION OF HAZARDS





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8.0 IDENTIFICATION OF HAZARDS

The main products handled at the terminal include Sprit (MS), Furnace Oil (FO) 180 CST & Furnace Oil (FO) 380 CST, High Speed Diesel (HSD), Superior Kerosene Oil (SKO), Low Sulphur High Flash High Speed Diesel (LSHF HSD), Aviation Turbine Fuel (ATF), Ethanol & Bio Diesel. These oils are all flammable and slightly toxic. As such, hazards are associated with the products.

8.1 ENUMERATION AND SELECTION OF INCIDENTS

Effective management of a Risk Analysis study requires enumeration and selection of incidents or scenarios. Enumeration attempts to ensure that no significant incidents are overlooked; selection tries to reduce the incident outcome cases studied to a manageable number. These incidents can be classified under either of two categories: **low frequency high consequence and high frequency low consequence**. Unfortunately, there is an infinite number of ways (incidents) by which accidents can occur in either category. For example, leaks of process materials can be of any size, from a pinhole up to a severed pipeline or ruptured vessel. An explosion can occur in either a small container or a large container and, in each case, can range from a small "puff" to a catastrophic detonation.

The technique commonly used to prepare an incident list is to consider potential leaks and major releases from fractures of all process tanks and vessels. This compilation should include all pipe work and vessels in direct communication, as these may share a significant inventory that cannot be isolated in an emergency. The data generated is as shown below:

- Tank number, description, and dimensions
- Materials present
- Tank conditions (phase, temperature, pressure)
- Inventory and connecting piping and piping dimensions.



The goal of selection is to limit the total number of incident outcome cases to be studied to a manageable size, without introducing bias or losing resolution through overlooking significant incidents or incident outcomes. The purpose of incident selection is to construct an appropriate set of incidents for the study from the Initial List that has been generated by the enumeration process. An appropriate set of incidents is the minimum number of incidents needed to satisfy the requirements of the study and adequately represent the spectrum of incidents enumerated.

8.2 CHARACTERIZING THE FAILURES

Accidental release of flammable or toxic vapors can result in severe consequences. Delayed ignition of flammable vapors can result in blast overpressures covering large areas. This may lead to extensive loss of life and property. Toxic clouds may cover yet larger distances due to the lower threshold values in relation to those in case of explosive clouds (the lower explosive limits). In contrast, fires have localized consequences. Fires can be put out or contained in most cases; there are few mitigating actions one can take once a vapour cloud gets released.



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In a petroleum marketing installation such as the plant in question, the main hazard arises due to the possibility of leakage of petroleum products during decanting (number of hose connections, tank lorry movement etc.), storage, filling and transportation. To formulate a structured approach to identification of hazards and understanding of contributory factors is essential.

8.2.1 BLAST OVER PRESSURES

Blast Overpressures depend upon the reactivity class of material and the amount of gas between two explosive limits. MS could give rise to a VCE due to their vapour pressures - however, the cloud flammable masses are quite small due to the high boiling point and low vapour pressures. In addition, unless there is sufficient extent of confinement, it is unlikely to result in any major explosion. Examples where flammable mixtures could be found are within storage tanks and road tankers. Open-air explosions are unlikely. As a result damage would be limited.

8.2.2 POOL FIRES

Pool fires occur when spilled hydrocarbons burn in the form of large diffusion flames. Calculating the incident flux to an observer involves four steps, namely

- Characterizing the flame geometry
- Estimation of the flame radiation properties
- Computation of the geometric view factors
- Estimation of flame attenuation coefficients and computation of geometric view factors between observer and flame.



The size of the flame will depend upon the spill surface and the thermo-chemical properties of the spilled liquid in particular, the diameter of the fire, the visible height of the flame, the tilt and drag of the flame etc. The radiative output of the flame will depend upon the fire size, the extent of mixing with air and the flame temperature. Some fraction of the thermal radiation is absorbed by the carbon dioxide and water vapour in the intervening atmosphere. In addition, large hydrocarbon fires produce thick smoke which significantly obscure flame radiation.

8.2.3 Operating Parameters

Potential vapour release for the same material depends significantly on the operating conditions. The petroleum oils are handled at atmospheric temperature and pressure except during pumping operations, where the pressures are those developed by the respective pumps.

8.2.4 Inventory

Inventory Analysis is commonly used in understanding the relative hazards and short listing of release scenarios. Inventory plays an important role in regard to the potential hazard. Larger the inventory of a vessel or a system, larger is the quantity of potential release. A practice commonly used to generate an incident list is to consider potential leaks and major releases from fractures of pipelines and vessels containing sizable inventories. The potential vapour release (source strength) depends upon the quantity



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of liquid release, the properties of the materials and the operating conditions (pressure, temperature),

8.2.5 Loss of Containment

Plant inventory can get discharged to Environment due to Loss of Containment. Various causes and modes for such an eventuality have been described. Certain features of materials to be handled at the plant need to be clearly understood to firstly list out all significant release cases and then to short list release scenarios for a detailed examination.

Liquid Outflow from a vessel/ line

Liquid release can be either instantaneous or continuous. Failure of a vessel leading to an instantaneous outflow assumes the sudden appearance of such a major crack that practically all of the contents above the crack shall be released in a very short time. The flow rate will depend on the size of the hole as well as on the pressure in front of the hole, prior to the accident. Such pressure is basically dependent on the pressure in the vessel.

Vapourisation

The vaporization of released liquid depends on the vapour pressure and weather conditions.

8.3 IDENTIFICATION OF HAZARDS



HAZARD SCENARIO	CAUSATIVE FACTOR	IMPACT
Tank Truck under Fire in TLF Gantry.	<ul style="list-style-type: none"> In case of Hose rupture, Coupling leakage, pipeline crack, strainer leak, flange gasket failure etc the liquid spills inside the TLF and causes fire, if the vapours come into contact with an ignition source from the TT, electrical fittings, static charge generation. 	Fire may propagate to the nearby area and persons in the vicinity
Leakage/Fire in TW siding area during loading.	<ul style="list-style-type: none"> In case of loading arm leakage, Pipeline crack, strainer leak, flange gasket failure etc., the liquid spills inside the TW siding and causes pool fire, if the vapours come into contact with an ignition source from the electrical fittings, static charge generation. 	Fire may propagate to the nearby area and persons in the vicinity.
Leakage/Fire in Product pump house (TLF Pump House)	<ul style="list-style-type: none"> In case of pump seal failure, pipeline rupture, flange gasket failure, the liquid spills inside the dyke from the storage tank and causes pool fire, if come into contact with an ignition source 	Fire may propagate to the nearby tanks and adjacent areas and persons in the vicinity.



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Leakage/Fire in Siding pump house.	<ul style="list-style-type: none"> • In case of pump seal failure, flange joint damage, pipeline rupture, the liquid spills inside the pump house area and causes pool fire, if come into contact with an ignition source. • Pool Fire may occur due to rupture of and subsequent release and instantaneous ignition 	Fire may propagate to the nearby area.
Leakage/Fire during Pipeline or TW loading at PL Manifold.	<ul style="list-style-type: none"> • Pool Fire may occur due to rupture of flange gasket and Subsequent release and instantaneous ignition 	Fire may propagate to the nearby areas and persons in the vicinity.
Leakage/Fire in tank dyke no. 1 (Old Class 'A' MS tank farm).	<ul style="list-style-type: none"> • In case of tank rupture, ROSOV / DBBV flange failure, nozzle rupture , valve gland leakage, water drain line leakage, expansion line leak etc., the liquid may spill into the tank dyke and cause pool fire, if the vapors come into contact with an ignition source. • In case the vapor from the pool disperses in down wind direction and come in contact with the ignition source, causes vapor cloud explosion. • Leakage due to faulty operation and usage of inappropriate tools during operation and M&R can cause fire. Electrical fault from the electrical fittings may lead to fire in case of spilled product. 	Fire may propagate to the nearby tanks and adjacent areas.
Leakage/Fire in tank dyke no. 2 (Old Class 'B' HSD/SKD tank farm).	<ul style="list-style-type: none"> • In case of tank rupture, ROSOV / DBBV flange failure, nozzle rupture, valve gland leakage, water drain line leakage, expansion line leak etc., the liquid may spill into the tank dyke and cause pool fire, if the vapors come into contact with an ignition source. • Leakage due to faulty operation and usage of inappropriate tools during operation can cause fire. Electrical fault may lead to fire in case of spilled product 	Fire may propagate to the nearby area





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Leakage/Fire in tank dyke no. 3 (Old Class 'B' HSD tank farm).	<ul style="list-style-type: none"> • In case of tank rupture, ROSOV/DBBV flange failure, nozzle rupture, valve gland leakage, water drain line leakage, expansion line leak etc., the liquid may spill into the tank dyke and cause pool fire, if the vapors come into contact with an ignition source. • Leakage due to faulty operation and usage of inappropriate tools during operation can cause fire. Electrical fault may lead to fire in case of spilled product 	Fire may propagate to the nearby tanks and persons in the vicinity
Leakage/Fire in tank dyke no.4 (Class 'A' MS Tank Farm TK-7).	<ul style="list-style-type: none"> • In case of tank rupture, ROSOV / DBBV flange failure, nozzle rupture, valve gland leakage, water drain line leakage, expansion line leak etc., the liquid may spill into the tank dyke and cause pool fire, if the vapors come into contact with an ignition source. • In case the vapor from the pool disperses in down wind direction and come into ignition source, causes vapor cloud explosion. • Leakage due to faulty operation and usage of inappropriate tools during operation and M&R can cause fire. Electrical fault from the electrical fittings may lead to fire in case of spilled product. 	Fire may propagate to the nearby tanks and persons in the vicinity.
Leakage/Fire in tank dyke no. 5(Class 'B' ATF tank farm-TK-8/9).	<ul style="list-style-type: none"> • In case of tank rupture, ROSOV/DBBV flange failure, nozzle rupture, valve gland leakage, water drain line leakage, expansion line leak etc., the liquid may spill into the tank dyke and cause pool fire, if the vapors come into contact with an ignition source. • Leakage due to faulty operation and usage of inappropriate tools during operation can cause fire. Electrical fault may lead to fire in case of spilled product 	 Fire may propagate to the nearby tank wagon unloading area and persons in the vicinity.



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Leakage/Fire in tank dyke no.6 (Class 'B' SKO tank farm TK-10/11/12).	<ul style="list-style-type: none"> In case of tank rupture, ROSOV/DBBV flange failure, nozzle rupture, valve gland leakage, water drain line leakage, expansion line leak etc., the liquid may spill into the tank dyke and cause pool fire, if the vapors come into contact with an ignition source. Leakage due to faulty operation and usage of inappropriate tools during operation can cause fire. Electrical fault may lead to fire in case of spilled product 	Fire may propagate to the nearby jetty area
Leakage/Fire in tank dyke no. 7 (Class 'C' FO tank farm TK-13/14/15/16).	<ul style="list-style-type: none"> In case of tank rupture, nozzle rupture, valve gland leakage, water drain line leakage, expansion line leak etc., the liquid may spill into the tank dyke and cause pool fire, if the vapors come into contact with an ignition source. Leakage due to faulty operation and usage of inappropriate tools during operation can cause fire. Electrical fault may lead to fire in case of spilled product. Pool Fire may occur due to rupture in the Tank and Subsequent release and instantaneous ignition. 	Fire may propagate to the nearby areas and persons in the vicinity.
Leakage/Fire in tank dyke no. 8 (Class 'C' HFHSD tank farm-TK-17/18/19).	<ul style="list-style-type: none"> In case of tank rupture, ROSOV/DBBV flange failure, nozzle rupture, valve gland leakage, water drain line leakage, expansion line leak etc., the liquid may spill into the tank dyke and cause pool fire, if the vapors come into contact with an ignition source. Leakage due to faulty operation and usage of inappropriate tools during operation can cause fire. Electrical fault may lead to fire in case of spilled product. In case the vapor from the pool disperses in down wind direction and come into ignition source, causes vapor cloud explosion 	 Fire may propagate to the nearby jetty area
Leakage/Fire in Ethanol Storage Tank.	<ul style="list-style-type: none"> Leakage due to faulty operation and usage of inappropriate tools during operation can cause fire. Electrical fault in the motor & Junction boxes, improper earthing may lead to fire in 	Fire may propagate to the nearby area



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	case of spilled product.	
Leakage/Fire in IPH area	<ul style="list-style-type: none"> In case of nozzle rupture, pump seal failure, flange leaks, gland leaks of valves etc. the liquid spills inside the pump house area and causes pool fire, if the vapours come into contact with an ignition source 	Fire may propagate to the nearby tanks and persons in the vicinity
Leakage/Fire in TT unloading area.	<ul style="list-style-type: none"> In case of nozzle rupture, improper bonding/earthing, flange leaks, valve gland leaks etc the liquid spills in the area and causes pool fire, if the vapours come into contact with an ignition source 	Fire may propagate to the nearby areas and persons in the vicinity.
Fire in Main PMCC Room.	<ul style="list-style-type: none"> Fire maybe caused due to improper termination, short circuit, overheating, improper fuses, etc. 	Fire may propagate to the area and persons in the vicinity.
Fire in IPH PMCC Room.	<ul style="list-style-type: none"> Fire maybe caused due to improper termination, short circuit, overheating, improper fuses, etc. 	Fire may propagate to the nearby tank wagon unloading area and persons in the vicinity.
Fire in TW PMCC Room	<ul style="list-style-type: none"> Fire maybe caused due to improper termination, short circuit, overheating, improper fuses, etc. 	Fire may propagate to the nearby jetty area
Fire in Transformer Yard	<ul style="list-style-type: none"> Fire maybe caused due to improper termination, short circuit, overheating, improper fuses, etc. Transformer Oil may catch fire due to overheating, flashing of Oil due to drop in breakdown voltage of Oil. 	Fire may propagate to the nearby areas and persons in the vicinity.
Fire in Store Room	<ul style="list-style-type: none"> Fire maybe caused due to improper termination, short circuit, overheating of electrical cable. Fire maybe caused due to electrical fault inside leading to burning of the combustible materials etc. 	Fire may propagate to the nearby jetty area





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Fire in Laboratory	<ul style="list-style-type: none"> Fire maybe caused due to improper termination, short circuit, overheating of electrical cable. Fire maybe caused due to electrical fault inside leading to burning of the combustible materials etc. Leakage of flammable chemicals from the containers may also cause fire due to faulty operation and usage of inappropriate tools during testing can cause fire. Electrical fault may lead to fire in case of spilled product. 	Fire may propagate to the nearby area
Fire during Bunkering	<ul style="list-style-type: none"> In case of hose rupture, the liquid may spill into the sea and cause pool fire, if the vapors come into contact with an ignition source In case the vapor from the pool disperses in down wind direction and come into ignition source, causes vapor cloud explosion 	Fire may propagate to the nearby jetty area





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CHAPTER - 9

MOST CREDIBLE HAZARD

SCENARIO





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9.0 MOST CREDIBLE HAZARD SCENARIO

9.1 CONSEQUENCE MODELLING

If petroleum liquids are released into the atmosphere, they would be expected to form a pool of liquid (the size of which would be determined by the presence of any secondary containment such as bund walls). This pool could be either confined or unconfined and the evaporation from the pool is what determines the strength of the vapour cloud, if at all it forms.

9.2 DAMAGE CRITERIA

In consequence analysis, use is made of a number of calculation models to estimate the physical effects of an accident (spill of hazardous material) and to predict the damage (lethality, injury, material destruction) of the effects. The calculations can roughly be divided in three major groups:

- Determination of the source strength parameters;
- Determination of the consequential effects;
- Determination of the damage or damage distances.

The basic physical effect models consist of the following:

9.2.1 SOURCE STRENGTH PARAMETERS

- Calculation of the outflow of liquid out of a tank or pipe, in case of rupture.
- Calculation, in case of liquid outflow, of the instantaneous flash evaporation and of the dimensions of the remaining liquid pool.
- Calculation of the evaporation rate, as a function of volatility of the material, pool dimensions and wind velocity.
- Source strength equals pump capacities, etc. in some cases of pump discharge line ruptures for catastrophic cases.

9.2.2 CONSEQUENTIAL EFFECTS

- Dispersion of gaseous material in the atmosphere as a function of source strength, relative density of the gas, weather conditions and topographical situation of the surrounding area.
- Intensity of heat radiation [in kW/m²] due to a fire, as a function of the distance to the source.
- Energy of vapour cloud explosions [in N/m²], as a function of the distance to the distance of the exploding cloud.
- Concentration of gaseous material in the atmosphere, due to the dispersion of evaporated chemical. The latter can be either explosive or toxic.

It may be obvious, that the types of models that must be used in a specific risk study strongly depend upon the type of material involved:



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- Gas, vapour, liquid, solid
- Inflammable, explosive, toxic, toxic combustion products
- Stored at high/low temperatures or pressure
- Controlled outflow (pump capacity) or catastrophic failure

9.2.3 Selection of Damage Criteria

The damage criteria give the relation between extent of the physical effects (exposure) and the percentage of the people that will be killed or injured due to those effects. The knowledge about these relations depends strongly on the nature of the exposure. For instance, much more is known about the damage caused by heat radiation, than about the damage due to toxic exposure, and for these toxic effects, the knowledge differs strongly between different materials. In Consequence Analysis studies, in principle three types of exposure to hazardous effects are distinguished:

- Heat radiation, from a jet, pool fire or flash fire.
- Explosion
- Toxic effects, from toxic materials or toxic combustion products (not relevant for terminal).

Heat Radiation

The consequences caused by exposure to heat radiation are a function of:

- The radiation energy onto the human body [kW/m^2];
- The exposure duration [sec];
- The protection of the skin tissue (clothed or naked body).



The limits for 1% of the exposed people to be killed due to heat radiation, and for second-degree burns are given in the table below:

Table 5.1: Damages to Human Life Due to Heat Radiation

EXPOSURE DURATION	RADIATION ENERGY (1% LETHALITY, KW/M^2)	RADIATION ENERGY FOR 2 ND DEGREE BURNS, KW/M^2	RADIATION ENERGY FOR FIRST DEGREE BURNS, KW/M^2
10 Sec	21.2	16	12.5
30 Sec	9.3	7.0	4.0

Since in practical situations, only the own employees will be exposed to heat radiation in case of a fire, it is reasonable to assume the protection by clothing. It can be assumed that people would be able to find a cover or a shield against thermal radiation in 10-sec. time. Furthermore, 100% lethality may be assumed for all people suffering from direct contact with flames, such as the pool fire, a flash fire or a jet flame. The effects due to relatively lesser incident radiation intensity are given below.

Table 5.2: Effects Due To Incident Radiation Intensity



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INCIDENT RADIATION - kW/m ²	TYPE OF DAMAGE
0.7	Equivalent to Solar Radiation
1.6	No discomfort for long exposure
4.0	Sufficient to cause pain within 20 sec. Blistering of skin (first degree burns are likely)
9.5	Pain threshold reached after 8 sec. Second degree burns after 20 sec.
12.5	Minimum energy required for piloted ignition of wood, melting plastic tubing etc.
25	Minimum energy required to ignite wood at indefinitely long exposure
37.5	Sufficient to cause damage to process equipment

Source: Major Hazard Control, ILO

The actual results would be less severe due to the various assumptions made in the models arising out of the flame geometry, emissivity, angle of incidence, view factor and others. Upon ignition, a spilled liquid hydrocarbon would burn in the form of a large turbulent diffusion flame. The size of the flame would depend upon the spill surface and the thermo-chemical properties of the spilled liquid. In particular, the diameter of the fire (if not confined to a dyke), the visible height of the flame, the tilt and drag of the flame due to wind can be correlated to the burning velocity of the liquid. The radiative output of the flame would be dependent upon the fire size, extent of mixing with air and the flame temperature. Some fraction of the radiation is absorbed by carbon dioxide and water vapour in the intervening atmosphere. In addition, large hydrocarbon pool fires produce thick smoke, which can significantly obscure flame radiation. Finally the incident flux at an observer location would depend upon the radiation view factor, which is a function of the distance from the flame surface, the observer's orientation and the flame geometry. Estimation of the thermal radiation hazards from pool fires essentially involves 3 steps; characterization of flame geometry, approximation of the radiative properties of the fire and calculation of safe separation distances to specified levels of thermal radiation.

Explosion

In case of vapour cloud explosion, two physical effects may occur:

- a flash fire over the whole length of the explosive gas cloud;
- a blast wave, with typical peak overpressures circular around ignition source.

As explained above, 100% lethality is assumed for all people who are present within the cloud proper.

For the blast wave, the lethality criterion is based on:

- A peak overpressure of 0.1 bar will cause serious damage to 10% of the housing/structures.





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- Falling fragments will kill one of each eight persons in the destroyed buildings.

The following damage criteria may be distinguished with respect to the peak overpressures resulting from a blast wave:

Table 5.3: Damage Due To Overpressures

Peak Overpressure	Damage Type
0.83 bar	Total Destruction
0.30 bar	Heavy Damage
0.10 bar	Moderate Damage
0.03 bar	Significant Damage
0.01 bar	Minor Damage

From this it may be concluded that $p = 0.17 \times 10^5 \text{ Pa}$ corresponds approximately with 1% lethality. Furthermore it is assumed that everyone inside an area in which the peak overpressure is greater than $0.17 \times 10^5 \text{ Pa}$ will be wounded by mechanical damage. For the gas cloud explosion this will be inside a circle with the ignition source as its center.

9.3 EXTERNAL EVENTS

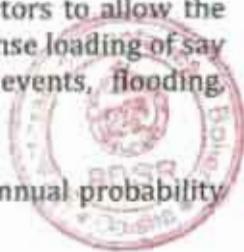
External events can initiate and contribute to potential incidents considered in a Risk Analysis. Although the frequency of such events is generally low, they may result in a major incident. They also have the potential to initiate common cause failures that can lead to escalation of the incident. External events can be subdivided into two main categories:

- Natural hazards: Earthquakes, floods, tornadoes, extreme temperature, lightning etc.
- Man induced events: Aircraft crash, missile, nearby industrial activity, sabotage etc.

TECHNOLOGY

Normal design codes for oil and gas plants have sufficient safety factors to allow the plant to withstand major external events to a particular level (e.g. intense loading of say 120 mph). Quantitative design rules usually used for seismic events, flooding, tornadoes and extreme wind hazards as follows:

- Seismic**
The design should withstand critical ground motion with an annual probability of 10^{-4} or less.
- Flooding**
The design should withstand the efforts of worst flooding occurrence in 100-year period.
- Winds**
The design should withstand the most critical combination of wind velocity and duration having a probability of 0.005 or less in a 50 year period (annual probability of 10^{-4} or less).





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CLIMATE DATA:

Month	Highest Max	Lowest Min	Total Monthly Rainfall(mm)	Humidity	Wind direction	Average Wind Speed (m/s)
JAN	33.2	14.0	7	72	NE	6
FEB	35.4	16.2	8	79	S	6
MAR	36.7	21.2	10.7	73	S	8
APR	36.5	22.0	8.9	82	S	6
MAY	38.6	21.8	113	80	SSW	6
JUN	38.4	24.0	98.7	82	SW	8
JUL	36.7	23.8	384.2	85	SW	8
AUG	33.5	24.2	840.5	90	SW	6
SEP	35.5	24.4	195.1	85	SE	8
OCT	35.4	23.0	87.5	77	NE	14
NOV	33.9	19.9	13.1	71	NE	8
DEC	31.2	16.3	9	63	NE	6

9.4 IDENTIFICATION OF MOST CREDIBLE HAZARD SCENARIO:

CASE-1

FIRE IN MS STORAGE TANK

Fire in MS storage tank farm due to release of Flammable liquids from rim vent/nozzle failure is considered as the most credible scenario because of the following reasons:

As per schedule 1, Part - II (b) (v), MS is flammable liquid having flash point of <18°C and auto ignition temperature of 257°C and explosive limit of 1.3-7.6% volume in air. In case of fire in MS storage tank, the effect distance of significant heat radiation assessed in different season is given in the table given below.

Hazard Scenario	Significant heat level Kw/m ²	Experience at distance in mtrs.						Indication
		Summer day	Summer night	Rainy day	Rainy night	Winter day	Winter night	
Fire in MS Tank	2.0	34m	40m	37m	40m	34m	40m	Causes pain within 60 seconds.
	5.0	24m	27m	26m	27m	24m	27m	Blistering of the skin (2 nd degree burn) within 60 seconds.
	10.00	18m	21m	20m	20m	18m	21m	Potentially lethal within 60 seconds.



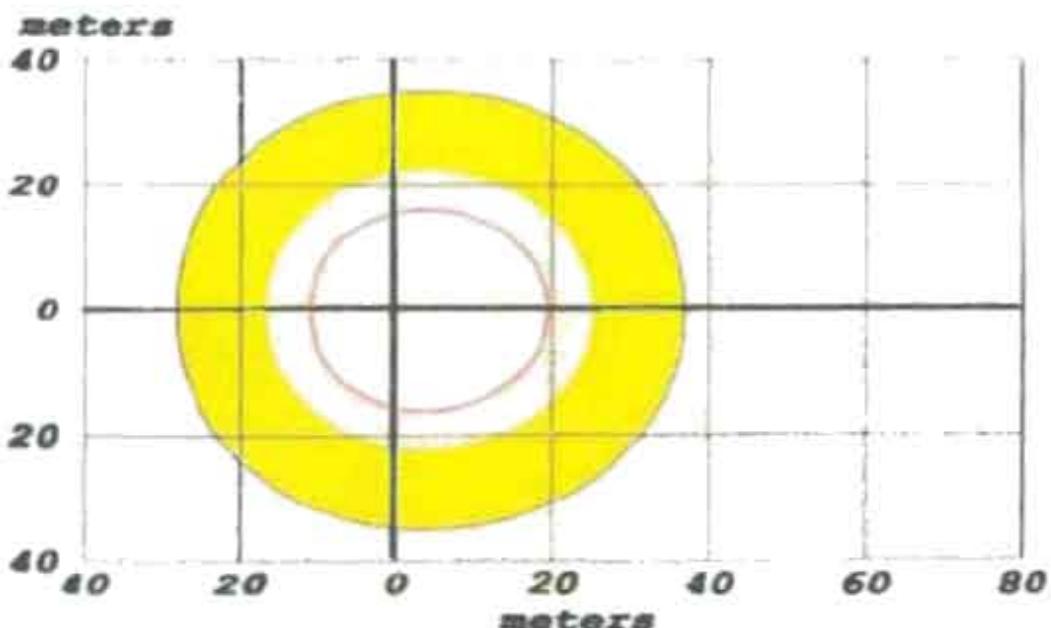
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MS SUMMER DAY:-

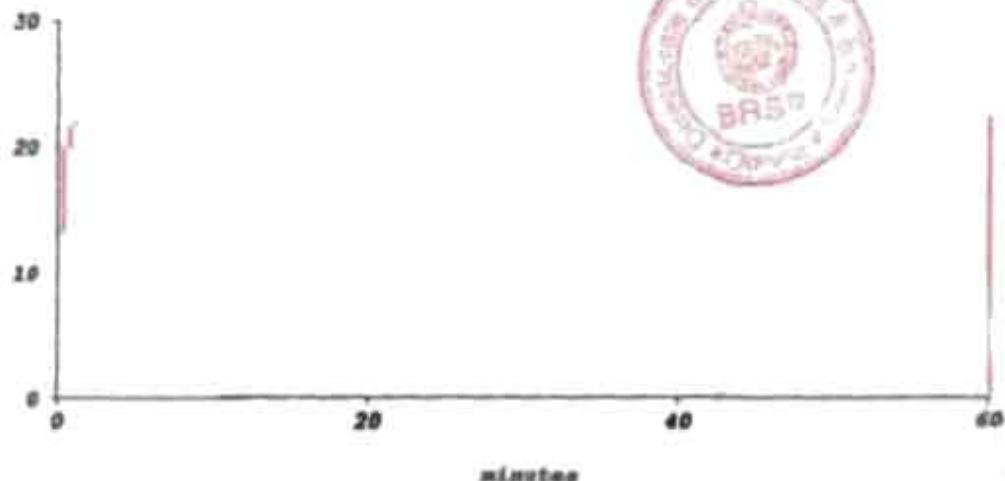


THREAT ZONE:

Threat Modelled: Thermal radiation from pool fires

Red : 20 meters --- $(10.0 \text{ kW}/(\text{sq m})$ = potentially lethal within 60 sec)Orange: 26 meters --- $(5.0 \text{ kW}/(\text{sq m})$ = 2nd degree burns within 60 sec)Yellow: 37 meters --- $(2.0 \text{ kW}/(\text{sq m})$ = pain within 60 sec)

kilograms/minute



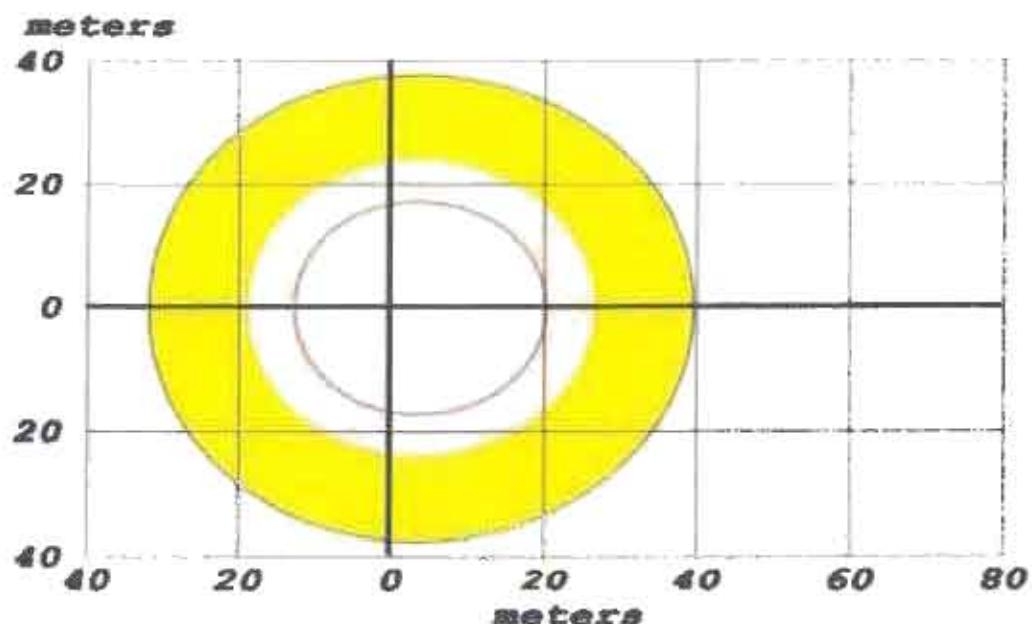


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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

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MS SUMMER NIGHT:-**THREAT ZONE:**

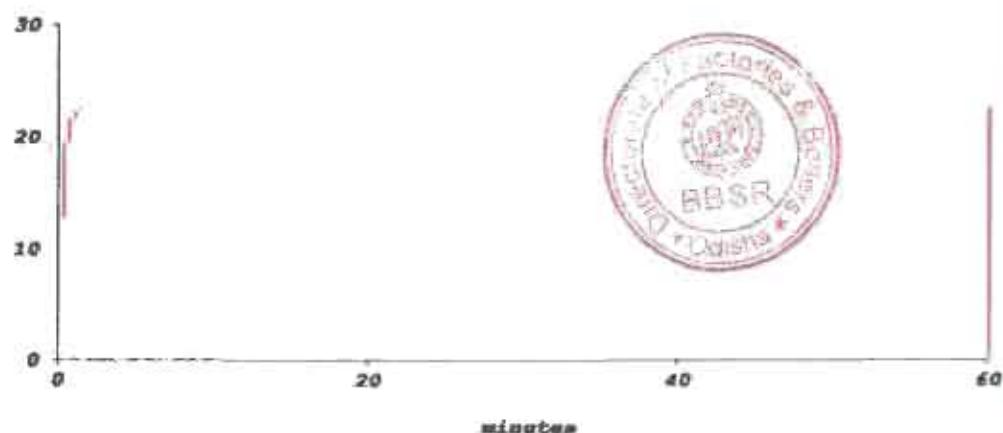
Threat Modelled: Thermal radiation from pool fire

Red : 21 meters --- $(10.0 \text{ kJ}/(\text{sq m})$ = potentially lethal within 60 sec)

Orange: 27 meters --- $(3.0 \text{ kJ}/(\text{sq m})$ = 2nd degree burns within 60 sec)

Yellow: 40 meters --- $(2.0 \text{ kJ}/(\text{sq m})$ = pain within 60 sec)

kilograms/minute





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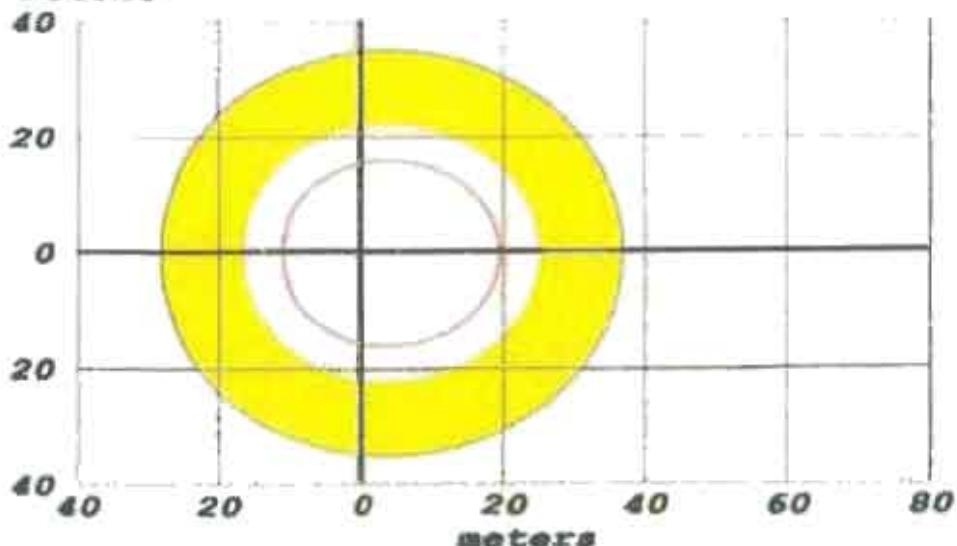
ON-SITE EMERGENCY PLAN

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MS.RAINY DAY-

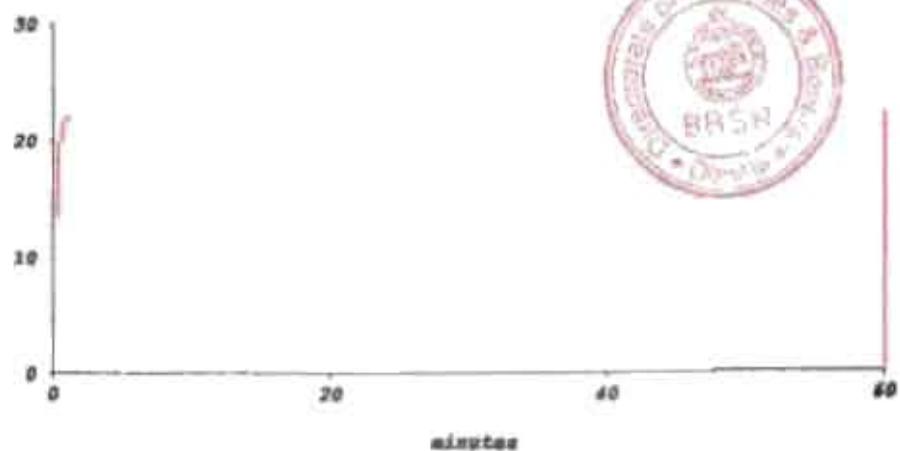
meters

**THREAT ZONE:**

Threat Modelled: Thermal radiation from pool fire

Red : 20 meters --- $(10.0 \text{ MW}/(\text{sq m}) = \text{potentially lethal within 60 sec})$ Orange: 26 meters --- $(5.0 \text{ MW}/(\text{sq m}) = \text{2nd degree burns within 60 sec})$ Yellow: 37 meters --- $(2.0 \text{ MW}/(\text{sq m}) = \text{pain within 60 sec})$

kilograms/minute





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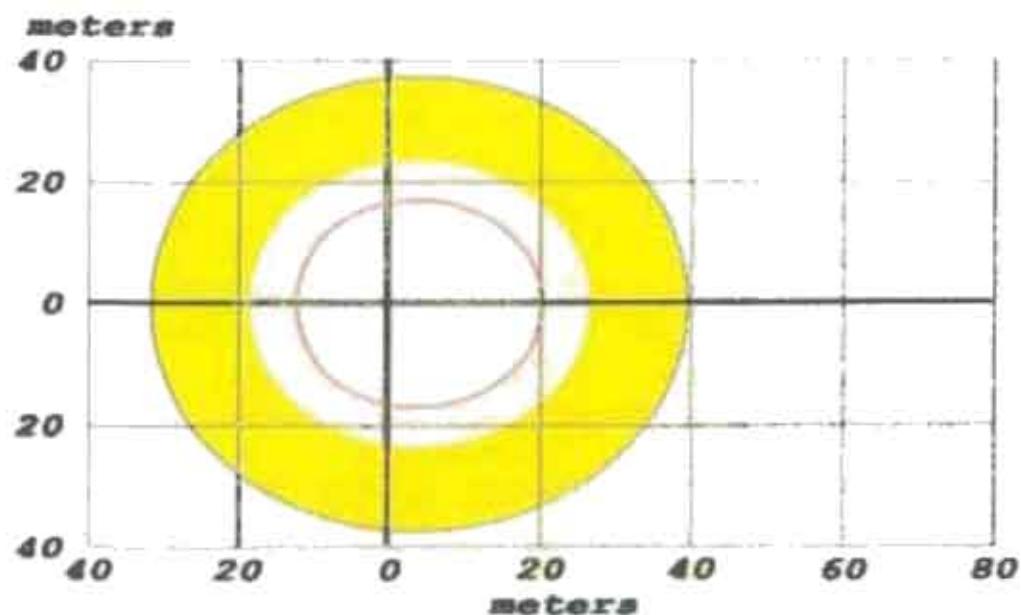
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MS RAINY NIGHT:THREAT ZONE:

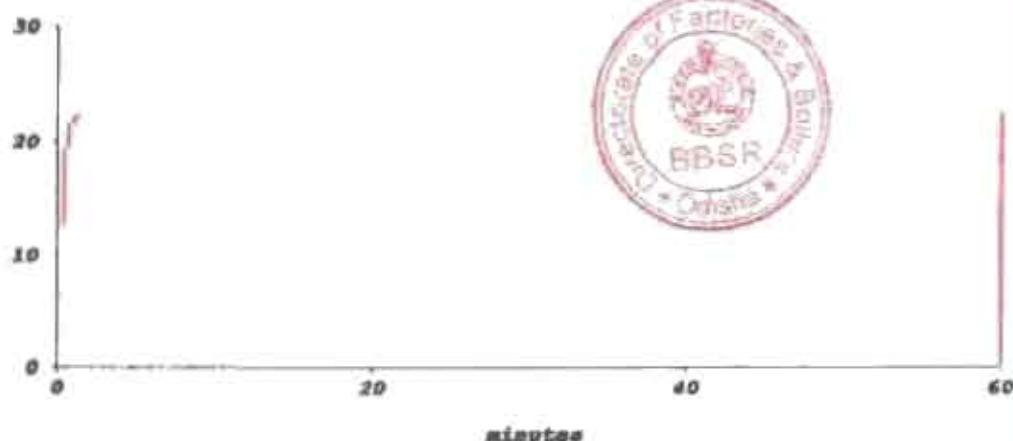
Threat Modelled: Thermal radiation from pool fire

Red : 20 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 27 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 40 meters --- (2.0 kW/(sq m) = pain within 60 sec)

kilograms/minute





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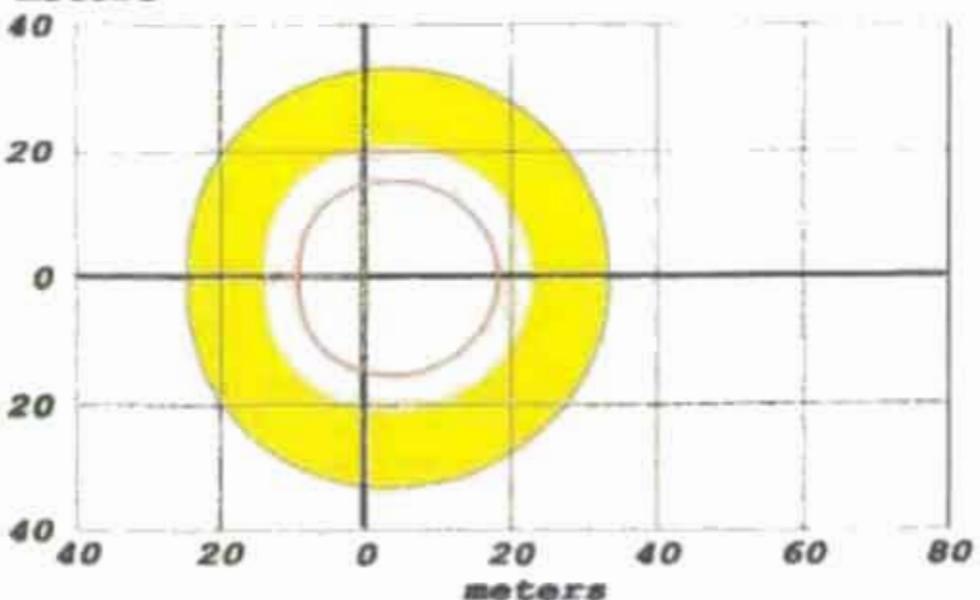
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MS WINTER DAYS

meters



THREAT ZONE:

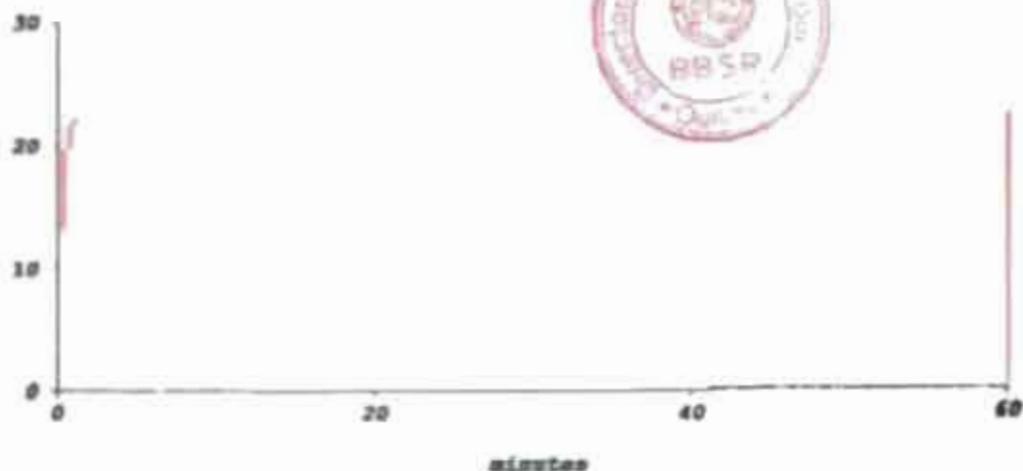
Threat Modelled: Thermal radiation from pool fire

Red : 18 meters --- (10.0 MJ/(sq m)) = potentially lethal within 60 sec)

Orange: 24 meters --- (5.0 MJ/(sq m)) = 2nd degree burns within 60 sec)

Yellow: 34 meters --- (2.0 MJ/(sq m)) = pain within 60 sec)

kilograms/minute





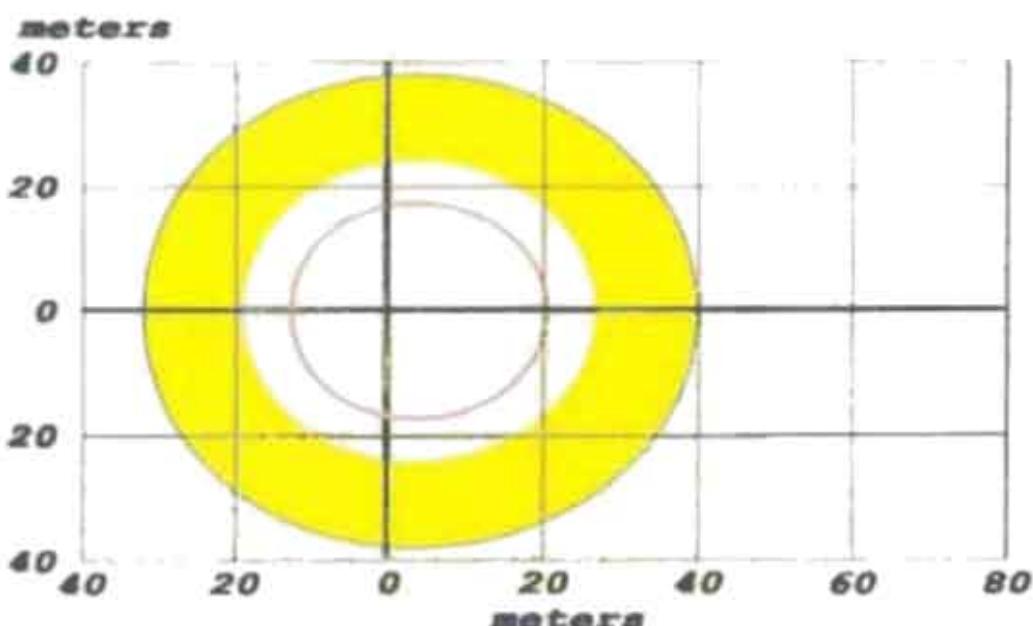
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MS WINTER NIGHT:

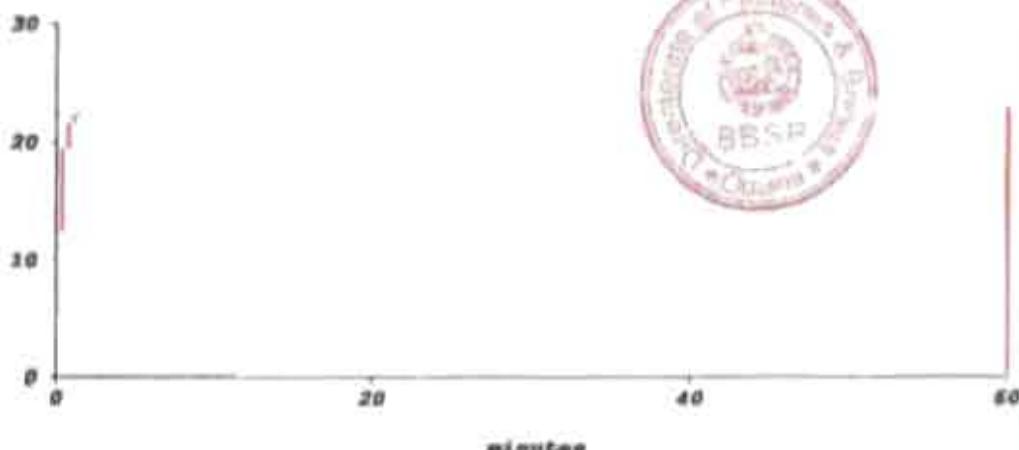


SUMMER DAY:

Threat Modeled: thermal radiation from pool fire

Red : 21 meters --- $(10.0 \text{ MJ}/(\text{sq m}) = \text{potentially lethal within 60 sec})$ Orange: 27 meters --- $(5.0 \text{ MJ}/(\text{sq m}) = \text{2nd degree burns within 60 sec})$ Yellow: 40 meters --- $(2.0 \text{ MJ}/(\text{sq m}) = \text{pain within 60 sec})$

kilograms/minute





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CASE-2

FIRE IN SKO STORAGE TANK

Fire Hazard in SKO Storage Tank is considered as most Credible Scenario because of the following reasons:

SKO is a flammable liquid as per Schedule-1, Part-I (b) (v) having flash point of 35°C and auto ignition temperature of 210°C and explosive limit of lower value 0.6% & upper value 4.9% by volume in air. Fire classification as per OSHA, it comes under category Flammability. So, it is susceptible to fire hazard. Whenever SKO catches fire it shall manifest in the form of pool fire. Taking into consideration of the metrological data of the area, one time storage quantity of SKO and its physical and chemical property, it is considered credible Hazard scenario.

The effect of significant heat radiation level of 2.0 Kw /m², 5.0 Kw/m² and 10.0 Kw/m² for different season in case of fire on SKO storage tank as assessed through modeling in different season as per modeling is given in table below.

Hazard Scenario	Significant heat level Kw/m ²	Experience at distance in Mtrs.						Indication
		Summer day	Summer Night	Rainy Day	Rainy Night	Winter Day	Winter Night	
Fire in SKO Tank	2.0	43 m	44m	43m	44m	40m	45m	Causes pain within 60 seconds.
	5.0	30m	30m	30m	30m	30m	30m	Blistering of the skin (2 nd degree burn) within 60 seconds.
	10.0	23m	22m	23m	23m	24m	22m	Potentially lethal within 60 seconds.

From the above assessment, the maximum effect distance (ISO-risk contour) of heat radiation due to fire hazard in case of fire in SKO storage area is experienced up to 45 meter in Winter season night from the source of fire.





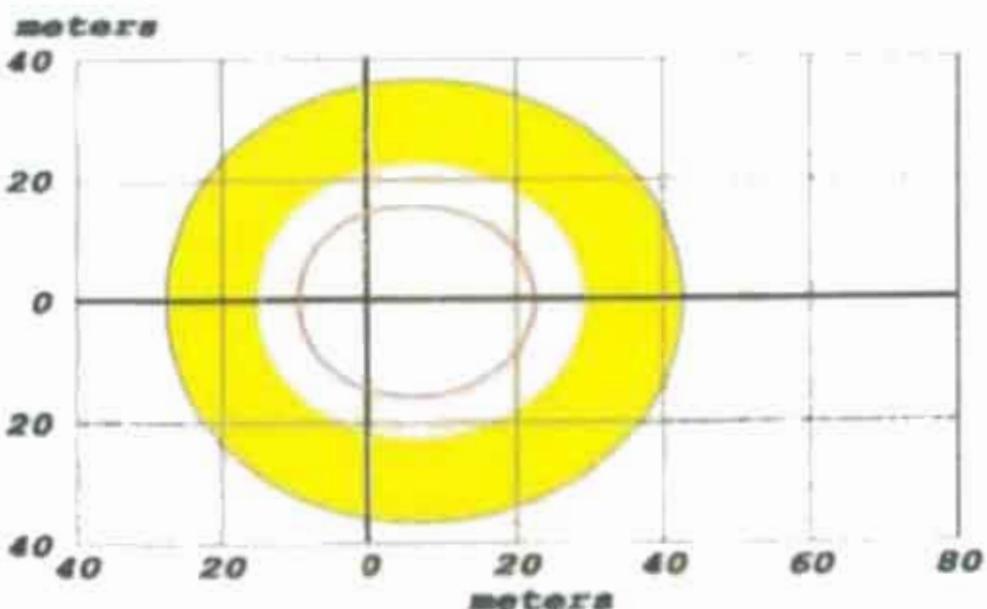
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SKO SUMMER DAY-

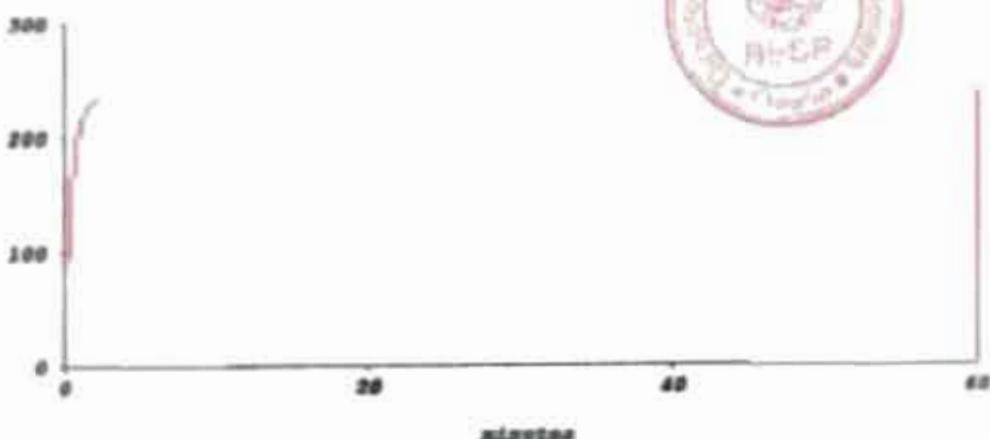


THREAT ZONE:

Threat Modelled: Thermal radiation from pool fire

Red : 23 meters --- ($10.0 \text{ kJ}/(\text{sq m})$ = potentially lethal within 60 sec)Orange: 30 meters --- ($5.0 \text{ kJ}/(\text{sq m})$ = 2nd degree burns within 60 sec)Yellow: 43 meters --- ($2.0 \text{ kJ}/(\text{sq m})$ = pain within 60 sec)

kilogravme/minute



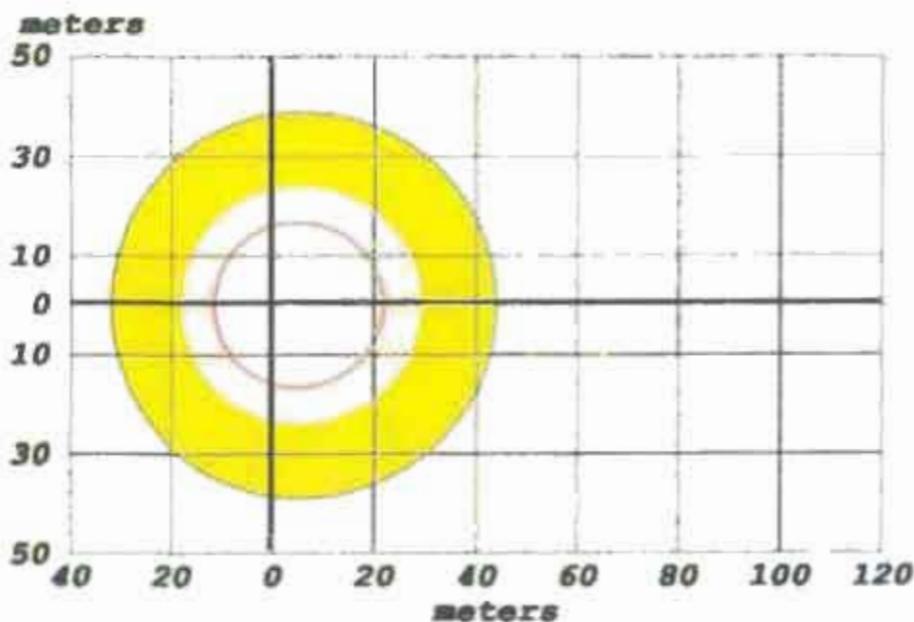


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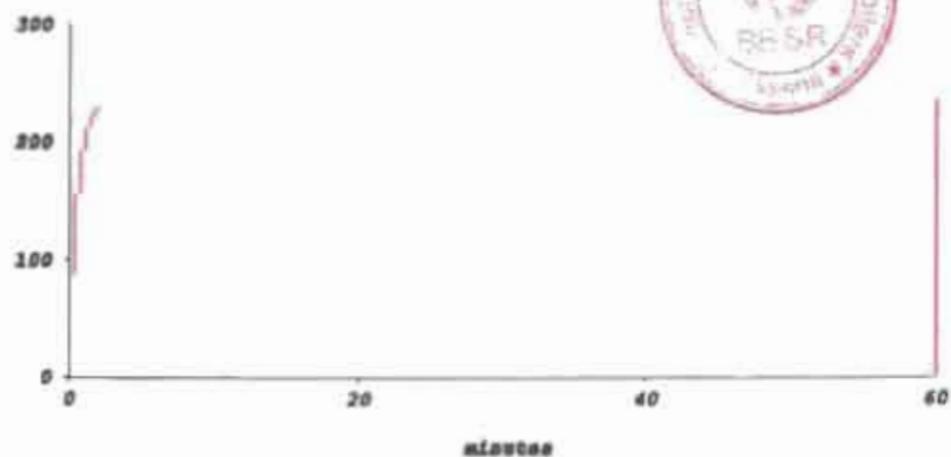
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SKO SUMMER NIGHT:-**THREAT DOME:**

Threat Modelled: Thermal radiation from pool fire

Red : 22 meters --- $(10.0 \text{ kW}/(\text{sq m}) = \text{potentially lethal within } 60 \text{ sec})$ Orange: 30 meters --- $(5.0 \text{ kW}/(\text{sq m}) = 2\text{nd degree burns within } 60 \text{ sec})$ Yellow: 44 meters --- $(2.0 \text{ kW}/(\text{sq m}) = \text{pain within } 60 \text{ sec})$

kilograms/minute





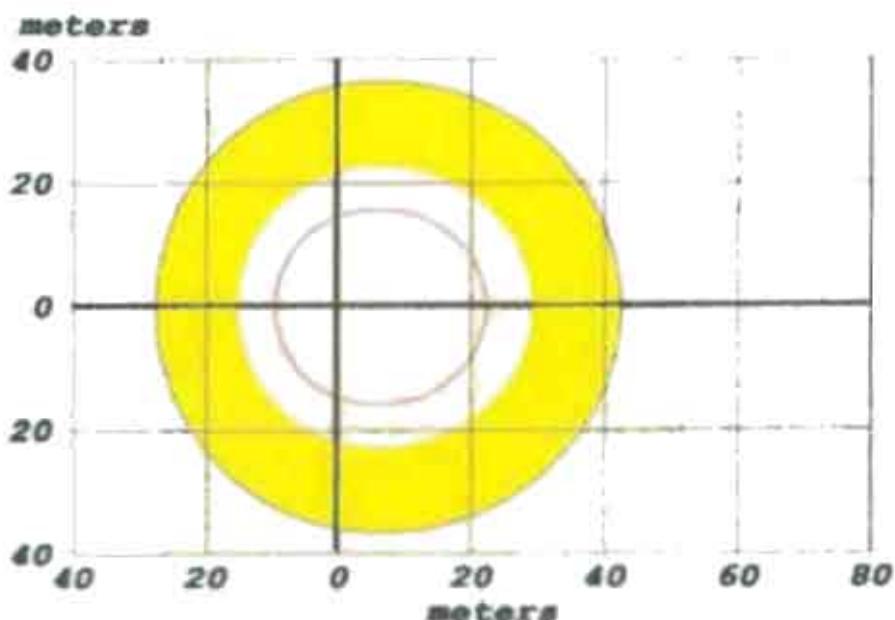
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SKO RAINY DAY:-

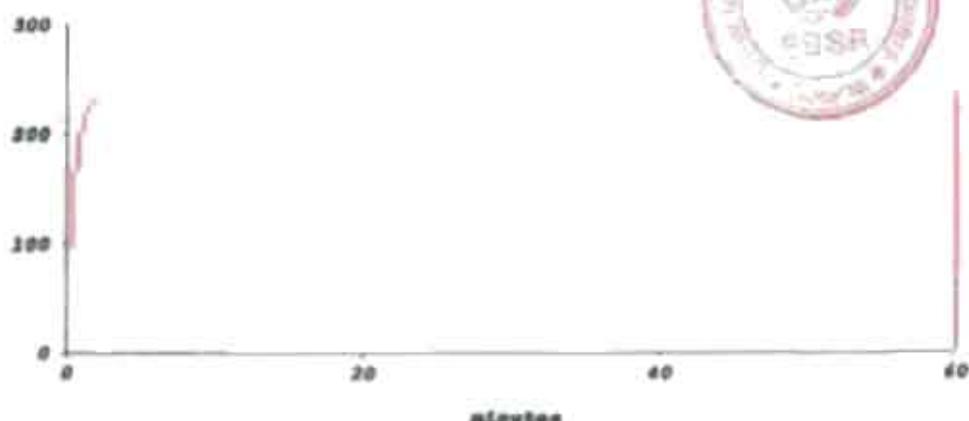


THREAT ZONE:

Threat Modelled: Thermal radiation from pool fire

Red : 23 meters --- $(10.0 \text{ kW}/(\text{sq m}))$ = potentially lethal within 60 sec)Orange: 30 meters --- $(5.0 \text{ kW}/(\text{sq m}))$ = 2nd degree burns within 60 sec)Yellow: 43 meters --- $(2.0 \text{ kW}/(\text{sq m}))$ = pain within 60 sec)

kilogrammes/minute



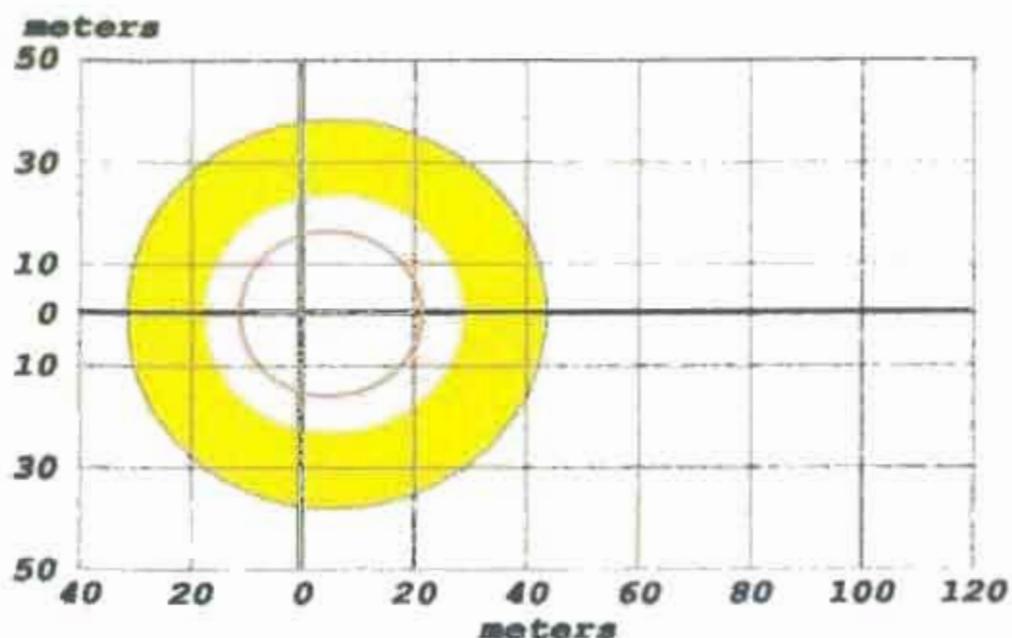


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SKO RAINY NIGHT:-**THREAT ZONE:**

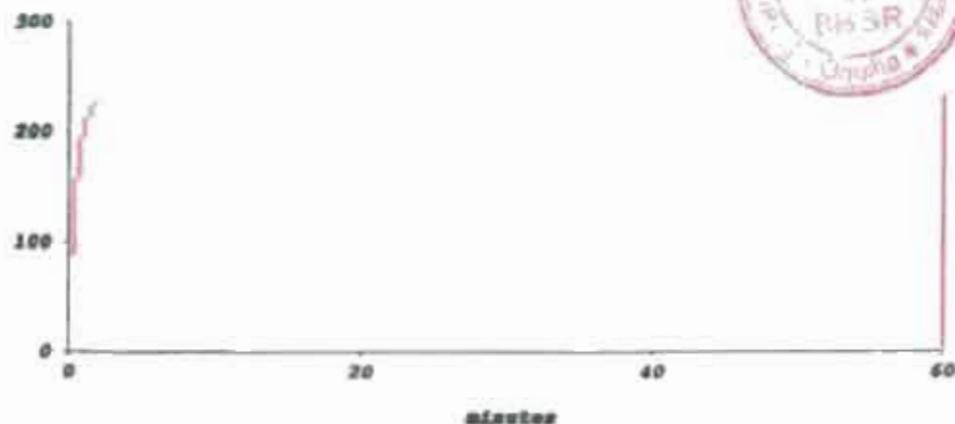
Threat Modelled: Thermal radiation from pool fire

Red : 22 meters --- (10.0 kW/(sq m)) = potentially lethal within 60 sec)

Orange: 30 meters --- (5.0 kW/(sq m)) = 2nd degree burns within 60 sec)

Yellow: 44 meters --- (2.0 kW/(sq m)) = pain within 60 sec)

kilograms/minute





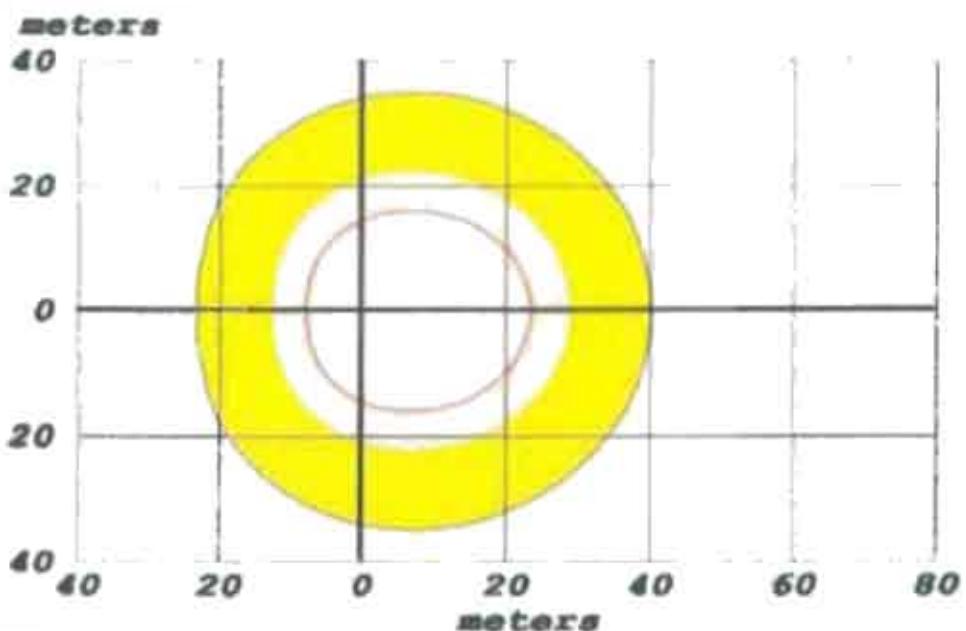
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SKO WINTER DAY:-

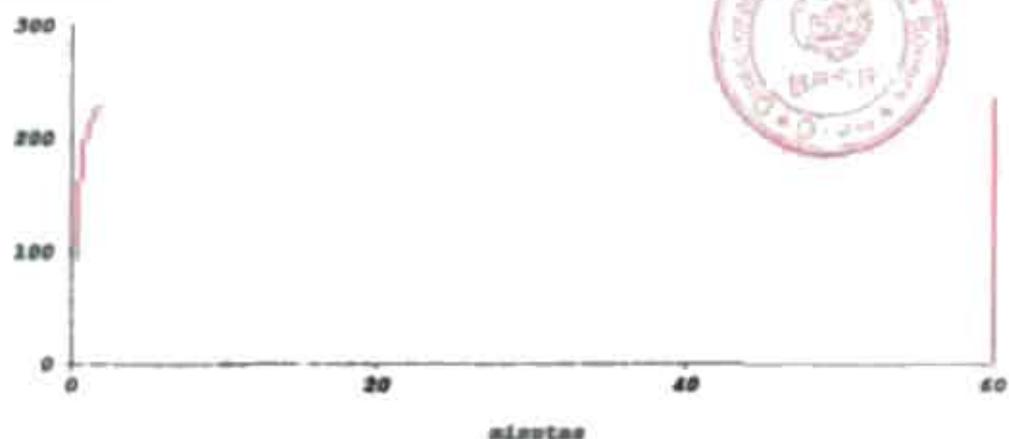


THREAT ZONE:

Threat Modelled: Thermal radiation from pool fire

Red : 24 meters --- $(10.0 \text{ kW}/(\text{sq m}))$ = potentially lethal within 60 secOrange: 30 meters --- $(5.0 \text{ kW}/(\text{sq m}))$ = 2nd degree burns within 60 secYellow: 40 meters --- $(2.0 \text{ kW}/(\text{sq m}))$ = pain within 60 sec

kilograms/minute





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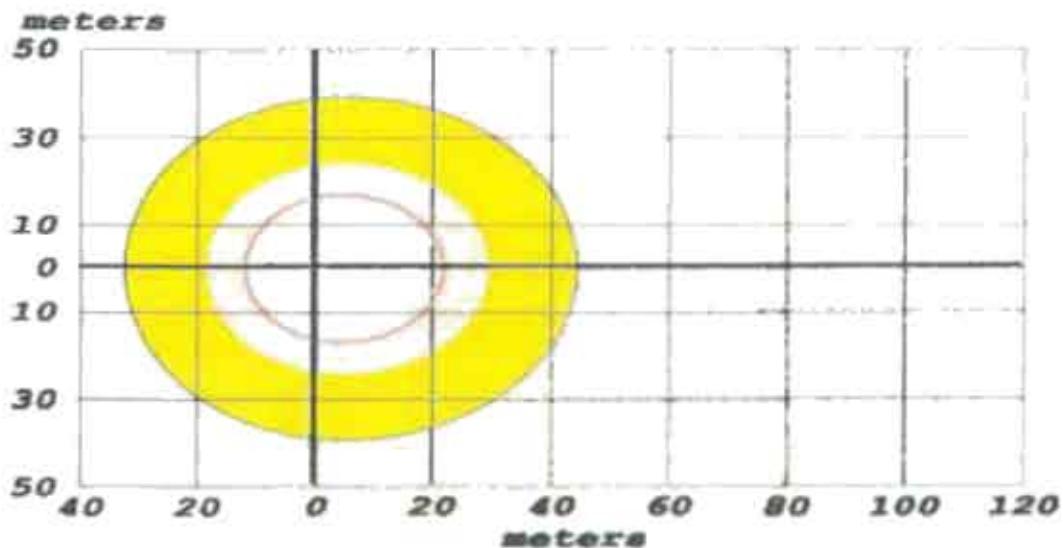
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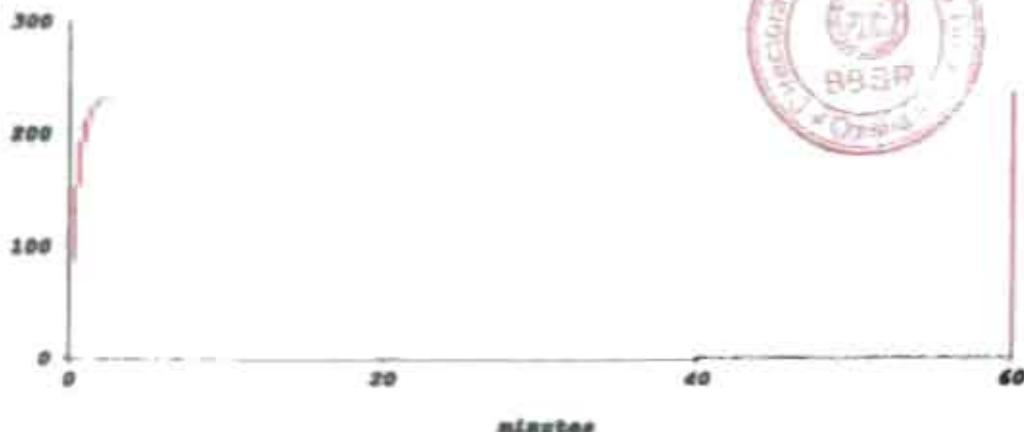
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SKO WINTER NIGHT:THREAT ZONE:

Threat Modelled: Thermal radiation from pool fire

Red : 22 meters --- ($10.0 \text{ MJ}/(\text{sq m})$) = potentially lethal within 60 sec)Orange: 30 meters --- ($5.0 \text{ MJ}/(\text{sq m})$) = 2nd degree burns within 60 sec)Yellow: 45 meters --- ($2.0 \text{ MJ}/(\text{sq m})$) = pain within 60 sec)

kilograms/minute





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CASE-3

FIRE ON HSD STORAGE TANK

Fire Hazard in HSD Storage Tank is considered as most Credible Scenario because of the following reasons;

HSD is a flammable liquid as per schedule-1, Part-II (b) (v) having flash point of 500C and auto ignition temperature of 220-3000C and explosive limit of lower limit 0.6% & upper explosive limit 6% volume in air. So, it is susceptible to fire hazard. Whenever HSD catches fire it shall manifest in the form of pool fire. Taking into consideration of the metrological data of the area, one time storage quantity of HSD and its physical and chemical property, it is considered credible Hazard scenario.

The effect of significant heat radiation level of 2.0 Kw /m², 5.0 Kw/m² and 10.0 Kw/m² for different season in case of fire on HSD storage tank as assessed is given in table below.

Hazard Scenario	Significant heat level Kw/m ²	Experience at distance in Mtrs.						Indication
		Summer day	Summer Night	Rainy Day	Rainy Night	Winter Day	Winter Night	
Fire in HSD Tank	2.0	318 m	334 m	317 m	328 m	324 m	337 m	Causes pain within 60 seconds.
	5.0	206 m	217 m	206 m	213 m	224 m	219 m	Blistering of the skin (2 nd degree burn) within 60 seconds.
	10.0	147 m	156 m	147 m	153 m	171 m	157 m	Potentially lethal within 60 seconds.

From the above assessment, the maximum effect distance (Iso-risk contour) of heat radiation due to fire on HSD storage tank is experienced up to 337 meter in winter season from the source of fire.





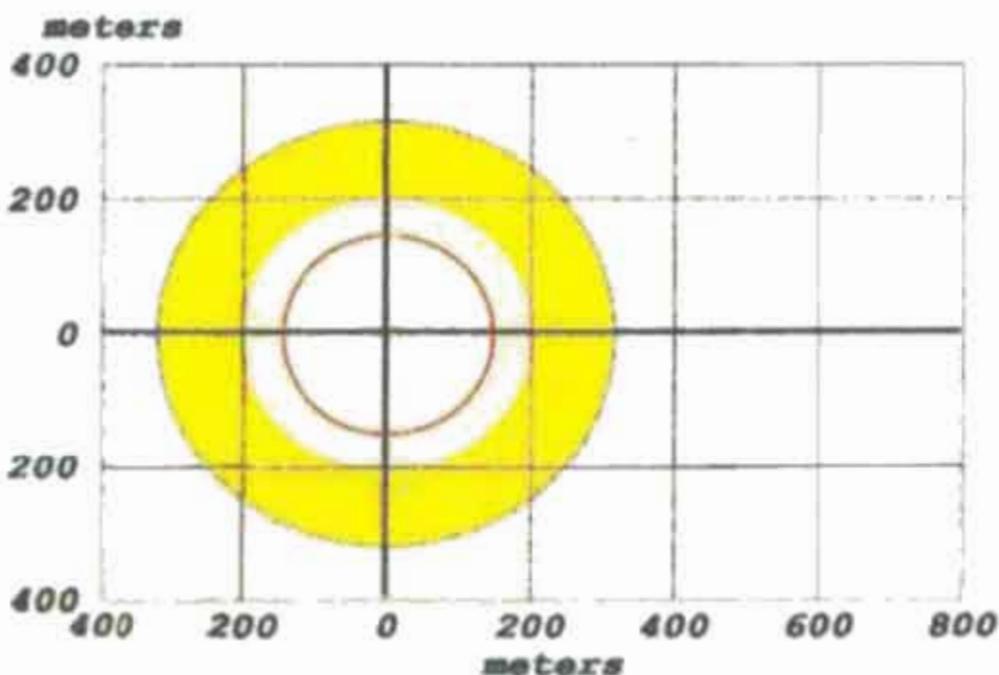
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HSD SUMMER DAY:THREAT ZONE:

Threat Modelled: Thermal radiation from pool fire

Red : 147 meters --- $(10.0 \text{ kW}/(\text{sq m}) = \text{potentially lethal within } 60 \text{ sec})$ Orange: 206 meters --- $(5.0 \text{ kW}/(\text{sq m}) = 2\text{nd degree burns within } 60 \text{ sec})$ Yellow: 318 meters --- $(2.0 \text{ kW}/(\text{sq m}) = \text{pain within } 60 \text{ sec})$ 

kilograms/minute

20,000

15,000

10,000

5,000

0

0

20

40

60

minutes

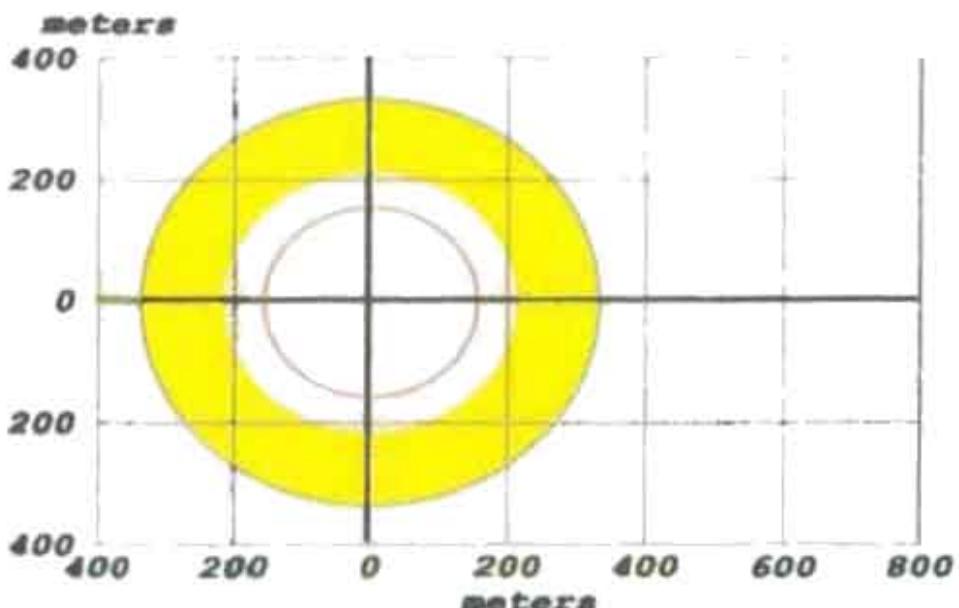


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HSD SUMMER NIGHT:THREAT ZONE:

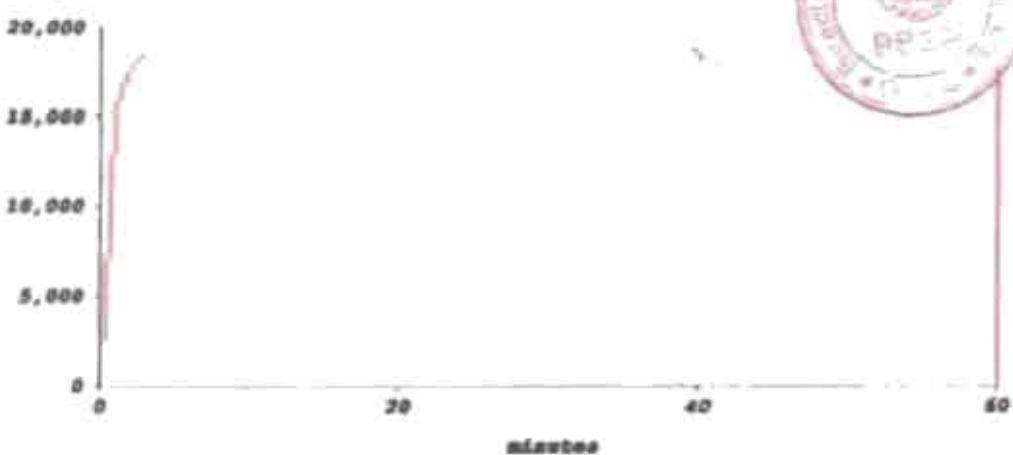
Threat Modelled: Thermal radiation from pool fire

Red : 156 meters --- (10.0 MJ/(sq m) = potentially lethal within 60 sec)

Orange: 217 meters --- (5.0 MJ/(sq m) = 2nd degree burns within 60 sec)

Yellow: 334 meters --- (2.0 MJ/(sq m) = pain within 60 sec)

kilograms/minute



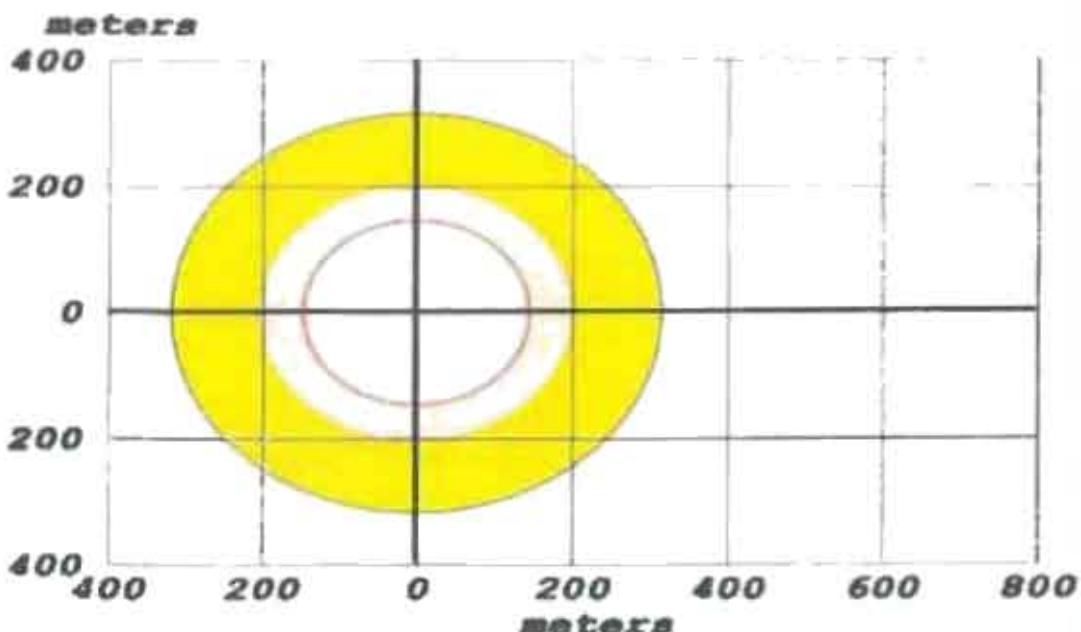


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HSD RAINY DAY:-**THREAT ZONE:**

Threat Modelled: Thermal radiation from pool fire

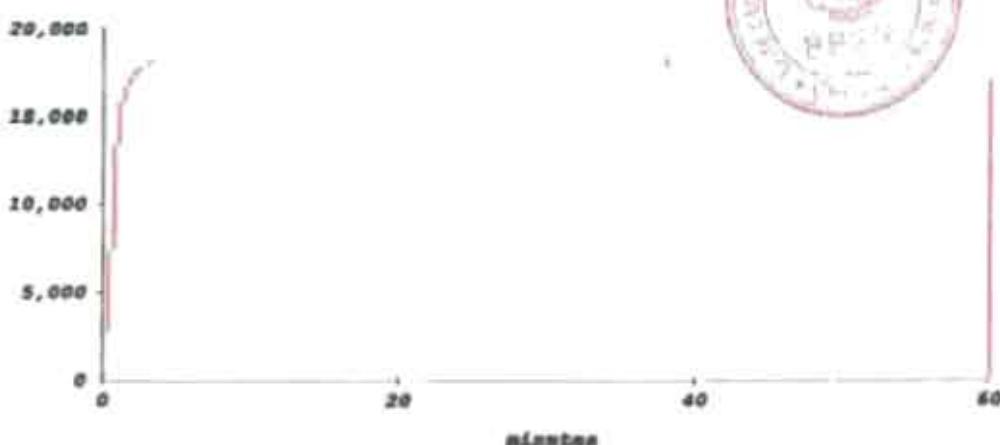
Red : 147 meters --- (10.0 kW/(sq m)) = potentially lethal within 60 sec

Orange: 206 meters --- (5.0 kW/(sq m)) = 2nd degree burns within 60 sec

Yellow: 317 meters --- (2.0 kW/(sq m)) = pain within 60 sec



kilograms/minute



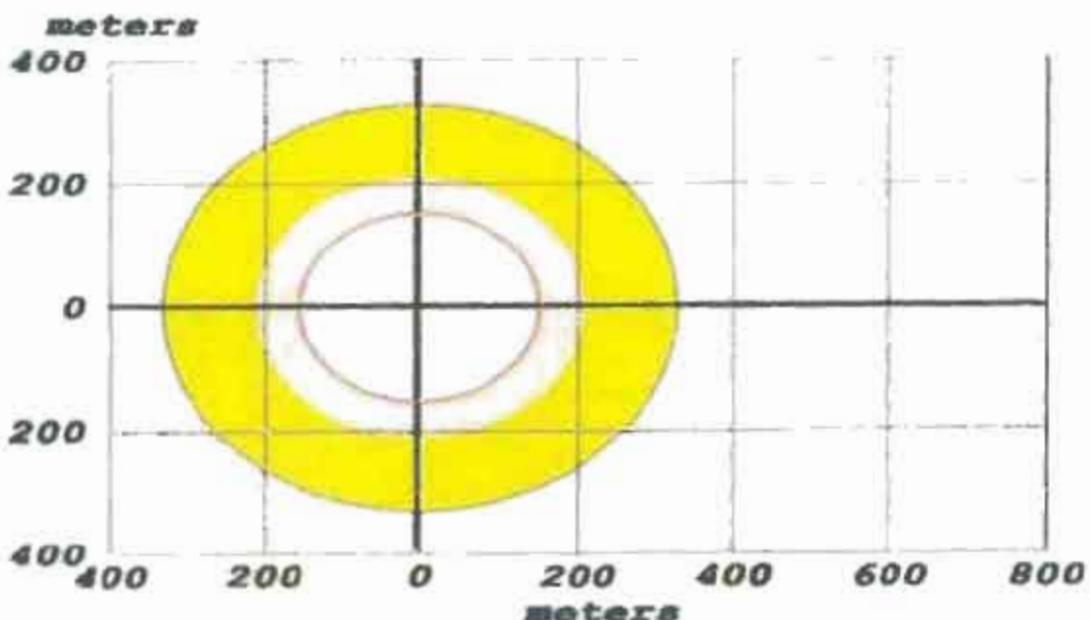


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HSD RAINY NIGHT:**THREAT ZONE:**

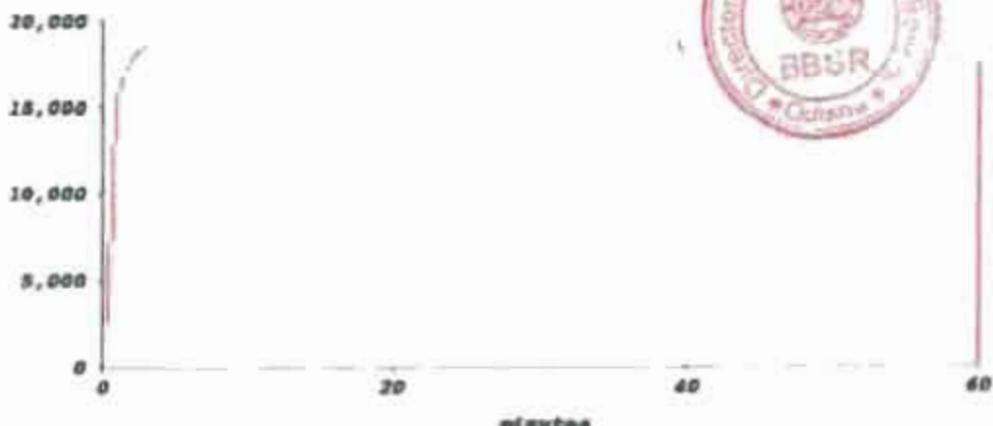
Threat Modeled: Thermal radiation from pool fire

Red : 153 meters --- (10.0 kW/(sq m)) = potentially lethal within 60 sec)

Orange: 213 meters --- (5.0 kW/(sq m)) = 2nd degree burns within 60 sec)

Yellow: 320 meters --- (2.0 kW/(sq m)) = pain within 60 sec)

kilograms/minute





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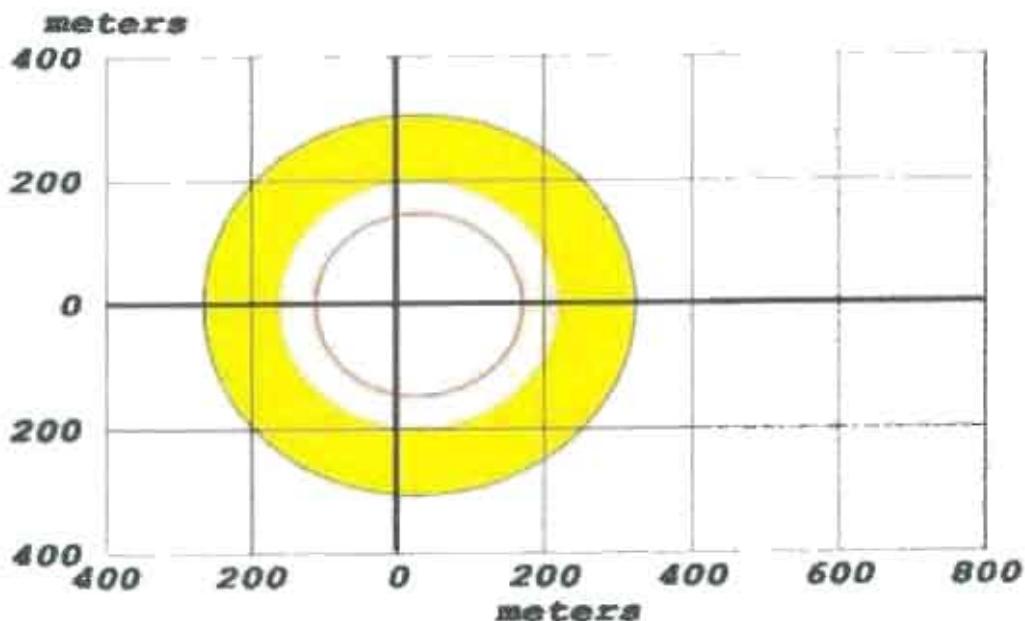
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HSD WINTER DAY:-THREAT ZONE:

Threat Modelled: Thermal radiation from pool fire

Red : 171 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 224 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 324 meters --- (2.0 kW/(sq m) = pain within 60 sec)

kilograms/minute

20,000

15,000

10,000

5,000

0

0

minutes



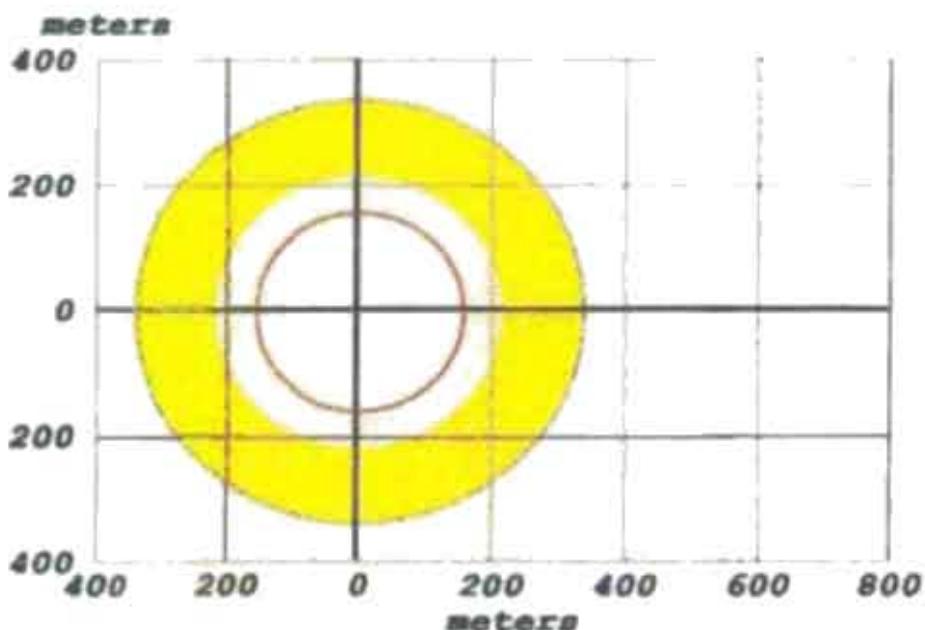


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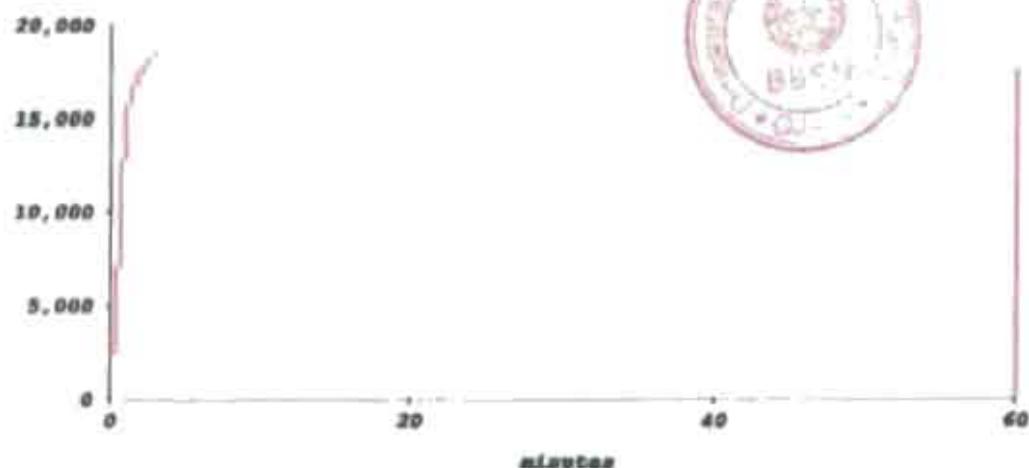
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HSD Winter Night:-THREAT RING:

Threat Modelled: thermal radiation from pool fire

Red : 157 meters --- $(10.0 \text{ kJ}/(\text{sq m})$ = potentially lethal within 60 sec)Orange: 219 meters --- $(5.0 \text{ kJ}/(\text{sq m})$ = 2nd degree burns within 60 sec)Yellow: 337 meters --- $(2.0 \text{ kJ}/(\text{sq m})$ = pain within 60 sec)

kilograms/minute





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CASE - 4

FIRE ON FO STORAGE TANK

Fire Hazard in FO Storage Tank is considered as most Credible Scenario because of the following reasons;

FO is a flammable liquid having flash point of 620C and auto ignition temperature of 250- 3570C and explosive limit of lower value 0.5% & upper value 5% by volume in air. So, it is susceptible to fire hazard. Fire classification as per OSHA, it comes under category Flammability-2. Whenever FO catches fire it shall manifest in the form of pool fire. Taking into consideration of the metrological data of the area, one time storage quantity of FO and its physical and chemical property, it is considered credible Hazard scenario.

The effect of significant heat radiation level of 2.0 Kw/m², 5.0 Kw/m² and 10.0 Kw/m² for different season in case of fire on FO storage tank as assessed through modeling in different season as per modeling is given in table below.

Hazard Scenario	Significant heat level Kw/m ²	Experience at distance in Mtrs.						Indication
		Summer Day	Summer Night	Rainy Day	Rainy Night	Winter Day	Winter Night	
Fire in FO Tank	2.0 Kw/m ²	96 m.	96 m.	30 m.	30 m.	64 m.	64 m.	Causes pain within 60 seconds.
	5.0 Kw/m ²	96 m.	96 m.	30m.	30m.	64 m.	64 m.	Blistering of the skin (2 nd degree burn) within 60 seconds.
	10.0 Kw/m ²	96 m.	96 m.	30 m.	30 m.	64 m.	64 m.	Potentially lethal within 60 seconds.



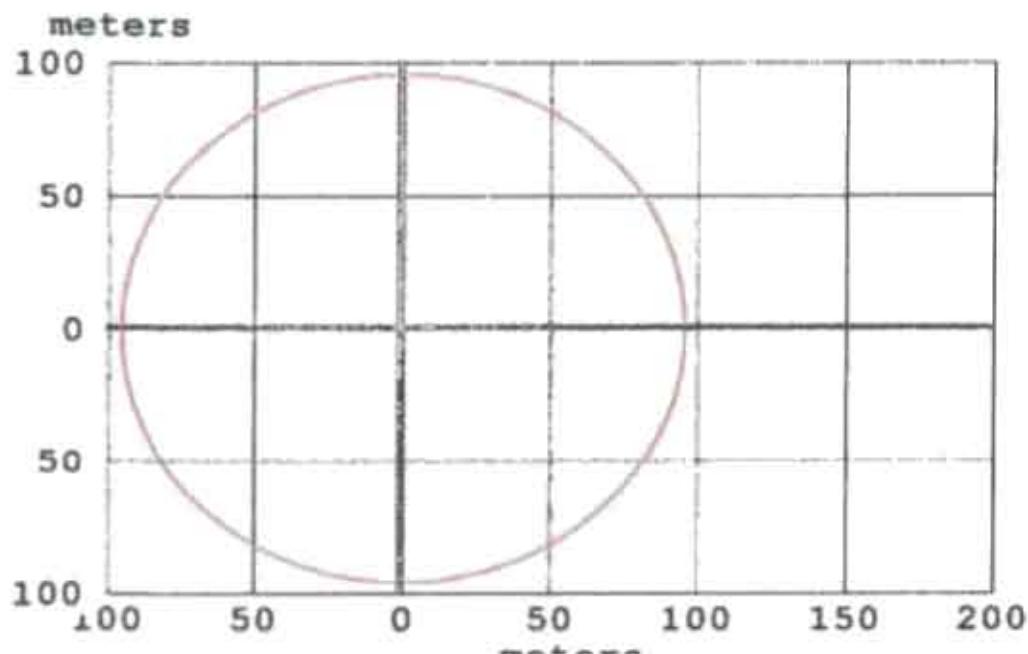


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FO SUMMER DAY:-**THREAT ZONE:**

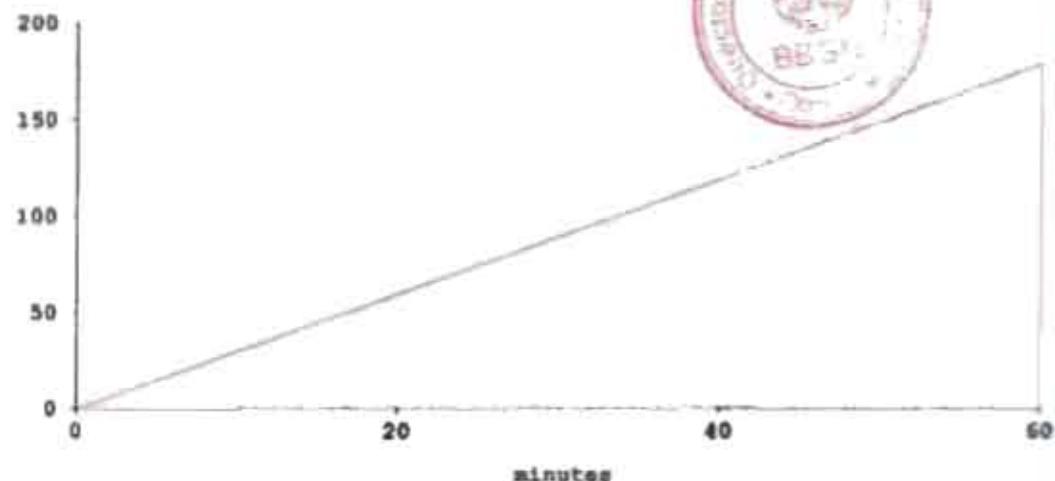
Threat Modeled: Thermal radiation from pool fire

Red : 96 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 96 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 96 meters --- (2.0 kW/(sq m) = pain within 60 sec)

kilograms/minute



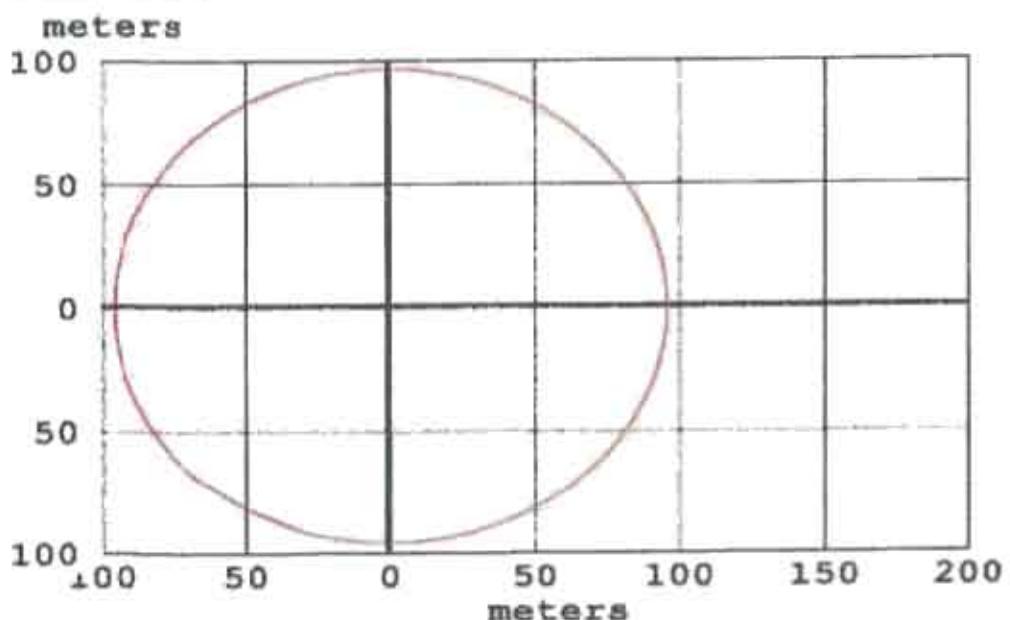


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EO SUMMER NIGHT:-

THREAT ZONE:

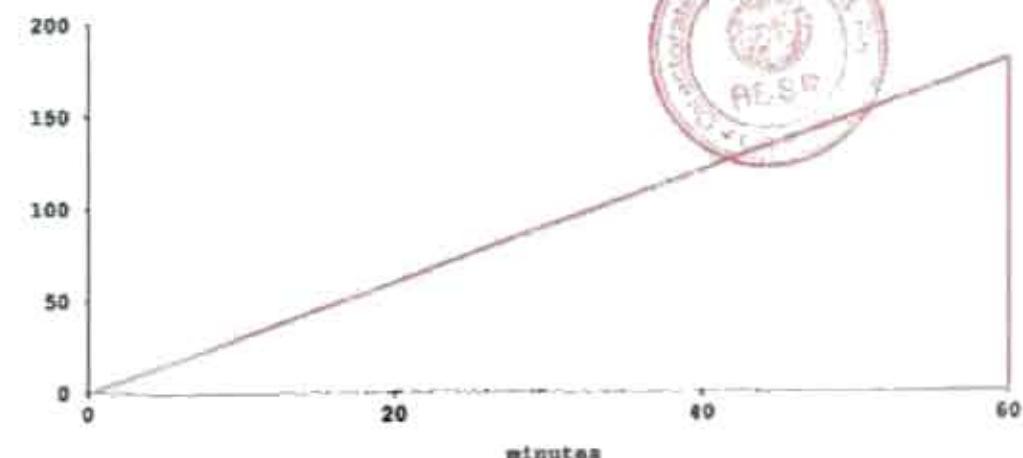
Threat Modelled: Thermal radiation from pool fire

Red : 96 meters --- (10.0 kW/(sq m)) = potentially lethal within 60 sec

Orange: 96 meters --- (5.0 kW/(sq m)) = 2nd degree burns within 60 sec

Yellow: 96 meters --- (2.0 kW/(sq m)) = pain within 60 sec

kilograms/minute



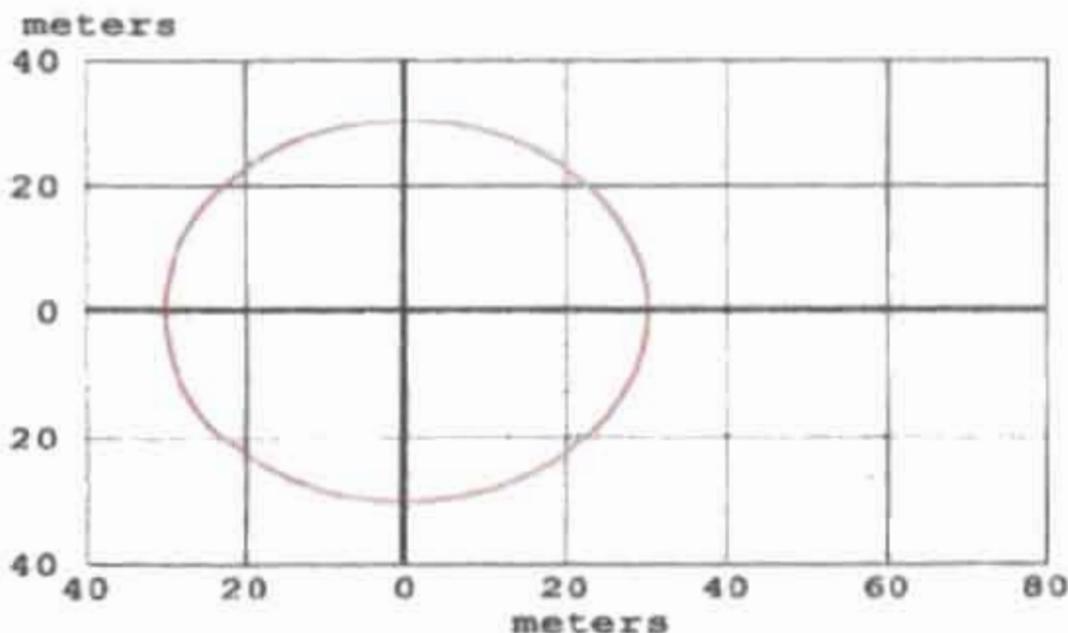


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FO RAINY DAY:THREAT ZONE:

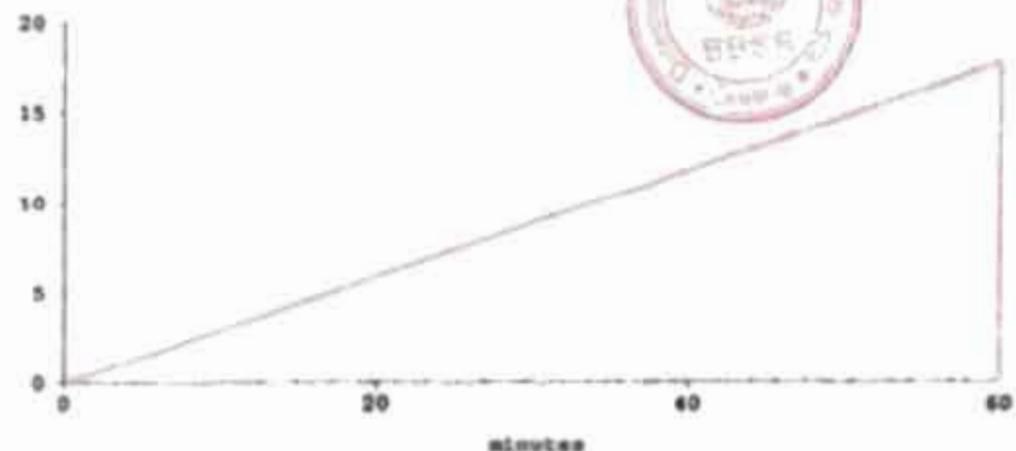
Threat Modeled: Thermal radiation from pool fire

Red : 30 meters --- (10.0 kW/(sq m)) = potentially lethal within 60 sec

Orange: 30 meters --- (5.0 kW/(sq m)) = 2nd degree burns within 60 sec

Yellow: 30 meters --- (2.0 kW/(sq m)) = pain within 60 sec

kilograms/minute





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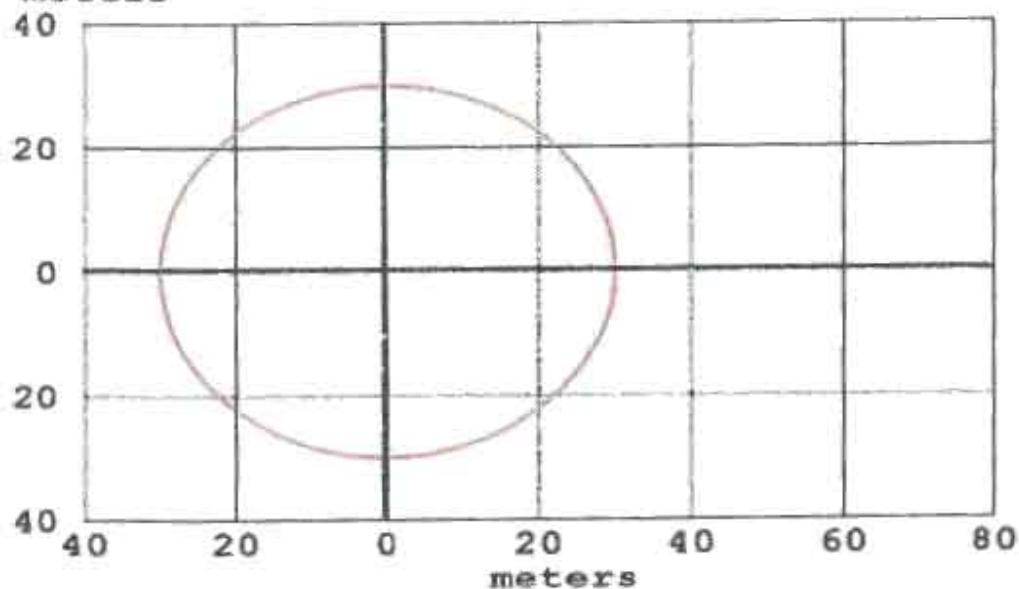
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EO RAINY NIGHT:-

meters

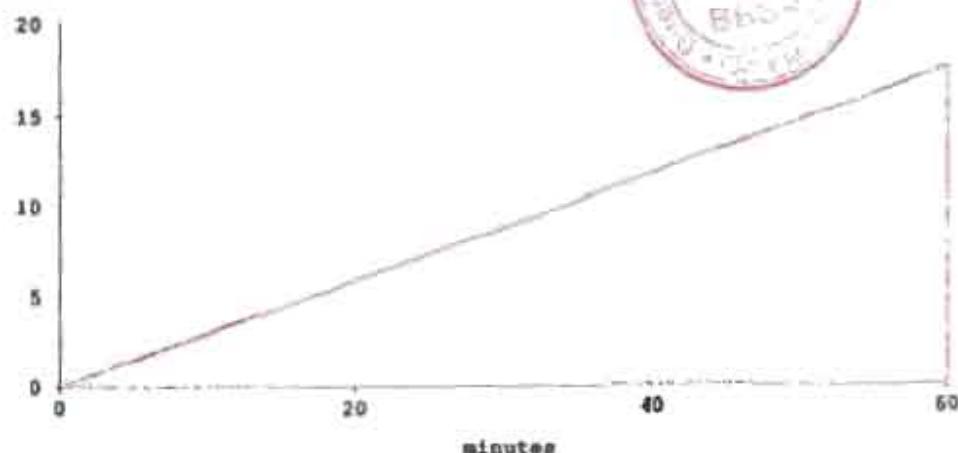


THREAT ZONE:

Threat Modeled: Thermal radiation from pool fire

Red : 30 meters --- $(10.0 \text{ kW}/(\text{sq m}))$ = potentially lethal within 60 secOrange: 30 meters --- $(5.0 \text{ kW}/(\text{sq m}))$ = 2nd degree burns within 60 secYellow: 30 meters --- $(2.0 \text{ kW}/(\text{sq m}))$ = pain within 60 sec

kilograms/minute



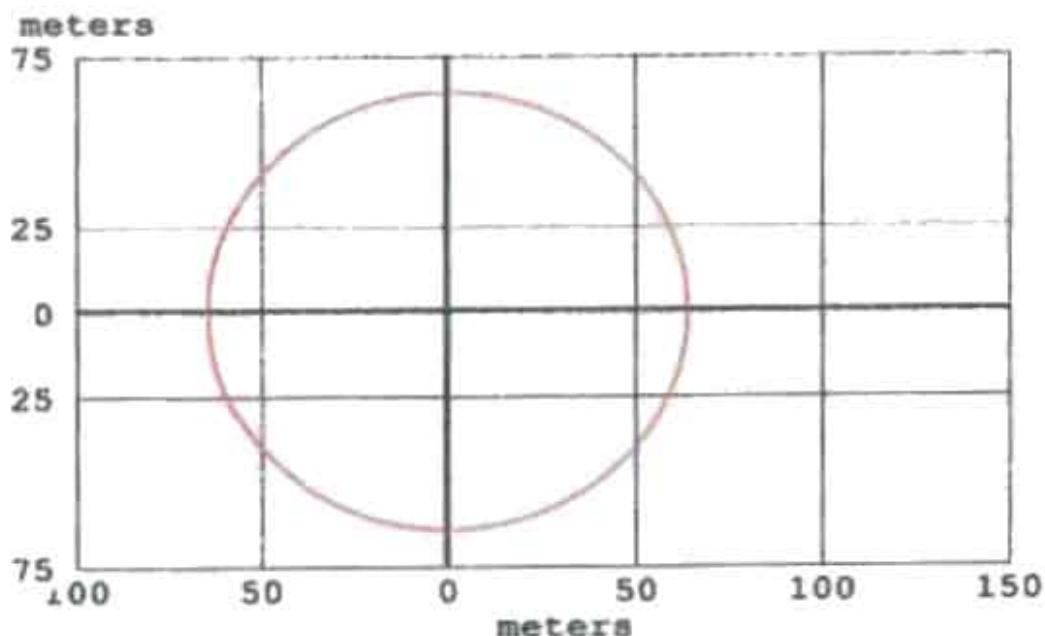


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EO WINTER DAY:-**THREAT ZONE:**

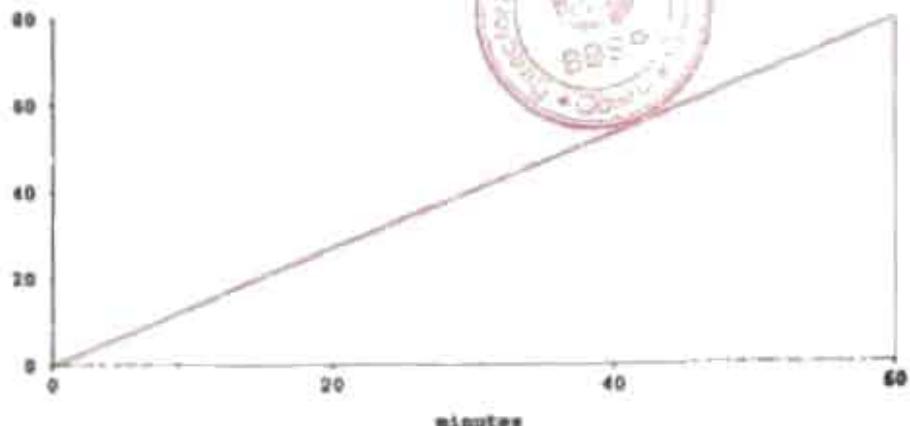
Threat Modeled: Thermal radiation from pool fire

Red : 64 meters --- (10.0 kW/(sq m)) = potentially lethal within 60 sec)

Orange: 64 meters --- (5.0 kW/(sq m)) = 2nd degree burns within 60 sec)

Yellow: 64 meters --- (2.0 kW/(sq m)) = pain within 60 sec)

kilograms/minute



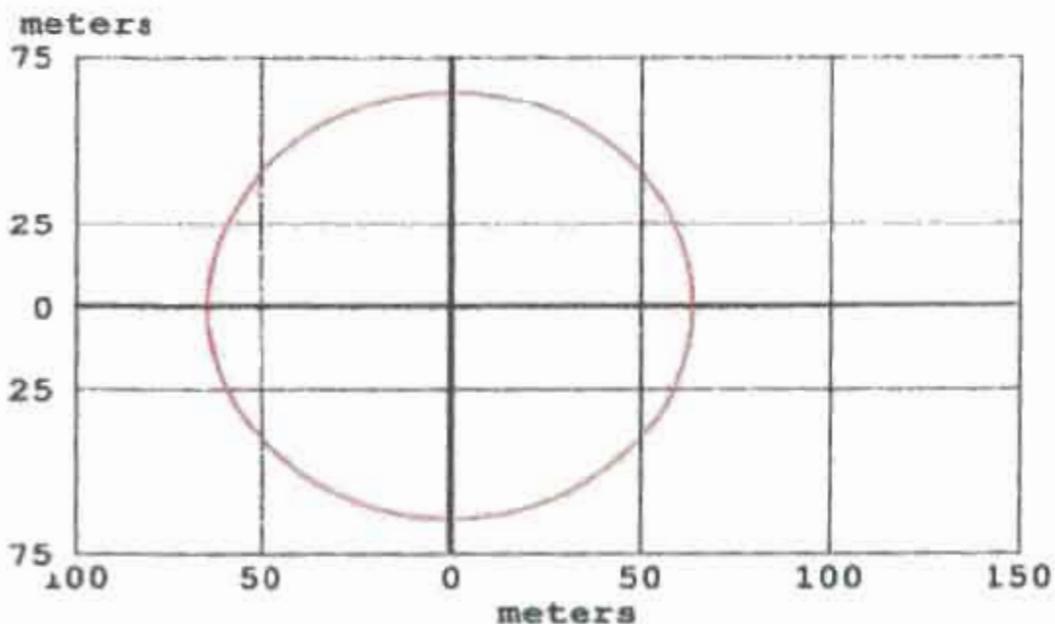


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EO Winter Night:-**THREAT ZONE:**

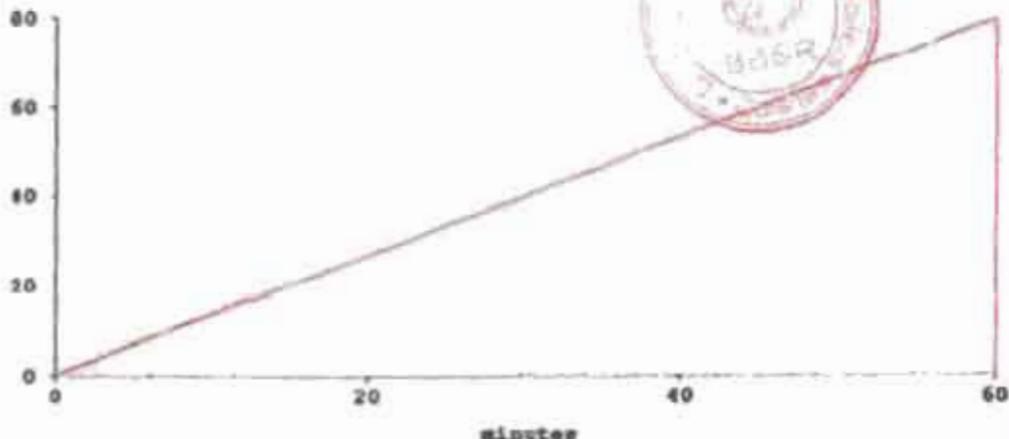
Threat Modelled: Thermal radiation from pool fire

Red : 64 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 64 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 64 meters --- (2.0 kW/(sq m) = pain within 60 sec)

kilograms/minute





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9.5 ACTION PLAN FOR SPECIFIC CASES:

A. FIRE/ EXPLOSION IN TLF SHED

Facilities: 12 nos. of filling bays with multi-product filling points.

Products handed: MS, SKO, HSD, FO, LSHFHSD and ATF

Structure: Entire TLF structure are of elevated iron structures with proper roof, iron platforms and movable iron ladders with chains fixed to each bay.

Hazard Minimiser

- a. TLF in charge with his officers and staff
- b. Fire extinguishers
- c. Fire hydrant points
- d. Foam
- e. Water jet
- f. Water gel Blankets
- g. Alarm
- h. Combating as per fire/Disaster organization chart



Special references

- a. Fire in filling shed should be attacked promptly with fire extinguisher
- b. Close all valves promptly
- c. Ensure orderly removal of TTs.
- d. Stop spreading over of fire and call for help.
- e. Put sand on small oil spills of fire to put off the fire by preventing source of O₂.
- f. Apply foam on burning oil on the floor. Apply foam gently so as not to scatter the burning oil and spread the fire. Apply foam from one side of the fire and with the foam blankets from that side across the oil pool. Remember that water destroys foam and water streams must not be turn on fire which is blanketed with foam.
- g. Apply water cooling to adjacent TLF bays& TTs.
- h. Remove records/ documents to safe place.
- i. When oil is burning under the truck and tank is not leaking, remove the truck away from, if possible or cover the oil with sand. Use water to cool the tank truck.
- j. Use foam or sand to fight fire around engine, raise the hood direct the stream of fluid at the base of fire.
- k. Use fire extinguisher/ water to fight fire in the cabin.
- l. Use water to fight fire on the tyres.
- m. In case of dome fire, close the dome cover immediately.

B. FIRE IN PUMP HOUSE

Facilities: Building, electric power/ diesel engine driven pump



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Hazard minimiser

- a. Staff members assigned to the pump house
- b. Fire extinguishers
- c. Fire hydrant points
- d. Foam
- e. Water jet
- f. Water gel blankets
- g. Main switches in the switch room
- h. Alarm
- i. Fire resistant asbestos suit.
- j. Action plan as per fire / disaster organization chart

Special reference

- a. Discharge DCP to prevent fire from spreading.
- b. Shut down the pumps by cutting off power supply.
- c. Remove any person who is working in the manifold
- d. Close all tank valves and manifold valves
- e. Put foam on burning oil spills.
- f. Do not splash burning oil.
- g. Use CO₂ fire extinguisher on electrical fire.
- h. Cool the manifold with water.
- i. Wet down the structure close to fire with water.
- j. When burning oil is running from the pump house or out of a broken connection in the manifold, check the flow or direct it to the points where it will not endanger structure and the surrounding properties.



C. FIRE AT SMALL LEAK IN PIPE LINE

- a. Fire at a small leak in pipe line must be attacked promptly with the nearest fire extinguishers.
- b. Shut off the flow of oil in the line by closing valves and by stopping pumping
- c. Cover the oil pool with sand and build up the sand so as to cover the leak.
- d. Put foam on the burning oil pool.
- e. Build earth dykes around the oil pool to prevent spreading of burning oil.
- f. Take care of the oil dropping from the leak even after extinguishing fire as fire may occur again due to heating of oil dropped. Try to collect the same in containers.
- g. Wet down the adjacent structure to keep them cool.

D. BURSTING OF GASKET / LEAKAGE THROUGH JOINTS

- a. Stop pumping.
- b. Stop flow of oil through drain. Keep oil with in limited area.
- c. Close line valves.
- d. Collect the spilled oil.
- e. Build earth dykes/ foam boom around the oil pool to prevent spreading of spilled oil.



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- f. Take care of the oil dropping from the leak even after extinguishing fire as fire may occur again due to heating of oil dropped. Try to collect the same in containers.
- g. Wet down the adjacent structure to keep them cool.
- h. Take action for replacement of gasket/ repair leak with due care.

E. FIRE IN TANK FARM

Hazard minimiser

- a. All employees particularly the employees of loading /receipt section.
- b. Fire extinguishers
- c. Fire Hydrant Points
- d. Foam system
- e. Fixed Foam system in MS Tanks
- f. Water jet nozzles, foam nozzles, fire hoses
- g. Water sprinklers in floating roof tanks
- h. Fire proximity Suit
- i. Alarm



Fire Combating Plan: As per Fire/Disaster Organization Chart

Special Reference—

- a. A fire burning at the vent will not normally flash back into tank and explode if the tank contains product since flame arrestors are provided.
- b. Start cooling of tanks by using water sprinkler provided on tanks as well as water jets.
- c. Close all valves.
- d. Close manhole covers of other if they are open. Also stop loading/receipt of oil in tank.
- e. Use foam to extinguish fire. Small fire can be handled with portable fire extinguishers.
- f. Call for help from outside agencies before fire is aggravated with the instruction of chief emergency controller.

F. FIRE IN TANK

- a. Fire in tank will normally burn quietly till the oxygen inside is consumed unless temperature of the product is allowed to increase uncontrolled. Hence, care must be taken to ensure that product temperature does not go high by cooling with water sprinklers and jets.
- b. Care should be taken to ensure that the fire does not spread to other areas. If there is product spill to outside, foam should be used to cover the same.
- c. In such cases, foam should be pumped inside the tank for blanketing the fire simultaneously taking action to cool the tank shell with water and also removing the product by pumping it out to some other tank.
- d. Uncontrolled use of water on the burning product will result in product spill over and spread of fire. In the case of heavy ends this will result in boil over and frothing at the surface.



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- e. When heavy ends like HSD burn a layer of hot oil is formed below the surface, which extends towards the bottom. Temperature of this layer is of the order of 2500 C to 3000 C much above the boiling point of water. When water turns into steam, it expands approx. 1600 times and this result in boil over. The boil over may overflow the tank resulting in spreading of fire. Hence, In case of such fires, cool down the tank by continuous water jet on the tank shell, transfer the product to other tanks and judiciously use foam from outside.
- f. In case of F/R tanks, fire normally occurs at F/R seals. Efforts should be made to put foam in the correct place simultaneously cooling the tank shell from outside.
- g. Do not waste foam by using it for cooling.
- h. Usage of water also should be in a controlled manner so that maximum benefit can be obtained.

G. SPILLAGE DURING HANDLING OF PETROLEUM PRODUCTS IN TANK FARM AREA AND TLF AND TANK WAGON AREA

Action to be taken in the Event of Spillage



Small Spills:

- Plug the source of the spill by closing valves, removal of leaky drums and collection of the spilled liquid safely etc.
- Adding Neutralization agents and/or absorbents/sand.

Large Spills:

Large spills are fire and Health Hazardous. The procedure/action for response to fire is to be followed along with appropriate spill control and containment procedures such as:

- Plug the source of the spill by closing valves, patching leaks, emptying faulty containers etc.
- Prevent or contain the extent of spill by closing the boundary wall valves/dyke valves etc.
- The pumping operation has to be stopped immediately
- The fire equipments and sand buckets have to be kept ready.
- Oil has to be stored with in the Tank dyke area. For this the drain going out has to be closed to prevent flow of oil to outside.
- The main outlet valve leading up to the oil water separator has to be kept in closed position. Earth dykes/absorbent booms may be used to create barricades.
- The spilled product to be salvaged and transferred to safer place.
- Implement other spill - control measures as appropriate for the spill.
- Prevent the entry of the chemical into the drainage system
- Close the main valve.
- Check winds directions and remove personnel to the opposite direction.
- Plug the source of leakage.
- Close the main valve.



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- Use DCP Fire extinguishers/water/foam/sprinkler for mitigating fire.
- Clear the passage of exit.
- Remove all nearby flammable materials from the site of fire.

H. OVERTURNING OF TRUCK CONTAINING FLAMMABLE LIQUIDS



HAZARDS

- Flash back fire to the Depot
- Fire

ACTION PLAN

- Sound fire alarm and get all the employees inside the premises ready.
- The site should be cordoned off immediately. No commuters or vehicles should be allowed nearby.
- Barricade the area using oil absorbing pillow/pads, sand to prevent oil from spreading
- Please ensure that no source of ignition is around the place
- Alert civil authorities for evacuation of people and render Medical Aid if necessary.
- Spread foam over the oil spill as well as in the surroundings for preventing flash back
- Immediate salvaging of the oil should be done.
- All the valves should be closed properly and a total shutdown would be declared.
- Orderly evacuation of TTs has to be ensured.
- Attempts to stop the spread of fire should be made and at the same time help should be called out for.
- In case of burning oil on the floor, foam should be used and it should be applied gently to prevent the burning oil from scattering which may spread the fire. The foam is squirted from one side of the fire to other to form blanket of foam over the oil pool. Water streams must not be applied on fire which is blanketed with foam.
- Neighbouring TT/tanks should be cooled with water jets/sprinklers or remove if possible.
- One should use foam or sand to fight fire in the TT cabin

I. FIRE IN ELECTRIC SUB-STATION / TRANSFORMER ROOM/SWITCH ROOM

Hazard Minimiser

- a. Generator operators and employees
- b. CO₂/DCP/Dry sand fire extinguishers
- c. Sand buckets
- d. Main switches
- e. Alarm
- f. Earthing



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- g. Action plan as per fire/ disaster organization chart

Special Reference:-

- Cut off power supply by switching off the mains.
- Apply DCP/CO₂ extinguisher or dry sand.
- Call for outside help if required.
- Do not allow anybody to touch any electrical appliances.
- Take action to prevent spreading of fire.
- If fire is not extinguished, extinguish by spreading water with fog nozzle only after ensuring complete isolation of electrical supply.

J. HAZARD DUE TO INCIDENT IN NEIGHBOURING TERMINAL OF M/S. HPCL, BPCL OR IOCL

Hazards

- Spread of fire to inside of Terminal
- Disorder



ACTION PLAN

- The various Disaster Management teams should be ready to assume their respective roles as described in section 12.0 (ROLE OF KEY PERSONS OF EMERGENCY COMMAND STRUCTURE)
- There has to be a very good co-ordination with District Administration, Railways, HPCL, BPCL & IOCL.
- Proper communication should be done with local authorities for the rescue procedure & fire aid.

K. HAZARD DUE TO SPILLAGE OF OIL / FIRE IN JETTY DURING VESSEL LOADING/ UNLOADING

HAZARDS

- Spillage of oil/ bursting of Tanker composite hose / Marine loading arm
- Fire

ACTION PLAN

- The various Disaster Management teams should be ready to assume their respective roles as described in section 12.0 (ROLE OF KEY PERSONS OF EMERGENCY COMMAND STRUCTURE)
- There has to be a very good coordination with PPT/ Coast Guard/CISF.

L. HAZARD DURING BUNKERING OPERATIONS SUCH AS SPILLAGE/FIRE

HAZARDS

- Spillage of oil/ bursting of bunkering hose
- Fire



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ACTION PLAN

- The various Disaster Management teams should be ready to assume their respective roles as described.
- There has to be a very good coordination with PPT / Coast Guard/CISF

M. LEAKAGE/FIRE DURING PIPELINE OR TANK WAGON LOADING IN TW SIDING.

HAZARDS

- Spillage of oil from TW loading arms
- Fire



ACTION PLAN

- The various Disaster Management teams should be ready to assume their respective roles as described in section 12.0 (ROLE OF KEY PERSONS OF EMERGENCY COMMAND STRUCTURE).
- The person spotting the leakage/spillage should immediately raise Alarm by voice/VHF and alert all concerned.
- ESD available in TW siding/Pump House/Tank Farm/TLF should be operated to activate Process ESD to shut down all operations— Action by the first responder/alternatively by the control room officer/TLF Officer.
- For containment of leaked oil, dry sand to be applied on leaked oil. Further oil sorbent boom may be used to contain the spilled product – action of sand by first responder and application of oil sorbent boom by Auxiliary team.
- In case fire after leakage, intimation should be passed immediately by the first responder to control room and other concerned.
- Message to control room should be clear about the type of emergency, location of emergency, product involved etc.
- After informing control room first responder should asses the intensity of fire and apply 10 kg fire extinguisher FE, if the fire is of low intensity.
- In case the fire is of high intensity, then hydrant points available to be used for fire fighting by connecting hoses with nozzle/foam branch pipe. Water cum foam monitors available to be operated on the affected area depending on the situation and direction of wind – Action by Combat team
- As it may take some time for foam to get generated, care to be taken not to direct the monitor to the affected area initially. Only after confirmation of generation of foam, then foam monitor to be directed towards affected area.
- Mobile foam trolley (500/750/1000 GPM) to be moved and operated depending on the situation and direction of wind- Action by Combat team
- Auxiliary team should carry Fire Fighting Trolley, Emergency Trolley and place them at a safe distance from the fire spot.
- Auxiliary team should ensure the continuous supply of AFFF foam.



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- During fire fighting, it has to be ensured that foam application should not break at any time. For this purpose, continuous supply of foam cans/barrels has to be ensured –
- Action by Auxiliary Team
- After identifying the leak source, action to be taken to stop/ arrest leakage. For this purpose, a person wearing fire proximity suit with SCABA shall be sent to leakage site for stopping the identified leakage.- Action by person identified from auxiliary team by team in charge in consultation with fire in chief.
- Security guard, present in TLF, in coordination with TLF Officer, should direct the crew of TTs in waiting to sit in their TTs and wait for instructions to move their TTs towards emergency exit on the instructions of Fire in Chief.
- Informing Emergency services viz, Fire Brigade, Ambulance, Police, District Administration, Mutual aid partners etc on the directives of Fire in Chief – Action by Rescue team.
- Directing Emergency vehicles, District Authorities and mutual aid partners to emergency site and advising them to report to Fire in Chief. Only diesel driven vehicles to be allowed inside license area after fitting spark arrestor.- Action by Security Supervisor.
- Evacuation of all workmen not involved in emergency handling from Terminal licensed area and moving to assembly point. – Action by Auxiliary Team In-charge in coordination with Security.
- In case of any casualty/ injury to personnel, they shall be rescued and administered first aid/ sent for further medical attention. – Action by Finance officer, finance assistant, lab operator and security guards (Rescue team).
- Before advising all clear, surrounding area to be checked with explosive meter so as to ensure nil presence of hydrocarbon vapours. Action by Maintenance Officer (Auxiliary Team)
- Changing of fire clock and readiness with emergency gates key – Security guard at TLF gate.





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CHAPTER - 10

PLOT PLAN





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10.0 PLOT PLAN

Plot plan has been enclosed, which shows the hazards zones, emergency control room, assembly points, emergency exit route, fire hydrant line, main and material Gate at different points within the Terminal Premises.





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CHAPTER - 11

EMERGENCY COMMAND STRUCTURE





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11.0 EMERGENCY COMMAND STRUCTURE

Fire Organisation Chart of Paradeep Terminal

EMERGENCY COMMAND STRUCTURE

WORKS MAIN CONTROLLER

Sri Ram Oraon, DGM(T)

Cell No. - 9437496439

Alt.

Sri. Dilip Mahapatra

Ch. Manager (T)

Cell No. - 7042166330

SITE INCIDENT CONTROLLER

Sri. Dilip Mahapatra

Ch. Manager (T)

Cell No. - 7042166330



Combat Team Leader (CTL)

Sri. Lavnish Mohapatra
Asst. Mgr (M & I)
Cell no-8982081515

ALT

Sri. Biswajit Behera
Asst. Mgr (Ops-IM)
Cell no- 7381002643

Rescue Team Leader (RTL)

Sri. Srikanth Pradhan
DGM (Quality Control)
Cell no- 9437554917

ALT

Sri. G. Durga Prasad
Operations Officer
Cell no-7978803529

Auxiliary Team Leader (ATL)

Sri. Bhramaraksha Goswami
Manager (Ops. - Safety)
Cell no-9089308173

ALT

Sri. Samreedha Nayak
Officer (Ops-MM)
Cell no- 8637818928

Members

- OFFICER IN LOCK ROOM
- TLF OFFICER
- BCW IN LOCK SECTION
- BCWs AT TLF
- BCW AT MAINTENANCE
- BCWs AT CONTROL ROOM
- SECURITY GUARD AT TLF AREA
- SECURITY GUARDS AT TANK FARM

Members

- OFFICER IN S&D
- LAR OFFICERS
- SECURITY GUARD AT ADMIN
- SECURITY GUARD AT MAIN GATE
- SECURITY GUARD AT TANK WAGON

Members

- SHIFT IN CHARGE (CONTROL ROOM)
- OFFICER AT CALIBRATION POINT
- OFFICER ON BUNKER DUTY
- WAGON OFFICER
- BCWs AT TANK WAGON



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Function of Combat Team:

- Rush to the fire spot with fire extinguisher & other safety equipment.
- Operate ESD/Inform control room to operate ESD
- Close nearby valves, which need to be closed.
- Connect hose to hydrant point for water-cooling.
- Operate water monitor for cooling tanks & pipeline
- Charge foam on the fire spot by operating foam trolley, water cum foam monitors, foam pourers, HVLR's and Sprinklers as the case may be.
- Co-ordinate with Fire PH operator for maintaining required water pressure in hydrant line.
- Stop fighting after all clear signals from Works Main Controller.

Function of Rescue Team:

- Closing of cash chest and preserving office important records.
- Rush to the fire spot with stretcher & first aid box.
- Identify victim, bring to safe place and give first aid and shift to nearby Hospital.
- Communicate to the Fire tender/Govt./State office/Mutual aid for assistance/ Water Tender.
- Guide incoming fire tender & ambulance to fire spot.

Function of Auxiliary Team:

- Co-ordinate with Refinery for stopping PLT
- Close all tanks and manifold valves on hearing fire siren.
- Supply of FE's, Foam drums/cans and other fire fighting equipment to combating team, as required.
- Supply of manpower to combating & rescue team.
- Evacuate TT from TLF to the safe parking area.
- Operate fire siren as per norm after all clear signals from fire chief.

**Note:**

- Control Room Officer will liaison with mutual aid members, Nearby industries and Govt. Bodies.
- During double fire scenarios, simultaneously fire fighting to be done by dividing team, dividing resources to ensure quick response.
- During double fire scenarios, in first exigency, LIC will be Fire-In-Chief/(WMC) and in second exigency, the Fire in Charge shall be No. 2 in the location/ nominated officer by LIC. However, LIC shall remain overall Fire in Chief.
- The Team Leaders will hand over the site A (1st Scenario) to Alternate team leaders while he shall head towards Site B (2nd Scenario) and shall take the charge of the second exigency. All the roles and responsibility for the team leaders and members are narrated in point 11.
- In case of Double scenario few members of the Auxiliary team will become a part of the Combat team (Site A) and will report to Alternate Combat Team leader.



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CHAPTER - 12

ROLE OF KEY PERSONS OF EMERGENCY COMMAND STRUCTURE





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ON-SITE EMERGENCY PLAN

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12.0 ROLE OF KEY PERSONS OF EMERGENCY COMMAND STRUCTURE

12.1 WORKS MAIN CONTROLLER (WMC):-

- On being informed, rushes to the scene and takes overall charges of the situation.
- Makes quick assessment of the situation and decides declaration of emergency, by blowing the siren as per siren codes.
- Directs leaders of the Combat, Rescue & Auxiliary teams through Site Incident Controller to take control of the situation in the affected area.
- Makes continuous review and assess the possible developments to determine the extent of damage to plant and human beings.
- Directs shut-down of the plant, if necessary.
- Orders evacuation process by consulting with key persons.
- Ensures that casualties are receiving adequate attention.
- Liaises with the fire services, police services and other statutory authorities.
- Declares closure of the emergency by blowing the siren as per siren codes.
- Issues the authorized statements to the media services.
- Reports all statutory authorities in the prescribed manner.



12.2 SITE INCIDENT CONTROLLER (SIC):-

- On hearing Emergency siren, rushes to the scene and reports to the Works Main Controller.
- Carries out the instructions of Works Main Controller.
- Makes quick assessment about the gravity of the situation and appraises Works Main Controller.
- Orders Combat Team Leader, Rescue Team Leader and Auxiliary Team Leader to discharge their responsibilities immediately.
- Extends all sorts of help through different agencies, to minimize the damage to human being, plant, property and environment.
- Reports the development of the situation, time to time to Works Main Controller.
- Provides the required information to the Govt. fire brigade team for fire fighting.
- Preserves the evidences for the subsequent inquiries.

12.3 COMBAT TEAM LEADER (CTL):-

- On hearing the emergency siren, rushes to the scene along with the fire fighting team, with sufficient equipments in the minimum possible time and reports to Works Main Controller & Site Incident Controller time to time.
- Carries out the instructions of Works Main Controller & Site Incident Controller.
- Activate emergency siren as per the practiced code.
- Switch off Electrical Mains and activate the Emergency shutdown system.
- Ensure security runs to the Fire Spot after getting the information shouting Fire,Fire,Fire.



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- Ensures that, the team members resume their position with appropriate equipments.
- Ensure empty and loaded trucks are removed to safer place to the extent possible so as not to affect emergency handling operation.
- Close all affected Valves of Tanks and Pipelines if any.
- Operate DCP Fire Extinguishers to extinguish the Fire.
- Take position near Sprinkler/Foam System/Foam Monitor/Hydrant operation etc.
- Start combat Operation as per instruction
- Continually liaise with WMC/SIC and implement the emergency combat strategies as communicated by him.
- Wear Fire Proximity suit and SCABA and be ready at the Fire spot.
- Monitors the fire fighting operation to control the situation.
- Ensures that, the situation is controlled by arresting spillage, shutting/closing of the valves etc. by the team, in consultation with Works Main Controller & Site Incident Controller.
- Assists the Works Main Controller & Site Incident Controller, till the situation is under control.

12.4 COMBAT TEAM MEMBERS:-

- On hearing the emergency siren, rushes to the scene with fire fighting equipments, in the minimum possible of time and report to their team leader
- Carry out orders of the team leader.
- Operate the fire fighting equipments for controlling the situation.

12.5 RESCUE TEAM LEADER (RTL):-

- On hearing the emergency siren rushes to the site and reports to the Site Incident Controller
- Carries out the instruction of Site Incident Controller and Works Main Controller.
- To safe guard documents, Records and other important files.
- Carries out the instruction of Site Incident Controller and Works Main Controller.
- Ensures the arrival of his team members.
- Intimates statutory authorities such as District Administration, Asst. Director of Factories, Pollution Control Board, Local Police, ambulance, Fire brigade etc. over phone.
- Intimates nearest Fire Station over phone.
- Intimates Mutual-Aid Partners and neighboring industries such as BPCL, HPCL, IOCL LPG terminal, Refinery Fire Brigade, PPT Fire Brigade, IFFCO, PPL, ESSAR Steel etc. over phone.
- To direct them on arrival of external agencies to respective coordinators at desired locations.
- Keeps necessary equipments of first-aid such as stretcher, First Aid Box etc. for preliminary treatment.



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- Keeps the first-aid trainers ready with essential medicines & dressing materials, to give first- aid to victims.
- Ensures the use of proper personal protective equipments / Clothing by the team members, before their rescue operation.
- Keeps the ambulance ready to carry the injure persons to the hospital.
- To mobilize transport to various teams for facilitating the response measures.
- Hired car to remain as standby near the main gate and remove the injured to Hospital in case more ambulances required for shifting of casualties to nearby Hospital.
- Ensures that all casualties are shifted to hospital for medical treatment
- Makes all arrangements like transport, other needs, finance etc.
- Keeps records of casualties and provide information of the matter to Works Main Controller time to time.
- To monitor entry and exit of personnel enter into the premises.
- To ensure authorized persoanle enter into the premises.
- To regulate the flow of traffic into and out of premises and control the mob outside, if any, with the assistance of the police.
- Informs the Works Main Controller about the development time to time.
- Takes care of victims' family.
- To provide administration and logistics assistance to various teams.
- Searches the missing person(s) on the roll call basis.
- To arrange evacuation as directed by Works Main Controller (WMC/CIC) in co-ordination with the civil authorities like police, Panchayat / municipal authorities.
- After all clear signal, assemble at the assembly point.
- Ensure assemble of Visitors, Contract Labours, all team members at designated assembly point.

12.6 RESCUE TEAM MEMBERS:-

- On hearing the emergency siren, rushes to the scene with appropriate personal protective equipments and report to their team leader.
- Carry out orders of the team leader.

12.7 AUXILIARY TEAM LEADER (ATL):-

- On hearing the emergency siren, rushes to the scene and reports to the Works Main Controller and Site Incident Controller.
- Carries out the instruction of the Works Main Controller and Site Incident Controller.
- Ensures the arrival of his team members.
- Arrange to supply fire fighting equipments such as 10 KG DCP FE, 25 KG DCP FE, 75 KG DCP FE, CO₂ FE, Water gel Blanket, Explosimeter, Foam drums / cans, various Fire Fighting Nozzles etc to combating team.
- Move Emergency Trolley with all equipments as per list and First Aid Fire Fighting Trolley to the fire spot.
- Coordinate with Fire Combating team leader, CIC & SIC for necessary assistance.



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PARADEEP TERMINAL



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- Use Fire Proximity suit / SCABA for entry into the emergency spot for closing of valves and rescue of causalities if any in co-ordination with Fire combating team leader.
- Take care of visit of the authorities to the Emergency Site.
- Guides the Mutual Aid Partners for their course of action at the site.
- Guides the rescued workers to reach the assembly point.
- Searches the missing person(s) on the roll call basis.
- After all clear signal, assemble at the assembly point.

12.8 AUXILIARY TEAM MEMBERS:-

- On hearing emergency siren, rushes to the site and reports to their team leader.
- Carry out the orders of the team leader.

12.9 SECURITY IN CHARGE OFFICER ON DUTY AT THE TIME OF EMERGENCY

- On hearing the siren, to find out the location of the incident and inform about the location of the incident to the essential personnel coming to the plant.
- Check entry of unauthorized personnel & Control gates and traffic.
- Control of mob and spectators.
- Mobilize additional force for help.
- Help the fire officer to cordon off the incident area/danger zone.
- Direct ambulance & emergency vehicle to the scene of incident
- Help to evacuate the persons in the incidents scene.
- As directed system for warning surrounding villages for evacuation.
- Keep careful watch to prevent any further damage.





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CHAPTER - 13

ACTION PLAN FOR ON-SITE EMERGENCY PLAN





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ON-SITE EMERGENCY PLAN

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13.0 ACTION PLAN FOR ON-SITE EMERGENCY PLAN

STEP NO.	INITIATOR	ACTION TO TAKE
1.	The person noticing the emergency(fire)	<ul style="list-style-type: none"> Informs the Security Gate and the concerned Shift-in-charge who in turn informs Combat Team Leader immediately regarding the fire hazard.
2.	Combat Team Leader (CTL)	<ul style="list-style-type: none"> Informs Site Incident Controller (SIC) through common dialing system and rushes to the spot for combating the situation. Takes charge of the situation, arranges for evacuation of people from the affected area. Organizes trained personnel equipped with firefighting appliances. Start combating by shutdown plant & equipments and takes steps to extinguish fire with available firefighting facilities. Finds out the root cause of fire and to takes necessary action for prevention of fire.
3.	Site Incident Controller (SIC)	<ul style="list-style-type: none"> Informs Works Main Controller (WMC) and rushes to site. In case of failure of the electronic communication system, arranges the standby available provision i.e. a runner with bike to convey the message about the emergency to the works Main Controller Discusses with the Combat Team Leader (CTL), assesses the situation and call the Rescue Team Leader (RTL) & Auxiliary Team Leader (ATL) to the site. Arranges to evacuate the unwanted persons and call for additional help. To Passes information to the Works Main Controller (WMC) about the situation of site, time to time.
4.	Works Main Controller (WMC)	<ul style="list-style-type: none"> Rushes to Emergency Site and observe the ongoing activities. Takes stock of the situation in consultation with the Site Incident Controller. Moves to Emergency Control Room. Takes decision on declaration of emergency and asks for emergency wailing siren. Advises the Auxiliary Team Leader to inform the statutory authorities and to seek help from Mutual- aid Partners, if required. Decides the declaration of normalcy of emergency, after the situation is overcome. Ensures that the emergency operations are recorded chronologically.



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5.	Rescue Team Leader (RTL)	<ul style="list-style-type: none"> Consults with Works Main Controller and Site Incident Controller (SIC) and rushes to the emergency site through safe route along with the team members and starts rescue work. On being directed by Works Main Controller (WMC) informs about the emergency to Statutory Authorities, mutual Aid Members, neighboring industries and emergency services such as Fire, Police etc. Shifts the injured persons to hospital by ambulance after necessary first aid. Informs the Auxiliary Team Leader for necessary help from Mutual Aid Partners. Takes role call to find out the missing persons, if any. Arranges to inform the relatives of casualties. Takes care of visit of the Statutory Authorities to the emergency site.
6.	Auxiliary Team Leader (ATL)	<ul style="list-style-type: none"> Consults with Works Main Controller and Site Incident Controller (SIC) and rushes to the emergency site through safe route along with the team members and start supply of emergency fire fighting equipments. Arrange to supply fire fighting equipments such as 10 KG DCP FE, 25 KG DCP FE, 75 KG DCP FE, C02 FE, Water gel Blanket, Explosimeter , Foam drums / cans, various Fire Fighting Nozzles etc to combating team. Seeks help from Mutual- Aid Partners and coordinate the Mutual Aid Partners to render their services, if required.
7.	Team Members	<ul style="list-style-type: none"> Each team member should follow the instructions of his team leader to mitigate the emergency.





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ON-SITE EMERGENCY PLAN

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PARADEEP TERMINAL



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CHAPTER - 14

SILENT HOUR (OFF HOUR)

COMMAND STRUCTURE





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ON-SITE EMERGENCY PLAN

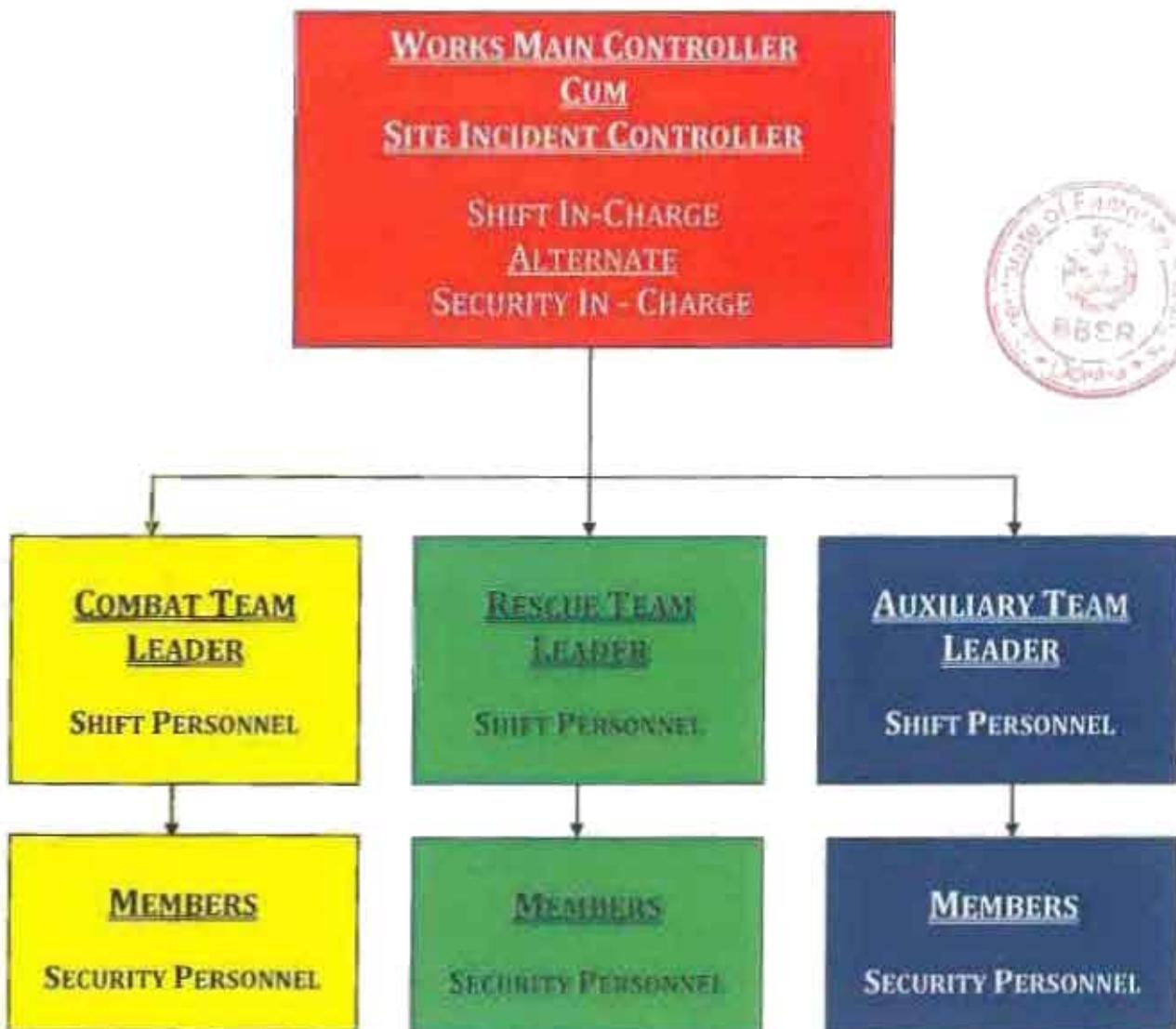
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14.0 SILENT HOUR (OFF HOUR) COMMAND STRUCTURE

14.1 OFF HOUR COMMAND STRUCTURE:





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14.2 ROLE OF KEY PERSONS IN SILENT HOUR (OFF HOUR) COMMAND STRUCTURE:

Silent Hour is the time when General Shift/ Shift people are not available

Fire during night time and on holidays

In-charge: Shift In-Charge on duty

Assisted by: Security Supervisor & Security guards on duty

Role:

1. Shift In-charge / Security guard on duty seeing the fire, will shout Fire, and shall need assistance from other guards on duty in different pockets and shall fight the fire nearest available fire equipments.
2. In case of emergency, the security in-charge informs Works Main Controller, Site Incident Controller, Combat Team Leader, Rescue Team Leader and the Auxiliary Team Leader by telephone or by sending special messenger to their residences.
3. On receiving the information the Works Main Controller, Site Incident Controller, Combat Team Leader, Rescue Team Leader and Auxiliary Team Leader shall reach the site at the earliest and take over the overall charges of the situation. Immediately telephone to fire bridges and police station for assistance.
4. The security guards to control the gates and ensure that no unauthorized person enter the premise.
5. Thereafter the action plan as well as the role of key persons shall be same as the normal hour execution of Command Structure.





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CHAPTER - 15

ACTIVATION AND CLOSING

PROCEDURE





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15.0 ACTIVATION AND CLOSING PROCEDURE

- Anybody noticing FIRE, shout "FIRE", "FIRE" and inform the Shift-in Charge of the exact location of FIRE over the VHF Handsets
- Being informed about fire, the Shift-in-charge shall inform the Work Main Controller-cum-Site Incident Controller
- On getting information about the fire, the Work Main Controller-cum-site incident controller shall rush to the site and make quick assessment of the situation.
- After proper assessment of the situation, the Work Main Controller-cum-site incident controller shall instruct the emergency control room to declare emergency by blowing appropriate siren code.
- On hearing of Emergency siren the key personnel of Emergency Combat structure shall perform their duties and responsibilities as per the worksheet
- During the emergency operation, the Works main Controller keeps records of activities carried out, supervises overall situation, maintains liaison with mutual aid partners and statutory authorities.
- Once the situation is controlled, the Works main Controller shall instruct the emergency control room to declare normalcy by blowing appropriate siren code.

SIREN CODES:

- (1) The Emergency siren/s should be located suitably to cover the whole area with the operational control within the Depot. These should be tested at least once in a week to keep them in working condition.
- (2) Emergency siren code should be as follows, namely:-
 - (a) Emergency Level-I: A wailing siren for two minutes.
 - (b) Emergency Level-II and III: Same type of siren as in case of Level - I and II but the same will be sounded for three times at the interval of 30 seconds i.e., wailing siren (2 minute) + gap (30 seconds) + wailing siren (2 minutes) + gap (30 seconds) + wailing siren (2 minutes). Total duration of Disaster siren to be 7 (Seven) minutes.
 - (c) ALL CLEAR: Straight run siren for two minutes.



The above siren codes are displayed at prominent places of the terminal.



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Annexure - I
DETAILS OF FIRE FIGHTING
FACILITIES AVAILABLE





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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

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ANNEXURE - I

DETAILS OF FIRE FIGHTING FACILITIES AVAILABLE

Modern fire fighting facilities has been provided in the Terminal in line with norms of OISD.

A. FIRE EXTINGUISHER:-

SL. NO.	LOCATION	DCP	DCP	DCP	CO2-	CO2-	CO2-
		9 KG	25 KG	75 KG	4.5 KG	6.5 KG	2 KG
1	OFFICE	4			2		7
2	CANTEEN	1					1
3	S&D ROOM	1			1		1
4	TLF SAMPLE ROOM	1					
5	CONTROL ROOM	1			2		
6	MAIN GATE	1					1
7	DG ROOM- Main SS	2			7	1	
8	Transformer yard	4					
9	Store	2					
10	FIRE PUMP HOUSE	4			1		
11	LAB	2			5	1	
12	Extra premium Pump House	2					
13	BIO DIESEL PUMP HOUSE	2					
14	ETHANOL TANK	2					
15	BIO DIESEL TANK	2					
16	TLF PH(NEW)	11	6				
17	TLF(NEW)	12	3	2			
18	DG ROOM IPH	2			3	1	
19	IPH Trafo Room	1			1		
20	IPH P/H	4	6				
21	High Tension Substation	1			4		
22	OIL WATERSEPARATOR TLF	2		1			
23	OIL WATER SEPARATOR FO	2		1			
24	TANK 13/14/15/16	8	4				
25	TANK 17/18/19	6	2				
26	TANK 10/11/12	6	2				
27	TANK 8/9	4	4				
28	REF EXCHANGE PIT	2	2				
29	TANK 7	2	4				
30	TANK 1&2	4	4				
31	TANK 3&4	4	2				
32	TANK 5&6	4	4				
33	TW DG ROOM	2			8		
34	TW Transformer Room	1					
35	Refinery Tapoff Point	2					



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PARADEEP TERMINAL

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36	TW PH	4	12					
37	TW OFFICE	1						1
38	O W S Tank Wagon	2		1				
39	TW SECTION	20	2	2				
40	TW battery Room							1
41	SLOP Tank Tank Wagon		1					
		138	58	7	34	3	12	

B. SIREN: 3 KM RANGE- 02 NOS.**SIREN CODES:**

- ❖ The Emergency siren/s should be located suitably to cover the whole area with the operational control within the Depot. These should be tested at least once in a week to keep them in working condition.
- ❖ Emergency siren code should be as follows, namely: -
 - Emergency Level-I: A wailing siren for two minutes.
 - Emergency Level-II and III: Same type of siren as in case of Level - I and II but the same will be sounded for three times at the interval of 30 seconds i.e., wailing siren (2 minute) + gap (30 seconds) + wailing siren (2 minutes) + gap (30 seconds) + wailing siren (2 minutes). Total duration of Disaster siren to be 7 (Seven) minutes.
 - ALL CLEAR: Straight run siren for two minutes.

The above siren codes are displayed at prominent places of the terminal.

**C. WATER STORAGE TANKS**

- i. Above Ground (Effective Capacity) - $2 \times 2140 \text{ KL} = 4280 \text{ KL}$
- ii. Above Ground (Effective Capacity) - $2 \times 6288 \text{ KL} = 12576 \text{ KL}$

D. WATER SOURCE

- i. Through Natural Pond of M/s. HPCL
- ii. Through Hydrant Line Inter-connection with Mutual Aid Members

E. HYDRANT SYSTEM

Name of the Location	No. of Fire Hydrants	No. of Fire Monitors	No. of Hose Boxes	No. of Fire Hoses	No. of Nozzles / Branches	No. of Foam Branches	No. of MEFG (Fixed + Mobile)
PARADEEP TERMINAL	104	46	54	104	48	2	8
Name of the Location		No. of HVLR'S		No. of Water cum Foam Monitors		750-500 GPM Wheeled Mobile Monitors	200-210 Foam Trolley
PARADEEP TERMINAL		12		53		02	03



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**INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL**



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A Hydrant/Monitor system has been provided in the terminal with 700 mm hydrant lines running through all vulnerable and hazardous area of the terminal. This is a non-pressurized system. In order to pressurize the system the pumps have to be operated manually.

The details of the pumps are as follows:

F/F Pumps	: 7Nos (5Nos Main Pump & 2no Stand-by)
Engine	: Greaves Cotton
HP	: 355 BHP
Pump	: Mather & Platt
Discharge	: 616 cu. m/hr
Head	: 105 M
RPM	: 2100 RPM
Discharge Pressure at furthest point	: 7 kg/sq. cm. Jockey Pumps 2 No's
Jockey Pumps (2 nos.)	: 100 Hp
No's of fire hoses	: 104
Hydrant line pressure	: 7 kg/cm ² Mutual water hydrant system with HPCL & BPCL. Hydrant systems are in auto mode round the clock.

F. EMERGENCY EQUIPMENTS

- i. FIRE PROXIMITY SUIT - 01 NO
- ii. STRETCHER - 02 NO.



G. SPRINKLER/ FOAM SYSTEMS:

i) Sprinkler System

Water sprinkler system with spray nozzles are provided in all floating roof storage tanks as well as Cone roof tanks for cooling the tanks if required.

ii) Foam System

Foam system with nozzles are provided in all floating roof storage tanks as well as in Cone roof tanks for extinguishing the oil fire inside the tanks if required.

H. EMERGENCY KIT:

Emergency Kit consists of listed emergency equipment required for rescue and control/arresting leakage in case of emergency in oil installations. The equipment shall be mounted on a compact light weight trolley. Emergency Kit consisting of the following emergency equipments is available at Terminal:



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ON-SITE EMERGENCY PLAN

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Emergency
Kit

Sl.No	Item	Requirement	Qty.
1	Cold / Low Temperature Hand gloves,	NA	NA
2	Electrical Rubber Hand Gloves	2 pair Suitable for Electrical jobs up to 33000 Volts	2
3	Chemical Splash proof goggles	4 nos	4
4	First Aid Box	1	5
5	Folding Stretcher	1 no Size 6 feet X 3 feet with tying belts & blanket.	4
6	BREATHING APPARTUS SET(40 minute duration)	2 set	2 set
7	EMERGENCY ESCAPE SETS (15minutes duration)	2 set	2 set
8	Manual Resuscitator	1 Manually operated for artificial respirators consisting of adult size nose, mouth, face plate, air bulb with oxygen inlet connection, no return, no breathing human valves and first aid charge packed in a plastic bag.	1
9	Non-Sparking Tools	One set consisting of : - Shoe handle brush -01 no - 9" Crate opener -01 no - 16oz Claw hammer with fiberglass handle - 01no -Common knife 53/4" Blade : 1 no 103/4" OAL, -12" Groove joint plier, -7" Long nose pliers with cutters, -8" Combination Pliers, -Deck scraper,-11/2" Blade X 15"Long, -Spray booth scraper, -3" blade X 9 1/4" Long, -Std Screwdriver - 5/16" Tip, -6" Blade, - 3" Phillips Screwdriver, -12" Tin Snips, -8" Adjustable Wrench, -12" Adjustable wrench, -14" pipe Wrench (Aluminum), -12" Bung Wrench (Fits 3/4" X 2")	1
10	Mechanical Tools	1 set	1 set
11	Electrical Tester	1	1
12	Hand Siren with stand	1	1





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13	Oil Sorbents and Petroleum Products clean-up Chemical	PETROLEUM PRODUCT CLEANUP CHEMICAL -Boom (5 inch dia , 3 mtr. Long) : 6 nos. - Boom (3 inch dia , 3 mtr. Long) : 6 nos. - Granular particles to absorb Oil : 20 Kg	1 set
14	Fire Proximity Suit	1	1
15	Flame Proof Search Light	2 nos Rechargeable type suitable for Explosive Environment.	1
16	Megaphone ex Proof	1 Portable battery operated PA System with 1 loud speaker with a range of 1 KM in still air and 500 M in noisy areas.	1
17	Fireman Axe	1	1
18	PVC SUIT	2 sets	2
19	Leak Control Kit	Consisting of 1 no. each of leak arresting pad, leakage control of external pipes, internal pipes, large external pipes up to 8 inch, drums / containers leakages, general purpose leakages in storage leakages, large hole tanks.	1 Set

I. EMERGENCY CONTROL CENTRE & SHELTER ROOM

The Control Room of the Terminal has been designated as Emergency Control Centre. P&T telephones, Emergency Control manual and Safety and Personal Protective Equipments have been arranged in sufficient numbers and kept in the room.

Emergency Shelter

The area has been designated outside the licensed area for giving shelter to employees/ other personnel who are not involved in emergency control actions.

J. ALARM AND COMMUNICATION SYSTEM**a. Alarm system**

- i. Electrical Siren and Hand Sirens are provided in office building / Emergency control room and other vulnerable areas like Tank Farm area, pump House, Receipt Manifold, and other vulnerable areas like Tank farm area, Pump house, receipt manifold, and TLF for warning the public as well as employees inside.
- ii. The sound of electrical siren is audible up to 1.5 km & 3 km.
- iii. For fire condition electrical siren will be wailing for 2 minutes and for all clears signal it will be a straight run siren for 2 minutes.
- iv. For disaster condition the wailing sound shall be repeated thrice with a 30 second gap.



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b. Communication System

For communication with officers/employees Intrinsically Safe VHF Handsets and Intercom services are provided with sufficient nos. of P&T telephones at different places including Control Room for communication with other agencies.

K. WIND SOCKS:-

During emergencies, the knowledge of exact wind direction helps the Terminal personnel to decide on the escape route to be taken for safe evacuation of personnel and also the safe assembly of Personnel. Therefore, the wind socks have been provided strategically at various location of the Terminal such as TLF Area, Tank Farm Area, Fire Water Pump House Area for ease in knowing the wind direction during emergency.

L. WALKIE TALKIE SETS:

A total of 53 numbers of mobile walkie talkie handsets and 3 base stations are available in the Terminal. Base stations are available at Admin. Building, Control Room and TW Siding Control Room and operating personnel are provided with Mobile Walkie Talkie Handsets for establishing proper communication within the Terminal premises.

M. EMERGENCY FIRST AID ARRANGEMENT:-

- ❖ A total of 9 First -aid boxes are available and provided at various workstations such as Pump House, Control Room, Administrative Building, Laboratory, PMCC and TLF etc.
- ❖ Adequate stock of essential medicines, bandages etc. are being maintained and First-Aid boxes are kept well equipped.

N. PERSONAL PROTECTIVE / LIFE SAVING/FIRE FIGHTING EQUIPMENTS

Safety Helmet	48 Nos.
Safety Shoes	All are with safety shoe and helmet (In addition Safety Shoes of Various sizes are kept in stock for visiting officials)
Self contained breathing apparatus-	02 no.
No. of safety nose mask	15 no.
No. of safety showers	01 no.
Hand gloves	50 no.
Safety goggles	50 no
Safety belt	02 no.
Safety Harness	At TLF, LockSection, Calibration point, TT checking point & TW gantry.
Face shield	01 no.
Explosive meter	01 no.
Rubber hand gloves	02 pair.
First aid box	04 nos.
Foam trolley	03 nos.



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Fire engine	07 nos
Water cum foam monitor	50 nos.
Water monitor	52 nos.
Fire hose	98 nos.
Fire bucket	10 nos.
Fire proximity suit	01 nos.
Portable public address system	01 no.
Ear plug	03 NOS.
Hand gloves for handle blue dye & additives	02 pairs.
Safety goggles for handle Blue dye & additives	02 NOS.





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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL.



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Annexure - II MUTUAL AID DETAILS





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ANNEXURE - II

MUTUAL AID

It is not possible to combat large scale fire/disaster single handed effectively by any organization. Assistance of resources of fire fighting and other services are of utmost importance during hours of crisis. IOCL, Paradeep Terminal has a Mutual-Aid Following type of mutual aid is envisaged:

- I. Assistance by fire fighting teams & equipment
- II. Medical and first aid assistance.
- III. Assistance of vehicles for any emergency requirement.
- IV. Help in liaison with Police, District Collectorate, Fire brigade, Hospital and the nearby industries.



In case of an emergency in any of the Oil Companies, the Coordinator of the company / alternate Coordinator whose names with telephone nos. are given below should be contacted and called for assistance from neighbouring companies, emergency siren also to be operated to draw the attention of all personnel, neighbouring companies and outside agencies.

Sl. No	Name of the Factory with Address	Distance In KM	Mutual Aid to be Provided	Name of contact person and Telephone Number
1	M/s. HPCL, Paradeep Terminal	0.95 km adjacent to the Terminal (common boundary on the Western Side)	As per Mutual Aid Agreement (Fire Extinguisher, First aid facilities, PPE, Vehicle, Hydrant hoses etc.)	Shri. B D Sethy, Ch. Terminal Manager, Phone: 06722-229225/ 9706046033
				Shri. Manoj Kumar, CM (Safety), Phone: 9472726597/ 8340437784
2	M/s. BPCL, Paradeep Installation	0.45 km adjacent to the Terminal (common boundary on the Eastern Side),	As per Mutual Aid Agreement (Fire Extinguisher, First aid facilities, PPE, Vehicle, Hydrant hoses etc.)	Shri. K Srinivasulu, Installation Manager, Phone: 06722-226600/ 7382084744
				Shri. Souparna Roy, HSSE Officer, Phone: 06722-226601/ 9836809687
3	M/s. IOCL, LPG Mktg. Terminal, Paradeep	1.3 kms adjacent to the Terminal (common boundary on the Northern Side)	As per Mutual Aid Agreement (Fire Extinguisher, First aid facilities, PPE, Vehicle, Hydrant hoses etc.)	Shri. Pankaj Kumar, General Manager (P). Phone: 06722-216216/ 9167007047
				Mohd. Azfar, AM (LPG - Safety), Phone: 9968686450



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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL.

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MUTUAL AID AGREEMENT

PARADEEP



**AN INDUSTRY LEVEL AGREEMENT SIGNED
BETWEEN IOCL, BPCL, HPCL AND LPG
MARKETING TERMINAL (IOCL) AS A PART OF
DISASTER MANAGEMENT PLAN FOR
MOBILIZATION OF RESOURCES**

Smt. K Shripadab	Smt. Purnima Joshi	Smt. Jit Sethi	Smt. Prakash Kumar
Installations Manager	Deputy General Manager	Chief Financial Manager	General Manager (P)
BPCL, Paradeep Installation	IOCL, Paradeep Terminal	HPCL, Paradeep Terminal	IOCL, LPG Marketing Terminal Paradeep

Page | 1

Mr. Deepak
General Manager
LPG Marketing Terminal
Paradeep
IOCL



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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED, PARADEEP TERMINAL



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**MOU FOR MUTUAL FIRE FIGHTING AMONG PUL & LPG INSTALLATIONS
AT ATHARAKANKI, PARADEEP AS A PART OF DISASTER MANAGEMENT PLAN**

(MOU No. 01 dated 01-06-2019 between IOCL, Paradeep and BPL, Paradeep dated 01-06-2019 and effective from 01-06-2019 to 31-05-2024)

1. M/s. BHARAT PETROLEUM CORPORATION LIMITED, CLUSTER OF
PETRO-CHEMICALS, ATHARAKANKI, PARADEEP PIN-754120
AND

2. M/s. INDIAN OIL CORPORATION LIMITED, PARADEEP TERMINAL,
ATHARAKANKI, PARADEEP PIN-754120.

AND

3. M/s. HINDUSTAN PETROLEUM CORPORATION LIMITED, CLUSTER OF
PETRO-CHEMICALS, ATHARAKANKI, PARADEEP PIN-754120

AND

4. M/s. INDIAN OIL CORPORATION LIMITED, LPG MARKETING TERMINAL,
ATHARAKANKI, PARADEEP PIN-754120



Whereas all the 4 (Four) parties in above letterhead called as the 'member units' have agreed to have a Voluntary Mutual Fire Fighting and Release Response, called as "Scheme" for fighting the outbreaks of fire in their respective installations as a system of goodwill and with the view to prevent devastation causing damage to life and property.

Now, the member units of the scheme hereby agree as follows:

1. COMMUNICATION SYSTEM

For better and quicker communication, the member units will mutually explore an effective radio and telephone system between the respective unit heads. The cost towards the annual maintenance, usage and rental charges, if any, shall be borne by the concerned member units.

2. STATEMENT TO MEMBER AND RELEASES AND RELEASES

- a. The member units agree to form part of a unitary fire coordinating the activities under the aegis of the manager to minimize our losses from their Fire & Safety Department and to maintain a mutual understanding.

RPCI, Paradep- tment Installation	IOCL, Paradeep Cluster	HPCl, Paradeep Terminal	IOCL, LPG Marketing Terminal, Paradeep
✓		✓	✓

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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED, PARADEEP TERMINAL.



- b. The operator is to be assigned to a vehicle unit as a gunner and maintain the required organization and responsibilities for all weapons including a variety of fire and mine systems. The operator will report to the Gunner Training Instructor or their respective Unit Leader/Commander for the first 30 days. Once qualified, the change of status components from gunner, will become and the operator will then assume the responsibilities of the gunner. This will be accomplished by issuing to the Unit Leader/Commander a certificate of the affected unit stating the MGR is trained for Fighting and Maneuver - part 2000A or equivalent from the affected unit.

The Chair of the steering group is responsible for facilitating opportunities for the establishment and guide the working groups to ensure there is a response to aid by any of the parties mentioned above.

← Return To All

- a. In the event of outbreak of fire including emergencies, which may be beyond the capability of the individual member unit, the mobility of the mutual aid scheme should be able to supplement in shortest possible time, as per the Category equipment's that can be spared by each member unit as per the list enclosed & enclosed with this MOU.
 - b. Although the mutual aid will be treated as a gesture of goodwill, cost of maintenance/other materials used in firefighting shall be recoverable from the affected unit. For this purpose certificate of cost incurred by the assisting units shall be submitted by the affected unit.

5. JASPER CHANG CLASSIFIED BY PUBLICATION TIME. EQUATIONS AND APPROXIMATIONS

With due regard to the requirements of the individual member unit, the following is answered:

- a. To the extent possible individual unit shall follow such standards in the purchase of equipment that there would be adequate interchangeability and compatibility between units.
 - b. Member units of the alliance shall also exchange fully detailed information regarding the various fire-fighting appliances available, so that if necessary simpler pieces can be loaned by the affected unit/other members for handling of equipment not conforming to specifications held by other member units.
 - c. Member units of the alliance will have within their unit, some type inventory of emergency equipment so that the management of each unit can see at any given time what items can be accessed without affecting their own plant adversely.

RPCI, Paradip Institution	MTL, Paradip Terminal	HPCL, Paradip Terminal	IOCI, LPG Marketing Terminal, Paradip
✓	✓	✓	✓



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ON-SITE EMERGENCY PLAN

**INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL.**



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4. Member units of the scheme shall participate in such exercises as may be organized by the scheme organization and the Group Emergency Committee by holding joint exercises or giving training to the personnel up to the required standard.

5. Discharge of affected unit:

During the course of an emergency situation, the affected unit committee is required to discharge the affected unit after receiving the instructions issued by the Group Emergency Committee and subsequent written order issued by the company where the required person of authority is present.

7. Disposition of Damaged Equipment:

Decree that the equipment as per Annexure A (Under Schedule 3(a)) or Annexure B (Under Schedule 3(b)) of Scheme shall be disposed of as per the procedure as per clause B(4) of PmtGMP regulations, dt. 18th January, 2010 as under:

- For first default in response, the offending unit with the application and its management shall have to submit written explanation to affected units.
- For the second and successive failure, the offending unit shall have to pay the double of the billed amount of expenses incurred by affected units in case of any emergency occurs in the premises of affected units for which aid as per the scheme was requested from the defaulting unit.

8. Validity:

This agreement will be valid for TWO years from the date of signing or change in statutory, whichever is earlier and may be extended by mutual consent among the member units as mentioned above. The member units will be at liberty to rescind this agreement by mutual consent or by giving prior notice to minimum three months in this effect.



Designation	Designation	Designation	Designation
IndianOil Manager	IOCL General Manager (E&S)	IOCCL Terminal Manager	IOCL Manager (E)
RPLC, Paradeep Installation	IOCL Paradeep Terminal	HPCL, Paradeep Terminal	IOCL LPG Marketing Terminal, Paradeep
_____	_____	_____	_____

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EMERGENCY
RESPONSE
PROTOCOL
FOR
PARADEEP
TERMINAL
OF
INDIAN OIL
CORPORATION
LIMITED
PARADEEP
TERMINAL



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5. FIRE FIGHTING EQUIPMENTS (AVAILABLE AND SHAREABLE WITH OMCS)

MANUFACTURER/MANUFACTURER

MUTUAL AID MEMBERS

Resource Number (Shareable/Fire Fighting Equipment)



S.No.	Total Requirement	IOCCL		BPCL		HPCL		IOCL LPG Terminal		Total Available
		Available	Shareable	Available	Shareable	Available	Shareable	Available	Shareable	
1. MANPOWER										
Regular	52	8	24	16	08	04	24	11	50	
Emergency										
Security staff	22	8	10	4	24	4	24	4	40	
Personnel Trained	36	8	9	9	08*	2	23	7	44	
Fire Guard										
2. FIRE FIGHTING APPARATUS / EQUIPMENT / CHEMICALS										
	FE > 7	FF > 1	FF > 5	FF > 5						
Extinguishers/Fire	No.	No.	No.	No.	No.	No.	No.	No.	No.	
Fire Fighting Truck	12	12	12	12	12	12	12	12	12	
1000 Litre										
Total	(12x12)	(12x12)	(12x12)	(12x12)	(12x12)	(12x12)	(12x12)	(12x12)	(12x12)	
Water Tank	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
12 kg DCO	900	900	900	900	900	900	900	900	900	
25 kg DCO	3	3	3	3	3	3	3	3	3	
4.5 kg DCO	40	10	10	10	9	8	32	8	8	
Emergency Response Vehicle	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Water storage	14400	00	00	00	16000	2400	2400	2400	16000	
Water for P.D.T	8.0	00	00	00	8.0	00	00	00	8.0	

BPCL Paradeep Installation	IOCCL Paradeep Terminal	HPCL Paradeep Terminal	IOCL LPG Marketing Terminal, Paradeep
—	—	—	—

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**ON-SITE EMERGENCY PLAN
INDIAN OIL CORPORATION LIMITED
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BPL, Paradeep Installation	BDL, Paradeep Terminal	BPL, Paradeep Terminal	IOCL IPG Marketing Terminal, Paradeep



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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED, PARADEEP TERMINAL.



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Point	No.										
Medium	No.										
6. SYSTEM LAYOUTS											
Storage Tank Area	TP-01	TP-02	TP-03	TP-04	TP-05	TP-06	TP-07	TP-08	TP-09	TP-10	TP-11
Delivery Bunkers	DB-01	DB-02	DB-03	DB-04	DB-05	DB-06	DB-07	DB-08	DB-09	DB-10	DB-11
Receiving Bunkers	RB-01	RB-02	RB-03	RB-04	RB-05	RB-06	RB-07	RB-08	RB-09	RB-10	RB-11
Product Transfer Bunkers	PBT-01	PBT-02	PBT-03	PBT-04	PBT-05	PBT-06	PBT-07	PBT-08	PBT-09	PBT-10	PBT-11
Product Transfer Pump	PTP-01	PTP-02	PTP-03	PTP-04	PTP-05	PTP-06	PTP-07	PTP-08	PTP-09	PTP-10	PTP-11
Product Transfer Pipe	PTP-01	PTP-02	PTP-03	PTP-04	PTP-05	PTP-06	PTP-07	PTP-08	PTP-09	PTP-10	PTP-11
Water Treatment	WT-01	WT-02	WT-03	WT-04	WT-05	WT-06	WT-07	WT-08	WT-09	WT-10	WT-11
7. EQUIPMENT FOR CORPS DISPOSAL											
Light Motor	LM-01	LM-02	LM-03	LM-04	LM-05	LM-06	LM-07	LM-08	LM-09	LM-10	LM-11
Shredder	S-01	S-02	S-03	S-04	S-05	S-06	S-07	S-08	S-09	S-10	S-11
Corporal Model	CM-01	CM-02	CM-03	CM-04	CM-05	CM-06	CM-07	CM-08	CM-09	CM-10	CM-11
Boat	B-01	B-02	B-03	B-04	B-05	B-06	B-07	B-08	B-09	B-10	B-11
Boat	B-01	B-02	B-03	B-04	B-05	B-06	B-07	B-08	B-09	B-10	B-11
Mobile phone	M-01	M-02	M-03	M-04	M-05	M-06	M-07	M-08	M-09	M-10	M-11
8. LIST OF EMERGENCY DRUGS & APPLIANCES											
Cure Medicine	Y-01	Y-02	Y-03	Y-04	Y-05	Y-06	Y-07	Y-08	Y-09	Y-10	Y-11
Oxygen Cylinder	OC-01	OC-02	OC-03	OC-04	OC-05	OC-06	OC-07	OC-08	OC-09	OC-10	OC-11
Eye Wash	EW-01	EW-02	EW-03	EW-04	EW-05	EW-06	EW-07	EW-08	EW-09	EW-10	EW-11
Respirator	R-01	R-02	R-03	R-04	R-05	R-06	R-07	R-08	R-09	R-10	R-11
Antiseptic	AS-01	AS-02	AS-03	AS-04	AS-05	AS-06	AS-07	AS-08	AS-09	AS-10	AS-11
Anesthetic	A-01	A-02	A-03	A-04	A-05	A-06	A-07	A-08	A-09	A-10	A-11
Sedatives	S-01	S-02	S-03	S-04	S-05	S-06	S-07	S-08	S-09	S-10	S-11
Treatment Tools	TT-01	TT-02	TT-03	TT-04	TT-05	TT-06	TT-07	TT-08	TT-09	TT-10	TT-11
Drugs	D-01	D-02	D-03	D-04	D-05	D-06	D-07	D-08	D-09	D-10	D-11
Medicine	M-01	M-02	M-03	M-04	M-05	M-06	M-07	M-08	M-09	M-10	M-11

BPCL Paradeep Installation	IOCL Paradeep	HPCL Paradeep Terminal	IOCL LPG Marketing Terminal, Paradeep

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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

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Annexure - 1

	H2S	NO	SO2	NOx	SOx	VOC	CO	NOy	VOC
Water supply	500	500	500	500	500	500	500	500	500
Water treatment	500	500	500	500	500	500	500	500	500
Water storage tanks	500	500	500	500	500	500	500	500	500
Water distribution system	500	500	500	500	500	500	500	500	500
Water collection system	500	500	500	500	500	500	500	500	500
Water treatment plant	500	500	500	500	500	500	500	500	500
Water storage tanks	500	500	500	500	500	500	500	500	500
Water distribution system	500	500	500	500	500	500	500	500	500
Water collection system	500	500	500	500	500	500	500	500	500



IOPCL, Paradeep Installation	IOCL, Paradepur Terminal	IOPCL, Paradeep Terminal	IOCL, LPG Marketing Terminal, Paradeep

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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED.
PARADEEP TERMINAL



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Annexure - III

IMPORTANT TELEPHONE NUMBERS





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ON-SITE EMERGENCY PLAN**INDIAN OIL CORPORATION LIMITED,
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ANNEXURE - III**IMPORTANT TELEPHONE NUMBERS****(A) PHONE NO. OF EMERGENCY COMMAND STRUCTURE KEY PERSONS:**

Sl. No.	Name & Designation	Designation as per emergency command structure	Telephone Number Office/Mobile
1	Mr. Ram Oraon Dy. General Manager(T)	Works Main Controller	9437496439
2	Mr. Dilip Mohapatra Ch. Manager (T)	Works Main Controller(Alt)	7042166330
3	Mr. Dilip Mohapatra Ch. Manager (T)	Site Incident Controller	7042166330
4	Mr. L Mahapatra Asst. Manager (Ops.-IM)	Combat Team Leader	8982081515
5	Mr. Biswajit Behera Asst. Manager (Ops.-IM)	Combat Team Leader (Alt)	7381002643
6	Mr. Srikant Pradhan Ch. Manager(QC)	Rescue Team Leader	9437554917
7	Mr. Durga Prasad Officer (Lab)	Rescue Team Leader (Alt.)	7978803529
8	Mr. Bhramaraksha Goswami Manager (Ops. - Safety)	Auxiliary Team Leader	9089308173
9	Mr. Samreeddhya Nayak Officer (Ops.-MM)	Auxiliary Team Leader(Alt)	8637818928

(B) IMPORTANT TELEPHONE NUMBERS OF STATUTORY AUTHORITY:

Sl. No.	Authority	Telephone Number
CIVIL AUTHORITIES		
1	Collector, Jagatsinghpur	06724-220379 (O) 06724-220199 (R)
2	ADM, Paradeep	06722-222237 (O) 06722-222003 (R)
3	Superintendent of Police, Jagatsinghpur	06724-220115
4	Additional Superintendent of Police	067422-222007(O) 222451(R)
5	Chief District Medical Officer, Jagatsinghpur	06724-220064
POLICE STATION		
6	Police Station, Paradeep	06722-222027, 9437344359
7	CISF, Paradeep	06722-222385
8	Kujanji Police Station	06722 236260
9	Paradip Lock Police station	06722 230035



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10	Marine Police Station	06722 222298
FIRE STATION		
11	Fire Officer, Tirtol	06722-250445
12	Dist. Fire Officer, Cuttack	0671-2306101
13	Fire officer, Jagatsinghpur	06724-220099
STATUTORY BODIES		
14	Director of Factories & Boilers, Odisha	0674-2396070
15	Asst. Director of Factories & Boilers, Paradeep Zone	9437167924
16	Pollution Control Board, Bhubaneswar	0674-2564033 / 2561909
17	Pollution Control Board, Paradeep	9437162129
PARADIP PORT TRUST(PPT)		
18	Chairman PPT	06722-222046(0) 222001(R)
19	PPT Control Room	06722-229175(R)
20	Traffic Department	06722-222151
21	Marine Site Office, PPT	06722-222048(0)
22	Port Signal Station	06722-222137(0)
HOSPITAL		
23	Nearest Hospital/Dispensary, Paradeep	06722-222385/220452
24	CDMO	06722-229217(0) 220312(R); 9937233999(M)
25	ADMO, Medical, Jagatsinghpur	06724-221850
26	ADMO, (PH), Jagatsinghpur	06724-221119
27	ADMO (FW), Jagatsinghpur	06724-221435
28	PPT Hospital	06722-222041(0) 222102(R)
29	IOCL Paradip Refinery Township Hospital	06722-254063
30	Biju Hospital, Paradip	06722-220009
31	Ambulance IOCL Ref Township Hospital	06722-254060 / 8599009075
32	Ambulance PPT	06722-222041/102
MUTUAL AID MEMBERS AND NEARBY INDUSTRIES		
33	In charge HPCL.	06722-229225(0) 222641(R)
34	In charge BPCL	06722-229232(0) 220285(R)
35	In charge LPG Terminal	9167007047
36	Paradeep Phosphate Ltd, Paradeep	06722-229175; 9937297620
37	IFFCO, Paradeep	06722-224072
38	IOT Paradip Refinery	9178466012
BOMB SUQAD		
39	Bomb Detection & Disposal Squad, DCP (Dy. Commissioner of Police), Bhubaneswar	0674-2540555



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ON-SITE EMERGENCY PLAN

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40	Bomb Detection & Disposal Squad, SP (I/C) BDDS, Bhubaneswar	9437852009
41	Dog Squad, Cuttack	0671-2305022
42	Railway Paradeep	06722-229434
43	Port Signal Station	06722-222137

(C) EMERGENCY CONTACT NUMBERS:

Emergency Contact Numbers

SL	Name-	Telephone		Mobile
		Office	Residence	
1	Dy General Manager(T) (Ram Oraon)	06722-229217	-	9437496439
2	Ch. Manager (T) (Dilip Mohapatra)	06722-229215	-	7042166330
3	Mgr(Ops-Safety)(Bhramaraksha Goswami)		-	9089308173
4	Asst Manager (Ops-M&I) (Lavnish Mohapatra)	06722-229220	-	898208155
5	Paradeep Terminal Main Gate	06722-229218	-	
6	Paradeep Terminal Control Room	06722-229214	-	9437075915
6	CGM OSO	0674-2745830	0674-2561159	9409698352
7	GM I/C (OPS) OSO	0674-2748541	-	9437199713
8	GM (MC)			9437123396
9	DGM(F),RC, Paradeep			8697222855
10	GM (HSE),Kolkata	033-24145077		9073354372
11	GM(LPG), LPG Terminal			9167007047
12	Paradeep Refinery	06722-253209		9437165447
13	Paradeep Refinery Fire Brigade & Control Room			9238196475/ 9238104068
14	Chairman PPT	06722-222046	06722-222001	-
15	Paradeep Fire Station, CISF	06722-222385/101	-	-
16	Dog Squad Bhubaneswar	06722-220452	-	9437935700
17	Bomb Disposal Bhubaneswar	-	-	9437433060
18	Dog Squad Cuttack	0671-2305022	-	9853406695
19	Cargill India Pvt. Limited	9178457313		9861218477
20	Essar Steel Private Limited			7381007155/ 7381007290
21	PPT Hospital (Ambulance)	06722-222041/102	-	-
22	DM, Jagatsinghpur	06724-220379	06724-220199	-
23	SP, Jagatsinghpur	06724-220115	06724-220015	-
24	ADM, Paradeep	06722-222237	-	9938068656
25	Addl. SP, Paradeep	06722-222007	-	9439049600
26	Police Station, Paradeep	06722-222027/100	-	9437234014
27	HPCL In-charge, Paradeep	06722-229225	06722-222641	9472726597
28	BPCL In-charge, Paradeep	06722-229232	06722-220285	9727784811
29	Marine Site Office, PPT	06722-222048	-	-
30	Port Signal Station	06722-222137	-	-
31	Dy. Director of Factories & Boiler, Cuttack	-	-	8895605658
32	Asst. Director of Factories & Boiler, Paradeep	0671-2548575		9437167924



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INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL



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33	Chief Manager (Safety), Pipeline Division, Paradeep	.	.	9650100901
34	Pollution Control Board, Bhubaneswar	0674-2564033/ 2561909	-	9438883905
35	Pollution Control Board, Paradeep	-	-	9437162129
36	Railway Paradeep	06722-229434	-	8455887921
37	Paradeep Phosphate Ltd, Paradeep	06722-229175	-	9937297620
38	IFPCD, Paradeep	06722-224072	-	-
39	IOT Paradip Refinery	-	-	9178466012





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ON-SITE EMERGENCY PLAN

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Annexure - IV

MATERIAL SAFETY DATASHEET





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ANNEXURE - IV

MATERIAL SAFETY DATASHEET

MATERIAL SAFETY DATA SHEET

MOTOR SPIRIT



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CHEMICAL IDENTITY

Chemical Name	Motor Spirit		Chemical Classification		Hydrocarbon Mixture			
Synonyms	Petrol, Gasoline, Aviation Gasoline, Automotive fuel			Trade Name	Motor Spirit			
Formula	Mixture of Hydrocarbons	C.A.S. NO.	86290-81-5	UN NO.	1203			
Regulated Information	Shipping Name Codes/Label Hazardous waste LD. No. Hazchem Code	Motor Spirit Flammable Liquid, Class 3 E7 3 Y**						
HAZARDOUS INGREDIENTS	C.A.S. NO.							
1 Mixture of Hydrocarbons	86290-81-5							

PHYSICAL AND CHEMICAL DATA

Boiling Point/ Range °C	32-215	Physical State	Liquid at 15°C	Appearance	Colourless
Melting/ Freezing Point °C	-75	Vapour pressure @ 25 °C mm Hg	300 - 500 mm at 25 °C	Odour	Gasoline
Vapour Density (Air = 1)	2 to 4	Solubility in water @ 20 °C	Insoluble	Solubility in other:	Soluble in Organic Solvents, Alcohol
Specific Gravity (Water = 1)	0.69 - 0.77 at 15°C	pH	Not pertinent		





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ON-SITE EMERGENCY PLAN

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FIRE AND EXPLOSION HAZARD DATA

Flammability TDG Flammability	Dangerous 3	LEL (%V) UEL (%V)	1.3 7.6	Flash Point (OC) °C Flash Point (CC) °C	-43 (Typical)
Auto Ignition Temperature °C	257 (Typical)				
Explosion Sensitivity to Impact					
Explosion Sensitivity to Static Electricity					
Hazardous Combustion products	Toxic gases/ Vapours Does not occur				
Hazardous Polymerization					
Combustible Liquid	Yes	Explosive Material	No	Corrosive Material	No
Flammable Material	Yes	Oxidiser	No	Others	
Pyrophoric Material	No	Organic Peroxide	No		

REACTIVITY DATA

Chemical Stability Incompatibility with other material	Stable Oxidising agent
Reactivity	No reaction with common materials
Hazardous Reaction Products	



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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

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HEALTH HAZARD DATA

Routes of Entry:	Inhalation, Ingestion, Skin		
Effects of Exposure / Inhalation / Symptoms:	In very high concentration causes loss of consciousness, coma and sudden death. In less severe causes headache, nausea, mental confusion and depression occurs. Moderately toxic by inhalation.		
Ingestion:	Irritation of gastrointestinal tract with vomiting, colic and diarrhea. Fatal dose for adult 350 gms and for children 10 to 15 gms.		
Contact:	Skin: Dry and detect skin with dermatitis. Splash contact with eyes causes pain and slight transient corneal epithelial disturbances.		
Emergency Treatment:	IMMEDIATE MEDICAL ATTENTION REQUIRED.		
Inhalation:	Remove victim to fresh air, give artificial respiration (not mouth to mouth). If breathing has stopped. Oxygen if breathing is laboured. Rescuers should take suitable precautions to prevent being overcome by high vapour concentration.		
Ingestion:	Give water to conscious olive oil or some vegetable oil is to be given orally to retard absorption of Gasoline. Induction of vomiting is not advisable.		
Contact:	Remove contaminated clothing. Wash affected part (skin / eyes) with plenty of water.		
LD ₅₀ (Oral-Rat), mg/kg		LD ₅₀ , mg/kg	
Permissible Exposure Limit, mg/kg ppm	Not listed	Odor Threshold, ppm	0.25
	Not listed	mg/kg	





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ON-SITE EMERGENCY PLAN

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PARADEEP TERMINAL

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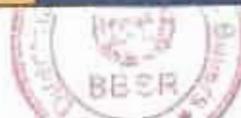
TLV (ACGIH)	ppm mg/kg	300 900 mg/m ³	STEL	ppm mg/kg	500 1500 mg/m ³
NFPA Hazard Signals	Health 1	Flammability 3	Reactivity/Stability 0	Special	

PREVENTIVE MEASURES

Personal Protective Equipment	Goggles/ face shields for eyes. Self contained breathing apparatus for containment/cleanup operation. Rubber hand gloves and rubber clothing
Handling and Storage Precautions	Gasoline should be stored in well ventilated, properly labeled and approved containers. Sniffing, siphoning and use of a solvent and cleaning agent should be avoided. Do not transfer to unlabeled, unsuitable or incorrectly labeled containers. All containers should be kept out of reach of children and kept fully closed when not in use. Cleaning and inspection/maintenance of storage tanks should be done according to proper procedures and precautions (work permit, gas freeing of tanks, using lifeline and wearing air supplied breathing apparatus).

EMERGENCY AND FIRST AID MEASURES

FIRE	Fire Extinguishing Media Special Procedure Unusual Hazards	Foam, CO ₂ , Dry Chemical Powder Keep the containers cool by spraying water if exposed to fire or heat Flash back may occur along vapour trail
EXPOSURE	First Aid Measures	IMMEDIATE MEDICAL ATTENTION REQUIRED Inhalation: Remove victim to fresh air; give artificial respiration (not mouth to mouth), if breathing has stopped.





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ON-SITE EMERGENCY PLAN
INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL



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	Antidotes/ Dosage	Ingestion: Give water to conscious victim to drink. Do not induce vomiting. Liquid paraffin, olive oil or some vegetable oil is to be given orally to retard absorption of gasoline. Contact: Remove contaminated clothing. Wash affected part (skin/eyes) with plenty of water.
SPILLS	Steps to be taken	Avoid spillage. Should they occur, sand or earth is useful means of containment and absorption. Because vapors can travel along the ground for considerable distances, naked flames in surrounding areas should be extinguished. Any action which might cause ignition of gasoline vapor must be avoided. Anybody in the nearby low lying confined space should be evacuated immediately until the area has been thoroughly ventilated and checked as safe to re-enter.
	Waste Disposal Method	Contaminated sand/ earth should be removed to a safe area.

ADDITIONAL INFORMATION / REFERENCES

Gastric lavage should be done after endotracheal intubation, in view of risk of aspiration which can cause chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

DISCLAIMER

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IndianOil

ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL



IndianOil

MATERIAL SAFETY DATA SHEET

HIGH SPEED DIESEL



IndianOil

ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

IndianOil

CHEMICAL IDENTITY

Chemical Name	Diesel	Chemical Classification	Hydrocarbon Mixture		
Synonyms	High Speed Diesel (HSD), Gas Oil, Diesel Oil			Trade Name	HSD
Formula	Mixture of Hydrocarbons	C.A.S. NO.		UN NO.	1202
Regulated Identification	Shipping Name Codes/Label	HSD Flammable liquid, Class 3			
	Hazardous waste I.D. No.	17			
	Hazchem Code	3Y*			
HAZARDOUS INGREDIENTS		C.A.S. NO.			
1. Mixture of Hydrocarbons					

PHYSICAL AND CHEMICAL DATA

Boiling Point/ Range °C	150-400	Physical State	Liquid at 15°C and 1 atm <1 mm at 38°C	Appearance	Light brown
Melting/ Freezing Point °C	-46	Vapour pressure @ 35 °C, mm Hg		Odour	Diesel
Vapour Density (Air = 1)	3 to 5	Solubility in water @ 30 °C	Insoluble	Solubility in others	Soluble in Organic Solvents, Alcohol
Specific Gravity (Water = 1)	0.81 - 0.91 at 20 °C	pH	Not pertinent		





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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

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FIRE AND EXPLOSION HAZARD DATA

Flammability	Moderate	LEL (%V)	0.6	Flash Point (OC) °C	
TDG Flammability	3	UEL (%V)	7.5	Flash Point, (CC) °C	> 32
Auto ignition Temperature °C	256				
Explosion Sensitivity to Impact					
Explosion Sensitivity to Static Electricity					
Hazardous Combustion products		Toxic gases/ vapours			
Hazardous Polymerization		Does not occur			
Combustible Liquid	Yes	Explosive Material	No	Corrosive Material	No
Flammable Material	Yes	Oxidiser	No	Others	
Pyrophoric Material	No	Organic Peroxide	No		

REACTIVITY DATA

Chemical Stability	Stable
Incompatibility with other material	Oxidising agent
Reactivity	No reaction with common materials
Hazardous Reaction Products	

HEALTH HAZARD DATA

Routes of Entry	Inhalation, Ingestion, Skin
Effects of Exposure/ Inhalation Symptoms	Dizziness and headache. Aspiration - Rapidly developing, potential fatal chemical pneumonitis.
Ingestion	Nausea and vomiting.
Contact	Irritation, Eyes: Irritation. Dermatitis may develop on prolonged contact.



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ON-SITE EMERGENCY PLAN

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Emergency Treatment		IMMEDIATE MEDICAL ATTENTION REQUIRED			
Inhalation		Remove victim to fresh air, give artificial respiration if necessary. If unconscious but breathing, place in the unconscious (recovery) position. Give external cardiac massage if necessary.			
Ingestion		Do not induce vomiting.			
Contact		Remove contaminated clothing and wash affected part (skin/eyes) with plenty of water.			
LD ₅₀ (Oral-Rat), mg/kg	2800	LD ₅₀ , mg/kg	200		
Permissible Exposure Limit, mg/kg ppm	Not listed	Odor Threshold, ppm mg/kg	1		
TLV (ACGIH), ppm mg/kg	Not listed 5 mg/m ³	STEL, ppm mg/kg	Not listed 10 mg/m ³		
NFPA Hazard Signals	Health 0	Flammability 2	Reactivity/ Stability 0	Special	

PREVENTIVE MEASURES

Personal Protective Equipment	Goggles/face shields for eyes Self contained breathing apparatus for containment/ cleanup operation. Rubber hand gloves and rubber clothing.
Handling and Storage Precautions	Diesel should be stored in well ventilated, properly labeled and approved containers. Sniffing, siphoning and use of a solvent and cleaning agent should be avoided. Do not transfer to unlabeled, unsuitable or incorrectly labeled containers. All containers should be kept out of reach of children and kept fully closed when not in use. Cleaning and inspection/ maintenance of storage tanks should be done according to proper procedures and precautions (work permit, gas freeing of tanks, using lifeline and wearing air supplied breathing apparatus).



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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

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EMERGENCY AND FIRST AID MEASURES

FIRE	Fire Extinguishing Media	Foam, CO ₂ , Dry Chemical Powder
	Special Procedure	If a leak or spill has not ignited, use water spray to disperse the vapours and to provide for men attempting to stop a leak. Water spray may be used to flush spills away from exposure.
	Unusual Hazards	Flash back may occur along vapour trail
EXPOSURE	First Aid Measures	Avoid spillage. Should they occur, sand or earth are useful means of containment and absorption.
	Antidotes/ Dosage	
SPILLS	Steps to be taken	Remove or shut-off all sources of ignition.
	Waste Disposal Method	Do not wash into drains.

ADDITIONAL INFORMATION/ REFERENCES

Gastric lavage should be done after endotracheal intubation, in view of risk of aspiration which can cause chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

DISCLAIMER

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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED.
PARADEEP TERMINAL



IndianOil

MATERIAL SAFETY DATA SHEET

SUPERIOR KEROSENE OIL





IndianOil

ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED.
PARADEEP TERMINAL.

IndianOil

CHEMICAL IDENTITY

Chemical Name	Kerosene	Chemical Classification	Hydrocarbon Mixture		
Synonyms	Superior Kerosene Oil (SKO), Stove Oil, Jet Fuel, Illuminating Oil, Range Oil, Fuel Oil No. 1			Trade Name	SKO
Formula	Mixture of Hydrocarbons	C.A.S. NO.		UN NO.	1223
Regulated Identification	Shipping Name Codes/Label	Superior Kerosene Oil (SKO) Flammable Liquid, Class 3			
	Hazardous waste I.D. No.	17			
	Hazchem Code	3 Y			
HAZARDOUS INGREDIENTS		C.A.S. NO.			
1. Mixture of Hydrocarbons					

PHYSICAL AND CHEMICAL DATA

Boiling Point/ Range °C	145 - 300	Physical State	Liquid at 15° C and 1 atm	Appearance	Colourless
Melting/ Freezing Point °C	- 49	Vapour pressure @ 35 °C, mm Hg	5 mm at 20° C	Odour	Gasoline like
Vapour Density (Air = 1)	4.1	Solubility in water @ 30 °C	0.2 to 0.4 @ 20° C mg/ml	Solubility in others	Soluble in Organic Solvents, Alcohol
Specific Gravity (Water = 1)	0.80 - 0.85 at 20° C	pH	Not pertinent		





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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

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FIRE AND EXPLOSION HAZARD DATA

Flammability	Moderate	LEL (%V)	0.7	Flash Point (OC) °C	
TDG Flammability	3	UEL (%V)	5	Flash Point (CC) °C	35 - 50
Auto Ignition Temperature °C		210			
Explosion Sensitivity to Impact					
Explosion Sensitivity to Static Electricity		Toxic gases / vapours			
Hazardous Combustion products		Does not occur			
Hazardous Polymerization					
Combustible Liquid	Yes	Explosive Material	No	Corrosive Material	No
Flammable Material	Yes	Oxidiser	No	Others	
Pyrophoric Material	No	Organic Peroxide	No		

REACTIVITY DATA

Chemical Stability	Stable
Incompatibility with other material	Oxidising agent
Reactivity	No reaction with common materials
Hazardous Reaction Products	

HEALTH HAZARD DATA

Routes of Entry Effects of Exposure/ Inhalation Symptoms	Inhalation, Skin Dizziness, headache and nausea. Higher concentration leads to depression/anesthetic effect. Continued inhalation produces visual and auditory hallucinations, delirium and mania. Also symptoms of fatigue, somnolence.
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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

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Ingestion	staggering gait, loss of memory.		
Contact	Spontaneous vomiting, low to moderate oral toxicity. Irritation of mouth, throat & gastro intestinal tract, nausea, weakness, dizziness, slow and shallow respiration, convulsions, unconsciousness.		
Emergency Treatment	IMMEDIATE MEDICAL ATTENTION REQUIRED		
Inhalation	Remove victim to fresh air, give artificial respiration if breathing has stopped. Oxygen if breathing is laboured.		
Ingestion:	Give conscious victim water to drink. Do not induce vomiting. Liquid paraffin, olive oil or some vegetable oil is to be given orally to retard absorption. Gastric lavage and induction of vomiting are not advisable.		
Contact	Remove contaminated clothing and wash affected part (skin/eyes) with plenty of water.		
LD ₅₀ (Oral-Rat), mg/kg	2800	LD ₅₀ , mg/kg	200
Permissible mg/kg	Not listed	Odor Threshold, ppm	1
Exposure Limit ppm	Not listed	mg/kg	
TLV (ACGIH) ppm mg/kg	500	STEL, ppm mg/kg	Not listed
NFPA Hazard Signals	Health 0	Flammability 2	Reactivity/Stability 0 Special

PREVENTIVE MEASURES

Personal Protective Equipment	Goggles / face shields for eyes. Self contained breathing apparatus for containment/ cleanup operation. Rubber hand gloves and rubber clothing.		
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IndianOil

ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,

PARADEEP TERMINAL



IndianOil

Handling and Storage Precautions	Kerosene should be stored in well ventilated, properly labeled and approved containers. Sniffing, siphoning and use of a solvent and cleaning agent should be avoided. Do not transfer to unlabeled, unsuitable or incorrectly labeled containers. All containers should be kept out of reach of children and kept
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EMERGENCY AND FIRST AID MEASURES

FIRE	Fire Extinguishing Media Special Procedure	Foam, CO ₂ , Dry Chemical Powder If a leak or spill has not ignited, use water spray to disperse the vapours and to provide for men attempting to stop a leak. Water spray may be used to flush spills away from exposure.
EXPOSURE	First Aid Measures Antidotes/ Dosage	IMMEDIATE MEDICAL ATTENTION REQUIRED Inhalation: Remove victim to fresh air, give artificial respiration if breathing has stopped. Ingestion: Give water to conscious victim to drink. Do not induce vomiting. Liquid paraffin, olive oil or some vegetable oil is to be given orally to retard absorption of kerosene. Contact: Remove contaminated clothing. Wash affected part (skin/ eyes) with plenty of water. Move victim out of spill area to fresh air.
SPILLS	Steps to be taken Waste Disposal Method	Avoid spillage. Should they occur, sand or earth are useful means of containment and absorption.





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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL



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ADDITIONAL INFORMATION/ REFERENCES

Gastric lavage should be done after endotracheal intubation, in view of risk of aspiration which can cause chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

DISCLAIMER

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INDIAN OIL CORPORATION LIMITED,
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MATERIAL SAFETY DATA SHEET

AVIATION TURBINE FUEL



IndianOil

ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

IndianOil

CHEMICAL IDENTITY

Chemical Name	Aviation Turbine Fuel	Chemical Classification		Hydrocarbon Mixture	
Synonyms	Jet A-1		Trade Name		ATF
Formula	Mixture of Hydrocarbons	C.A.S. NO	8008-20-6	UN NO.	1863
Regulated Identification	Shipping Name Codes/Label Hazardous waste LD. No. Hazchem Code	Aviation Turbine Fuel (ATF) Flammable Liquid, Class 3 17 3 Y			
HAZARDOUS INGREDIENTS		C.A.S. NO. 8008-20-6			

PHYSICAL AND CHEMICAL DATA

Boiling Point/ Range °C	147 - 273	Physical State	Liquid at 15° C and 1 atm	Appearance	Clear
Melting/ Freezing Point: °C	- 49	Vapour pressure @ 35 °C. mm Hg		Odour	Hydrocarbon
Vapour Density (Air = 1)		Solubility in water @ 30 °C	Negligible	Solubility in others	
Specific Gravity (Water = 1)	0.80	pH			





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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
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FIRE AND EXPLOSION HAZARD DATA

Flammability	Yes	LEL (%V)	1.3	Flash Point (OC) °C	
TDG	3	UEL (%V)	8	Flash Point (CC) °C	38 (min.)
Flammability					
Auto ignition Temperature °C					
Explosion Sensitivity to Impact					
Explosion Sensitivity to Static Electricity				CO, CO ₂ , Hazardous Gases	
Hazardous Combustion products				Does not occur	
Hazardous Polymerization					
Combustible Liquid	Yes	Explosive Material	No	Corrosive Material	No
Flammable Material	Yes	Oxidizer	No	Others	
Pyrophoric Material	No	Organic Peroxide	No		

REACTIVITY DATA

Chemical Stability	Stable
Incompatibility with other material	Strong Oxidizing agent
Reactivity	Do not react with most of the materials
Hazardous Reaction Products	

HEALTH HAZARD DATA

Routes of Entry Effects of Exposure/ Inhalation Symptoms	Inhalation, Skin Dizziness, headache and nausea. Higher concentration leads to depression/anesthetic effect. Continued inhalation produces visual and auditory hallucinations, delirium and mania. Also symptoms of fatigue, somnolence, staggering gait, loss of memory.
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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
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Ingestion	Ingestion of large amount may cause gastro-intestinal effects, diarrhea, vomiting.		
Contact	Irritation, prolonged contact can result in drying of skin, dermatitis and eye, nose and throat irritation.		
Emergency Treatment	IMMEDIATE MEDICAL ATTENTION REQUIRED		
Inhalation	Obtain medical help, Remove to fresh air.		
Ingestion	Do not induce vomiting.		
Contact	Skin: wash thoroughly with soap water. Eyes: wash eyes thoroughly with copious amount of water ensuring eyelids are open.		
LD ₅₀ (Oral-Rat) mg/kg		LD ₅₀ , mg/kg	
Permissible mg/kg	100	Odor Threshold, ppm	
Exposure Limit ppm		mg/kg	
TLV (ACGIH) ppm	100	STEL ppm	
	mg/kg	mg/kg	
NFPA Hazard Signals	Health	Flammability	Reactivity/Stability
			Special

PREVENTIVE MEASURES

Personal Protective Equipment	Impervious gloves, goggles, chemical cartridge respirator protective clothing		
Handling and Storage Precautions	Store away from ignition sources. Ensure equipment is electrically bonded & earthed to prevent static accumulation.		

EMERGENCY AND FIRST AID MEASURES

FIRE	Fire Extinguishing Media Special Procedure	DCP, Foam, CO ₂ , Water (fog) Fires in confined spaces shall be dealt by wearing breathing apparatus. Spray application increases the fire & possible explosion hazard.
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IndianOil

ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
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IndianOil

Unusual Hazards		
EXPOSURE	First Aid Measures	Remove to fresh air. Do not induce vomiting. Wash thoroughly the affected portion. Arrange for medical treatment.
	Antidotes/ Dosage	
SPILLS	Steps to be taken	Recover all spillage using absorbents or appropriate collection techniques. Do not water.
	Waste Disposal Method	Dispose off by incineration or other suitable means.

ADDITIONAL INFORMATION/ REFERENCES

DISCLAIMER

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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,

PARADEEP TERMINAL.



IndianOil

MATERIAL SAFETY DATA SHEET

1. CHEMICAL IDENTITY

Chemical Name :	Fuel Oil	Chemical classification :	Fuel
Synonyms :	Residual fuel Oil	Trade Name :	Furnace oil
C.A.S.No. :	U.N.No. : 1993	Hazardous Waste I.D No. :	5
Formula :	A Complex Mixture of hydrocarbons	Codes / Label :	90/Class 3, Flammable Liquid
Regulated Identification Shaping Name :	Furnace Oil	Hazchem No. :	-

HAZARDOUS INGREDIENTS

C.A.S. No.

2. PHYSICAL AND CHEMICAL DATA

Boiling Range :	Data Not available	Others :	Invisible and float in water
Vapour pressure :	<0.1 psi @ 38°C	Freezing Point :	0-21°C
Vapour Density :	Heavier Than air	pH :	Not pertinent
Specific Gravity :	0.88 to 0.99 gm/ml @ 15°C	Odour :	Characteristic
Appearance :	Black	Physical State :	Black viscous liquid @ 15°C 1 atm

3. FIRE AND EXPLOSION HAZARD DATA

Flammability :	Yes	IEL :	3.0%	Flash Point :	>60°C	(CC)
TDG Flammability :	3	UEL :	5.0%	Flash Point :	>70°C	(OC)
Auto Ignition Temperature :		:	200 - 300°C			
Explosion sensitivity to impact :		:	Stable			
Explosion sensitivity to static Electricity :		:	Stable			
Hazardous Combustion Products :		:	Acrid smoke and irritation fumes of CO/ CO ₂ /NO _x			
Hazardous Polymerization :		:	Does not occur			

Combustible Liquid :	Yes	Explosive Material :	No	Corrosive Material :	No
Flammable Material :	Yes	Oxidizer :	No	Others :	No
Pyrophoric Material :	No	Organic Peroxide :	No		

4. REACTIVITY DATA

Chemical Stability :	:	Chemically Stable
Incompatibility with other material :	:	Incompatible with strong oxidizers
Reactivity :	:	Does not react with common materials but may react with oxidizing agents
Hazardous reaction products :	:	Date not available

5. HEALTH HAZARD DATA

Routes of entry :	Inhalation / Ingestion / Skin / Eye
Effects of Exposure :	Inhalation : Dizziness, headache and bluish tint to the skin.
Symptoms :	Ingestion : Spontaneous vomiting, Irritation of mouth, throat and gastro intestinal tract Skin : Irritation, Prolonged or repeated contact should be avoided, otherwise skin chapping, cracking of possible contact dermatitis may occur. Dry skin, erythema, oil acne, and oil folliculitis & watery growth may occur which may become skin cancer subsequently on repeated exposure.





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ON-SITE EMERGENCY PLAN

**INDIAN OIL CORPORATION LIMITED,
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Emergency Treatment

Eye : Light to moderate irritation

: If inhaled, Remove victim to fresh air, give artificial respiration. If required, remove contaminated clothing quickly, do not induce vomiting. If ingested, keep victim warm and quiet. Wash all the affected skin thoroughly with soap and water. Irrigate affected eyes with copious amount of water. Administration of Olive oil of any other vegetable oil may reduce adsorption thru digestive tract. Gastric lavage should be done only after endotracheal intubation in view of respiration which may cause serious chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

TLV (ACGIH)

Not Listed

STEL

Not Listed

PEL

Not Listed

Odour Threshold

Not Listed

LD₅₀

Not Listed

Limit LD₅₀

Not Listed

FPA Hazard signal

health : 1

Reactivity : 0

Special : No

6. PREVENTIVE MEASURES

Personnel Protective Equipment

Avoid contact with liquid or vapour.

Handling & Storage precautions

Use gum boots, gloves while handling the product.

Store in dry, cool, ventilated area away from heat and flame.

Keep away from oxidizing agents.

7. EMERGENCY AND FIRST AID MEASURES

FIRE

Fire Extinguishing Media

: Foam / DCP / CO₂

Special Procedures

: Keep the containers cool by spraying water if exposed to fire.

Unusual Hazards

: Flashback may occur along vapour trail.

EXPOSURE

First Aid Measures

: A/S

Antidotes / Dosages : Not available

SPILLS

Shut off leak without risk.

Contain leaking liquid on sand or earth

Prevent liquid from entering into sewers.



Waste Disposal Method : Seal all the waste in vapour tight plastic bags for eventual disposal.

8. ADDITIONAL INFORMATION / REFERENCES**9. MANUFACTURERS / SUPPLIERS DATA | HINDUSTAN PETROLEUM CORPORATION LIMITED****10. DISCLAIMER**

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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

IndianOil

SAFETY DATA SHEET OF HIGH FLASH HIGH SPEED DIESEL (MGO)

1. CHEMICAL IDENTITY

Chemical Name:	Diesel	Chemical classification :	Middle distillate
Synonyms:	HSD	Trade Name :	HFSO (MGO)
Formula :	Not pertinent	UN No:	1202
Regulated Identification:			
	Shipping Name : HFSO (MGO)		
	Codes/Label : Flammable Liquid (Red)/3		
	Hazchem Code : BY*		

2. PHYSICAL AND CHEMICAL DATA

Boiling Point/Range :	(Max 400 C)	Physical State :	Liquid	Appearance :	Yellow brown
Pour Point :	(3C/150)	Vapor Pressure :	(N.A)	Odor :	Hydrocarbon
Vapor Density (Air=1) :	(0.82 to 0.85)	Solubility in water @ 30°C :		Not Soluble	
Specific Gravity (Water = 1):		pH:	(N.A)		

3. FIRE AND EXPLOSION HAZARD DATA

Flammability	LEL	1.30%	Flash Point °C	Above 56°C
TDG Flammability	UEL	8.00%		

4. REACTIVITY DATA

Chemical Stability :	Stable
Incompatibility with other Material :	Oxidizing agents

5. HEALTH HAZARD DATA

Routes of Entry :	Ingestion, Inhalation, Skin & eyes
Effects of Exposure/Symptoms :	Vapours cause slight smarting of the eyes or respiratory system if present in high concentrations
Emergency Treatment	Ingestion : If ingested an increased frequency of bowel movements will occur. Do not induce vomiting Eyes : Wash with plenty of water Skin : Wipe off and Wash with soap and water
LD ₅₀ (Oral-Rat)	5 to 50 gm/kg
Permissible TLV [ACGIH]	STEL not established

6. PREVENTIVE MEASURES

Personal protective equipment :	Use face shield / hand glove and barrier cream over skin.
Handling & Storage Precautions :	Store away from heat sources and combustible materials. Avoid contact with liquid or Vapour

7. EMERGENCY AND FIRST AID MEASURES

FIRE EXPOSURE	Fire Extinguishing media :	Carbon dioxide, dry chemical powder & foam
	First Aid Measures :	
	Eyes : Wash with plenty of water :	
SPILLS	Skins : Wipe off and wash with soap and water :	
	Steps to be taken : Arrest the leak if it is without risk. Contain the spill. Do not allow it to get into the	



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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED, PARADEEP TERMINAL.



IndianOil

drain. Absorb using suitable absorbing medium and remove the content to closed containers.

Disposal Method : Incinerate in accordance with regulations or disposal by biodegradation method.

B. ADDITIONAL INFORMATION / REFERENCES

Service/Location : Petroleum Product for Automotive Fuel.

Manufacturer / Supplier :

Name :

Address :

Telephone No :

Contact person :

DISCLAIMER

Information given herein is offered in good faith as accurate but without guarantee. Conditions of use of the product are beyond our control; all risk of use of the product are therefore assumed by user and we expressly disclaim all warranties of every kind. Appropriate warning and safe handling procedures should be provided to handlers users.





IndianOil

ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL

IndianOil

Material Safety Data Sheet

Ethanol, Absolute

MSDS Number: M1004

Effective Date: 8/23/2004

Section 1 -

Chemical Product and Company Identification

MSDS Name: Ethanol, Absolute

Synonyms: Ethyl Alcohol; Ethyl Alcohol Anhydrous; Ethyl Hydrate; Ethyl Hydroxide; Fermentation Alcohol; Grain Alcohol

Company Identification:

VFE GEE Scientific, Inc.
13600 NE 126th Pl Ste A
Kirkland, WA 98034

For information in North America, call: 425-823-4518

Section 2 -

Composition/Information on Ingredients

CAS#	Chemical Name	Percent	UN/ID/INCI/INC
64-17-5	Ethanol	ca. 100	200-578-6

Hazard Symbols: F

Risk Phrases: (1)

Section 3 -

Hazards Identification

Emergency Overview

Appearance: Colorless clear liquid. **Fish Poison:** 10-15 days. **Wetting:** Flammable liquid and vapor. Causes respiratory tract irritation. May cause serious damage to eyes. Causes severe eye irritation. This substance has caused adverse reproductive and fetal effects in humans. **Carcinogen:** Not identified. **Mutagenicity:** May cause somatic mutations.

Target Organs: Kidney, heart, central nervous system, liver.

Potential Health Effects

Eye Contact: Causes severe eye irritation. May cause partial or total blindness if left untreated. May cause chemical conjunctivitis and corneal damage.**Skin Contact:** Causes moderate skin irritation. May cause ulceration of the epidermis.**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause systemic toxicity with anorexia. May cause central nervous system depression, characterized by excitement followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause convulsions, unconsciousness, coma and possible death due to respiratory failure.**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. **Lung:** Respiratory tract irritation. May cause mucosal effects at high concentrations. Victims may cause diarrhea or vertigo.**Chronic Exposure:** May cause reproductive and fetal effects. Laboratory experiments have resulted in instigated effects. Animal studies have reported the development of tumors. Prolonged exposure may cause liver, kidney, and heart damage.

Section 4 -

First Aid Measures

Eye Contact: Get medical aid. Gently flush eyes and hold eyelids open with water.**Skin Contact:** Get medical aid. Wash soaping contact areas. Flush skin with plenty of soap and water.**Ingestion:** Do not induce vomiting. If vomit is synchronous and alert, give 2-4 cups of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.**Inhalation:** Remove from exposure or move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.**Notes to Physician:** Treat symptomatically and supportive. Persons with skin or eye disorders or liver, kidney disease, respiratory diseases, or central and peripheral nervous system disorders may be at increased risk from exposure to this substance.**Antidote:** None reported.

Section 5 -

Fire Fighting Measures

General Information: Combustible liquid if exposed to heat and/or fire. At ordinary fire, over a self-contained breathing apparatus in pressure-demand, HSEIA/NIOSH approved or equivalent, and full protective gear. Vapor may form explosive mixture with air. Vapor may travel to a source of ignition and flash back. Will burn if exposed to a fire. **Flammability:** Can release vapors that form explosive mixtures at temperatures above the flashpoint. Use water spray to keep fire-exposed containers cool. **Combustion Products:** Combustion may produce toxic fumes at temperatures above the flashpoint.

Fire Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray. **Flameout Temperature:** 303°C (605.4°F).

Flash Point: 6.6°C (43.8°F).**Explosion Limits, lower:** 3.3 vol%**Explosion Limits, upper:** 19.0 vol%**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Instability: 0



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Section 11 -
Toxicological Information (continued)

Other Studies: Standard Draize Test (Skin, rabbit) = 20 mg/24h (Maximum); Standard Draize Test: Administration into the eye (rabbits) = 500 mg /Severe;

Section 12 -
Ecological Information

Environmental Toxicity: Fish: Rainbow trout LC50 = 12000-15200 mg/L, 96 Hr; Flow-through @ 24-24.3°C Rainbow trout, LC50 = 11200 mg/L, 24 Hr; Fingering (Unspecified) no. *Photobacterium phosphoreum*, EC50 = 34000 mg/L, 5-30 min; Morphol test 250 ppm/lhr qualitative-tetherfish water

Environmental: Ethanol: In water, will volatilize and partially degrade.

Physical: No information available

Other: Not reported to bioconcentrate as fish.

Section 13 -
Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed

RCRA U-Series: None listed

Section 14 -
Transport Information

Shipping Name	US DOT	Canada TDG
Hazard Class	Ethanol	Ethanol
UN Number	1211/128	1211/128
Packing Group	B	B
Other		TP 14C

Section 15 -
Regulatory Information
US Federal

TSCA: CAS# 64-17-5 is listed on the TSCA inventory.

Health & Safety Reporting List: None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules: None of the chemicals in this product are under a Chemical Test Rule.

Section 12b: None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule: None of the chemicals in this product have a SNUR under TSCA SARA;

CERCLA Hazardous Substances and corresponding RQs: None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances: None of the chemicals in this product have a TPG.

SARA Codes: CAS #64-17-5: acute, chronic, flammable

Section 313: No chemicals are reportable under Section 313.

Clean Air Act: This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

Clean Water Act: None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA: None of the chemicals in this product are considered highly hazardous by OSHA.

STATE: Ethanol can be found on the following state right-to-know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

This product contains Ethanol, a chemical known to the state of California to cause birth defects or other reproductive harm.

California Non-Significant Risk Level: None of the chemicals in this product are above 1.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: F

Risk Phrases:

F+H3 Highly Flammable

Risk Phrases:

S+T Keep container tightly closed

S+K+Keep container in a well-ventilated place

S+M+Keep away from sources of ignition - No smoking

S+D+Take precautionary measures against static discharges





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Section 15 -

Regulatory Information (continued)

WGK (Water Danger/Protection): CAS# 64-17-5; 0

Canada - DSL/NDSL: CAS# 64-17-5 is listed on Canada's DSL List.

Canada - WHMIS: This product has a WHMIS classification of B2, D2A.

Canadian Ingredient Disclosure List: CAS# 64-17-5 is listed on Canada's Ingredient Disclosure List.

Exposure Limits: CAS# 64-17-5: OEL-AUSTRALIA TWA 1000 ppm (1000 mg/m³); OEL-BELGIUM TWA 1000 ppm (1000 mg/m³); OEL-CZECHOSLOVAKIA TWA 1000 mg/m³; STEL 5000 mg/m³; OEL-DENMARK TWA 1000 ppm (1000 mg/m³); OEL-FINLAND TWA 1000 ppm (1000 mg/m³); STEL 1250 ppm (1250 mg/m³); OEL-FRANCE TWA 1000 ppm (1000 mg/m³); STEL 5000 ppm; OEL-GERMANY TWA (100 ppm - 1000 mg/m³); OEL-HUNGARY TWA 1000 mg/m³; STEL 3000 mg/m³; OEL-THE NETHERLANDS TWA 1000 ppm (1000 mg/m³); OEL-THE PHILIPPINES TWA 1000 ppm (1000 mg/m³); OEL-POLAND TWA 1000 mg/m³; OEL-RUSSIA STEL 1000 mg/m³; OEL-SWEDEN TWA 1000 ppm (1000 mg/m³); OEL-SWITZERLAND TWA 1000 ppm (1000 mg/m³); OEL-THAILAND TWA 1000 ppm (1000 mg/m³); OEL-TURKEY TWA 1000 ppm (1000 mg/m³); OEL-UNITED KINGDOM TWA 1000 ppm (1000 mg/m³); JAN9 OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA (excl ACGIH TLV); OEL IN NEW ZEALAND, SINGAPORE, VIETNAM (excl ACGIH TLV).

Section 16 -

Additional Information

MSDS Creation Date: 08/23/2004

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall VEE GEE Scientific be liable for any special, indirect, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, however arising, even if VEE GEE Scientific has been advised of the possibility of such damages.





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Material Safety Data
Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Diesel B-100 Biodiesel

Product Use: Fuel

Synonyms: None Established

Product Cas No.: Mixture

Company Identification:

Chevron Phillips Chemical Company LP
 Specialty Chemicals
 10001 Six Pines Drive
 The Woodlands TX 77380

Product Information:

MSDS Requests: (800) 852 - 5530
 Technical Information: (832) 813 - 4862

24-Hour Emergency Telephone Numbers

HEALTH: Chevron Phillips Emergency Information Center 866.442.9628 (North America) and
 1.832.813.4984 (International)

TRANSPORTATION: North America: CHEMTREC 800.424.9300 or 703.527.3887

ASIA: 1.703.527.3887

EUROPE: +32.14.584545 (phone)
 or +32.14.583516 (telefax)

SOUTH AMERICA SOS-Cotec

Inside Brazil: 0800.111.767

Outside Brazil: 55.19.3467.1600



SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENT	CAS NUMBER	AMOUNT	EINECS	SYN	R-PHRASES
Proprietary	Proprietary	100 % weight	NA	NA	NA

Occupational Exposure Limits:

Component	Limit	TWA	STEL	Ceiling / Peak	Notation
Proprietary	CPChem	Not Established	NA	NA	NA

OIL MIST: ACGIH: TWA - 5mg/m³. STEL - 10mg/m³

SECTION 3 HAZARDS IDENTIFICATION



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EMERGENCY OVERVIEW

Light yellow liquid, slight odor.

IMMEDIATE HEALTH EFFECTS:

Eye: Not expected to cause prolonged or significant eye irritation.

Skin: Not expected to be harmful to internal organs if absorbed through the skin. Contact with the skin is not expected to cause prolonged or significant irritation.

Ingestion: Not expected to be harmful if swallowed.

Inhalation: Not expected to be harmful if inhaled.

SECTION 4 FIRST AID MEASURES

Eye: Flush eyes with running water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get medical attention if irritation persists.

Skin: To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse. Get medical attention if any symptoms develop.

Ingestion: If swallowed, do not induce vomiting. Give the person a glass of water or milk to drink and get immediate medical attention. Never give anything by mouth to an unconscious person.

Inhalation: Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.

SECTION 5 FIRE FIGHTING MEASURES

FIRE CLASSIFICATION:

OSHA Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

FLAMMABLE PROPERTIES:

Flashpoint: 218 °C (424.4°F)

Autoignition: NDA

Flammability (Explosive) Limits (% by volume in air): Lower: NDA Upper: NDA

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

PROTECTION OF FIRE FIGHTERS:

Fire Fighting Instructions: This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.

Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner



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consistent with applicable regulations.

Reporting: U.S.A. regulations require reporting spills of this material that could reach any surface waters. Report spills to local authorities and/or the U.S. Coast Guard National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL. REFER TO PRODUCT LABEL OR MANUFACTURERS TECHNICAL BULLETIN FOR THE PROPER USE AND HANDLING OF THIS MATERIAL.

Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations, which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77).

Recommended Practice on Static Electricity (liquids, powders and dusts), and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents' (liquids).

Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:

Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT:

Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear chemical goggles as a good safety practice.

Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances.

Suggested materials for protective gloves include: Natural rubber, or Nitrile Rubber

Respiratory Protection: No respiratory protection is normally required.

Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:



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Component	Limit	TWA	STEL	Ceiling / Peak	Notation
Proprietary	CPCHEM	Not Established	NA	NA	NA

OIL MIST: ACGIH: TWA - 5mg/m³, STEL - 10mg/m³

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR: Light yellow liquid, slight odor.

pH: NA

VAPOR PRESSURE: <1 mmHg

VAPOR DENSITY (AIR=1): NA

BOILING POINT: 315 °C (599°F)

SOLUBILITY (in water): Negligible

MELTING POINT: -1 °C (30.2°F)

SPECIFIC GRAVITY: 0.87 mg/l

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Conditions to Avoid: No Data Available

Incompatibility With Other Materials: May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Hazardous Decomposition Products: Carbon Oxides formed when burned.

Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS:

Acute Oral Toxicity: The oral LD₅₀ in the rabbit is > 2000 mg/kg.

Acute Dermal Toxicity: The dermal LD₅₀ in the rat is > 5000 mg/kg.

Acute Inhalation Toxicity: The inhalation LC₅₀ is not known.

Eye Irritation: This material is not expected to be irritating to the eyes.

Skin Irritation: This material is not expected to be irritating to the skin.



ADDITIONAL TOXICOLOGY INFORMATION:

The toxicological properties of this product have not been tested or have not been tested completely and its handling or use may be hazardous. EXERCISE DUE CARE.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY:

The toxicity of this material to aquatic organisms has not been evaluated. Consequently, this material should be kept out of sewage and drainage systems and all bodies of water.

ENVIRONMENTAL FATE:

The environmental fate of this material is not available.



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SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

Shipping Descriptions per regulatory authority:

US DOT

NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR
TRANSPORTATION

ICAO / IATA

NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR
TRANSPORTATION

IMO / IMDG

NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR
TRANSPORTATION

RID / ADR

NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR
TRANSPORTATION

SECTION 15 REGULATORY INFORMATION

SARA 311/312 CATEGORIES:

- | | |
|---------------------------------------|----|
| 1. Immediate (Acute) Health Effects: | NO |
| 2. Delayed (Chronic) Health Effects: | NO |
| 3. Fire Hazard: | NO |
| 4. Sudden Release of Pressure Hazard: | NO |
| 5. Reactivity Hazard: | NO |

REGULATORY LISTS SEARCHED:

01 = CA Prop 65	16 = FDA 177	31 = OSHA Carcinogen
02 = LA RTK	17 = FDA 178	32 = OSHA Highly Hazardous
03 = MA RTK	18 = FDA 179	33 = RCRA Waste Appendix VIII
04 = MN Hazardous Substance	19 = FDA 180	34 = RCRA Waste D-List
05 = NJ RTK	20 = FDA 181	35 = RCRA Waste P-List
06 = PA RTK	21 = FDA 182	36 = RCRA Waste U-List
07 = CAA Section 112 HAPs	22 = FDA 184	37 = SARA Section 311/312
08 = CWA Section 307	23 = FDA 186	38 = SARA Section 313
09 = CWA Section 311	24 = FDA 189	39 = TSCA 12 (b)
10 = DOT Marine Pollutant	25 = IARC Group 1	40 = TSCA Section 4



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11 = FDA 172	26 = IARC Group 2A	41 = TSCA Section 5(a)
12 = FDA 173	27 = IARC Group 2B	42 = TSCA Section 8(a) CAIR
13 = FDA 174	28 = IARC Group 3	43 = TSCA Section 8(a) PAIR
14 = FDA 175	29 = IARC Group 4	44 = TSCA Section 8(d)
15 = FDA 176	30 = NTP Carcinogen	45 = WHMIS - IDL

No components of this material were found on the regulatory lists above.

WHMIS CLASSIFICATION:

This product is not considered a controlled product according to the criteria of the Canadian Controlled Products Regulations.

CHEMICAL INVENTORY LISTINGS:

AUSTRALIA: All the components of this material are listed on the Australian Inventory of Chemical Substances (AICS).

CANADA: All the components of this material are on the Canadian Domestic Substances List (DSL).

PEOPLE'S REPUBLIC OF CHINA: All the components of this product are listed on the draft Inventory of Existing Chemical Substances in China.

EUROPEAN UNION: All the components of this material are in compliance with the EU Seventh Amendment Directive 92/32/EEC.

JAPAN: This material contains components that require notification before sale or importation into Japan.

KOREA: All the components of this product are on the Existing Chemicals List (ECL) in Korea.

PHILIPPINES: This material contains components that require notification before sale or importation into the Philippines.

UNITED STATES: All of the components of this material are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0 Special: NA

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA).

REVISION STATEMENT: This is a new Chevron Phillips Chemical Company LP MSDS please review.



ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV Threshold Limit Value TWA - Time Weighted Average

STEL Short-term Exposure Limit PEL - Permissible Exposure Limit

ACGIH American Conference of
Government Industrial Hygienists

OSHA - Occupational Safety & Health

NIOSH National Institute of Safety & Health NFPA - National Fire Protection Agency



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WHMIS	Workplace Hazardous Materials Information System	IRAC	- Int'l. Agency for Research on Cancer
EINECS	European Inventory of existing Commercial Chemical Substances	RCRA	- Resource Conservation Recovery Act
SARA	Superfund Amendments and Reauthorization Act.	TSCA	- Toxic Substance Control Act
EC50	Effective Dose	LC50	- Lethal Concentration
LD50	Lethal Dose	CAS	- Chemical Abstract Service Number
NDA	No Data Available	NA	- Not Applicable
<=	Less Than or Equal To	>=	- Greater Than or Equal To
CNS	Central Nervous System	MAK	- Germany Maximum Concentration Values

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by EHS Product Stewardship Group, Chevron Phillips Chemical Company LP, 10001 Six Pines Drive, The Woodlands, TX 77380

The above information is based on the date of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.





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SAFETY INFORMATION SHEET
REFORMATE

Name (s) : Reformate, Platformate, Heavy Reformate,

Light Platformate, Powerformate

Chemical Formula: Complex mixture of aliphatic and aromatic hydrocarbons

Physical Properties	Physical State	:: Liquid	Sp. Gravity	:: 0.800 to 0.850
	Appearance	:: Clear, colorless to yellow	Flash Point	:: Closed cup: -50 DegC [Tag.]
	Odour	:: Gasoline	Auto Ignition Temp.	:: 257 DegC
	Distillation Range	:: 35 – 215DegC	Explosive Limits	:: 1.4 – 7.6% by volume in Air
	HAZCHEM CODE	:: 3YE	Solubility in Water	:: Insoluble in cold water
	Vapour pressure	:: 40 kPa (300 mm Hg) Maximum @ 38°C		
Toxicology	1. Ingestion	:: Gastro-Intestinal irritation. Aspiration of this product may result in severe Irritation or burns to the Respiratory tract.		
	2. Eye Contact	:: Eye Irritation.		
	3. Skin Contact	:: Skin irritation. Prolonged exposure may cause blood disorder due to permeation through skin.		
	4. Inhalation	:: Respiratory tract irritation and Central Nervous System (CNS) Depression, weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.		
	1. Ingestion	:: Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.		
First Aid Measure	2. Eye Contact	:: Remove contact lenses. Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Protect unharmed eye. Get medical attention immediately.		
	3. Skin Contact	:: Flush / wash skin with water and soap. Removing contaminated clothing. Get medical attention.		
	4. Inhalation	:: Move exposed person to fresh air. If unconscious or breathing is interrupted or if respiratory arrest occurs, provide artificial respiration immediately. Loosen tight clothing. Get medical attention immediately.		
	1. Use Alcohol-resistant foam, Carbon dioxide (CO ₂), Dry chemical, BCF, BTM, CBM, DBE.			
Fire Fighting	2. Water may be ineffective, but may be used to cool fire exposed containers. Water spray (Fog) may be used. Do Not use Water Jet.			
	3. In Case of Fire, Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA)			
	1. Wear a supplied-air NIOSH approved respirator that provides protection when working with this material.			
PPE	2. Use Protective hand gloves (Recommended: polyvinyl alcohol (PVA), Viton®).			
	3. Use Safety goggles			
	4. Use protective over – clothing.			
	5. Wear approved Safety Shoes			
	IN CASE OF FIRE / EMERGENCY INFORM NEAREST CONTROL ROOM			



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MATERIAL SAFETY DATA SHEET

BLUE DYE





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1. PRODUCT INFORMATION

Product Name	Solvent Blue RKB (Liquid)
C.I. Name	Solvent Blue Liquid
CAS No.	N.A

2. PHYSICAL DATA

Form	Liquid
Colour	Dark Blue
Odour	Typical Aromatic
Specific Gravity	0.93 - 1.01
Boiling Point	More than 180°C
Flash Point	More than 62°C
Viscosity Kinematic	
Solubility	a) Water Insoluble
	b) Benzene Soluble
	c) Xylene Soluble
	d) Oils Soluble

3. CHEMICAL DATA

Chemical Class	Anthraquinone
Active Matter	60%
Solvents	Appx. 90%
Solvent Chemistry	C10

4. HAZARDOUS INGRADIENTS

CHEMICAL NAME	CAS#	OSHA PEL	ACGIH TLV-TWA
C10	64742-94-5	100 PPM, 150 STEL	100 PPM, 150 STEL
Solvent Blue liquid	N.A.	N.A.	N.A.



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5. REACTIVITY DATA

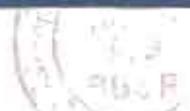
Stability	Stable.
Polymerisation	Does not occur.
Incompatibility(Materials to avoid)	Oxidising & reducing agents.
Thermal Decomposition Products	If heated to high temperature, the product may emit amines, nitrogen oxides, smoke, toxic fumes.

6. FIRE & EXPLOSION DATA

Flash Point	>62°C
Lower Explosive Limit	N.A.
Upper Explosive Limit	N.A.
Extinguishing Media	Foam, DCP, CO ₂ Cylinder or water spray.
Special precautions	Should be treated as class B Compounds. Sparks, static electricity should be avoided. Suitable air breathing apparatus should be used to protect from hazardous combustible products.

7. EMERGENCY AND FIRST AID PRECAUTIONS

Eye contact	Flush eyes with water for at least for 15 minutes. Get prompt medical attention.
Skin contact	Remove contaminated cloths and shoes, wash affected areas with soap and water. If irritation develops, consult physician. Wash contaminated clothing separately with soap before reuse.
Inhalation	Remove to fresh air. If symptoms develop take medical help. If not breathing, give artificial respiration preferably mouth to mouth.
Ingestion	Take medical help. Induce vomiting either by giving salt water or by sticking fingers down the throat. Do not give anything by mouth if the person is drowsy, unconscious.





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8. SPILL OR LEAK PROCEDURE

Step to be taken in case material
is released or spilled

Soak up spills with sand or earth. Small spills can
be washed with soap water.

Waste disposal method

Incinerate. Do not dispose in sewer.

9. SPECIAL PRECAUTIONS & STORAGE DATA

Storage temp.

Ambient.

Precautions

Keep away from heat, sparks & open flame. Keep
container closed. Use proper ventilation. Avoid
contact with eyes and skin.

10. PROTECTIVE EQUIPMENT

Eyes

Use safety goggles.

Hands

Use rubber gloves.

Respirator

Good ventilation. In emergency use self
breathing apparatus.

11. TRANSPORTATION DATA

IMO proper shipping Name

Dye-Liquid Toxic

IMO UN No.

3082

IMO UN Class

9

IMDG Code page

N.A

Packing Group

III

12. LABEL DATA

Label required

Yes

Common Name

Liquid Blue dye

Chronic Hazard

Yes

Signal Word

Danger

Acute Health Hazard

Moderate

Contact Hazard

Moderate



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ON-SITE EMERGENCY PLAN

INDIAN OIL CORPORATION LIMITED,
PARADEEP TERMINAL



IndianOil

Fire Hazard	Moderate
Reactivity Hazard	None

13. TOXICOLOGY

Acute Oral Toxicity (Rats)	LD ₅₀ >5000mg/kg
Skin Irritation (Rabbits)	Irritation on Prolonged Exposure
Route of Entry	Inhalation, Skin, Ingestion.
Carcinogenicity - NTP	No
Carcinogenicity - IARC	No
Carcinogenicity - OSHA	No

14. ECOLOGICAL EFFECTS

Not studied. However, as solubility in water is extremely low it should not affect the aquatic life. Product can be mechanically separated in effluent treatment plants.

15. DISCLAIMER

The information contained herein is to the best of our knowledge and belief. However conditions of handling and use are beyond our control, the above said conclusions and recommendations are without liability on our part.





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ULTRAZOL-E 9889

LubrizolMaterial Safety Data Sheet
ULTRAZOL-E 9889

Prepared according to 29 CFR 1910.1200

1	Chemical Product and Company Identification
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The Lubrizol Corporation
29488 Euclidland Boulevard
Wickliffe, Ohio 44092
Tel: (440) 943-4290

Product Trade Name: ULTRAZOL-E 9889
CAS Number: Not applicable for mixture.
Synonyms: None
Generic Chemical Name: MIXTURE
Product Type: Gasoline additive
Preparation Revision Date: 29 April 2014
Transportation Emergency Phone No.: FOR TRANSPORT EMERGENCY call CHEMTRIC: 1-1-703-527-3887 (outside the U.S. & 1-800-424-9300) in the U.S.
MNDS No.: 14215as/262a224-905471-1/02163

2	Hazard Identification
---	-----------------------

Appearance: Light colored liquid.
Odor: Hydrocarbon
Principal Hazards:

- Causes severe irritation to the respiratory tract
- Flammable liquid, very sensitive flash fire hazard
- Flammable
- Causes eye irritation
- Causes skin irritation
- May be harmful if swallowed
- Contains components which may cause cancer
- May cause damage to health

Target Organ(s): Central nervous system/Eye



See Section 11 for complete health hazard information.

3	Composition Information on Ingredients
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Hazardous Ingredients

Comp.	CAS No.	Percentage (by wt.)	Comments
Naphthalene	110-96-9	20.00%	NE
Ethylbenzene	100-31-4	6.7%	IARC Suspect Carcinogen
Petroleum naphtha	6-17-42-94-5	From 5 to 95 percent	NE
Naphthalene	91-20-3	6.6%	IARC Suspect Carcinogen NTP Carcinogen
Toluene	108-88-3	From 0.1 to 0.9 percent	NE

(N.E.) - None established

4	First Aid Measures
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Eyes: Rinse continuously with water for 20 minutes, or until chemical is removed. Remove contact lenses, if present and easy to do. If eye irritation persists, get medical attention.

Skin: Immediately remove all contaminated clothing. Rinse skin with water + shower. If skin irritation occurs, get medical attention. Launder contaminated clothing before reuse.

Inhalation: Remove victim to fresh air and keep at a positive comfortable low breathing. If breathing is labored, administer oxygen. If breathing has stopped, apply artificial respiration. Immediately call a poison center or doctor.



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ULTRATEL-3-1995

Oral

Additional Information

DO NOT INDUCE VOMITING. See section 3 for medical treatment.

If exposed to contact, get medical advice.

P Fire Fighting Measures

Flash Point

11 °C, 51°F (Typical)

Extinguishing Media

CO₂, dry chemical, foam. Water can be used to cool and protect exposed materials.

Firefighting Procedures

Wear full protective firegear including self-contained breathing apparatus operated in the positive pressure mode with full facepiece mask worn, gloves and suit. Water spray cone splitting. A water stream of 6 m will split the flame front if saturated.

Unusual Fire & Explosion Hazards

Tonic flammable vapors may result in burning. Vapors may be heavier than air and may travel along the ground to a distant ignition source and flashback. Consider any explosive setting. See section 11 for additional information.

Q Accidental Release Measures

Spill Procedures

May form explosive mixtures with air. Immediately evacuate all personnel from danger area. Personal Protection: If exposure can be avoided, use Personal Protection Systems for PPE recommendations. Take precautions to avoid release to the environment. Eliminate all sources of heat, sparks, pilot lights, arcs, electricity and open flames. Ventilate spill area. Prevent entry into drains and waterways. If spill of an aerosol occurs with oil, alcohol, water and fuel no treatment required. Puff up the liquid. Encourage surface dispersal if it can be accomplished safely with explosion-proof equipment. Related liquids can be absorbed in inert material. Check under Transportation and Shipping (DOT-CERCLA) and Other Regulatory Information Section (SARA) for transportation regulations to determine regulatory responses to spills.

R Handling and Storage

Pouring Temperature

Austere

Maximum Heating Temperature

Austere

Handling Procedures

Keep away from incompatible materials such as heat, sparks and open flame. No smoking. Keep containers closed whenever in use. Do not discharge into drains or the environment, despite its unfiltered waste collection point. Use appropriate cleaning agent to avoid incompatible combinations. Do not breath dust. Wear gauze mask, respirator or respirator. Ground, bond containers and equipment frequently. Use explosion-proof equipment. Take precautions to avoid static discharge. Use only non-sparking tools. Use only methods or at a well-ventilated area. Wash thoroughly after handling. Provide uncontaminated defiance before reuse. Proper containerization must be maintained. Do not eat, drink, bathe, smoke, drill, sand or expose containers to heat, flame, spark or other source of ignition. Dispose of packaging or containers in accordance with local, regional, national and international regulations.

Maximum Storage Temperature

Austere

Storage Procedures

Do not store near potential sources of ignition. Isolated outside storage is preferred. Inside storage areas should be as fire-resistant as possible as storage area. Take precautions to avoid release to the environment. Store in a well-ventilated place. Keep cool. Keep containers tightly closed. Store upright. See section 11 for incompatible materials.

Maximum Loading Temperature

Not determined

S Exposure Controls/Personal Protection

Exposure Limit

Comp	OSHA		ACGIH		Other	
	TWA	STEL	TWA	STEL	TWA	STEL
Naphtha	107 ppm	STL	167 ppm	150 ppm	STL	STL
Light benzene	200 ppm	STL	20 ppm	125 ppm	STL	STL
Petroleum naphthalene	NE	STL	NE	NE	100 ppm	STL
Naphthalene	10 ppm	STL	17 ppm	15 ppm	STL	STL
Toluene	250 ppm	200 ppm	20 ppm	STL	STL	STL

(E)-Skin exposure

(F)-Respiratory tract

(G)-Eye irritation

(H)-Reproductive effects

(I)-Supplier recommended exposure limit

(N/A) - None established

Confidential - See section 1 for HSDRA exemption status

Other Exposure Limits

None known

Engineering Controls

Use local exhaust ventilation to control levels of vapors. Additional ventilation or exhaust may be required to reduce air concentrations below recommended exposure limits. Use explosion proof equipment.

Gloves Procedures

Viton, Teflon, Polyvinyl acetate. Non-polyvinyl chloride gloves are water soluble and should not be used when there is potential for white contact.

Eye Protection

Chemical goggles or shielded



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Respiratory Protection

The self-contained breathing apparatus for entry into confined space, for other poorly ventilated areas and for large spill clean-up sites. Consult with an industrial hygienist to determine the appropriate respiratory protection for your specific use of this material. A respirator protection program in compliance with all applicable regulations must be followed whenever workplace conditions require the use of a respirator.

Clothing Recommendation

Gloves, coveralls, apron, boots or necessary to minimize contact. Wear either a chemical protective suit or apron when potential for contact with material exists. Do not wear rings, watches or similar apparel that could entrap the material and cause a skin reaction. Launder contaminated clothing before reuse.

9	Physical and Chemical Properties
Flesh Point	81 °C, 87.6 °F 25°C (Typical)
Upper Flammability Limit	Not determined
Lower Flammability Limit	Not determined
Autoignition Point	Not determined
Explosion Data	Material does not have explosive properties in the liquid state, but vapors may form explosive mixtures with air.
Vapor Pressure	0.0296 psi (Calcd) @ 0 °C 0.0759 psi @ -10 °C 0.07211 psi (Calcd) @ 20 °C 0.19261 psi (Calcd) @ 38 °C 1.17279 psi (Calcd) @ 77 °C
pH	Not determined
Specific Gravity	0.91 (15.6 °C)
Bulk Density	7.57 lb/gal, 303 kg/L
Water Solubility	Insoluble
Percent Volatile	Not determined
Volatile Organic Compound	- 41.9%
Vapor Density	Not determined
Evaporation Rate	Not determined
Odor	Hydrocarbon
Appearance	Light colored liquid
Viscosity	124 Centistokes (0 °C) 36 Centistokes (25 °C) 22 Centistokes (40 °C)
Oder Threshold	Not determined
Boiling Point	> 237 °C, > 278.6 °F (estimated)
Four Point Temperature	-55 °C, < -71 °F
Melting / Freezing Point	Not determined

The above data are typical values and do not constitute a specification. Vapor pressure data are calculated unless otherwise noted.



10	Stability and Reactivity
Stability	Material is normally stable at moderately elevated temperatures and pressures.
Decomposition Temperature	Not determined.
Incompatibility	Strong oxidizing agents
Polymerization	Will not occur.
Thermal Decomposition	Smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion.
Conditions to Avoid	Not determined.

11	Toxicological Information
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- ACUTE EXPOSURE -

Eye Irritation	Moderate to strong eye irritant. Based on data from similar materials.
Skin Irritation	Skin irritant. Based on data from similar materials. Prolonged or repeated skin contact as from clothing wet with material may cause dermatitis. Symptoms may include redness, edema, dryness, and cracking of the skin.
Respiratory Irritation	Severe nose, throat and lung irritant. Based on data from similar materials.
Dermal Toxicity	The LD50 in rabbit is ~ 2099 mg/Kg. Based on data from components or similar materials. Components of this material may be absorbed through the skin.
Inhalation Toxicity	The LC50 (1 hr) varies for vapors of the material to > 279 mg/L. Based on data from components or similar materials. High concentrations may cause headaches, dizziness, fatigue, nausea, vomiting, diarrhea, stupor, other central nervous system



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DEFINITION OF WORDS

Oxidant	object leading to visual impairment, respiratory irritation, neurotoxicity, and death. The LC50 value of this product is 0.700 ppm.
Debris	The LD50 value is ~ 10,000 mg/kg. Based on data from component or similar materials, the following shall control classification of mixture: explosives and dynamite, emulsions, oxidizers, desensitizers and detonated prop.
Inhalation Sensitization	No data available to indicate product or components may be an IGE sensitizer.
Irritation Sensitization	No data available to indicate product or components may be respiratory sensitizers.
Chronic Irritancy	Reported as responsible to persistent regular eye contact nervous system disease. Nystagmus has been found to cause cardiac arrhythmia effects, associated eye disease in laboratory animals. Prolonged and repeated inhalation of hydrocarbons vapors such as styrene can cause chronic neurological difficulties. Chronic exposure to styrene has been shown to cause learning loss in experimental animals.
Carcinogenicity	A two-year National Toxicology Program (NTP) study found an increased incidence of tumors of the nose/skin exposed to styrene by inhalation. In mice, females exposed, increased incidence of fibrosarcoma adenomas were observed. Styrene has been classified by the International Agency for Research on Cancer (IARC) as a possible human carcinogen (Group 2B) on the basis of sufficient evidence of carcinogenicity in experimental animals but inadequate evidence in exposed humans. A National Toxicology Program (NTP) study found an increased incidence of nasal fibrosarcoma in male and female rats exposed to styrene by inhalation for 18 months. Female and female mice similarly exposed, increased incidence of fibrosarcoma adenomas were found, and hepatocellular neoplasms, respectively, were observed. Styrene has been classified by IARC as a possible human carcinogen (Group 2B) on the basis of sufficient evidence of carcinogenicity in experimental animals but inadequate evidence in exposed humans.
Mutagenicity	No data available to indicate product or any component present at greater than 0.1% are mutagenic or genotoxic.
Reproductive Toxicity	No data available to indicate either product or components present at greater than 0.1% are any type reproductive toxicity.
Teratogenicity	No data available to indicate either product or components present at greater than 0.1% are any type teratogenic.
Others	No other health hazard known.

- ADDITIONAL INFORMATION -

13	Eco-toxicological Information
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- ENVIRONMENTAL TOXICITY -

Freshwater Fish Toxicity	The acute LC50 is 1 - 10 mg/L based on component data. Chronic effect exposure is 0.1-10 mg/L based on component data.
Freshwater Invertebrate Toxicity	The acute EC50 is 1 - 10 mg/L based on component data. Chronic effect exposure is 0.1-10 mg/L based on component data.
Algal Inhibition	The acute EC50 is 1 - 10 mg/L based on component data.
Saltwater Fish Toxicity	The acute LC50 is 10 - 100 mg/L based on component data.
Saltwater Invertebrates Toxicity	The acute LC50 is 10 - 100 mg/L based on component data.
Bioconcentration	Not determined
Miscellaneous Toxicons	Not determined

- ENVIRONMENTAL FATE -

Biodegradation	At least 20% of the component in the product does not readily biodegrade based on OECD 301D test data.
Bioconcentration	1 - 10% of the component potentially bioconcentrates. Based on octanol/water coefficient.
Soil Mobility	Not determined

14	Disposal Considerations
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Water Disposal	This material, if discarded, is a hazardous waste under RCRA Requirements for CTR 261. Material, if discarded, expected to be disposed in accordance with RCRA due to ignitability (D001), 1500°F. Benzene, CAS no. 71-43-2, D010. Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State, Provincial, and Local regulations.
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15	Transport Information
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ICAO TATA I	UN1999 Flammable Liquids, n.o.s. (D01 Benzene, Xylenes, 1-2)
ICAO TATA II	UN1999 Flammable Liquids, n.o.s. (D01 Benzene, Xylenes, 1-2), Marine Pollution (Hazardous Pollution none)
EMDG	UN1999 Flammable Liquids, n.o.s. (D01 Benzene, Xylenes, 1-2), Marine Pollution (Hazardous Pollution none)
TDG/ EMSI File	1-2
TDG/ EMSI Spill	2B
TDG/ MEAG	*Inhalation 4.2
MARPOL Annex II	Not determined



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UL TRA ZOLE 9460:

Swedish Registration Number	Not Registered
Norwegian Registration Number	Not Registered
Danish Registration Number	Not Registered
Swiss Registration Number	Not Registered
Italian Registration Number	Not Registered

- Other : International -

Miscellaneous Regulatory Information	Not determined
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16	Other Information
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US NFPA Codes

Health	Fire	Riskivity	Special
2	1	0	NE

(N/E) - None established

HMIS Codes

Health	Fire	Riskivity
2	3	0

Precautionary Labels

Danger

- Causes severe irritation to the respiratory tract.
- Flammable liquid, may create a flammable fume.
- Harmful if inhaled.
- Causes eye irritation.
- Causes skin irritation.
- May be fatal if absorbed through skin.
- Contains components which may cause cancer.
- May cause chronic health effects.

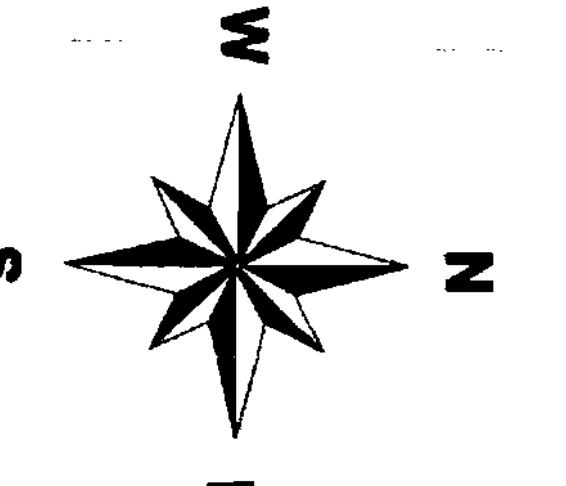
Revision Indicators

This MSDS has no revisions since 29 April 2014

In the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the results connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.



SITE PLAN
NOT TO SCALE



LAND OF I.O.C.

LANDS OF H.P.C.

331500MM
211820MM
307320MM

516760MM

591500
LANDS OF B.P.C.L.

VACANT LAND

LANDS OF H.P.C.

211820MM
307320MM

516760MM

591500
LANDS OF B.P.C.L.

VACANT LAND

LIST OF FACILITIES

No. / No.	DESCRIPTION	SIZE
1	ADMINISTRATIVE BUILDING (M4)	24.8 X 8 M
2	CANISTER HOUSE SHED	—
3	BLACK & WHITE OPERATED GATE	—
4	CANTER	16.8 X 8 M
5	TIME WAGON STATION	8.0 X 8 M
6	MAIN RAIL-STATION BUILDING	26.0 X 8 M
7	IPM BATTERY (DOCK LINE)	8.0 X 8 M
8	PUMP HOUSE BATTERY (DOCK LINE)	21.0 X 8 M
9	CALIBRATION TOWER	1.0 X 8 M
10	CONTROL ROOM	1.0 X 8 M
11	CONTRO ROOM	1.0 X 8 M
12	CONTRO ROOM	1.0 X 8 M
13	CONTRO ROOM	1.0 X 8 M
14	CONTRO ROOM	1.0 X 8 M
15	LAW WAREHOUSE (STORE ROOM)	27.0 X 8 M
16	NEW LAB DROG (STORE ROOM)	10.0 X 8 M
17	REPTITORS STORE ROOM	7.0 X 8 M
18	PUMP HOUSE (MANUFACTORY)	—
19	CHAMBER ROOM	8.0 X 8 M
20	TIN CONTROL ROOM	1.0 X 8 M
21	TIN HOUSE (MANUFACTORY)	16.0 X 8 M
22	TIN HOUSE (MANUFACTORY)	16.0 X 8 M
23	TOILET PLATFROM (12.0 M X 7.0 M)	12.0 X 7.0 M
24	TOILET PLATFROM (12.0 M X 7.0 M)	12.0 X 7.0 M
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26	TOILET PLATFROM (12.0 M X 7.0 M)	12.0 X 7.0 M
27	WATER TOWER	4.0 X 8 M
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