Oil and Natural Gas Corporation Limited
Health, Safety and Environment Department,
Western Onshore Basin, Regional Stores Complex,
Makarpura Road, Vadodara – 390009
(Tele – 0265-2603355, Fax – 0265-2638865)

DATE: 26.08.2019

To,
The Additional Principal Chief Conservator of Forests (Central),
MOEF& CC, Regional Office,
Link Road No.3, E-5 Arera Colony,
BHOPAL-462016

Sub: Six monthly Compliance Report of Environmental Clearance for Exploratory Drilling of Wells in, WON Basin, ONGC, Baroda period: 01.01.2019 to 30.06.2019 in Cambay Asset

EC letter No. J-11011/102/2012-IA II(I), dated 22.08.2013

Dear Sir,

With reference to above mentioned Environmental Clearances issued by MOEF& CC, please find herewith six monthly compliance report as on 30.06.2019 [for the period **01.01.2019 to 30.06.2019**] for exploratory drilling of wells:

a. SSAH
b. PDCJ

Any other information/ documents desired, shall be furnished most gladly

Thanking you,

Yours sincerely,

26/08/19

(M. K. Garg)
GM – I/C Env. Mgmt.
HSE, Baroda

End.: As Above

Pl. fax. Kind Attention (1) Shri D. Purkayastha, GM - coord to Director (E) (2) Shri D.K. Trivedi, HSE, Baroda 23737745

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F. No. J-11011/102/2012- IA II (I)
Government of India
Ministry of Environment and Forests
(I.A. Division)

Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi - 110 003

E-mail : vp.upadhyay@nic.in
Telefax : 011: 2436 2875
Dated:22[nd] August, 2013

To,

Shri P.K. Marla (DGM-Incharge HSE)
M/s Oil and Natural Gas Corporation Ltd.
Jeevan Bharti Bldg. Tower-II, 9th floor,
124-Indira Chowk, New Delhi- 110001

E-mail : sharma_js@ongc.co.in; sharmajswarup@hotmail.com; Fax No.: 0265-2638055 / 011-22406681

Subject: Exploratory Drilling of 182 Wells in 33 Blocks Western onshore Basin, Baroda, Ahemdabad, Gandhinagar, Mehsana, Anand and Kheda District Gujarat by M/s ONGC Ltd. – Environmental Clearance reg.

Ref. : Your letter no. ONGC/CHSE/ENV/EC/2012-13 dated 22[nd] March, 2013.

Sir,

This has reference to your letter dated 22[nd] March, 2013 alongwith Form-1, Prefeasibility Report and EIA/EMP report regarding the above mentioned subject.

2.0 The Ministry of Environment & Forests has examined your application. It is noted that proposal is for exploratory drilling of 182 Wells in 33 Blocks Western onshore Basin, Baroda, Ahemdabad, Gandhinagar, Mehsana, Anand and Kheda District Gujarat by M/s ONGC Ltd. As per hydrocarbon exploration programme, ONGC intends to drill 182 exploratory wells in the ML blocks in next 5 years. The proposed drilling is spread over an area of 3048.166 Km^2. Targeted depths of well will be in range of 600 m to 3500 m. Total cost of project is Rs. 1500 Crore. No. National Park/ Wildlife Sanctuary is located within 10 Km distance of proposed wells. Details of 33 ML Blocks with 182 proposed Wells are given below:

S. N.	Name of ML Blocks	Area in Sq. Km.	No. of wells to be drilled
1	Ahmedabad-Bakrol	30.160	3
2	Ahmedabad Ext-I to V	65.980	6
3	Asmali	43.256	4
4	Balasar	12.000	3
5	Gamij and Gamij Ext.-I to III	252.013	9
6	Halisa	143.441	6
7	Hirapur	87.918	6
8	Kadi Ext-III to V	34.350	6
9	Kalol (Main) and Ext.-I to II	211.262	8
10	Kalol North-East	9.440	2
11	Kalol West & Ext.-I to II	61.539	8
12	Limbodra & Ext.-I	30.707	5
13	Lohar	8.910	1
14	Motera, Ext.-I & II	65.366	8

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15	Nandej, Nandej East & Ext.-I	187.275	6
16	Nawagam & Ext.-I to III	145.656	7
17	Nawagam South Ext-I to III	128.530	6
18	Paliyad-Kalol-Limbodra	161.479	6
19	Rajpur & Ext-I	15.455	2
20	Rupal	14.060	4
21	Sanand & sanand Ext.-I to III	129.540	8
22	Wamaj & South Wamaj	38.730	6
23	Valod & Vrlod Ext.-I	118.580	8
24	Varsada-Halisa & Ext-I	324.000	9
25	Viraj	17.490	3
26	Wadu & Wadu Ext-I	70.583	6
27	Kathana & Kathana Ext.-I	33.944	3
28	Cambay	2.600	1
29	Siswa	37.764	4
30	Akholjuni	81.260	6
31	Ankiav Ext-I	61.000	5
32	Chaklasi-Rasnol & Ext-I	225.000	9
33	Vasad-Kathol & Ext.-I to III Part I, II & III	199.875	6
	TOTAL		182

3.3 Air emissions from D.G. sets will be dispersed by providing adequate stack height. Water based mud will be used. Total water requirement from tanker supply will be 35 m^3/day. Drilling and wash water generation will be 3 m^3/day and treated in ETP and stored in HDPE lined pit. Domestic effluent will be treated in septic tank followed by soak pit. No effluent will be discharged outside the premises and 'Zero' effluent discharge concept will be adopted. Drill cutting (DC) will be separated from water based mud (WBM) and washed properly and unusable drilling fluids (DF) will be disposed off in well designed lined pit with impervious liner for solar drying. Disposal of drill cuttings and drill mud will be carried out in accordance with the GSR 546 (E) dated 30th August, 2005. Used oil will be sent to authorized recyclers

4.0 The proposal was considered by the Expert Appraisal Committee (Industry) in its meetings held during 13th-14th April, 2012, 8th-9th January, 2013 and 10th-11th June, 2013 respectively.

5.0 All the projects related to offshore and onshore Oil and Gas exploration, development and production are listed in para 1(b) of schedule of EIA Notification, 2006 covered under category 'A' and appraised at central level.

6.0 Public hearing was exempted as per para 7 (ii) of EIA Notification, 2006.

7.0 Based on information submitted by you and presentation made by you, the Ministry of Environment and Forests hereby accords environmental clearance to the above project under the provisions of EIA Notification dated 14th September, 2006 subject to strict compliance of the following specific and general conditions:

A. SPECIFIC CONDITIONS :

i. This EC is only for Exploratory Drilling. In case Development drilling is to be done in future, prior clearance must be obtained from the Ministry.

ii. As proposed, no drilling shall be carried out within 10 Km distance from Thol Wildlife Sanctuary

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iii Gas produced during testing shall be flared with appropriate flaring booms. The flare system shall be designed as per good oil field practices and Oil Industry Safety Directorate (OISD) guidelines. The stack height shall be provided as per the regulatory requirements and emissions from stacks will meet the MOEF/CPCB guidelines.

iv. Ambient air quality shall be monitored near the closest human settlements as per the National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November, 2009 for PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, methane & Non-methane HC etc.

v Mercury shall also be analyzed in air, water and drill cuttings twice during drilling period.

vi. Approach road shall be made pucca to minimize generation of suspended dust.

vii The company shall make the arrangement for control of noise from the drilling activity. Acoustic enclosure shall be provided to DG sets and proper stack height shall be provided as per CPCB guidelines.

viii Total water requirement shall not exceed 50 m^3/day and prior permission should be obtained from the Competent Authority.

ix. The company shall construct the garland drain all around the drilling site to prevent runoff of any oil containing waste into the nearby water bodies. Soparate drainage system shall be created for oil contaminated and non-oil contaminated. Effluent shall be properly treated and treated wastewater should conform to CPCB standards.

x. Drilling wastewater including drill cuttings wash water shall be collected in disposal pit lined with HDPE lining evaporated or treated and shall comply with the notified standards for on-shore disposal. The membership of common TSDF should be obtained for the disposal of drill cuttings and hazardous waste. Otherwise, secured land fill should be created at the site as per the design approved by the CPCB and obtain authorization from the SPCB. Copy of authorization or membership of TSDF shall be submitted to Ministry's Regional Office at Bhopal.

xi Good sanitation facility shall be provided at the drilling site. Domestic sewage shall be disposed off through septic tank/ soak pit.

xii. Oil spillage prevention scheme should be prepared. In case of oil spillage/contamination, action plan should be prepared to clean the site by adopting proven technology. The recyclable waste (oily sludge) and spent oil should be disposed of to the authorized recyclers.

xiii The company shall comply with the guidelines for disposal of solid waste, drill cutting and drilling fluids for onshore drilling operation notified vide GSR.546(E) dated 30th August, 2005.

xiv. The Company shall take necessary measures to prevent fire hazards, containing oil spill and soil remediation as needed. Possibility of using ground flare shall be explored. At the place of ground flaring, the overhead flaring stack with knockout drums shall be installed to minimize gaseous emissions during operation.

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xv. The company shall develop a contingency plan for H_2S release including all necessary aspects from evacuation to resumption of normal operations. The workers shall be provided with personal H_2S detectors in locations of high risk of exposure along with self contained breathing apparatus

xvi On completion of drilling, the company have to plug the drilled wells safely and obtain certificate from environment safety angle from the concerned authority

xvii. Blow Out Preventer (BOP) system shall be installed to prevent well blowouts during drilling operations. BOP measures during drilling shall focus on maintaining well bore hydrostatic pressure by proper pre-well planning and drilling fluid logging etc.

xviii. Emergency Response Plan (ERP) shall be based on the guidelines prepared by OISD, DGMS and Govt. of India.

xix The company shall take measures after completion of drilling process by well plugging and secured enclosures, decommissioning of rig upon abandonment of the well and drilling site should be restored to the original condition. In the event that no economic quantity of hydrocarbon is found a full abandonment plan shall be implemented for the drilling site in accordance with the applicable Indian Petroleum Regulations.

xx Abandoned well inventory and remediation plan shall be submitted within six months from the date of issue of letter.

xxi. Occupational health surveillance of the workers shall be carried out as per the prevailing Acts and Rules.

xxii. In case the commercial viability of the project is established, the Company shall prepare a detailed plan for development of oil and gas fields and obtain fresh environmental clearance from the Ministry.

xxiii. Restoration of the project site shall be carried out satisfactorily and report shall be sent to the Ministry's Regional Office at Bhopal.

xxiv. Oil content in the drill cuttings shall be monitored by some Authorized agency and report shall be sent to the Ministry's Regional Office at Bhopal.

xxv. Under Enterprise Social Commitment (ESC), sufficient budgetary provision shall be made for health improvement, education, water and electricity supply etc. in and around the project.

xxvi. An audit shall be done to ensure that the Environment Management Plan is implemented in totality and report should be submitted to the Ministry's Regional Office

xxvii. A social audit shall be carried out for the whole operation area with the help of reputed institute like Madras Institute of Social Science etc.

xxviii. All personnel including those of contractors shall be trained and made fully aware of the hazards, risks and controls in place.

xxix. Company shall have own Environment Management Cell having qualified persons with proper background.

xxx. Company shall prepare operating manual in respect of all activities. It shall cover all safety & environment related issues and system. Measures to be taken for protection. One set of environmental manual shall be made available at the drilling site/ project site. Awareness shall be created at each level of the management. All the schedules and results of environmental monitoring should be available at the project site office.

B. GENERAL CONDITIONS:

i. The project authorities must strictly adhere to the stipulations made by the Gujarat Pollution Control Board (GPCB), State Government and any other statutory authority.

ii. No further expansion or modification in the project shall be carried out without prior approval of the Ministry of Environment & Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.

iii. The project authorities must strictly comply with the rules and regulations under Manufacture, Storage and Import of Hazardous Chemicals Rules, 2000 as amended subsequently. Prior approvals from Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. must be obtained, wherever applicable.

iv. The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).

v. A separate Environmental Management Cell equipped with full fledged laboratory facilities must be set up to carry out the environmental management and monitoring functions.

vi. A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad / Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions / representations, if any, were received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent.

vii. The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MOEF, the respective Zonal Office of CPCB and the GPCB. The criteria pollutant levels namely, PM_{10}, SO_2, NOx, HC (Methane & Non-methane), VOCs (ambient levels) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.

viii. The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEF, the respective Zonal Office of CPCB and the GPCB. The Regional Office of this Ministry / CPCB / GPCB shall monitor the stipulated

conditions. Environmental Clearance and six monthly compliance status reports shall be posted on the website of the company.

ix. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company alongwith the status of compliance of environmental conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail

x The Project Proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the GPCB and may also be seen at Website of the Ministry of Environment and Forests at http./envfor.nic in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the Regional office.

xi Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.

8.0 The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

9.0 The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.

10.0 The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, Air (Prevention & Control of Water Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008 and the Public Liability Insurance Act, 1991 along with their amendments and rules.

(V. P. Upadhyay)
Director

Copy to.

1. The Principal Secretary, Forests & Environment Department, Government of Gujarat, Sachivalaya, 8th Floor, Gandhi Nagar - 382 010, Gujarat
2. The Chief Conservator of Forests (Western Zone), Ministry of Environment & Forests, Regional Office, E-5, Arera Colony, Link Road -3, Bhopal -462 016, M.P.
3. The Chairman, Central Pollution Control Board Parivesh Bhavan, CBD-cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
4. The Chairman, Gujarat State Pollution Control Board, Paryavaran Bhawan, Sector 10 A, Gandhi Nagar-382 043, Gujarat.
5. Monitoring Cell, Ministry of Environment and Forests, Paryavaran Bhavan, CGO Complex, New Delhi.
6. Guard File/ Record File/Notice Board.

(V. P. Upadhyay)
Director

COMPLIANCE OF CONDITIONS IN ENVIRONMENTAL CLEARANCE
(COMPLIANCE REPORT)

Environmental Clearance No. J-11011/102/2012-IA II(I), dated 22.08.2013

Well No.: SSAH

Sl.No.	Conditions	Compliance status as on 30.06.2019
i	This EC is only for Exploratory Drilling. In case Development drilling is to be done in future, prior clearance must be obtained from the Ministry	**Complied.** This EC and conditions prescribed therein are only for drilling exploratory wells whereas for drilling development wells separate EC will be taken.
ii	As proposed, no drilling shall be carried out within 10 km distance from Thol Wild life sanctuary.	**Complied.** As proposed the exploratory well PDCI was not drilled in the environmental sensitive zone (SEZ) of THOL wild life sanctuary as has been notified vide SO 3202 (E), dt. 18.10.2013. The extent of eco-sensitive zone has been modified by MoEFCC vide notification dt: 09.02.2015 and it now ranges from 0.308 km to 2.244 km from the boundary of the sanctuary.
iii	Gas produced during testing shall be flared with appropriate flaring booms. The flare system shall be designed as per good oil field practices and Oil Industry Safety Directorate (OISD) guidelines. The stack height shall be provided as per the regulatory requirement and emissions from stacks will meet the MoEF/ CPCB guidelines	**Complied.** If any quantity of gas is produced during testing there is a provision of flaring in place which is in accordance to OISD guidelines and as prescribed by CPCB vide its letter dt: 27.04.2016. All the quantity of gas come across testing is flared through elevated flare equipped with separator and knock out drum. No ground flaring is resorted to.
iv	Ambient air quality should be monitored near the closest human settlements as per the National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No.826(E) dated 16th November,2009 for PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, methane & Non-methane HC etc	**Complied** Ambient air quality was monitored through 3rd party for PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, methane & Non-methane HC, within and upto the premises of drill site. It is evident from the monitoring reports placed as Annexure - I that the concentration of all parameters are within prescribed limits
v	Mercury should also be analyzed in air, water and drill cuttings twice during drilling period.	**Complied.** Mercury was analyzed in waste water & drill cuttings during drilling period. Report placed as Annexure – II
vi	Approach road should be made pucca to minimize generation of suspended dust	**Complied.** Approach road to drill site are made of metals to minimize generation of suspended dust during transportation of rig equipment, etc. In case of this well approach road of dimension 1200m x 5.0 m was constructed
vii	The company should make the arrangement for control of noise from the drilling activity. Acoustic enclosure should be provided to DG Sets and proper stake height should be provided as per CPCB guidelines.	**Complied** Acoustic enclosure have been provided to DG sets to reduce noise within permissible limits. Noise level monitoring divulge the efficiency of the acoustic enclosures when the noise levels were monitored within the perimeters of the drill site. However, the noise levels are slightly higher near the engine house and mud pump area and personnel working in these areas are always using ear muff/plug. Brief reports placed as Annexure-III. The stack height of the rig engines (engine capacity 380 KVA each) are as per CPCB guidelines on stack height.

viii	Total water requirement should not exceed 50 M3/day and prior permission should be obtained from the competent authority.	**Complied.** During the drilling activity the water consumption was approx. 35 m3 per day on an average.
ix	The Company should construct the garland drain all around the drilling site to prevent run off any oil containing waste it to the nearby water bodies. Separate drainage system should be created for oil contaminated and non-oil contaminated Effluent should be properly treated and treated waste water should confirmed to CPCB standards	The garland drains are not constructed to prevent run off any oil contaminating waste as all the vulnerable processes like diesel storage tank, POL shed have their dedicated containment whereas Drains are constructed throughout the drill site near mud pumps, cellar pit, mud tanks which drain waste water in HDPE lined waste pit. No garland drains are constructed around drill sites as these are not required since the waste pits have enough volume to accumulate waste water and prevent any run off. The drilled cuttings and other wastes are collected in HDPE lined waste pits and solar dried. It is notable that Gujarat is rain deficient area and chance of run off from drill site area is very remote. As the drill site effluent is a soft effluent, the suspended particles like bentonite clay are settled leaving clear supernatant water which at times is recycled for washing purpose. Please refer to Annexure-II. In view of above the same may be considered as **Complied.**
x	Drilling waste water including drill cuttings wash water shall be collected in disposal pit lined with HDPE lining evaporated or treated and shall comply with the notified standards for on-shore disposal. The membership of common TSDF shall be obtained for the disposal of drill cuttings and hazardous waste. Otherwise secured land fill shall be created at the site as per design approved by the CPCB and obtain Authorization from the SPCB. Copy of authorization or membership od TSDF should be submitted to Ministry's Regional Office at Bhopal.	**Complied.** Drilling waste water including drill cuttings wash water is collected in disposal pit lined with HDPE lining and solar dried. Drill cuttings from water based mud have been removed from the category of hazardous waste [Schedule I - rule 3 (1) (17) (i) of MOEFCC notification dt. 14.04.2016]. ONGC Cambay is member of TSDF at M/S Recycling Solutions Pvt. Ltd - Annexure - IV.
xi	Good sanitation facility should be provided at the drilling sites. Domestic sewage should be disposed of through septic tank/soft pit.	**Complied.** Domestic sewage is disposed through adequate septic tanks and soak pits
xii	Oil spillage prevention scheme should be prepared. In case of oil spillage/contamination, action plan should be prepared to clean the site by adopting proven technology. The recyclable waste [oily sludge] and spent oil should be disposed of to the authorized recycler.	**Complied.** Oil spillage prevention plan like containments of diesel storage tank, POL shed and testing tank [during production testing] and drainage leading to waste pit are in place. However, in case of oil spill and contamination of soil thereof, ONGC is equipped with the technology of bio remediation to address such eventualities. It is notable that ONGC has a step down company M/S ONGC TERI BIO REMEDIATION LIMITED (OTBL) which has developed a consortium of bacteria capable of digesting entire range of hydrocarbon. Recyclable hazardous waste like Spent oil, POL barrels etc. are recycled centrally through authorized re-cyclers.

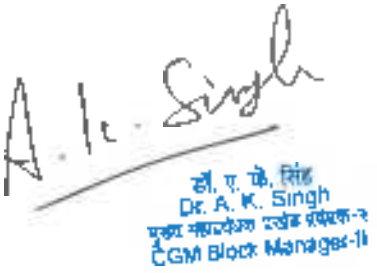
xiii	The company shall comply with the guidelines for disposal of solid waste drill cutting and drilling fluids for onshore drilling operation notified vide GSR.546 (E) dated 30th August, 2005.	**Complied** Solid waste like drill cuttings and effluent drilling fluids are collected in HDPE lined waste pits which is eventually back filled and covered with local soil after the drilling operations are over. Other solid wastes like oil contaminated hand gloves, cotton waste, fillers, chemical sack, etc. are disposed at TSD site
xiv	The company should take necessary measures to prevent fire hazards, containing blow and soil remediation as needed. Possibility of using ground flare should be explored. At the place of ground flaring, the overhead flaring stack with knockout drums should be installed to minimize gaseous emissions during operation.	**Complied** Each drilling rig in ONGC has fixed firefighting system and portable extinguishers in accordance to OISD 189. All personnel posted at DH site are trained in firefighting. Hot jobs are controlled through a permit system i.e. Hot Work Permit System. As mentioned above in point 12, in case of oil soil and contamination of soil thereof, ONGC is equipped with the technology of bio remediation to address such eventualities. It is noteworthy that ONGC has a step down company M/S ONGC TIDAL BIO REMEDIATION LIMITED (OTBL) which has developed a consortium of bacteria capable of digesting entire range of hydrocarbon. All the quantity of gas come across testing is flared through elevated flare equipped with separator and knock out drum. No ground flaring is resorted to.
xv	The company shall develop a contingency plan for H2S release including all necessary aspects from evacuation to resumption of normal operations. The workers should be provided with personal H2S detectors in locations of high risk of exposure along with self-containing breathing apparatus.	**Complied.** Emergency response plans for H2S release is available. H2S detector are available at drilling rigs. However it is pertinent to mention that H2S is usually not encountered during drilling operations in oil fields of Kheda district.
xvi	On completion of drilling, the company have to plug the oil wells safely and obtain certificate from the environment safety angle from the concerned authority	**Complied.** On completion of drilling the well is equipped with a Christmas Tree which safely regulates the flow of oil& gas. However, if any well is abandoned, it is plugged with a cement column as prescribed in OMR 2017 and the same is communicated to DGMS.
xvii	Blow Out Preventer (BOP) system should be installed to prevent well blowouts during drilling operations. BOP measures during should focus on maintaining wel bore hydrostatic pressure by proper pre-well planning and drilling fluid logging etc.	**Complied.** Appropriate Blow Out Preventer (BOP) systems having a set of Annular and RAM BOPs is installed to prevent well blowouts during drilling operations. Function test of BOPs are carried out frequently and care is taken to maintain proper hydrostatic pressure in the well bore during drilling, logging and other well operations by maintaining mud weight.
xviii	Emergency response plan(ERP) should be based on the guidelines prepared by OISD, DGMS and Government of India	**Complied.** ONGC has Site Specific Emergency Plan (HSE) and Contingency Plans and Disaster management Plan (DMP) based on relevant and realistic emergency scenarios. ERP and contingency plans are duly approved by DGMS whereas offsite DMP is approved by local district authorities. (Annexure - V)
xix	The company shall take measures after completion of drilling process by well plugging and secured enclosures, decommissioning of rig upon abandonment of the well and drilling site shall be restored to original condition. In	**Complied** ONGC has formulated a well-defined and plausible abandonment and restoration procedure which is being followed in the event of decision taken to abandon the well. The procedure is placed as Annexure - VI.

	the event that no economic quantity of hydrocarbon is found a full abandonment plan shall be implemented for the drilling site in accordance with the applicable Indian Petroleum Regulations.	
xx	Abandoned well inventory and remediation plan shall be submitted with in six month from the date of issue of letter.	**Complied**. Remediation plan is already addressed at point no xii above. This well is to be tested.
xxi	Occupational health surveillance of the workers shall be carried out as per the prevailing Acts and Rules.	**Complied**. PME of all employees is carried out as per company policy (Annexure - VII).
xxii	In case commercial viability of the project is established, the company shall prepare a detailed plan for development of oil and gas fields and obtain fresh environmental clearance from the Ministry.	**Complied**. In case of commercial viability of oil/gas, fresh EC is obtained for the entire block.
xxiii	Restoration of the project site should be carried out satisfactorily and report should be sent to Ministry's Regional Office at Bhopal	**Complied**. This well is abandoned. In case the well is abandoned, restoration of land will be taken up and the report shall be sent to Ministry's regional office Bhopal, after the job is over.
xxiv	Oil content in the drill cuttings should be monitored by some Authorized agency and report should be sent to the Ministry's Regional Office at Bhopal.	**Complied**. Cuttings are analyzed for oil content through M/S Eco system management pvt. Ltd., which is a reputed laboratory in the area. (Annexure-II).
xxv	Under Enterprise Social Commitment (ESC), sufficient budgetary provision should be made for health improvement, education, water and electricity supply etc. in and around the project	**Complied**. 2% of average net profit of ONGC is earmarked for CSR(Corporate Social Responsibility) projects which includes components of health, education, water, solar lights ecological development in or around operational area, as directed by GOI
xxvi	An audit should be done to ensure that the Environment Management Plan is implemented in totality and report should be submitted to Ministry's Regional Office	**Complied**. An annual environment audit is carried out through schedule auditors and the reports are submitted to Gujarat Pollution control Board. Apart from its annual internal audit and surveillance audit of Environment Management system is carried out in accordance to the protocol of ISO 14001. It is notable that all drilling rigs are maintaining 3rd party certified EMS based on ISO 14001.(Annexure - VIII)
xxvii	A social audit shall be carried out for the whole operational area with the help of reputed institute like Madras Institute of Social Science etc.	**Complied**. CSR schemes for social areas around the work centers of ONGC are usually rendered through reputed 3rd parties which keep on auditing on the progress of the CSR project.
xxviii	All personnel including those of contractors should be trained and made fully aware of the hazards, risks and controls in place	**Complied**. MVT (Mines Vocational Training) are imparted to all contractual workers before deployment at site. MVT trainings are specially designed to develop competence and skill of employees including contractual employees w.r.t risk management
xxix	. Company shall have own Environment Management Cell having qualified persons with proper background	**Complied**. EM Cell is at Corporate HSE of ONGC, New Delhi. HSE set up at unit level are also having qualified safety & environment officers
xxx	Company should prepare operating manual in respect of all activities. It should cover all safety & environment related issues and system. Measures to be taken for protection. One set of environment manual should be made available at the drilling site/project site. Awareness should	**Complied**. Standard Operating Procedures for drilling operations covering safety and environmental aspects of operations and management thereof, have been given to supervisors and concerned persons of all drilling rigs. Safe Work Practices is also made available at all rigs. Regular safety and environment training is being

	be created at each level of the management. All the schedules and results of environment monitoring should be available at the project site office.	provided to the employees by our various in- house training institutes like IPSHEM Goa, IDT and ONGC Academy, Dehradun and RTI Vadodara etc. Ambient/stack, noise level and potable water report is available at rigs.
B	**GENERAL CONDITIONS**	
i	The project authorities must strictly adhere to the stipulations made by the Gujarat State Pollution Control Board (GPCB) State Government and any other statutory authority.	**Complied** Consent to Establish (CTE) for exploratory drilling is taken from Gujarat Pollution Control Board prior to commencement of drilling. Conditions stipulated in CTE are complied to. Apart from it all the oil and gas processing installations wherein the oil and gas produced during exploratory and development drilling is processed are operating under consolidated consent and authorization (CCA) from GPCB. Monthly and annual returns are filed online on XGN site as per the conditions stipulated in CCA
ii	No further expansion or modification in the project shall be carried out without prior approval of the Ministry of Environment & Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.	**Complied.** So far no expansion or modification in the project has been carried out. In future if any expansion and modification happens the stipulated condition shall be complied
iii	The project authorities must strictly comply with the rules and regulations under Manufacture, Storage and Import of Hazardous chemicals Rules, 2000 as amended subsequently. Prior approvals from Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. must be obtained, wherever applicable.	**Complied.** During drilling water base mud is used and no hazardous /toxic chemicals are used. All the mud systems got tested through National Institute of Oceanography (NIO), Goa and found non-hazardous and non-toxic. Hence this point is not applicable. However as precautionary measure MSDS of chemicals are displayed at site. Permission for storage, transportation and use of explosives for perforation of well are taken from controller of explosive.
iv	The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).	**Complied.** The overall noise levels in and around the rig area is kept well within the standards by keeping provision of Acoustic enclosures and regular condition monitoring of equipment. The ambient noise levels are monitored during day and night time (Recent monitoring reports are annexed) which reveals that the ambient noise level is with in prescribed standards.
v	A separate Environmental Management Cell equipped with full-fledged laboratory facilities must be set up to carry out the environmental management and monitoring functions.	**Complied** Environment Management cell is functional under Head HSE which is responsible for environment management, monitoring and compliance to regulatory bodies
vi	A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad /Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions/representations, if any, were	**Complied.** The communication of the environmental clearance has been made to all the relevant stake holders by way of publishing the same in the leading newspapers, the EC is also posted on the Web Site of ONGC as well as communicated to concerned panchayat and local authorities

	received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent	
vii	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MOEF, the respective Zonal Office of CPCB and the GPCB. The criteria pollutant levels namely;PM10,SO2,NOx,HC (Methane & Non-methane),VOCs(ambient levels as well as stack emissions)or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain	**Complied**. The compliance of the stipulated environment clearance conditions, including results of monitored data are uploaded on our website (link - http://www.ongcindia.com/wps/wcm /connect /ongcindia/ Home/initiatives /HSE/ Environmental Clearance/) and updated periodically. It is sent to the Regional Office of the MOEF. The criteria pollutant levels viz: PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, methane & Non-methane HC, indicated for the projects are monitored and displayed at the main gate of the rig.
viii	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEF, the respective Zonal Office of CPCB and GPCB. The Regional Office of the this Ministry/CPCB/GPCB shall monitor the stipulated conditions. Environment Clearance and six monthly compliance status reports shall be posted on the website of the company	**Complied**. The compliance of the stipulated environment clearance conditions, including results of monitored data are uploaded on our website (link - http://www.ongcindia.com/wps/wcm/connect/ongcindia/Home/Initiatives/HSE/Environmental_Clearance/) and updated periodically. It is sent to the Regional Office of the MOEF. The criteria pollutant levels viz: PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, methane & Non-methane HC, indicated for the projects are monitored and displayed at the main gate of the rig.
ix	The environment statement for each financial year ending 21st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environment conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail	**Complied**. After completion of exploratory drilling and if any oil and gas produced through it is subjected to the nearby production installation for processing and thus becomes part of that installation. All the installations are operating under CCA from GPCB and accordingly environmental statement as per prescribed form-V is filed annually. If no oil is found the well is abandoned and land restored as per company policy
x	The Project Proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the GPCB and may also be seen at Website of the Ministry of Environment and Forests at http://www.envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of	**Complied**. Information regarding grant EC for the project was passed on to all stake holders and the same was advenised in two newspapers.

	the locality concerned and a copy of the same shall be forwarded to the Regional office.	
xi	The Project Authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	Complied. The details prescribed in condition regarding commencement of exploratory drilling are furnished in six monthly compliance to Regional Office MOEF&CC, Shillong



ANNEXURE - I

ENVIROCHEM
Consultancy Services
Industrial Pollution Control Consultant
BSCIC
ISO 9001:2008

Ref. - ECS/S/3498/Q3/18-19

Date:-12/01/2019

ANALYSIS REPORT OF AMBIENT AIR QUALITY MONITORING

Name and Address of Industry : JOHN#27 (SSAH)
KHEDA-DHOLKA HIGHWAY,
JOHN ENGRGY LTD.,
AHMEDABAD.

Date of Sample Collection : 08/01/2019

Sr. No.	PARTICULARS	UNIT	POLLUTION CONCENTRATION (RESULTS)		GPCB LIMITS
			A	B	
1.	Duration of Sampling	Hrs.	24	24	---
2.	Avg. Flow Rate during Sampling	m^3/min.	1.31	1.28	---
3.	PM_{10}	$\mu g/m^3$	74.0	69.0	100
4.	$PM_{2.5}$	$\mu g/m^3$	32.5	31.0	60
5.	SO_2	$\mu g/m^3$	1.5	1.9	80
6.	NO_x	$\mu g/m^3$	11.7	12.3	80
7.	HC	$\mu g/m^3$	0.3	0.7	160
8.	CO	$\mu g/m^3$	245	361	4000

Location of Sampling:

A. Nr. Security Room.
B. Nr. HSE Office.

ANALYST

Environchem Consultancy Services * Rajkot * ECS

ENVIROCHEM CONSULTANCY SERVICES

201-Radhika Complex, 1-Radhakrushna Nagar, Opp Vivek & Lathiya Motors, B/h Umiya Mobile, Gondal Road,
Rajkot-4. Ph. : 0281-2378207, M : 98791 88568 E : envirochem.consultancy@gmail.com, W : www.envirochem.co.in

Ref. : ECS/S/3498/Q3/18-19 Date:-12/01/2019

ANALYSIS REPORT OF FLUE GAS EMISSION MEASUREMENT

Name and Address of Industry : JOHN#27 (SSAH)
KHEDA-DHOLKA HIGHWAY,
JOHN ENGRGY LTD.,
AHMEDABAD.

Date of Sample Collection : 08/01/2019

Sr. No.	PARTICULARS	UNIT	OBERVATION			
1.	Stack Attached to	----	4	5	6	----
2.	Stack Height from G.L.	Meter	5.0	5.0	5.0	----
3.	Stack Diameter	Inch	6.0	6.0	6.0	----
4.	Stack Temperature	°C	174.8	208.3	195.8	----
5.	Avg. Velocity of Flue Gases	Mtr/Sec.	22.4	23.1	21.8	----
6.	Iso-Kinetic Flow Rate for SPM	LPM	20.0	20.0	20.0	----
7.	Gaseous Sampling Flow Rate	LPM	2.0	2.0	2.0	----
Sr. No.	PARAMETERS	UNIT	POLLUTION CON. (RESULTS)			GPCB LIMITS
1.	SPM	mg/Nm³	72.0	98.0	112.0	150
2.	SO_2	mg/Nm³	14.3	17.8	23.4	100
3.	NO_x	mg/Nm³	11.0	13.1	15.6	50
4.	HC	mg/Nm³	2.7	3.1	3.5	15
5.	CO	mg/Nm³	12.0	13.4	13.7	150
6.	VOC	mg/Nm³	ND	ND	ND	Not Specified in CCA

ND= Not Detected

Stack Attached to:

4. Mud Pump Engine Stack-II (Diesel)
5. DG Set Stack-I (500 KVA)
6. DG Set Stack-II (500 KVA)

ANALYST

ENVIROCHEM CONSULTANCY SERVICES

201-Radhika Complex, 1-Radhakrushna Nagar, Opp Vivek & Lathiya Motors, B/h. Umiya Mobile, Gondal Road.
Rajkot-4. Ph. : 0281-2378207, M : 98791 86568. E : envirochem.consultancy@gmail.com, W : www.envirochem.co.in

Ref. - ECS/S/3498/Q3/18-19 Date:-12/01/2019

ANALYSIS REPORT OF FLUE GAS EMISSION MEASUREMENT

Name and Address of Industry : JOHN#27 (SSAH)
KHEDA-DHOLKA HIGHWAY,
JOHN ENGRGY LTD.,
AHMEDABAD.

Date of Sample Collection : 08/01/2019

Sr. No.	PARTICULARS	UNIT	OBERVATION			
1.	Stack Attached to	-----	1	2	3	-----
2.	Stack Height from G.L.	Meter	5.0	5.0	5.0	-----
3.	Stack Diameter	Inch	6.0	6.0	6.0	-----
4.	Stack Temperature	°C	133.4	145.3	125.6	-----
5.	Avg. Velocity of Flue Gases	Mtr/Sec.	18.45	20.10	16.70	-----
6.	Iso-Kinetic Flow Rate for SPM	LPM	20.0	20.0	18.0	-----
7.	Gaseous Sampling Flow Rate	LPM	2.0	2.0	2.0	-----
Sr. No.	PARAMETERS	UNIT	POLLUTION CON. (RESULTS)			GPCB LIMITS
1.	SPM	mg/Nm³	81.0	88.0	79.0	150
2.	SO_2	mg/Nm³	17.1	16.9	17.5	100
3.	NO_x	mg/Nm³	12.6	11.9	11.7	50
4.	HC	mg/Nm³	2.4	2.2	3.0	15
5.	CO	mg/Nm³	12.0	11.4	11.2	150
6.	VOC	mg/Nm³	ND	ND	ND	Not Specified in CCA

ND= Not Detected

Stack Attached to:

1. **Rig Engine Stack-I**
2. **Rig Engine Stack-II**
3. **Mud Pump Engine Stack-I (Diesel)**

ANALYST

ENVIROCHEM CONSULTANCY SERVICES

201-Radhika Complex, 1-Radhakrushna Nagar, Opp Vivek & Lathiya Motors, B/h. Umiya Mobile, Gondal Road, Rajkot-4. Ph. : 0281-2378207, M : 98791 88568. E : envirochem.consultancy@gmail.com, W : www.envirochem.co.in

ANNEXURE - II

Issue Date: 29/01/2019

TEST REPORT

EFFLUENT SAMPLE ANALYSIS REPORT

TEST REPORT NO: ERM/QF/5.10/02 A/EFFLUENT/ONGC-Cambay/Rev.0-01/01-2019

Name of Industry	: Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat. SSAH, Ganjana.
Sample Description	: Drill Cutting Sample (Semi Solid)
Sampling Location	: SSAH, Ganjana.
Mode of sampling	: Grab
Sample Collected on	: 16/01/2019
Sample Received on	: 17/01/2019
Sample Analyzed & Completion	: 17/01/2019 to 28/01/2019
Sample ID No.	: ERM/2019/01/170
Quantity/No. of Sample	: 2 L in Plastic carboys for each location. /1 Nos.
Protocol (Purpose)	: As per work order
Packing/ Seal	: Packed
Sample Collected By	: Mr. Krishna Patel

Sr. No.	Parameters	Unit	Results	Test Method
1.	pH at 25° C	pH Unit	7.26	IS 3025 (Part 11):1983(Reaffirmed 2017)
2.	Total Dissolved Solid (TDS) at 180°C	mg/100gm	394	IS 3025 (Part 16):1984(Reaffirmed 2017)
3.	Chloride	mg/100gm	17.2	IS 3025 (Part 32):1988 (Reaffirmed 2014) Argentometric Method
4.	Sulphide	mg/100gm	9.3	IS 3025 (Part 29)-1986
5	Chemical Oxygen Demand (COD)	mg/100gm	407	APHA 23rd Edition- 2017, Part - 5000 Section:5220-B (Open Reflux Method)
6.	Biochemical Oxygen Demand (BOD) 3 days at 27° C	mg/100gm	138	IS 3025 (Part 44):1993 (Reaffirmed 2014)
7.	Sulphate	mg/100gm	0.34	APHA 23rdEd. - 2017, Part-4000 Section : 4500-E SO4-2(Turbidity Method)
8.	Fluoride	mg/100gm	92	APHA 23nd Ed. - 2017, Part 4000 Section 4500-F-D
9.	Total Chromium	mg/100gm	0.013	IS 3025 (Part 52)2003 (Reaffirmed2014)(Diphenylcarbazide method)
10.	Hexavalent Chromium	mg/100gm	<0.01	IS 3025(Part 52):2003(Reaffirmed 2014) Diphenylcarbazide method
11.	Oil & Grease	mg/100gm	0.11	IS 3025 (Part 39) - 1991(Reaffirmed 2014) (Partition Gravimetric Method)
12.	Phenolic Compounds	mg/100gm	6.8	IS 3025 (Part 43):1992 (Reaffirmed 2014) (4-Aminoantipyrine method without Chloroform Extraction)

P.T.O

Name of Industry: **Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat.**
SSAH, Ganjana.
Sample ID: ERM/2019/01/170

13.	Cyanide	mg/100gm	0.03	APHA, 23rd Edition, 2017, 4500 CN E
14.	% Sodium	%	32.8	IS 3025 (Part 45):1993 (Reaffirmed 2014) Flame Photometric Method
15.	Copper	mg/100gm	0.09	AAS Method (Direct)IS 3025 (Part 42):1992(Reaffirmed 2014)
16.	Nickel	mg/100gm	4.03	AAS method (Direct) IS 3025 (Part 54) : 2003 (Reaffirmed 2014)
17.	Zinc	mg/100gm	0.05	IS 3025 (Part 49) : 1994 (Reaffirmed 2014) AAS method (Direct)
18.	Cadmium	mg/100gm	<0.01	APHA 23rd Ed. - 2017, Part 4000 Section: 4500-F-D
19.	Mercury	mg/100gm	0.04	APHA 23rd Edition - 2017, Part -3000 Section . 3500 Hg (AAS)
20.	lead	mg/100gm	1.00	IS 3025 (Part 47) : 1994 (Reaffirmed 2014)

Remark: (1) Results expressed as '<' denotes the detection limit of testing. These results are below detection limit (BDL).
(2) Results are expressed in Dry weight/weight basis.

Note: (1) These results relate to the sample tested only.
(2) The report shall not be reproduced except in full without written approval of the laboratory.

Chemist

Authorized Signatory
(Sunilkumar Pandey)

TEST REPORT

EFFLUENT SAMPLE ANALYSIS REPORT

TEST REPORT NO: ERM/QF/5.10/02 A/EFFLUENT/ONGC-Cambay/Rev.0-01/01-2019

Name of Industry	: **Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat.** S$AH, Ganjana.
Sample Description	: Effluent Sample
Sampling Location	: S$AH, Ganjana.
Mode of sampling	: Grab
Sample Collected on	: 16/01/2019
Sample Received on	: 17/01/2019
Sample Analyzed & Completion	. 17/01/2019 to 28/01/2019
Sample ID No.	: ERM/2019/01/171
Quantity/No. of Sample	: 5 L in Plastic carboys for each location. /1 Nos.
Protocol (Purpose)	: As per work order
Packing/ Seal	: Packed
Sample Collected By	: Mr. Krishna Patel

Sr. No.	Parameters	Unit	Results	Test Method
1	Temperature	°C	23	IS 3025 (part 09) – 1984 (Reaffirmed 2017)
2	pH at 250 C	pH Unit	7.18	IS 3025 (Part 11):1983(Reaffirmed 2017)
3	Total Suspended Solid(TSS)	mg/L	1346	IS 3025 (Part17). 1984 (Reaffirmed 2017)
4	Total Dissolved Solid (TDS) at 180°C	mg/L	4072	IS 3025 (Part 16):1984(Reaffirmed 2017)
5	Chemical Oxygen Demand (COD)	mg/L	1943	APHA 23rd Edition- 2017,Part - 5000 Section:5220-B (Open Reflux Method)
6	Biochemical Oxygen Demand(BOD) at 27^0 C for 3 days	mg/L	593	IS 3025 (Part 44):1993 (Reaffirmed 2014)
7	Oil & Grease	mg/L	326	IS 3025 (Part 39) – 1991 (Reaffirmed 2014)(Partition Gravimetric Method)
8	Phenolic Compounds	mg/L	0.62	IS 3025 (Part 43):1992 (Reaffirmed 2014) (4- Aminoantipyrine method without Chloroform Excraction)
9	Chloride	mg/L	397	IS 3025 (Part 32):1988 (Reaffirmed 2014) Argentometric Method
10	Sulphate	mg/L	128	APHA 23rdEd. - 2017, Part-4000 Section : 4500-E SO4-2 (Turbidity Method)
11	Hexavalent Chromium	mg/L	<0.02	IS 3025(Part 52):2003 (Reaffirmed 2014) Diphenylcarbazide method
12	Total Chromium	mg/L	2.12	IS 3025 (Part 52)-2003(Reaffirmed 2014) (Diphenylcarbazide method)

P.T.O

Name of Industry: **Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat.**
SSAH, Ganjana.
Sample ID: ERM/2019/01/171

13.	Sulphide	mg/L	1.3	IS 3025 (Part 29)-1986
14.	Copper	mg/L	0.5	AAS Method (Direct) IS 3025(Part 42):1992 (Reaffirmed 2014)
15.	Nickel	mg/L	0.2	AAS method (Direct) IS 3025(Part 54) : 2003 (Reaffirmed 2014)
16.	Zinc	mg/L	1.1	IS 3025 (Part 49) : 1994 (Reaffirmed 2014) AAS method (Direct)
17.	Fluoride	mg/L	0.4	APHA 23rd Ed. - 2017, Part 4000 Section: 4500-F-D
18.	Cyanide	mg/L	0.01	APHA, 23nd Edition, 2017, 4500 CN E
19.	Mercury	mg/L	<0.01	APHA 23rd Edition - 2017, Part -3000 Section : 3500 Hg (AAS)
20	lead	mg/L	0.25	IS 3025 (Part 47) : 1994 (Reaffirmed 2014)
21.	% Sodium	%	38.5	IS 3025 (Part 45).1993 (Reaffirmed 2014) Flame Photometric Method

Remark: (1) Results expressed as "<" denotes the detection limit of testing. These results are below Detection limits (BDL).

Note: **(1)** These results relate to the sample tested only.
(2) The report shall not be reproduced except in full without written approval of the laboratory.

Chemist

Authorized Signatory
(Sunilkumar Pandey)

Issue Date: 29/01/2019

TEST REPORT

DRINKING WATER SAMPLE ANALYSIS REPORT

TEST REPORT NO: ERM/QF/5.10/02 A/DRINKINGWATER/ONGC-Cambay/Rev.0-01/01-2019

Name of Industry	: Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat. SSAH, Ganjana.
Sample Description	: Drinking Water sample
Sampling Location	: SSAH, Ganjana.
Mode of sampling	: Grab
Sample Collected on	: 16/01/2019
Sample Received on	: 17/01/2019
Sample Analyzed & Completion	: 17/01/2019 to 28/01/2019
Sample ID No.	: ERM/2019/01/172
Quantity/No. of Sample	: 2 L in Plastic carboys for each location/1 Nos.
Protocol (Purpose)	: As per work order
Packing/ Seal	: Packed
Sample Collected By	: Mr. Krishna Patel

Sr. No.	Parameters	Unit	Results	Test Method
1.	pH at 25^{0}C	pH Unit	7.02	IS 3025 (Part 11):1983 (Reaffirmed 2017)
2.	Color	Hazen	<5	APHA 23rd Edition.- 2017, Part - 2000 Section : 2120-C
3.	Turbidity	NTU	<1	APHA (21st Edition, 2005)- 2130-B (Nephelometric Method)
4.	Total Dissolved Solids (TDS) at 180 °C	mg/L	117	IS 3025 (Part 16):1984 (Reaffirmed 2017)
5.	Total Hardness as $CaCO_3$	mg/L	24	IS 3025 (Part 21):2009 (Reaffirmed 2014)
6.	Calcium (as Ca)	mg/L	10	IS 3025 (Part 40):1991 (Reaffirmed 2014)
7.	Magnesium (as Mg)	mg/L	2.3	IS 3025 (Part 46):1994 (Reaffirmed 2014)
8	Chloride (as Cl)	mg/L	16	IS 3025 (Part 32):1988 (Reaffirmed 2014)
9.	Sulphate(as SO4)	mg/L	1.7	APHA 23rd Edition- 2017, Part-4000 Section : 4500-E SO4-2
10.	Iron (as Fe)	mg/l	<0.05	IS 3025 (Part 53):2003 (Reaffirmed 2014)
11.	Copper (as Cu)	mg/L	<0.05	IS 3025 (Part 42):1992 (Reaffirmed 2014)
12.	Zinc (as Zn)	mg/L	<0.02	IS 3025 (Part 49) : 1994 (Reaffirmed 2014)
13.	Manganese	mg/L	<0.1	IS 3025 (Part 46)
14	Mineral oil	mg/L	<0.01	IS: 3025(Part 39), 1992
15	Nitrates	mg/L	<2.0	IS 3025 (part 34) – 1988 (Devadra Alloy Method) Reaffirmed (2014)
16	Fluorides	mg/L	<0.1	APHA 23nd Ed. - 2017, Part 4000 Section: 4500-F-D.

P.T.O

Name of Industry: Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat.
SSAH, Ganjana.
Sample ID No.: ERM/2019/03/172

Sr. No.	Parameters	Unit	Results	Test Method
17	Phenol	mg/L	<0.001	IS 3025 (Part 43):1992 (Reaffirmed 2014) (4- Aminoantipyrine method_Chloroform Extraction)
18.	Hexavalent chromium	mg/L	<0.03	IS 3025(Part 52):2003 (Reaffirmed 2007) (clause 6) APHA 22nd Ed. -3500 Cr B
19.	Residual Free Chlorine	mg/L	<0.1	IS 3025(Part 26): Iodometric method
20.	Mercury	mg/L	0.002	APHA 23rd Ed.- 2017, Part -3000 Section : 3500 Hg (AAS)
21.	Cadmium	mg/L	<0.003	IS 3025 (Part 41): 1992, (Reaffirmed 2014)
22.	Selenium	mg/L	<0.005	IS 3025 (Part 56)
23.	Arsenic	mg/L	<0.005	APHA 23rd Edition,2017 (Part 3000 Section 3500 As B
24.	Cyanide	mg/L	Nil	APHA, 23rd Edition, 2017, 4500 CN E
25.	Lead	mg/L	<0.01	IS 3025 (Part 47) . 1994, (Reaffirmed 2014)
26	Pesticide	mg/L	Absent	USEPA method 508 &507

Remark: (1) Results expressed as "<" denotes the detection limit of testing. These results are below detection limit (BDL)

Note: (1) These results relate to the sample tested only.
(2) The report shall not be reproduced except in full without written approval of the laboratory

Chemist

Authorized Signatory
(Sunilkumar Pandey)

ANNEXURE - III

ENVIROCHEM
Consultancy Services
Pollution Control Consultant

BSCIC
ISO 9001:2015

Ref. - ECS/S/3498/Q3/18-19

Date:-12/01/2019

NOISE LEVEL MONITORING REPORT

Name and Address of Industry : JOHN#27 (SSAH)
KHEDA-DHOLKA HIGHWAY,
JOHN ENERGY LTD.,
AHMEDABAD.

Date of Sample Collection : 08/01/2019

SR. NO.	LOCATION	Day Time Results in dB(A)	Day Time GPCB Limits in dB(A)	Night Time Results in dB(A)	Night Time GPCB Limits in dB(A)
1.	Nr. Main Gate	67.7	75.0	63.4	70.0
2.	Nr. HSE Office	59.2	75.0	52.8	70.0
3.	Nr. Store Area	73.8	75.0	68.9	70.0
4.	Nr. ONGC Office	63.4	75.0	56.5	70.0
5.	Boundary Area	54.6	75.0	49.6	70.0

Remarks: Noise level Monitoring Carried Out during Day Time between 6:00A.M. To 10:00P.M. & Night Time between 10:00P.M. To 6:00A.M.

ANALYST

Envirochem Consultancy Services * Rajkot * ECS

ENVIROCHEM CONSULTANCY SERVICES

VEXIL
BPS

Certificate

This Certificate is issued to

Oil and Natural Gas Corporation Limited
Cambay Asset
CW-IX
Kansari, Khambat
Anand 388 630
Gujarat
INDIA

who have implemented an Environmental Management System, which meets the requirements laid down in ISO 14001:2015, with the following scope:

Drilling Services for Exploration and Production of Hydrocarbons

Certificate No.	: E9122766.01
Original Issue	: 17 May 2018
Latest Issue	: 17 May 2018
Valid Till	: 16 May 2021

The continuing validity of this certificate is subject to timely conduct of surveillance audits

Surveillance 1 due before : 6 May 2019
Surveillance 2 due on : 6 May 2020

for Vexil Business Process Services Private Limited

JAS-ANZ

VEXIL
BPS MS

ISO 14001:2015

ANNEXURE - IV

RSPL
Recycling Solutions Pvt. Ltd

PROVISIONAL CERTIFICATE

CPCB ID : 1572
Client Code : CPAW1600

Date : 14.11.2016

To,
OIL AND NATURAL GAS CORPORATION LIMITED
CAMBAY ASSET,
PO.KANSARI,
KHAMBHAT

Sub:-Membership for Waste Mix Processing Facility (Alternate Fuel Resource Facility)

Dear Sir,

We have received your necessary documents for membership of our Waste Mix Processing Facility. We give our principle acceptance that we will accept your wastes and we will enroll you as our member for Waste Mix Processing Facility. We will issue Membership Certificate in due course of time.

We assure you that we work in most economical way as per the legal requirement and in the environmentally suitable manner.

Validity of this letter is 6 months from the date of issuance.

Please feel free to call undersigned or write us at marketing@rs-pl.com for any query or clarification.

Thanking You.

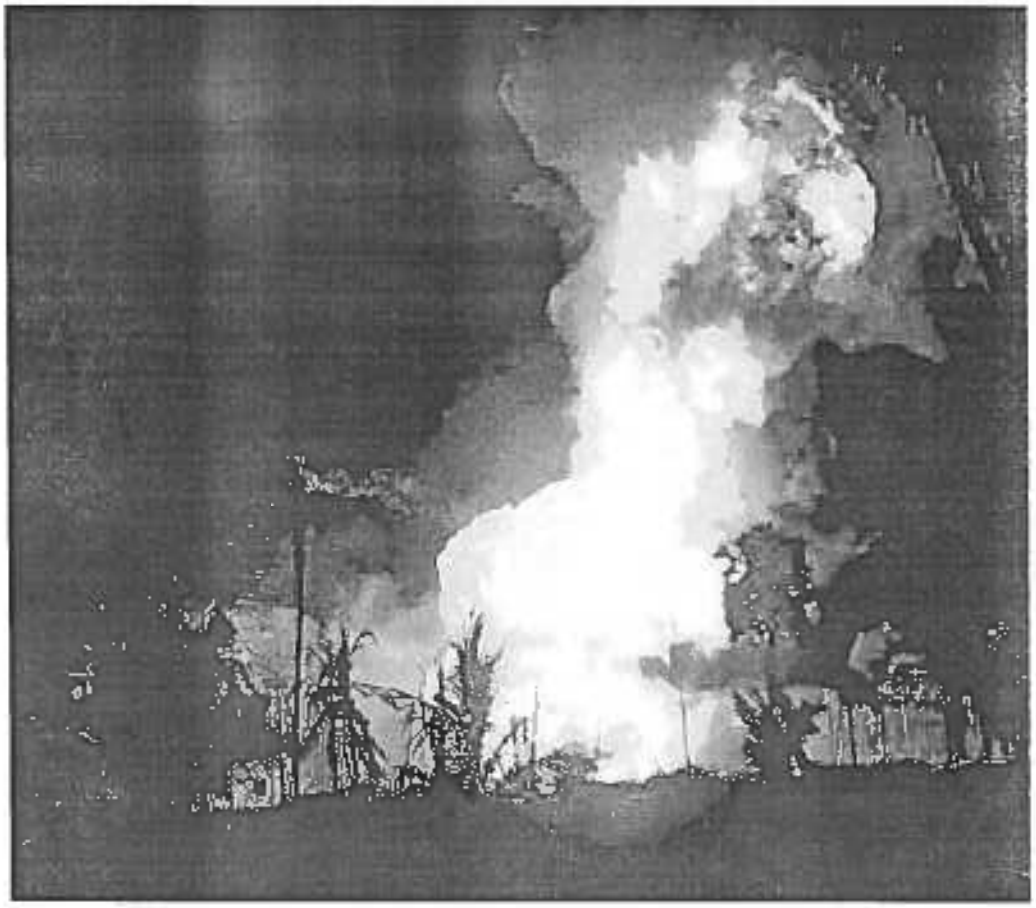
Yours Faithfully,

For Recycling Solutions Private Limited

Authorized Signatory

ANNEXURE-V

DISASTER MANAGEMENT PLAN
CAMBAY ASSET
2017-18



Health, Safety & Environment Section

OIL AND NATURAL GAS CORPORATION LTD.

CAMBAY ASSET

CAMBAY

DISASTER MANAGEMENT PLAN
(ONGC/CBY/DMP)

CAMBAY ASSET
OIL AND NATURAL GAS CORPORATION LTD.

Issue no. 1	Total pages : 148	2017-18

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Approved by

HARI SHANKAR TIWARI
Asset Manager

Approval

Revised Disaster Management Plan 2017-18 ONGC, Cambay Asset is approved Upon Declaration of (Onsite/Offsite) Disaster / Emergency by the District Authority in any site of ONGC, the plan comes in to force with immediate effect an the help of district DMP may also be followed as and where necessary during operation.

The Cambay Asset ONGC will be responsible for all types of logistic support to the various Emergency services during implementation of this plan as per rule & regulation of national Disaster Management act, 2005.

Dr.Dhaval Patel,(IAS)
District Collector & District Magistrate
Anand

Collector, Anand

ओएनजीसी
ONGC

जी.के.सिंघा रॉय
परिसंपत्ति प्रबंधक
H.S.TIWARI
Asset Manager

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MESSAGE

We are committed to maintain highest standards of occupational health, safety and environment protection with effective HSE risk management. As our core business involves high degree of risk, we use several techniques like integrated QHSE system, external safety audit by statutory & advisory bodies. In addition to these, disaster management plan is the most effective tool to cope up with any emergency situation.

For sustaining high growth of the organization, we must always remain prepared to handle any emergency situation effectively. For this purpose, Disaster Management Plan-2017-18 has been prepared based on the corporate disaster management plan, governing legislation & guidelines, incident & risk analysis. It will help in timely action in any emergency to minimize the losses.

DMP/Mock drills and loss control tours are the best mechanism to test our response preparedness and communicative channels which help us to identify any deficiency in the system & taking suitable timely corrective action.

This Disaster Management Plan 2017-18 is applicable for the entire Cambay Asset and hope that this document will be practiced during mock drills & will prove very useful in the emergency situation.

Hari Shankar Tiwari
Asset Manager

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14	Copy 20NOs	Installations/Rigs & Other I/Cs of Asset		

ABBREVIATIONS

S.No	Abbreviation	Description
1	AM	Asset Manager
2	BOP	Blow Out Preventer
3	CMT	Crisis Management Team
4	D/Rigs	Drilling Rigs
5	DCP	Dry Chemical Powder
6	DG Set	Diesel Generator Set
7	DGMS	Directorate General of Mines Safety
8	DIC	Drilling In charge
9	DMP	Disaster Management Plan
10	DSA	Drill Site Accommodation
11	EPS	Early Production System
12	ER	Employee Relations
13	FO	Fire Officer
14	FOSV	Full Opening Safety Valve
15	FWP	Fire Water Pump
16	GGS	Group Gathering Station
17	HDS or Head DS	Head Drilling Services
18	HP Separator	High Pressure Separator
19	HR	Human Resources
20	HSD	High Speed Diesel
21	H-HSE	Head- Health, Safety & Environment
22	HSE	Health, Safety & Environment
23	HWS	Head Well Services
24	I/C	In charge
25	I/C PR	In charge Public relations
26	IEOT	Institute of Engineering & Ocean Technology
27	KO Drum	Knock Out Drum
28	LEL	Lower Explosive limit
29	LM	Location Manager
30	LPG	Liquefied Petroleum Gas
31	MCC	Motor Control Centre
32	MM	Materials Management
33	MoP&NG	Ministry of Petroleum & Natural Gas
34	MoU	Memorandum of Understanding

35	MSDS	Material Safety Data Sheet
36	NRV	Non Return Valve
37	OISD	Oil Industry Safety Directorate
38	ONGC	Oil and Natural Gas Corporation Limited
39	PBX	Private branch exchange
40	S/I	Shift In charge
41	S/O	Safety Officer
42	SCBA	Self contained breathing apparatus
43	SICP	Shut in casing pressure
44	SIDPP	Shut in drill pipe pressure
45	SM	Surface Manager
46	S O P	Standard Operating Procedure
47	MGVCL	Madhya Gujarat Vij Company Limited
48	TSG	Technical Services group
49	SRP	State Reserve Police
50	GPCB	Gujarat Pollution Control Board
51	VHF set	Very High Frequency sets (for communication)
52	WO Rig or WOR	Work Over Rig
53	PEL	Permissible Explosive Limit
54	TLV	Threshold Limit Value
55	DM&C	District Magistrate and Collector
56	PWD	Public works department
57	PHE	Public Health Engineer

PART -I

ON SITE DISASTER MANAGEMENT PLAN

CHAPTER –I

CHAPTER -I

ON SITE DISASTER MANAGEMENT PLAN

A 1.0 INTRODUCTION

The principal activity of ONGC is to explore, to identify and to exploit the oil / gas reservoir. The inflammable nature of oil and gas and the availability of these in the reservoirs at high pressures make the ONGC operations highly hazardous. Occurrence of emergency situations such as fire, blowouts, accidents, environmental hazards etc. cannot be ruled out during ONGC operations.

It is a matter of observation that during any disaster, presence of many opinions about how to tackle the situation, lack of knowledge about available resources and absence of clear allocation of responsibility of individual, leads to a state of confusion.

The purpose of the disaster management plan is to identify as quickly as possible, various actions to be taken in order of priority and to specify the personal responsibility for taking actions in the event of different types of disaster situation with a view to overcome the crisis in the least possible time with no or minimum injury to persons / damage to equipment, material, hydrocarbon reserves and environment.

A 1.1 SCOPE & OBJECTIVES OF DISASTER MANAGEMENT PLAN

A 1.1.1 SCOPE OF DISASTER MANAGEMENT PLAN

The disaster management plan endeavours to cover all the possible types of emergency situations, which may arise during operations at GGS's, EPS, W.O Rig & Drilling Rigs at Cambay Asset. For all the situations, specific action plans have been drawn for overall command, control & communication. The plan identifies the personnel at different levels for taking various actions.

A 1.1.2 OBJECTIVES OF DISASTER MANAGEMENT PLAN

a. Safe guarding lives and property both at Installations and in the neighborhood.
b. Containing the said disaster & bringing it under control.
c. Minimising damages to property & the environment.
d. Rescuing & treating causalities.
e. Evacuating people to safe areas.
f. Identifying affected persons and to extend necessary welfare assistance to causalities.
g. Finally when the situation is controlled, efforts to be made to return to near normal conditions.

The "Risk Analysis" for GGS was carried out by EOT to identify the potential hazards, to evaluate the consequences & evaluation of risk involved while handing the hydrocarbons in the form of crude oil, natural gas etc. This disaster management plan has been prepared considering all the possible type of emergency situations, which may arise during operations at GGS, Rigs and also the various scenarios considered in the said "Risk Analysis".

A1.2 WHAT IS A DISASTER?

Disaster in an event, natural or man made sudden or progressive, which has such a severe impact that the affected community has to respond by taking exceptional measures. More precisely the disaster is an occurrence of such magnitude as to affect normal pattern of life in the vicinity causing extensive damage to life and property.

A1.2.1 TYPES OF DISASTERS

(a) **Operational** – Fire /Spillage/ Leakages
(b) **Natural** -- Earthquakes/ Cyclone/ Flood
(c) **Manmade** — Pilferage /Riot / Insurgency/ Bomb blasts

A.1.2.2 FIRE / EXPLOSION / IMPLOSION IN FACILITIES

a) In flowlines
b) In oil trunk pipeline
c) In Work Over Rigs
d) In Drilling Rigs.

A 1.2.3 FIRE / EXPLOSION / IMPLOSION IN PLANT UNITS

a) In Separator units.
b) In Pressure vessels/Heat exchangers.
c) In Control room.
d) In HSD Tanks

A 1.2.4 ELECTRICAL FIRE

a) In switch yard.
b) In MCC Rooms
c) In transformers.
d) In cables, glands & electrical equipment.

A 1.2.5 BUILDING FIRE

a) In administrative building.
b) In laboratories.
c) In workshop.
d) In store rooms
e) In scrap yard.

A 1.2.6 BUSH/GRASS FIRE

A 1. 3 ABNORMAL OPERATIONAL SITUATIONS:

1) Flange Gasket leak due to incorrect gasket or incorrect installation of the same or aging effect
2) Weld failure due to incorrect use of design code, incorrect use of material or incorrect weld procedures etc.
3) Pipe over-stressing causing fracture due to error in stress analysis, improper pipe material, inappropriate design code, extreme temperature differentials, incorrect supports and lack of inspection during erection etc.
4) Over pressurization of pipe causing fracture due to incorrect setting of R.V. & BD pressures. Incorrect RV size or relief valve simmering and hydrating or icing etc.
5) Pipe failure due to low temperature brittle fracture.
6) Failure of pipe due to corrosion.
7) Valve leakage due to gland failure, packing failure, spindle plug cork blow out or operator's negligence
8) Valve body failure due to catastrophic valve body bonnet failure etc.
9) Instrument connections failure, bourdon tube failure, level glass failure, blow out of plugged connection or failure of instrument connections.
10) Explosions / implosion due to inadequate purging and local source of ignition or release of hydrocarbon into confined area and local source of ignition etc.
11) Over pressure or depression due to inadequate relief, fire impingement rapid bottling of pocketed super heated liquid or high-pressure gas break through etc.
12) Over–pressurisation / over flowing due to line choking because of hydrate formation
13) Flash back from seal drum / KO drum of flare system
14) Generation of static charges due to non / faulty grounding.
15) Ingression of liquid in flare line causing two phase flow and failure of flare line thereof.
16) Failure of heating system.
17) Failure due to vibrations and shock loading
18) Failure due to congestion due to deposition in liquid circuits.
19) Failure of control system
20) Leakage in the Installation premises
21) Failure of small bore hydrocarbon pipe lines, vents and drains etc. due to ageing
22) HP Separator bottom connection failure
23) Random failure

A 1.4 ACCIDENTS CAUSING SERIOUS OR FATAL INJURIES / SERIOUS DAMAGE TO EQUIPMENT

a) Fire in GGS/EPS machinery
b) Explosion in pipe line or vapour cloud
c) Thermal flare system
d) Penetration of solid particles in the human skin due to high pressure air / gas.
e) Falling of tackling device from top of drilling rigs /W O R.

A 1.5 NATURAL DISASTER

a) Cyclone, Storm, Typhoon .Hurricane
b) Earthquake
c) Flood
d) Lightening
e) Land slide at sites

A 1.6 SOCIAL DISTURBANCES

a) Riots
b) Strikes
c) Sabotage
d) Theft
e) Tampering by miscreants
f) Damage caused by act of terrorism
g) Impact damage due to road block or vehicle failure

A 1.7 ENVIRONMENT HAZARDS

The activities of ONGC during exploration, drilling & production for Hydrocarbons, their transportation, processing and storage involve a multitude of processes and facilities, which have an impact on air, water and land quality and may cause various environment hazards if proper preventive measures are not taken.

Major environment hazards

The possible sources of pollution are listed below:

a) *Handling of chemicals:*
The chemicals used in drilling rigs are listed in Annexure XIX.
Chemical are being used in production installations are listed in Annexure XX.

b) *Air Pollution:*
The main contaminants to which special attention needs to be paid are hydrocarbons, CO, particulate matter and fumes. The possible sources are water separation water leaks, cold vents, flares and diesel engine exhausts.

c) *Water pollution:*
Inland water resources are likely to get polluted through uncontrolled discharge of condensate effluents, sanitary waste water, cuttings, effluent mud from rigs, etc.

d) *Noise Pollution:*

The principal source of noise in ONGC installations / Rigs is vents, valves, control valves, process equipment's, diesel engines, draw works, mud pumps, flares and burners, piping systems, compressors, motors etc.

e) *Damage to soil:*

The possible sources causing damage to soil are effluent water, lubricant and oil leakage and spillage, storm water run-offs, deforestation, disposal of waste material, chemicals, concrete etc.

A 1.8 THE MOST SERIOUS DISASTERS THAT CAN BE ENVISAGED AT INSTALLATIONS OF CAMBAY ASSET:

a) **Blow Out:**

Every hydrocarbon drilling is a potential source of blow-out, which is the worst accident that can occur in such operation. Blowouts usually may develop into another cascaded disaster like fire, explosion, gas leak etc.

b) **Explosion in Pressure Vessels:**

This occurs where gas separators with pressure much above atmosphere pressure rupture. On rupturing, the contents of the vessels are exposed to atmospheric pressure and liquid drop-lets burn as they fly through the air.

Causes :-

a) Excess pressure due to small relief valves and high pipe line pressure.
b) Heating of the internally welded surface of the separators by a fire below it.
c) If the relief valve is not adequate or not working properly, rupture of the container may occur.
d) Impact of a missile that hits the separators as a consequence of an adjacent explosion.

c) Jet Flame: -

The ignited /escaping vapour of flammable liquid can give rise jet flame or flare. This may not cause much effect beyond the installation boundary, but may lead to the explosion of nearby equipment.

Causes: -

a) Leakage observed in flanges and other types of joints.
b) Leakage due to cracks in the line pipes.
c) Leaking valves.

A 1 .9 DIFFERENT PHASES OF DISASTER

The period of time for which a disaster affects our plant can be divided into some or all of the following phases.-

a) Warning phase
b) Period of impact phase
c) Rescue phase
d) Relief phase
e) Rehabilitation phase

a) WARNING PHASE

Some sort of warning, for example, precedes some natural disasters with the aid of satellites and network of weather forecasting. Meteorological disasters like cyclone can be predicted and some preventive actions may be taken to counteract. For any similar or other situation, following action may be taken

To reduce the stock of hydrocarbons, if dispatch is still possible
To stop all hot jobs within the work-centre
To inform gas consumers.
To inform local authorities (in case there are possibilities of local people getting affected)

b) PERIOD OF IMPACT PHASE

This is the period when the disaster actually spreads and very little can be done to reduce the effects of disaster. The period of impact may last for a few seconds (like fire, explosion, gas leaks) or may prolong for days (fire, gas, leaks, floods etc.)

c) RESCUE PHASE

The rescue phase starts immediately after the impact, and continues until necessary measures are taken to rush help and combat the situation. The coordinators will perform the responsibilities assigned to each of them in organisation chart.

d) RELIEF PHASE

In this phase, apart from organising the relief measures (initiated depending on the severity) external help should also be summoned to augment the relief measures like evacuating of personnel to safe place and providing medical help, food, clothing etc. this will continue till normalcy is restored. The main features are:

(i) Mainly to take care of victims
(ii) Providing financial and material help for the victims

e) REHABILITATION PHASE

This is the final and longest phase. It includes assessment of damage, rebuilding of damaged property, payment of compensation etc.

A 2.0 DISASTER MANAGEMENT

DEFINITION

"An applied science which seeks, by the systematic observation and analysis of disasters, to improve measures relating to prevention, mitigation, preparedness, emergency, response and recovery"

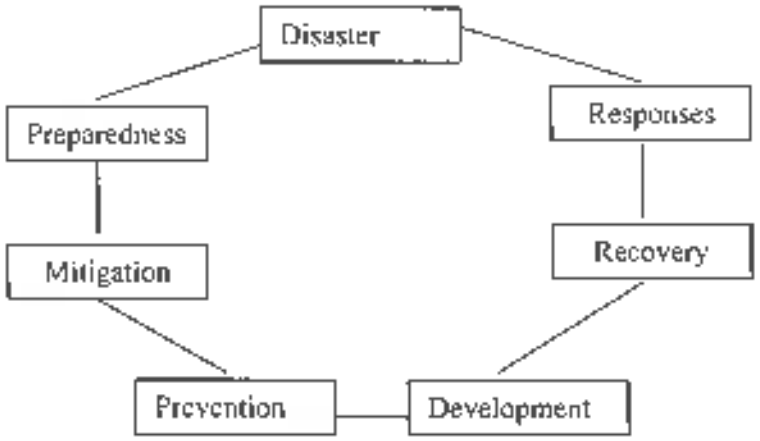
Disaster management is acknowledged as being essentially a dynamic process. It encompasses the classical management functions of planning, organising, staffing, leading and controlling. It also involves many organisations which must work together to prevent, mitigate, prepare for, respond to and recover from the effects of disaster.

Effective disaster management planning at the installations provides assurance to a community as to how plant operators and property will be protected in a disaster. All disaster plans have the same objectives, particularly to ensure:

a) A level of preparedness for identifying potential disasters.
b) An orderly and timely decision-making process.
c) The availability of necessary services, equipment, supplies and personnel.
d) A consistent pre-planned response to a given set of circumstances.

THE DISASTER MANAGEMENT CYCLE

Disaster and its management are series of inter–linked activities, not a series of events, which start and stop with disaster occurrence.



The composition of the main segments within the disaster management cycle may be described as follows:-

a) DISASTER IMPACT

This segment is self-explanatory, being the point in the disaster cycle at which a disaster event occurs. However, in disaster management terms, impact varies between different types of disaster.

a) An earthquake may give no warning and its impact time can be short. Yet the result can be very severe.
b) A cyclone may provide a long warning period and its impact time, i.e. the time during which it has destructive and damaging effects, can be protracted.
c) An explosion /implosion or a fire has a different impact, if it occurs in the installations, rather than in a deserted place.

b) RESPONSE

Response measures are usually those, which are taken immediately prior to, or following, disaster impact. Such measures are mainly directed towards saving life and protecting property and to dealing with the immediate disruption, damage and other effects caused by the disaster.

Typical measures include:
a) Implementation of plans
b) Activation of the counter -disaster system
c) Search and rescue
d) Provision of emergency food, shelter, medical assistance etc.
e) Survey and assessment
f) Evacuation measures.

It may be worth noting here that it is sometimes said that all disaster-related activity which follows impact, including measures of relief, rehabilitation, restoration and reconstruction, constitute the response. However, it is more convenient and practical to divide response from recovery.

Effective response to the impact of disaster is critical mainly in order to:

a) Limit causalities.
b) Alleviate hardship and suffering
c) Restore essential life support and community system.
d) Mitigate further damage and loss.
e) Provide the foundation for subsequent recovery.

e) RECOVERY

Recovery is the process by which installation is assisted in returning to their proper level of functioning following a disaster. Three main activities coming within the recovery segment are:-

a) Restoration
b) Rehabilitation
c) Reconstruction

d) DEVELOPMENT

The development segment provides the link between disaster related activities and national development. Its inclusion in the disaster cycle is intended to ensure that the results of disaster are effectively reflected in future policies in the interest of national progress.

e) MITIGATION

Action within this segment usually takes the form of specific programmes intended to reduce the effects of disaster. The term mitigation more generally implies that while it may not be possible to prevent some disaster effects, but these can be modified or reduced provided appropriate action is taken.

f) PREPAREDNESS

Preparedness is usually regarded as comprising measures which enables organization, and individuals to respond rapidly and effectively to disaster situations.

CHAPTER II

MATERIAL DATA SHEET OF CRUDE OIL

CHAPTER – II

MATERIAL DATA SHEET OF CRUDE OIL

PRODUCT IDENTIFICATION

PRODUCT NAME : CRUDE OIL
CHEMICAL NAME : Crude oil, mixture of saturated/unsaturated Aliphatic/Aromatic Hydrocarbon

HEALTH HAZARD

a.	**Routes of Exposure**	Skin , Ingestion , Inhalation.
b.	**Potential Health Effects**	**Inhalation:** May affect central nervous system. May cause respiratory tract irritation. Causes nose irritation **Skin:** May cause moderate skin irritation. May cause deffating of the skin and dermatitis. **Ingestion:** May be harmful if swallowed. May be fatal if swallowed. May cause gastrointestinal disturbance. **Eyes:** May Cause severe eye irritation. May cause conjunctivitis.
c	**i) Respiratory Protection**	Use suitable respiratory protection.
	ii) Hand Protection	Protective gloves of neoprene.
	iii) Eye Protection	Protective Splash goggles, Do not wear contact lenses when working around this product.
	iv. Body Protection	Wear impervious clothing/ boots. Remove and wash contaminated clothing before re-use.

FIRST AID MEASURES

a.	**Eye Exposure**	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
b.	**Skin Exposure**	Wash off with soap and water, Take off all contaminated clothing immediately. Seek medical advice.
c.	**Inhalation**	Remove to fresh air. Seek medical advice.
d.	**Ingestion**	Do not induce vomiting. Give vegetable oil, Seek medical advice.

FIRE HAZARDS & FIRE FIGHTING

a.	Lower explosion limit	0.4 %(V)
b.	Upper explosion limit	15 %(V)
c.	Fire extinguishing media	Dry chemicals powder, Foam, Carbon dioxide (CO_2), Halons.
d.	Hazards during fire-fighting	Improper use of water may cause frothing and spread fire over larger area., Vapor or gas may spread to distant ignition sources and flash back.
e.	Fire-fighting procedures/ further	Product will release flammable vapours which can advice burn in open or be explosive in confined space., Pump contents from tanks and cool tanks with water.

ENVIRONMENTAL HAZARDS

a.	Personal precautions	Keep people away from and upwind of spill/ leak., Do not enter or stay in area unless monitoring indicates OK.
b.	Environmental	Try to prevent the material from entering drains or water precautions courses., Run off to sewer may cause fire or explosion hazard.
c.	Further accidental release measures	Isolate hazard area, Restrict entry.

HANDLING & STORAGE

a.	Advice on System Design	In confined space, mechanical ventilation may be necessary to keep below PEL/ TLVS, Vapours may concentrate in confined areas, Use adequate grounding to prevent static build

CHAPTER III
STANDARD OPERATING PROCEDURES
(SOP)
FOR
EMERGENCY SITUATIONS IN CAMBAY ASSET

STANDARD OPERATING PROCEDURE (SOP) FOR ANY ONSITE/ OFF SITE EMERGENCY/ DISASTER AT DRILLING RIG/ W.O.R/ PRODUCTION INSTALLATION

A.3.0 INTRODUCTION

Standard operating procedure (SOP) are set of specific written instruction laid down sequentially and in systematic manner to facilitate smooth and quick functioning of any organization in case of any emergency or an event . SOP is usually descriptive in nature and describes the nature of the duties, functions and responsibilities of every individual in an organization and it also describes the actions to be taken. A well laid down SOP assists the user to take decision and also facilitates optimum use of resources in minimum time

Disaster, whether man-made or natural comes with or without warning. The objective of Standard operating procedure (SOP) is to deal with such eventuality. It is well known fact that many disasters cannot be predicted, and in case of few natural disasters cannot even be prevented. But if an organized and well trained team is present to deal with Disaster, damage may be minimised. The SOP of disaster management aims to spell out the standard methodology to deal with disaster, if and when it occurs in any of the operational area / site of the ONGC Cambay Asset.

A.3.1 STANDARD OPERATING PROCEDURE (SOP) FOR ANY ONSITE EMERGENCY

A.3.1.0 DETECTION OF AN EMERGENCY

A.3.1.1 ON-SITE EMERGENCY

On site emergency (Blow out/fire, release of Toxic gases) can be detected either manually or automatically through different detection systems provided in a drilling / work over operation. For this there shall be a continuous monitoring system and alarms from mud logging units etc-shall be connected to the drillers console and keep the people alert.

During drilling/work-over operation, an abnormality starts with the kick, i.e. uncontrolled flow of oil/gas into the well bore, kick is usually observed during drilling & when it is out of control it may lead to a blow-out.

A.3.1.2 RESPONSE OF THE PERSON NOTICING THE EVENT

a. Any person noticing a fire, explosion or leak of hazardous gas must shout out for help and alert the shift in charge.

b. Attempt should be made to control and contain the emergency with the available resources at site.

A.3.1.3 EMERGENCY SIREN / Fire Bell

Shift in charge will instruct to operate the emergency siren / fire bell.
Siren code: A continuous ringing of alarm.

A.3.1.4 EMERGENCY CELL

As soon as emergency is declared there will be two-tier communication system round the clock control room established at.

i. Site of emergency or near by
ii. At Asset head office.

All control rooms are equipped with VHF and telephones, Hot line etc.

- F3 and above level person are deputed.
- Log book maintained to record all communication.
- Message to be conveyed to chief emergency co-ordinator and respective co-ordinators.

A.3.1.5 NECESSITY OF INSTALLATION SHUT DOWN:

Depending on the situation Installation Manager / Site Incharge will shut down a part of the installation or the total installation. If required the shift in-charge will switch off the Engines and Generators in case of oil and gas blow out.

A.3.1.6 MOBILIZATION OF EMERGENCY ACTION TEAM:

On receipt of emergency message from head of Groups i.e. Head of DS/Surface/WS, the Asset Emergency Task Force (AETF) will rush to take charge of the situation.

On receiving a call, Fire officer with his crew along with security escort will reach the installation /site with fire tender and report to the installation co-ordinator or shift in-charge.

Safety officer will rush to the installation and report to the installation in-charge. He will regularly ensure the availability of the necessary safety equipment /personal safety equipment.

A.3.1.7 ESCAPE ROUTE (EMERGENCY EXIT):

Exit gate is provided with inter linked road. Evacuation can be carried out safely through exit. Drill site in general is fenced, enough carpeted space is provided for personnel, vehicles and crane movement, around the rig. Exit is through main entry gate. In case of Production installation, lay out and gas pipeline lay out have been provided at Annexure 5-7 &11-18 respectively.

A.3.1.8 ASSEMBLING POINT:

Assembly points for various groups of persons during emergency period are as follows: -

1. Operating personal not directly involved with management will assemble at the **main gate** and wait for any instruction from the Installation In-charges/ DIC/ Leader - Asset Emergency Task Force.

2. Person directly involved with the emergency management will assemble at the Drilling In-charge / Installation In-charges office.

Following will be the sequence of the execution of the activities with responsibility centres indicated against each.

A3.1.9 SEARCH AND RESCUE TEAM

Team of SRP personnel (off duty) under the leadership of safety officer will count the heads and will search person missing if any.

ADMINISTRATIVE CONTROL

ACTIVITY	RESPONSIBILITY
➢ First information of Blow out to Base office.	Shift In-charge /DIC
➢ Establishment of camp at site.	Chief coordinator (Asset Manager.)
➢ Mobilization of fire tenders	I/C Fire section of Asset.
➢ Arrangement of water sources/ transportation of water/ Drilling tube wells/Laying of necessary pipe lines.	In Charge works.
➢ Identification of special firefighting equipment i.e. capping equipment and capping procedure.	Leader Asset Emergency Task Force(AETF)
➢ Mobilization of special firefighting equipment and capping.	Leader AETF
➢ Camp electrification including illumination and power.	LM Maintenance
➢ Installation and operation of communication system.	I/C Info-Com.
➢ Basic amenities at camp.	I/C HR/ER
➢ Security at well site	I/C Security (Asset)
➢ Public relations and photography and filming	I/C Corp. Communications
➢ Disposal of fluid and other effluents.	I/C Logistics, I/C MM

OPERATIONAL CONTROL

SL.	ACTIVITY	ACTION
1.	Switching off all engines and generators	Shift In charge Mech.
2.	Start spraying water at well mouth through Emergency Hydrant, keep it cool and avoid catching fire	Fire Crew / Mech. Crew.
3.	Prohibit and extinguish all naked flames sparks.	Fire Crew.
4.	Search and Rescue	Safety Officer(Inst./Rig) with off-duty SRP
5.	Evacuate all personals to safe place, if necessary.	Shift In-Charge – Drilling.
6.	Pull out all inflammable like HSD, petrol, Gas Cylinders from well premises or affected area.	Shift In-Charge –Chemistry.
7.	Warn nearby ONGC installation / testing area	Wireless / Radio operator or Elect. Crew.
8.	Call fire tenders available in the locality	Shift In-Charge
9.	Warn the nearby inhabitants (through public address system, of possible consequences to enable them to keep themselves in readiness for evacuation)	Shift In-Charge – Geology.
10.	Warn nearby factories / installations / villages/township	In-Charge – HR/ ER
11.	Removes and secure all well records	Shift In-Charge – Geology.
12.	Intimate concerned authorities as per information flow chart given at the end pages	Wireless / Radio Operator & Shift I/C -Drilling
13.	Control Rooms will be formed at Asset to function round the clock.	Head HSE
14.	All Clear after termination of emergency	Leader AETF with approval of Asset Manager

Note: - All these will be carried out by the concerned official under instruction of the Shift In-charge (Drilling / Surface) at the time of blow out or Gas well fire till AETF takes over control.

A 3.2 CONTINGENCY PLAN FOR DRILLING RIGS/ W.O. RIG

EMERGENCY PREPAREDNESS IN THE EVENT OF FIRE

This section out lines in details the basic duties and responsibilities of all employees in the event of fire. Fire is always an emergency situation; it is impossible to list every contingency in this procedure. Therefore, good judgment and good sense should supplement the basic steps outlined here.

1. Action to be taken by the person noticing the Fire:

a. Minor Fire

ACTION	RESPONSIBILTY
Extinguish fire by shutting off source of fuel, and by using water, CO2 or DCP depending on the nature of fire.	Shift In – Charge/ Individual

b. Major Fire.

ACTION	RESPONSIBILTY
If public address system is available announce the same through it or if emergency, siren provided, blow it and inform everybody.	DIC/ Shift In-charge/ Individual
Pass information to I/C Fire section, ONGC, Cambay. Nearest State Fire Station. Leader AETF Mines manager. Nearby installation. Base Control Room. Installation manager Head HSE	C/R Operator
Keep vigilant; keep a watch over the area under fire. Try to extinguish the fire or prevent it from spreading further with available fire fighting equipment. Take the help of trained persons available to contain & extinguish the fire.	Shift In – Charge/ DIC / Individual
All help and medical assistance to persons who sustained injuries during fire with availability of Ambulance	Medical Section
Proper Parking of Vehicles at Incident Location	Individual
Cancellation of all Hot permit	DIC/ Shift In-charge
Availability of Vehicles as and when required by the Fire chief, Head HSE and other support personnel from Base office. The department will also arrange transport to fetch people from nearby Residential area / installation / Drill site accommodation to supplement fire fighting activities for sending people back who had stayed for extend for extend period.	Logistics In – Charge

Supply of Food /Snacks/Tea/coffee etc., arrangement for accommodation in nearby site /DSA, communicating to families of employees	I/c HR-ER
Feeding the information to the Public media like T V/ Newspapers Reporters after collecting timely feedback from the I/C Fire/ Head DS / Surface Manager.	I/c IR & I/c CC

A 3.3 STANDARD OPERATING PROCEDURE (SOP) FOR CONTROL OF KICK IN A WELL

BLOW OUT CONTROL (DRILLING / WORKOVER RIG.)

A Blow Out situation is a consequence of uncontrolled flow of fluid/gas where there is very strong likelihood of a fire being triggered off. To tackle such an emergency situation the flow of action has been divided onto following two steps.

Step – A: **ONSITE**
Action with internal resources

Step – B: **OFFSITE**
Actions of Asset base office in co-ordination with State Agencies / Head quarters.

The various functions with regard to these steps have been given in the form of information flow charts and kick control procedures. With a view to avoid overlapping of functions the various actions required to be taken during a blow out have been identified and the personnel responsible for taking these actions have been specified.

Also included here is an organizations chart for overall responsibilities during such a situation.

As the position of blow-out will be different in different cases, the exact action plan of work to control spill / blow-out fire and for capping of well would finalized by competent authorities of the Asset/ Head quarters.

The duly approved procedures to be followed for kick control and BOP drill.

A.3.3.1 PROCEDURE FOR EMERGENCY AT DRILL SITE :

In the event of any **kick,** the information will flow as follows.

S/N	ACTIVITY	RESPONSIBILTY
1.	Taking the charge of the situation (till senior / AETF arrives)	DIC/ Shift In-charge
2.	Until the higher ups reach site, all operations will be carried out under the control and guidance of the DIC/Shift In-Charge. When a kick is detected a signal will be given by the shift in charge and all members of the crew will take up their respective position.	All members of the crew
3.	Convey detailed information in following format /sequence a) Well condition b) Time at which kick observed c) Position of Drill string d) Shut in drill pipe pressure, pit gain and annulus pressure recorded e) Number, Name and Designation of the persons on site f) Mitigative Measures initiated to encounter the situation g) Technical /Administrative/ Medical help needed.	DIC/ Shift In-charge
4.	To inform following Authorities a) Asset Manager b) Leader AETF c) Head Drilling services / Surface Manager/ Head Well Services d) I/C fire e) I/C Security f) Head HSE g) Safety officer (DS/ Surface/ WS) h) Installation Manager i) I.M- Drilling/workover	DIC/ Shift In-charge
5.	Stand on brake and control as necessary. Supervise all activities to control the situation. - Ensure functions of BOP and choke manifold lines. - Ensure help is provided to chemist in order to maintain mud parameters as directed by authorities. - Ensure removal of records, men, and material to safe and secure place.	Shift In-charge
6.	Be available at control panel of BOP to operate as per direction of DIC /Shift in-charge /JE (D)/AE (D)/AEE (D) and the guidelines issued to close BOP, install Kelly choke etc. - Keep watch on pressure in discharge line, standpipe and	Assistant Shift In-charge

	annulus pressure and increase in mud volume in the Pit / Tanks. - Help chemist in preparation of mud and maintaining mud parameters as required. - Ensure operations of degassing unit, if any. Also keep watch for rise in mud level in the suction tank. - Work on choke line / Kill line of BOP. - Keep watch on the float in the mud pit for loss or gain of mud, inform shift in charge the status and request shift in charge to alert shift personnel.	
7.	**Working** on choke-line and valves	Top man
8.	**Helping** the shift in charge in fitting NRV / Kelly cock etc. and will be available at derrick floor.	Rig man
9.	**Standby** near the engine waiting directives from shift in charge	Mechanical Crew
10.	Co-ordinating and supporting shift in charge.	I/C – Mech.
11.	Looking after the electrical power supply.	I/C – Elect.
12.	**Liaison** with shift in-charge and calculate kill mud wt, as per available data and take necessary steps to prepare mud as per requirements. It must be ensured however, it should be checked at the time of kick control and shift in-charge should be informed of condition of mud / mud weight	Chemist
13.	**Keeping** contact with the shift in-charge and keep him abreast of possible reservoir condition.	Geologist
14.	**Organising** a head count of all persons at site and in case of any missing person, he would organize and lead a search and rescue operation with help of off-duty security guards (SRP personnel). He should also ensure that there is no open fire at the site.	Safety Officer of the installation /rig
15.	**Allow entrance** to authorized persons only to enter the site. He should remain at drill-site, and not allow the villagers to assemble near the gate. He should ensure that there is no open fire nearby.	Security Guard
16.	**Assemble** at the assembly point within full view of Shift In charge so that any of them is summoned by shift in-charge at the time of need.	The rest of the members of the crew

Note:-

1. After steps are completed as applicable all lines valves, closed position of BOP are be inspected by Shift In-charge and certified.
2. Same procedures to be followed by every member of the crew during BOP drill.

A.3.3.4 REHABILITATION:-

After the emergency is controlled and the all clear signal by Leader AETF has been received, the rehabilitation of the damaged facilities and affected persons will have to be carried out. This will include identifying of damages for rebuilding; time bound rebuilding, providing necessary medical facilities to affected individuals and checking all infrastructural facilities for quick normalization.

A.3.3.5 RE-COMMISSIONING:

When the rebuilding of damaged equipment / facilities required is complete, re-commissioning the system will be taken up. All steps stipulated in the detailed start up procedure of the unit concerned will be carried out.

WELL CONTROL PROCEDURES

A 3.4. STANDARD OPERATING PROCEDURE (SOP) FOR WELL SHUT –IN WHILE STRING OUT OF HOLE

- Close Blind
- Close Adjustable Choke / Remotely Operated Choke and Open Hydraulic Control Valve
- Record Shut- In Pressures

A.3.5 SOP FOR WELL SHUT - IN WHILE DRILLING

a. Stop rotary
b. Pick up Kelly to clear tool joint above rotary table
c. Stop mud pump, check self-flow, if yes, proceed further by any of the following method for shut in the well as shown in table.

SOFT SHUT-IN	HARD SHUT-IN
1. OPEN HYDRAULIC CONTROL / MANUAL VALVE ON CHOKE LINE 2. CLOSE BOP(PREFERABLY ANNULAR PREVENTER) 3. GRADUALLY CLOSE ADJUSTABLE / REMOTELY OPERATED CHOKE MONITORING CASING PRESSURE. 4. ALLOW THE PRESSURE TO STABILIZE AND RECORD SIDPP, SICP & PIT GAIN.	1. CLOSE BOP (PREFERABLY ANNULAR PREVENTER) 2. OPEN HYDRAULIC CONTROL REMOTE / MANUAL VALVE ON CHOKE LINE WHEN CHOKE IS IN FULLY CLOSED POSITION 3. ALLOW PRESSURE TO STABILIZE AND RECORD SIDPP, SICP & PIT GAIN.

A 3.6 STANDARD OPERATING PROCEDURE (SOP) FOR WELL SHUT –IN WHILE TRIPPING

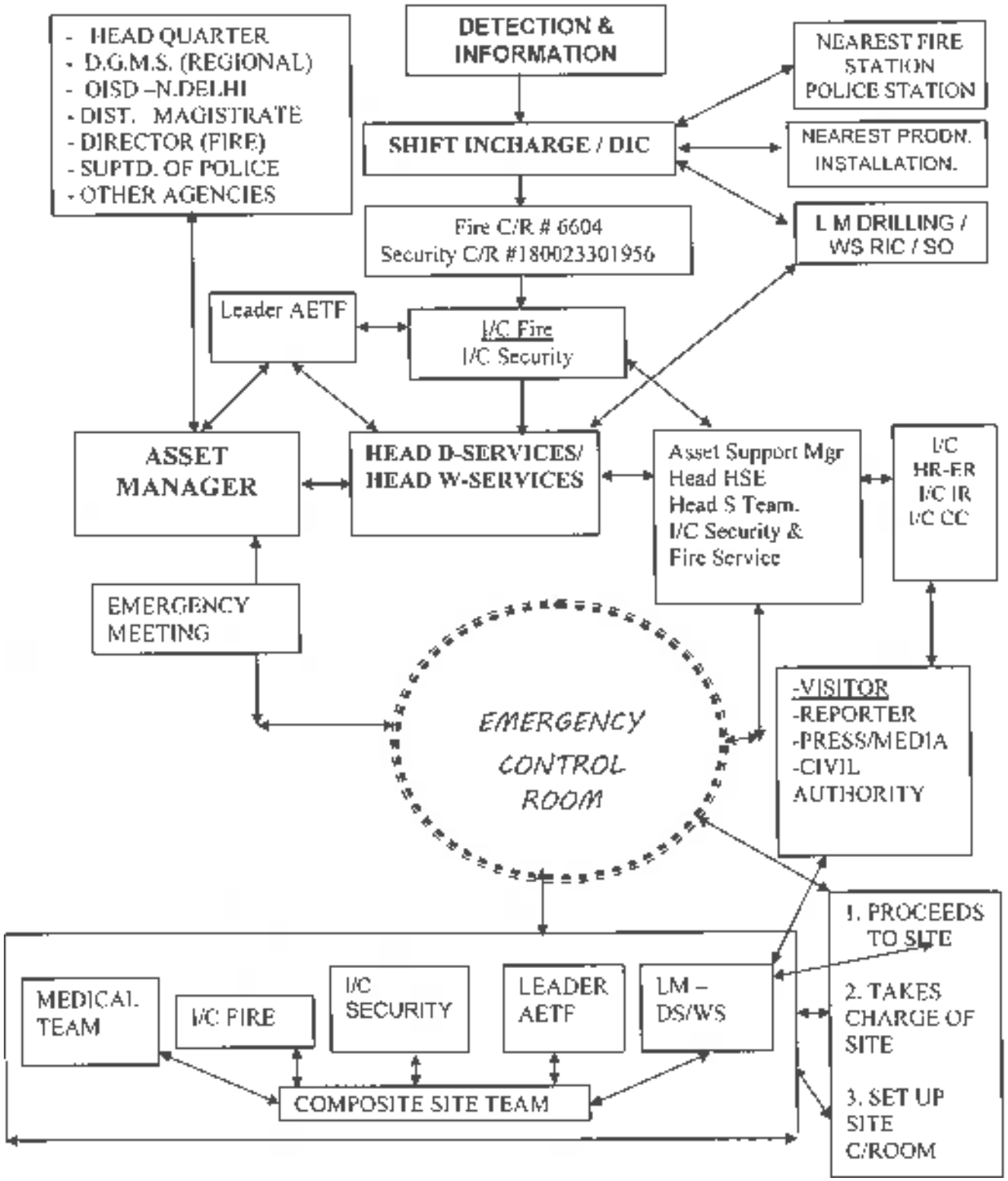
a) Position tool joint above rotary table and set pipe on slip.
b) Install Full Opening Safety valve (FOSV) in open position on the drill pipe and close it
Following method are recommended for shut in the well as shown in the table

SOFT SHUT-IN	HARD SHUT-IN
1 OPEN HYDRAULIC CONTROL / MANUAL VALVE ON CHOKE LINE 2 CLOSE BOP (PREFERABLY ANNULAR BOP) 3 GRADUALLY CLOSE ADJUSTABLE/ REMOTELY OPERATED CHOKE, MONITORING CASING PRESSURE. 4 MAKE UP KELLY AND OPEN FOSV. 5 ALLOW THE PRESSURE TO STABILIZE AND RECORD SIDPP, SICP & PIT GAIN.	1. CLOSE BOP (PREFERABLY ANNULAR PREVENTER) 2. MAKE UP KELLY AND OPEN FOSV. 3. OPEN HYDRAULIC CONTROL REMOTE / MANUAL VALVE ON CHOKE LINE WHEN CHOKE IS IN FULLY CLOSED POSITION. 4. ALLOW PRESSURE TO STABILIZE AND RECORD SIDPP, SICP & PIT GAIN.

CREW POSITION DURING THE WELL CONTROL OPERATIONS

1. DIC	6 ELECT. IN CHARGE
HE WILL PREPARE KILL SHEET AND DIRECT THE OPERATION. HE WILL OPERATE THE CHOKE DURING WELL KILLING OPERATION	HE WILL ENSURE SMOOTH RUNNING OF ALL ELECT. EQUIPMENT WITH THE HELP OF ELECT. CREW STATIONED NEAR PCR.
2. SHIFT IN CHARGE	**7. MECH. IN CHARGE**
HE IS THE MAIN LINE OF DEFENSE WHEN A KICK OCCURS. HE WILL BE AT THE DERRICK FLOOR AND FOLLOW THE DIRECTION OF DIC AND WILL BE RESPONSIBLE FOR a) DETECTION OF KICK b) CLOSE THE WELL IN c) OPERATING THE RIG EQUIPMENT (DRAW WORKS, MUD PUMP ETC) d) MONITOR PRESSURE	HE WILL ENSURE SMOOTH RUNNING OF ALL MECH. EQUIPMENT WITH THE HELP OF MECH. CREW STATIONED NEAR ENGINE ROOM.
	8. SHIFT CHEMIST
	SHIFT CHEMIST WILL BE RESPONSIBLE FOR a) MONITORING THE MUD PROPERTIES, MUD GAIN / LOSS AND CONDITIONING b) PREPARATION OF PROPER MUD WEIGHT AS DIRECTED BY THE D I C c) HANDLING THE MUD CONTAMINATED DUE TO KICK
3. ASST. SHIFT INCHARGE	**9 SHIFT GEOLOGIST**
HE WILL ASSIST THE CHEMIST / ENGINEER IN OPERATING THE MUD CONDITIONING EQUIPMENT (DE- GASSER ETC) WITH THE HELP OF TOP MAN AND RIG MAN OR AS DIRECTED BY THE DIC DEPENDING UPON THE SITUATION	STAND BY AT GEOLOGICAL LAB. HE WILL KEEP CONTACT WITH SHIFT I/C AND KEEP HIM ABREAST OF POSSIBLE RESERVOIR CONDITION **10.A ELECTRICIAN / MECHANIC** STAND BY FOR THE INSTRUCTION OF THE ELECT/ MECH. IN CHARGES
4. ASST. ENGR. (D)/TOP MAN	**11 OTHERS**
THEY WILL BE READILY AVAILABLE NEAR CHOKE LINE TO FOLLOW INSTRUCTIONS OF THE ASST. SHIFT IN CHARGE.	ALL OTHERS WILL STAND BY AND READILY AVAILABLE AT THE ASSEMBLY POINT AND WAIT FOR INSTRUCTIONS FROM D I C .
5. RIG MAN	**12. SECURITY GUARDS**
THEY WILL BE READILY AVAILABLE ON THE DERRICK FLOOR TO FOLLOW THE INSTRUCTION S OF THE SHIFT IN CHARGE.	THEY WILL ENSURE ENTRY OF AUTHORISED PERSON IN THE SITE.

A 3.7 EMERGENCY INFORMATION FLOW CHART: - DRILL SITE / W.O. SITE



A 3.8 STANDARD OPERATING PROCEDURE (SOP) FOR MOCK FIRE DRILL ON DRILLING RIGS / W O RIG

OBJECTIVES

To prepare the employees, contractor, his representatives and SRP personnel for any occurrence of fire incident/accident at the drill site.

SCOPE:-

Any pre-assumed area with specific occurrence.

ROLES:-

Senior-most person at the drill site	Installation Manager/ DIC	Referred to as "A"
Next to senior- most person at the drill site	Shift InCharge/ Asst. Shift I/c	Referred to as "B"

STEPS TO BE CARRIED OUT:-

S/N.	ACTION BY	ACTIVITY
1.	Head DS/ Head WS	- Will decide the drill site from where the call for mock fire drill with fire tender will be initiated. - Will fix the date and time on which drill will be organized. - Will take consent of the Asset Manager. - Will instruct "A" to carry out a mock fire drill at the pre-assumed drill site at the pre-fixed date and time.
2.	"A"	On reaching the drill site will declare a small fire in a pre-assumed area and will instruct any drill site crew member to raise the fire.
3.	"B"	- After hearing the fire alarm, will assume total control of the situation. - Will then ensure that the persons working on the derrick floor and in the PCRs are informed of the location and the severity of the fire.
4.	Man at the draw works brake	Depending upon the situation man at the draw works brake will act accordingly. • If the fire is at the derrick floor and the string is in the open hole, then the person working on the brake will secure the well before going to a safe position. • If the fire is at the derrick floor and the drill string is in the cased hole, he will move to a safe position as early as possible after securing the well. • If the fire is elsewhere, then he will react accordingly

		after keeping the safety of himself, other human beings, string and well in mind.
5.	"B"	Will inform the control room regarding the time, location and the severity of the fire with the instruction to inform the Head DS/ Head WS, Location Managers, Head HSE and I/C Fire for assistance. The fire officer in turn will ensure that a fire tender is despatched to the drill site in question at the earliest.
6.	Head HSE	Will inform the I/C Security, I/C Logistics, I/C Medical Services and the Safety Officer (DS/WS) for taking necessary action as per the standing orders prevailing in their respective sections to deal with such situations.
7.	I/C Security	Will make sure that whenever required, security escort is available for all the parties that go to the affected drill site.
8.	I/C Logistics	Will ensure that vehicles are available for the transportation of men or materials or both as required to tackle the emergency at the drill site.
9.	All employees, contractor and his personnel, on-duty SRP personnel	Will report to the Assembly Point, on hearing the fire alarm. Those who are on emergency duty will finish their duty at the earliest and then report to the Assembly Point.
10.	"B"	Will inform everybody assembled at the Assembly Point about the location of the fire.
11.	Safety Officer	Will do a head count. If someone is found missing a search party will be constituted by "B" and sent for search.
12.	"B"	- Will ensure that a responsible person attends to the radio at all times. That particular person will appraise base of the situation from time to time. - If required, "B" will instruct the senior-most electrical person available at the site to electrically isolate the affected area keeping his own safety in mind. - Will instruct the senior-most mechanical person available at the site to start the fire water pump for spraying of water as well as ask for the removal of any inflammable material which is present around the scene of the fire. - Will instruct the Post Commander SRP to cordon off the fire affected area and make sure that other than the fire tender no other vehicle enters the drill site. - Will instruct the fire trained persons to control/extinguish the fire with the help of portable fire extinguishers. - Will cancel all hot work permits under issue till further orders.

		- Will give instructions to make sure that the ambulance is ready for any emergency evacuations.
13.	In-Charge of the crew of the first turnout fire tender at site	Will take the charge of the fire fighting operations in coordination with Shift I/C.
14.	"A"	Will observe and record the performance of each individual for the responsibilities assigned and note the difficulties faced during the drill and convey a copy of the report to relevant persons.
15.	"B"	- After the fire is extinguished, "B" will give instructions to a member of the drill site crew for the "all clear" alarm to be raised as recommended to resume normal operation. - Will record the mock fire drill in the daily progress report for appraisal of the Head OS/ Head WS.

The observations will be reviewed in the monthly safety meeting and convey the recommendations to the relevant persons. Compliance of observations should be sent to Head HSE.

Frequency of the drill

1) At least once in a month without calling fire tender
2) At least once in a year by calling fire tender.
3) Odd hours mock drills to be conducted twice in a year.

Fire equipment/ Appliances to be used

First aid fire fighting equipment comprising of fire bell, fire buckets, portable fire extinguishers and portable fire water pump are available at the site.

Reporting with Observations

1. Mock fire drill is to be recorded as given in the format annexure with all the details.
2. These reports are to be submitted to the mines agent for reviewing in the safety committee meeting.
3. Records of the mock fire drill are to be maintained at the drill site. A copy of the mock fire drill is to be sent to the fire section and the HSE section for their record.
4. After reviewing, recommendations and suggestions based on observations to be incorporated in the next drill.

Shortcomings, if any

To be recorded in the mock fire drill report.

(Annexure no 11 to be taken from ERP manual)

OIL & NATURAL GAS CORPORATION LIMITED
CAMBAY ASSET
DETAILS OF MOCK FIRE DRILL
(ERP)

1.	Name of Installation	
2.	Date of Mock Fire Drill	
3.	Mock fire drill supervised by	Name Designation
4.	Staff / officers who attended mock Fire / Drill	Name Designation
5	Name of person who spotted fire	
6.	Place of Fire	
7.	Time of Fire	
8.	Call Of Fire Given At (time)	
9.	Horn/Siren/Paging	
10.	Staff responded to fire call at (time)	
11.	Response Time (in minutes)	
12.	Whether fire tender was called	Yes/No
13.	Who attended call at fire station	
14.	Call for fire tender given at (time)	
15.	Fire tender reported at (time)	
16.	Response time of Fire Tender (in min.)	
17.	Actions taken by persons to fight fire (Name & Desgn. wise).	
18.	Fire controlled at (Time)	
19.	Any other action taken as per emergency plan	
20.	Observations / Remarks on mock fire drill	
21	Positive Findings	Negative Findings

Signature of Shift I/c / S/O
Name & Designation

Signature of Installation Manager/ Officer supervising drill
Name & Designation

Distribution:-

1. Mines Manager
2. Asset HSE
3. I/c Fire
4. Office Copy

A 3.9 CONTINGENCY PLAN OF PRODUCTION INSTALLATIONS

Introduction:-

In GGS, in spite of all precautions there may arise a situation when there is uncontrolled BLEVE (Boiling Liquid Expanding Vapour Explosion), leakage in storage tank and bursting of crude oil lines of effluent line. The emergency situation thus can arise due to leakage of hydrocarbon gas, oil and fire in hydrocarbon.

The contingency plan will be set into action immediately in these three conditions i.e.

I) Leakage of Hydrocarbon
II) Bursting of crude oil lines.
III) Fire in the Storage Tank

All personnel concerned with the execution of this contingency plan should be acquainted with the procedures laid down in advance. Since particular situations may differ, the plan of work to control fire in GGS will be decided by the Asset Emergency Task Force and others appropriate authorities of the Asset depending upon particular situation.

DIRECT PHONE NO. OF INSTALLATIONS

I) KATHANA GGS : 94266 13821
II) PADRA GGS : 94266 13826
III) AKHOLJUNI EPS : 94266 13825
IV) PADRA EPS#49 : 94266 12274

PROCEDURE FOR EMERGENCY AT G G S

In the event of any uncontrolled leakage of hydrocarbon/fire, information shall flow as follows:

S/N.	ACTION BY	ACTIVITY
1.	Shift In-charge	- Will take the charge of the situation (till senior / AETF arrives) and ensure that the standing instruction in procedures are being carried out in sequence - Convey Detailed information to Security Control Room in following way: o Well or GGS or site condition o Time at which incident observed o Number, Name and Designation of the persons on site o Mitigative Measures initiated to encounter the situation o Technical/ administrative/ Medical help needed.
2	Radio Room	Will convey the information to the following Authorities: i. Asset Manager ii. Surface Manager iii. Leader AETF iv. Head HSE v. I/C Fire vi. I/C Security vii. Safety office (Surface) viii. Aera Managers

Pipe line emergencies:

3.9.1 Categorization of emergencies on any pipeline.

a. Leak of oil/ gas detected en-route the pipeline

b. Fire at any leakage point

c. Explosion occurred due to leak of petroleum

d. Leak/ fire due to natural disaster

3.9.2 Preparation:

a. All non essential persons should evacuate the fire/ leakage site.

b. Stop all the supplies to the pipeline and close the upstream valve.

c. If possible, depressurize the line by flaring.

d. Take gas readings of the surrounding areas and barricade 20% LEL zone.

e. Switch off all mobiles in the hazardous area zone.

3.9.3 Emergency procedure:

a. Allow the line to cool off.

b. Wait for LEL at the surrounding to reduce below 20%.

c. Keep the fire tender standby.

d. Mobilize men and materials

3.9.4 Response:

a. Clear the debris

b. Excavate and expose the pipeline. Look for extent of damage.

c. Decide repair method; clamping/ part replacement/ replacement of segment.

d. Remove the affected portion by cold cutting after cleaning and isolating the pipeline. (Positive isolation)

e. Make the line free of hydrocarbon by purging, before taking any hot job.

f. Pipeline or part pipeline is welded into the removed portion.

g. Weld portions are x-rayed for detecting the flaws & tested.

h. Pipeline is coated suitably.

i. Pipeline buried and site is cleared off all materials.

3.9.5 All clear:

The OSC will give 'all clear' signal for resuming normal operation

3.10 Emergency procedure for handling oil spill

3.10.1 Various possible scenarios are:

a) Case 1: Spillage from storage tanks.

b) Case 2: Spillage due to leakage of lines within installation.

c) Case 3: OWS pit overflow.

d) Case 4: Rupture of pipeline outside installation.

e) Case 5: Tanker accident/ leakage/ overturn resulting in oil spill.

f) Case 6: Blowout

3.10.2 Case 1: Spill from main oil storage tanks due to failure of tanks:

Consequences of such spill will depend on the following factors

1. The size and extent of damage of the tank and the dyke wall.
2. The capacity of storm water channel around the dyke wall. The layout of storm water channel will also determine the movement of oil within the plant boundary.

3.10.3 Case 2: Spill due to leakage from oil transfer lines:

The extent of spill can be minimized by early identification of spill; stopping pumping in that line and closing the valves as quickly as possible, if situation demands.

3.10.4 Case 3: Overflow of oil water sump (OWS) pit:

In monsoon, there could be overflow of oily water from the OWS pits leading to an oil spill. The size of spill will depend upon the detection time, seasonal condition and rate of overflow, which again depends on rate of inflow to the pit.

3.10.5 Case 4: Rupture of pipeline outside Installation/ spill from tanker:

In this case, oil spill may take place due to rupture of oil pipe line outside Installation. Since the pressure is measured continuously at the GGS in SCADA, the extent of spill can be minimized by stopping the pumping & closing the valve as quickly as possible. The worst-case spillage can occur due to a flange leakage or rupture of pipeline. Considering detection time and resultant corrective action time, spillage size is not expected to be more than 50 m^3.

3.10.6 Case 5: Tanker accident/ leakage/ overturn resulting in oil spill:

In case of tanker accident/ leakage/ overturn resulting in oil spill, spillage size is restricted maximum to the tanker capacity which is not more than 20 kl.

3.10.7 Case 6: Blow out:

Inspite of all safety precautions, there remains a probability of oil well leak or blow out during drilling/ work over operation or production causing oil spill. Since ONGC has well trained & experienced Crisis Management Team, the spill can be minimized by capping the wells as quickly as possible.

3.10.8 Measures to be taken to prevent occurrence/ spreading of oil spill for case 1 to 3 :

1. In case of oil spillage within the installation, the sluice gate, if available shall be closed immediately to stop flow of oil to outside the plant premises. The accumulated oil inside the channel shall be pumped to OWS.

2. Construct oil traps at various locations in the storm water channels in tank farm areas and pump house area.

3. The tank dyke walls & enclosed floor area to be made impervious to retain the spilled oil within the dyke.

4. In normal condition, dyke valve should always be kept closed

5. In case of spillage of oil along with storm water, notify GPCB & nearby civil authorities. Intimate nearby villagers to take necessary precautions, like not to ignite any spark in oil sleek to avoid any untoward incidence.

6. In case of spillage of crude oil, contaminated soil should be removed for suitable disposal and replaced with fresh good soil to prevent land contamination

7. Oil/ hazardous chemicals soaked soil should be handled as per Hazardous Chemicals and Waste Management act 1989 and its amended rules 2003

3.10.9 Behavior and fate of oil spill for case 4 to 6:

Natural actions are always at work in aquatic environment in case of oil spill. These can reduce the severity of an oil spill and accelerate the recovery of an affected area. Some natural actions include weathering, evaporation, oxidation, biodegradation and emulsification.

3.10.10 various Important processes of oil spill in water bodies:

3.10.10.1 Spreading

As soon as oil is spilled, it starts to spread out over the water surface, initially as a single slick. The speed at which this takes place depends to a great extent upon the viscosity of the oil. Fluid, low viscosity oils spread more quickly than those with a high viscosity. Nevertheless, slicks quickly spread to cover extensive areas of the water surface. Spreading is rarely uniform and large variations in the thickness of the oil are typical. After a few hours the slick will begin to break up & because of winds, wave action and water turbulence, will then form narrow bands or wind rows parallel to the wind direction. The rate at which the oil spreads is also determined by the prevailing conditions such as temperature, water currents, tidal streams and wind speeds. The more severe the conditions, the more rapid the spreading and breaking up of the oil.

3.10.10.2 Evaporation

Lighter components of the oil will evaporate to the atmosphere. The amount of evaporation and the speed at which it occurs depend upon the volatility of the oil. Oil with a large percentage of light and volatile compounds will evaporate more than one with a larger amount of heavier compounds. For example, petrol, kerosene and diesel oils, all light products, tend to evaporate almost completely in a few days whilst little evaporation will occur from a heavy fuel oil. In general, in temperate conditions, those components of the oil with a boiling point under 200°C tend to evaporate within the first 24 hours. Evaporation can increase as the oil spreads, due to the increased surface area of the slick. Rougher seas, high wind speeds and high temperatures also tend to increase the rate of evaporation and the proportion of oil lost by this process.

3.10.10.3 Dispersion:

Waves and turbulence at the water surface can cause all or part of a slick to break up into fragments and droplets of varying sizes. These become mixed into the upper levels of the water column. Some of the smaller droplets will remain suspended in the water while the larger ones will tend to rise back to the surface, where they may either coalesce with other droplets to reform a slick or spread out to form a very thin film. Oil that remains suspended in water have a greater surface area than before dispersion occurred. This encourages other natural processes such as dissolution, biodegradation and sedimentation to occur.

The speed at which an oil disperses is largely dependent upon the nature of the oil and the sea state, and occurs most quickly if the oil is light and of low viscosity and if the sea is very rough. The addition of chemical dispersants can accelerate this process of natural dispersion.

3.10.10.4 Emulsification:

An emulsion is formed when two liquids combine, with one ending up suspended in the other. Emulsification of crude oils refers to the process whereby water droplets become suspended in the oil. This occurs by physical mixing promoted by turbulence at the water surface. The emulsion thus formed is usually very viscous and more persistent than the original oil and is often referred to as "chocolate mousse" because of its appearance. The formation of these emulsions causes the volume of pollutant to increase between three and four times. This slows and delays other processes which would allow the oil to dissipate.
Oils with asphaltene content greater than 0.5% tend to form stable emulsions which may persist for many months after the initial spill has occurred. Those oils containing a lower percentage of asphaltene are less likely to form emulsions and are more likely to disperse.
Emulsions may separate into oil and water again if heated by sunlight under calm conditions or when stranded on shorelines

3.10.10.5 Dissolution:

Water soluble compounds in oil may dissolve into the surrounding water. This depends on the composition and state of the oil, and occurs most quickly when the oil is finely dispersed in the water column. Components that are most soluble in water are the light aromatic hydrocarbons compounds such as benzene and toluene. However, these compounds are also those first to be lost through evaporation, a process which is 10 -100 times faster than dissolution. Oil contains only small amounts of these compounds making dissolution one of the less important processes.

3.10.10.6 Oxidation:

Oils react chemically with oxygen either breaking down into soluble products or forming persistent compounds called tars. This process is promoted by sunlight and the extent to which it occurs depends on the type of oil and the form in which it is exposed to sunlight. However, this process is very slow and even in strong sunlight, thin films of oil break down at no more than 0.1% per day. The formation of tars is caused by the oxidation of thick layers of high viscosity oils or emulsions. This process forms an outer protective coating of heavy compounds those results in the increased persistence of the oil as a whole. Tar balls, which are often found on shorelines and have a solid outer crust surrounding a softer, less weathered interior, are a typical example of this process.

3.10.10.7 Sedimentation / Sinking:

Some heavy refined products have densities greater than one and so will sink in fresh or brackish water. Sinking usually occurs due to the adhesion of particles of sediment or organic matter to the oil. Shallow waters are often laden with suspended solids providing favorable conditions for sedimentation

3.10.10.8 Biodegradation:

Water bodies contain a range of microorganisms or microbes that can partially or completely degrade oil to water-soluble compounds and eventually to carbon dioxide and water. Many types of microbe exist and each tends to degrade a particular group of compounds in crude oil.

However, some compounds in oil are very resistant to attack and may not degrade. The main factors affecting the efficiency of biodegradation are the levels of nutrients (nitrogen and phosphorus) in the water, the temperature and the level of oxygen present. As biodegradation requires oxygen, this process can only take place at the oil-water interface since no oxygen is available within the oil itself. The creation of oil droplets, both by natural or chemical dispersion, increases the surface area of the oil and increases the area available for biodegradation to take place.

3.10.10.9 Combined processes:

The processes of spreading, evaporation, dispersion, emulsification and dissolution are most important during the early stages of a spill whilst oxidation, sedimentation and biodegradation are more important later on and determine the ultimate fate of the oil. To understand how different oils change over time whilst at sea/ river, one needs to know how these weathering processes interact. To predict this, some simple models have been developed based on oil type. Oils have been classified into groups roughly according to their density - generally, oils with a lower density will be less persistent. However some apparently light oils can behave more like heavy ones due to the presence of waxes.

3.10.11 Mechanical containment of oil spill

Two major steps involved in controlling oil spills are containment and recovery.

3.10.11.1 Containment:

When an oil spill occurs on water, it is critical to contain the spill "as quickly as possible" in order to minimize danger and potential damage to persons, property, and natural resources. Containment equipment is used to restrict the spread of oil and to allow for its recovery, removal, or dispersal. The most common type of equipment used to control the spread of oil is floating barriers, called booms.

3.10.11.1 Booms

Containment booms are used to control the spread of oil to reduce the possibility of polluting shorelines and other resources, as well as to concentrate oil in thicker surface layers, making recovery easier. In addition, booms may be used to divert and channel oil slicks along desired paths, making them easier to remove from the surface of the water

Booms can be fixed to a structure, such as a pier or a buoy, or towed behind or alongside one or more vessels. When stationary or moored, the boom is anchored below the water surface. It is necessary for stationary booms to be monitored or tended due to changes produced by shifting tides, tidal currents, winds, or other factors that influence water depth and direction and force of motion. People must tend booms around the clock to monitor and adjust the equipment. The forces exerted by currents, waves, and wind may impair the ability of a boom to hold oil.

Loss of oil occurring when friction between the water and oil causes droplets of oil to separate from the slick and be pulled under the boom is called entrainment. Currents or tow speeds greater than three-quarters of a knot may cause entrainment. Wind and waves can force oil over the top of the boom's freeboard or even flatten the boom into the water, causing it to release the contained oil. Mechanical problems and improper mooring can also cause a boom to fail.

While most booms perform well in gentle seas with smooth, long waves, rough and choppy water is likely to contribute to boom failure. In some circumstances, lengthening a boom's skirt or freeboard can help to contain the oil. Because they have more resistance to natural forces such as wind, waves, and currents, oversized booms are more prone to failure or leakage than smaller ones. Generally, booms will not operate properly when waves are higher than one meter or currents are moving faster than one knot per hour. However, new technologies, such as submergence plane booms and entrainment inhibitors, are being developed that will allow booms to operate at higher speeds while retaining more oil.

3.10.11.2 Other barriers: Improvised booms:

When a spill occurs and no containment equipment is available, barriers can be improvised from whatever materials are at hand. Although they are most often used as temporary measures to hold or divert oil until more sophisticated equipment arrives, improvised booms can be an effective way to deal with oil spills, particularly in calm water such as streams, slow- moving rivers, or sheltered bays and inlets. Improvised booms are made from such common materials as wood, plastic pipe, inflated fire hoses, automobile tires, and empty oil drums. They can be as simple as a board placed across the surface of a slow-moving stream, or a bream built by bulldozers pushing a wall of sand out from the beach to divert oil from a sensitive section of shoreline

3.10.11.3 Recovery of oil:

Once an oil spill has been contained; efforts to remove the oil from the water can begin. Three different types of equipment—booms, skimmers and sorbents—are commonly used to recover oil from the surface

3.10.11.4 Booms:

When used in recovering oil, booms are often supported by a horizontal arm extending directly off one or both sides of a vessel. Sailing through the heaviest sections of the spill at low speeds, a vessel scoops the oil and traps it between the angle of the boom and the vessel's hull. In another variation, a boom is moored at the end points of a rigid arm extended from the vessel, forming a "U"- or "J"-shaped pocket in which oil can collect. In either case, the trapped oil can then be pumped out to holding tanks and returned to shore for proper disposal or recycling.

3.10.11.5 Skimmers:

A skimmer is a device for recovery of spilled oil from the water's surface. Skimmers may be self propelled and may be used from shore or operated from vessels. The efficiency of skimmers depends on weather conditions. In moderately rough or choppy water, skimmers tend to recover more water than oil. Three types of skimmers weir, oleophilic, and suction are available. Each type offers advantages and drawbacks, depending on the type of oil being cleaned up, the conditions of the sea during cleanup efforts, and the presence of ice or debris in the water.

3.10.10.4 Sorbents:

Sorbents are materials that soak up liquids. They can be used to recover oil through the mechanisms of absorption, adsorption, or both. Absorbents allow oil to penetrate into pore spaces in the material they are made of, while adsorbents attract oil to their surfaces but do not allow it to penetrate into the material. To be useful in combating oil spills, sorbents need to be both oleophilic and hydrophobic (water-repellent). Although they may be used as the sole cleanup method in small spills, sorbents are most often used to remove final traces of oil, or in areas that cannot be reached by skimmers. Once sorbents have been used to recover oil, they must be removed from the water and properly disposed of on land or cleaned for re-use. Any oil that is removed from sorbent materials must also be properly disposed of or recycled

Sorbents can be divided into three basic categories: natural organic, natural inorganic, and synthetic. Natural organic sorbents include peat moss, straw, hay, sawdust, ground corncobs, feathers, and other carbon-based products. They are relatively inexpensive and usually readily available. Organic sorbents can soak up from 3 to 15 times their weight in oil, but they do present some disadvantages. Some organic sorbents tend to soak up water as well as oil, causing them to sink.

3.11 EMERGENCY SHUT DOWN PROCEDURES

3.11.1 GGS (Group Gathering Station):

3.11.1.1 Separator platform:

1. Close all the wells by closing isolation valves in oil manifold.
2. Release gas pressure from manifold through separator to the flare
3. Take action to close all the wells from well head
4. Start fire water pump and prepare to meet the emergency
5. Inform to near-by installation and fire station and operational control room at base.

3.11.1.2 Heater treater/ bath heater

1. Divert and by pass the heater treater and the separator oil directly to tanks.
2. Cut gas supply to the heater treater.
3. Cut power supply to heater treater transformer
4. If situation demands follow;
   - Close all the wells by closing isolation valves in oil manifold;
   - Release gas pressure from manifold through separator to the flare;
   - Take action to close all the wells from well head;
   - Start fire water pump and be ready to meet the emergency;
   - Inform to near-by installations, fire station and operational control room at base;
   - Stop the oil dispatch pump

3.11.1.3 Storage tanks

1. Close valves of all tanks - in case they are not on fire
2. Ensure fire water sprinkling on tanks to cool the liquid - in case tank is not on fire
3. Keep dyke valve open to drain out water
4. In case of tank under fire, use foam on that tank only & spray water on remaining tanks
5. Keep dyke valve of tank on fire closed

3.11.1.4 Pump house

1. Stop the pumps and disconnect the power supply
2. Close the suction and delivery valves of the pumps, if possible
3. Close outlet valve of the tank concerned and the pump delivery line at the scrapper point.
4. Inform to near-by installations, fire station and operational control room at base

3.11.2 EPS (Early Production System)

1. Divert all the flow from separator to tanks, instead of Heater treater, if any
2. Subsequently, if situation demands close the wells at Well sites.
3. Ask the loading tanker to leave the EPS immediately
4. Inform to near by installations, fire station and
5. Operational control room at base.

3.11.3 Sucker rod pumps

1. Shut down power by isolating main power (DO switch, MCB or DG set).

2. Bring main power switch on SRP panel to zero.

3. Only after completing power shutdown sequence and ensuring no current flow, SRP fencing to be opened.

EMERGENCY PROCEDURE:

1. Don't panic
2. Do not smoke. Don not allows anyone to smoke.
3. Don not attempts a rescue until you have done your breathing apparatus.

RESCUE PROCEDURE:

1. Put on your full rescue unit (minimum 30 minute breathing apparatus) before attempting a rescue otherwise you too can become a victim.
2. Remove victim immediately to fresh air.
3. If breathing, maintain victim at rest and administer oxygen, if available.
4. If person is not breathing, start artificial respiration immediately.
5. Call ambulance/Emergency vehicle get person to hospital or doctor.
6. Keep person lying down with blanket etc. under shoulders to keep airway open, Conserve body and not leave unattended.
7. If eyes are affected by H_2S wash them thoroughly with clear water.
8. When workers are exposed by dangerous atmosphere, two things must be quickly considered. First, anyone affected by lethal gas must be immediately removed to a safe atmosphere second, if more than one victim is involved, the person severely exposed to the must be moved before the rest. Simply, whoever is in most danger must be saved first.

A 3.12 STANDARD OPERATING PROCEDURE (SOP) FOR UNCONTROLLED GAS LEAK

ACTIVITY	ACTION
1. Switch off all engines and electric power.	I/C Maint./ Any Shift Maint. person
2. Cordon the affected area.	S/O. / Shift in charge
3. Prohibit and extinguish all naked flames / sparks.	S/O, / Shift in charge
4. If required close all wells.	Shift in charge
5. Try to pull out all inflammables from the affected area.	I/C Shift / Shift person
6. Warn nearby ONGC installation / testing site / rig	I/C Security / Shift I/C / Senior person of the shift.
7. Start diesel engine of fire water pump and call fire tenders available in the locality.	I/C Shift/Senior persons of shift.
8. Control Leakage through valves and if required, depressurize the whole system.	Shift I/C /Shift crew.
9. Warn nearby factories/ installation / villages / town ship.	I/C Shift / Shift Crew.
10. Keep in touch with control room through wireless the / radio rooms for help and instruction.	I/C Shift/Senior persons of Shift
11. Head Count and if required organize Search & Rescue	Head Count: S/O Search and Rescue: S/O with off-duty security personnel.

A 3.13 STANDARD OPERATING PROCEDURE (SOP) FOR CONTROL OF GGS FIRE

ACTIVITY	ACTION
1. Try to extinguish fire with suitable extinguishers.	Shift Crew
2. Switch off all engines and electric power	I/C Maint/Shift Person
3. Cordon off the affected area	I/C Shift, S/O, Shift persons
4. Prohibit and extinguish all naked flames/ sparks	S/O, shift persons
5. Close all wells	Shift persons
6. Isolate gas/condensate flow to the affected area	S/O/ Shift persons
7. Start fire water pump.	Four persons / Shift person
8. Contact nearby fire station	Shift I/C.
9. Inform to I/C fire –Asset	Shift persons
10. Removal all the vehicles, inflammable liquid out of reach.	S/O/ Shift Crew
11. SRP should immediately remove all the ammunitions, Explosives from the area to a safer place.	SRP Crew
12. Fire and first aid trained personnel should be kept ready for any service.	I/C fire / S/O
13. Head Count and if required organise Search & Rescue	Head Count: S/O Search and Rescue: S/O with off-duty security personnel.

A 3.13.1 STANDARD OPERATING PROCEDURE (SOP) FOR CONTROL OF FIRE IN WELL HEADERS UPSTREAM OF H.P. SEPARATORS

	ACTIVITY	ACTION
I.	Start the 75 KW electrical motor with fire water pump.	Elect. Person with Shift Crew
II.	In case the 75 KW motor is not getting started, start the Diesel Engine with fire water pump.	Shift Crew
III.	Direct 4 fire monitors to the affected area and continue fighting the fire till total control of the situation	Shift – In- Charge
IV.	Dispatch emergence vehicle to site to close all the wells. High flow wells to be closed first.	Shift – In- Charge
V.	Inform Base Fire control for fire tenders over radio. Inform Nearest Fire Station over phone. Inform MGVCL also with the help of SRP personal	Shift – In- Charge
VI.	Inform SM, and I/C – Installation over phone	Shift – In- Charge
VII.	On arrival of fire tenders, help positioning them	Shift – In- Charge
VIII.	Fight the fire till fire is extinguished over closure of wells	Shift Crew

A 3.13.2 STANDARD OPERATING PROCEDURE (SOP) IN CASE OF FIRE IN SEPARATORS

	ACTIVITY	ACTION
I.	Start the 75 KW electrical motor with fire water pump.	Elect. Person with Shift Crew
II.	In case the 75 KW motor is not getting started, start the Diesel Engine with fire water pump.	Shift Crew
III.	Direct fire monitors to the affected area and continue fighting the fire till total control of the situation	Shift – In- Charge
IV.	Try to divert the entire gas flow to flare through emergency flare header	Shift – In- Charge
V.	Dispatch emergency vehicle to site to close all the wells. High flow wells to be closed first.	Shift –In- Charge
VI.	Inform Base Fire control for fire tenders over radio. Inform Nearest Fire Station also over phone. Inform MGVCL also with the help of SRP personal	Shift – In- Charge
VII.	Inform SM, and I/C – Installation over phone	Shift – In- Charge
VIII.	On arrival of fire tenders, help positioning them	Shift – In- Charge
IX.	Fight the fire till fire is extinguished over closure of wells	Shift Crew

A.3.13.3 STANDARD OPERATING PROCEDURE (SOP) IN CASE OF FIRE IN GAS DISPATCH SKID (METERING STATION)

I.	ACTIVITY	ACTION
II.	Start the 75 KW electrical motor with fire water pump.	Elect. Person with Shift Crew
III.	In case the 75 KW motor is not getting started, start the Diesel Engine with fire water pump.	Shift Crew
IV.	Direct fire monitors to the affected area and continue fighting the fire till total control of the situation	Shift – In- Charge
V.	Try to divert the entire gas flow to flare through emergency flare header	Shift – In- Charge
VI.	Dispatch emergency vehicle to site to close all the wells. High flow wells to be closed first.	Shift –In- Charge
VII.	Inform Base Fire control for fire tenders over radio. Inform Nearest Fire Station also over phone. Inform MGVCL also with the help of SRP personal	Shift – In- Charge
VIII.	Inform SM and I/C – Installation over phone	Shift – In- Charge
IX.	On arrival of fire tenders, help positioning them	Shift – In- Charge
X.	Fight the fire till fire is extinguished over closure of wells	Shift Crew

A 3.14.1 STANDARD OPERATING PROCEDURE (SOP) FOR CONTROL OF GAS FIRE AT WELL SITE

In case of gas fire the incident will come onto notice through nearby dwellers or while on patrol of well sites by shift crew. There will be sudden drop in total gas flow also.

Sl. No.	ACTION	RESPONSIBILITY
1.	Send shift crew with walkie-talkie by emergency vehicle to site for closure of all the well head valves, if approachable.	Shift-In-Charge
2.	Inform Base Fire Control for fire tenders over radio. Inform Nearest Fire Station also over phone. Inform MGVCL.	Shift-In-Charge
3.	Inform SM and I/C Installation over phone.	Shift-In-Charge
4.	On arrival of fire tenders at site, position them suitable and fight the fire till total control of the situation.	Shift crew

A 3.14.2 STANDARD OPERATING PROCEDURE (SOP) FOR CONTROL OF GAS/OIL LEAKAGE AT WELL SITE

Sudden drop-in total gas flow is a possible indication of gas leakage at well site. Otherwise information from by the nearby dwellers may confirm occurrence of gas leakage incident at well site.

SL NO	ACTION	RESPONSIBILITY
1.	Send shift crew with walkie talkie by emergency vehicle to site for closure of all the well head valves.	Shift-In-Charge
2.	Inform Base Fire Control for fire tenders over radio. Inform Nearest Fire Station also over phone. Inform MGVCL.	Shift-In-Charge
3.	Inform SM and I/C Installation over phone.	Shift-In-Charge
4.	After arrival of the fire tenders station them at safe distance depending on the wind direction.	Shift crew

A 3.15.1 STANDARD OPERATING PROCEDURE (SOP) FOR CONTROL OF GAS/OIL LEAKAGE/FIRE IN FLOWLINES

Sudden drop-in total gas flow or/and a drop in line pressure is a possible indication of gas leakage in flow line. Otherwise information from by nearby dwellers may confirm occurrence of gas leakage in flow lines.

SL NO	ACTION	RESPONSIBILITY
1.	Send shift crew with walkie talkie and portable fire extinguishers by emergency vehicle to site for identification of affected flow line and for closure of all the concerned well head valves.	Shift-In-Charge
2.	Close manual isolation valve in the affected well flowline upstream of well manifold to prevent flow of gas from well manifold to the flowline in case NRV does not hold.	Shift-In-Charge
3.	Cordon off the area and persons within the affected zone should be removed. All naked flames and sources of ignition to be removed.	Shift crew and security as applicable
4.	Inform Base Fire Control Room for fire tenders over radio. Inform Nearest Fire Station also over phone. Inform Base Security Control Room.	Shift-In-Charge
5.	Inform Mines Manager, I/C Installation and Safety Officer over phone.	Shift-In-Charge
6.	Warn nearby ONGC installation / testing site / rig	Shift-In-Charge
7.	After arrival of the fire tenders station them at safe distance depending on the wind direction.	Shift crew

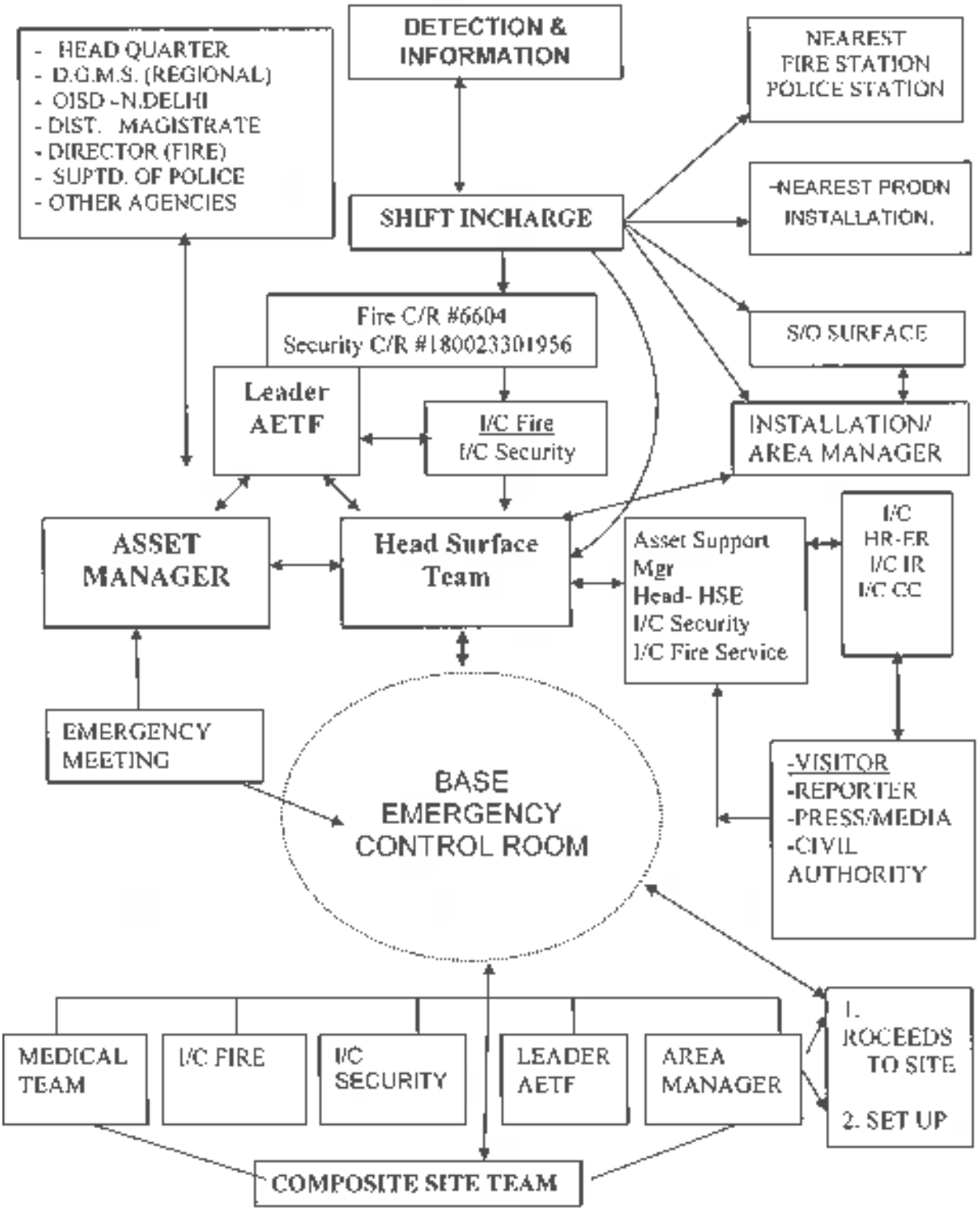
8.	Fight the fire till fire is extinguished over closure of wells (in case of fire)	Shift Crew & Fire Crew

A 3.15.2 STANDARD OPERATING PROCEDURE (SOP) FOR CONTROL OF GAS/OIL LEAKAGE/FIRE IN PIPELINES

Sudden drop in line pressure and sudden increase in flow rate is a possible indication of gas leakage in pipeline. Otherwise information from by nearby dwellers may confirm occurrence of gas leakage in pipelines.

SL NO	ACTION	RESPONSIBILITY
1.	Send shift crew with walkie talkie by emergency vehicle to site.	Shift-In-Charge
2.	Close manual isolation valve in the affected pipeline near the shut down valve to prevent flow of gas to pipeline if SDV (if installed) does not operate.	Shift-In-Charge
3.	Inform In-charge of downstream installation to close inlet manual isolation valve.	Shift-In-Charge
4.	Cordon off the area and persons within the affected zone should be removed.	Shift crew
5.	Inform Base Fire Control Room for fire tenders over radio. Inform Nearest Fire Station also over phone. Inform Base Security Control Room.	Shift-In-Charge
6.	Warn nearby ONGC installation / testing site / rig	Shift-In-Charge
7.	Inform Mines Manager, I/C Installation and Safety Officer over phone.	Shift-In-Charge
8.	After arrival of the fire tenders station them at safe distance depending on the wind direction.	Shift crew
9.	Fight the fire till fire is extinguished over closure of wells (in case of fire)	Shift Crew & Fire Crew

A 3.14 EMERGENCY INFORMATION FLOWCHART: – PRODUCTION INSTALLATION



A.3.15 STANDARD OPERATING PROCEDURE FOR MOCK FIRE DRILLS: ONSITE

OBJECTIVES
To prepare the employees for any occurrence of fire accident or any related exigency like leakage of gas/ fluid etc.

SCOPE:-
Any pre assumed area with specific occurrence.

Steps to be carried out:-
1) Person who witness the fire/gas leak will shout 'fire' 'fire' 'fire' to alarm others and inform the same to shift in-charge.

2) Shift in-charges/ installation in-charges will raise the fire alarm by ringing the fire bell/hooter.

3) He will declare a small fire in a pre –assumed area like small grass fire in separator area, a small cotton waste fire in storage tank area etc. as may be witnessed by the first person. At the same time he will inform the same to fire officer at base.

4) He will inform the same to Installation Manager and Surface Manager.

5) He will observe and record the performance of each individual for the responsibilities assigned and note the difficulties faced during the drill.

6) He will record the mock fire drill in the drill register and will mention in the daily progress report for appraisal of surface manager.

7) Observations will be reviewed in Safety meeting and the compliance of the observations should be sent to Head HSE.

(Prior to start the fire drill shift in-charge/ installation in-charge will brief the responsibilities of each individual employee under his control and check the equipment to be used during the exercise)

Responsibilities

1) Shift in charge will raise the alarm at any odd hours and declare a small fire within the complex.
2) Contingent labourers will evacuate the site and gather at a safe zone (or near the gate) and will wait for any call for their assistance.
3) Persons working near the area where fire is declared are to extinguish the fire by using suitable portable fire extinguishers.
4) Electrical person will switch off the electrical supply to the area declared under fire.
5) Mechanical shift person will operate fire pump.
6) One person will operate fire water monitor and fire hydrant by using fire hoses, if required.
7) Surface team will close the valve for cutting-off the supply of gas to the affected area declared under fire.
8) Ambulance will be kept ready.
9) SRP personnel will cordon off the area declared under fire
10) Fire Officer after getting the information shall send the fire tender to the site, if required
11) Security Officer, Safety Officer, Medical Officer and HSE representative will be informed for taking necessary actions as per the standing orders prevailing in their respective sections to deal with such situations.
12) In-Charge of the crew of first turnout fire tender will take the charge of the fire fighting operations.
13) After completion of fire fighting operations all clear by the In Charge or the senior most officer signal will be given to resume normal operation.

Level of personnel to be involved

1) All the shift personnel at the site
2) The in-charges of respective sections

Duration of drill

- 03 minutes when fire tender is not to be called
- Till fire tender arrives, in case fire tender has been called from ONGC Base Fire Station, Cambay or from State Fire Service.

Frequency of the drill

1) At least once in a month without calling fire tender
2) At least once in a year by calling fire tender.
3) Odd hour mock drills to be conducted twice in a year.

Fire equipment/ Appliances to be used

1) First aid fire fighting equipment comprising of fire bell / siren, fire buckets, portable fire extinguishers and fixed fire fighting system consisting of fire water pumps, monitors, hydrants, fire hoses, branch pipes and sprinklers available at the site and

2) Fire tender in monthly mock fire drill when fixed fire water pumps are in maintenance /repairs fire tender in yearly mock fire drills.

Reporting with Observations

1) Mock fire drill to be recorded in the format with all the details.
2) These reports are to be submitted to mines agent for reviewing in the safety committee meeting.
3) Records of the mock fire drill are to be maintained at the site. A copy of the mock fire drill should be sent to Fire section, HSE section for their records.
4) Recommendations and suggestions based on observations after reviewing to be incorporated in the next drill

Shortcomings, if any
To be recorded in the mock fire drill report

Conclusions

1. **Recommendations**
2. **Suggestions**

(Doc. no. to be taken from QHSE manual)

OIL & NATURAL GAS CORPORATION LIMITED
CAMBAY ASSET
DETAILS OF MOCK FIRE DRILL
(ERP)

1	Name of Installation	
2	Date of Mock Fire Drill	
3	Mock fire drill supervised by	Name Designation
4	Staff / officers who attended mock Fire / Drill	Name Designation
5	Name of person who spotted fire	
6	Place of Fire	
7	Time of Fire	
8	Call Of Fire Given At (time)	
9	Horn/Siren/Paging	
10	Staff responded to fire call at (time)	
11	Response Time (in minutes)	
12	Whether fire tender was called	Yes/No
13	Who attended call at fire station	
14	Call for fire tender given at (time)	
15	Fire tender reported at (time)	
16	Response time of Fire Tender (in min.)	
17	Actions taken by persons to fight fire (Name & Designation wise).	
18	Fire controlled at (Time)	
19	Any other action taken as per emergency plan	
20	Observations / Remarks on mock fire drill	
21	Positive Findings	Negative Findings

Signature of Shift I/c / S/O
Name & Designation

Signature of Installation Manager/ Officer supervising drill
Name & Designation

Distribution:-

1. Mines Manager
2. Asset HSE
3. I/c Fire
4. Office Copy

A.3.16 STANDARD OPERATING PROCEDURE FOR D M P DRILL: (ONSITE)

Two or three days prior to DMP (on site) drill Head HSE will give presentation on SOP on duties of various executives and teams during emergency and drill will be conducted as per following procedure

1. A site will be selected for mock DMP drill.
2. Information will flow from site to shift I/C to control room and mines manager to respective heads to Asset Manager
3. Asset Manager will call an emergency meeting with other heads and in charges wherein incidence will be briefed. I/C security must reveal security scenario and movement of the teams (AETF+ Fire+ INFOCOM+ Medical team+ Security) will be decided accordingly
4. Asset Manager will declare On Site Emergency
5. All teams according to decision as per point no 3 may assemble at one designated place
6. AETF leader will call his team, select personnel according to situation and proceed for site.
7. CMT Equipment will be tested and response time will be noted Arrangement for transportation shall be checked by I/C logistics.
8. LM maintenance will check for emergency generator
9. I/C HR-ER will make a survey for camping and supply of food
10. Emergency control room set up at base and executives from respective discipline will manned the C/R other discipline will also sent their representatives and ECR will function under Head HSE
11. Observation team to be formed to note the activities response time
12. A map will be made available in emergency control room by the respective group
13. Activities may be photographed

Note

1. In case of emergency at well site water tankers also to be moved along with the fire tender

(Annexure. No 11. to be taken from ERP manual)

MOCK DMP DRILL

(OFF SITE / ON SITE)

Name of the installation :
Date :
Area to be covered :
Nature of fire /incidence :
Description of incident :
Emergency call at : Hrs.
Response time :
1 Fire tender
2 Medical team
3 Info Com
4 Other Team or facility
Duration of drill :

Persons attended the mock DMP drill

Sl. No.	Name	Designation	Assignment / Role performed	Remarks

Equipment used
And their performance :

Whether fire tender from : yes / no
Base/state fire service called
If yes
Called at :
Reported at :
If late reason :
Observations :

Suggestions for improvement :

Signature of Head of Observing Team

Adequacy of Fire fighting equipment at site is checked and found in order.

Distribution:

1. Head HSE
2. Safety officer (Surface)
3. I/C Fire
4. Office copy.

Signature of Fire Officer

A 3.17 STANDARD OPERATING PROCEDURE (SOP) FOR OVERALL ADMINISTRATIVE CONTROL IN CASE OF EMERGENCY

01 ASSET MANAGER (CHIEF COORDINATOR)

- Declare the STATE OF DISASTER
- Co-ordinate with Corporate Head Quarters/ Regional Office/state authorities
- Release information to Media through I/C Corporate Communications.
- Decide to evacuate and rehabilitate in consultation with state authorities.
- Direct to organize meetings at site / base office and draw action plan
- After termination of Emergency authorize All Clear Signal on receipt of appropriate information from Leader AETF.

02 SURFACE MANAGER /HEAD –DRILLING SERVICES HEAD WELL SERVICES- OPERATION-COORDINATOR

- Proceed to site
- Assess the situation and DAMAGE to Asset
- Apprise Asset Manager and co-ordinate with other Heads / Managers
- Will decide operational and logistic priorities
- Inform & assist Head of CMT Operation ONGC
- Establish suitable emergency control room at site *(SITE C/R)*
- Monitor and implement all control measures.
- Take decision to evacuate in vicinity of site.
- Assist in Post disaster operations /Rehabilitation.
- Arrangement of outside expert , if required , in consultation with Asset Manager and Leader of AETF.

03 LEADER AETF (ASSET)

- Acquire complete information.
- Make action plan
- Inform the Composite Team (AETF/CMT+ SECURITY + FIRE+ MEDICAL+ INFO-COM) members of the impending task and to be on alert.
- Rush to site to study and take control of situation.
- Arrange first aid and attempt to mitigate the incident/emergency.
- Take operational responsibility till normalcy prevails.
- Coordinate with Regional and Head Crisis Management Team.
- After termination of Emergency apprise Asset Manager and request authorization of "All Clear Signal" after necessary checks
- AETF leader shall hold meeting with his team twice in year.

04 INSTALLATION MGR –GGS/LM-DS /LM-WS

- Assess the site situations and apprise respective Head
- Establish suitable control room at site.
- Coordinate with groups with fire fighting operation
- Liaison with security
- Insure information to nearest Fire Station & Police Station/nearest installation/ downstream consumers
- Prepare Situation Report
- Keep chronological record of all events during disaster
- Assist Asset Manager and Surface Manager/HDS in post disaster operations
- Isolation of disaster area

05 HEAD HSE

- Liaison with SM/HDS/H WS/F.O. under the guidance of Asset Manager.
- Comply with all statutory obligations and send / inform required information
- Establish Emergency Control Room at base and monitor its functioning.
- Liaison with mutual aid partners.
- Keep chronological record of all events during disaster.
- Information to DGMS, OISD, CPCB, SPCB and HQ (Corporate HSE) with approval of Asset Manager.
- Assist post disaster enquiry and draw corrective measures based on the experience gained out of the disaster situation
- Call air monitoring Equipment in case of blow out.
- Help I/c HR/ER in public awareness program regarding the dangers of the disaster(if any technical information is required)
- Coordinate in assessment the environmental impact of the Disaster and suggest methods for containment.

06 SHIFT IN- CHARGE

- Take charge of situation and follow the standing instructions given below and convey detailed information to Area Manager-GGS/ Surface manager/LM drilling/Head-Drilling Services.
- Switch off Engine and generation as per the requirement of Situation
- Avoid/extinguish all naked flames / sparks with the help of SRP/ Fire men and the trained personnel of the GGS/Rigs in association with installation safety officer
- Inform nearest FIRE C/R, FIRE STATION, POLICE ST Area in charge/ LM
- Try to isolate all inflammable material i.e. HSD, petrol, gas cylinders, chemicals etc. from the affected area of plant premises
- Mustering of man power.
- Keep in touch with control room for all help and instructions
- Try to remove all sundry material to safe distance
- Try to remove all records and databanks to a safe place.
- Contact nearby ONGC installations for all possible help in terms of men and machinery with the instruction of Surface Manager / Area Manager – GGS .

- Evacuate all personnel of the plant / area under disaster to a safe place
- Responsible for all possible control measures till seniors officers reach to site.
- Gram Pradhan should be informed

07 SAFETY OFFICERS (DS/ SURFACE/ WS)

- Assess and undertake overall safety measures.
- Evaluate the associated risk and advise senior officers, modalities to be adopted.
- Monitor wind direction / noise
- Issue permits for cold / hot jobs in consultation with Installation Manager.
- Keep chronological record of all events during disaster.
- Assist post disaster enquiry and draw corrective measures based on the experience gained out of the disaster situation.
- Keep record of personnel and safety equipment

08 I/C FIRE SERVICES

- Mobilize required fire fighting resources available with ONGC to the site.
- Organize fire-fighting crew.
- Guide employees in fire fighting operations
- Arrange and mobilize fire-fighting resources from other nearby organizations under "Mutual Aid Scheme" (SRP, State Fire Service Dept) within shortest possible time.
- Assume full responsibility for all the fire fighting operations.

09 IN-CHARGE SECURITY

- Take control of security related aspects.
- Inform I/C Fire Services, SP concerned, Comdt SRP before leaving for site.
- Detail SRP escort for personnel and material movement
- Keep outsiders at safe place away from site and to check theft / pilferage from the site(plant / installation)
- Keep routes clear from traffic jam / villagers movement of ONGC personnel /machinery/plant with liaison from local authorities.
- Coordinate for post emergency security aspects and suggest corrective steps for future implementation
- Apprise Surface Manager/ H Drilling Services/ Head Well Services/ Asset Manager on security related matters.

10 COMMANDANT , SRP

- To liaison with Shift I/C and I/c Security
- To act under the guidance of I/C security
- To provide escort for movement of men / material
- To arrange additional force through his higher authorities for deployment at affected site and also for escorts, if so required
- Restrict entry of un -authorized person inside affected site unless called by site I/C
- Cordon off affected site where SRP is deployed
- Warn nearby inhabitants, if required

11 I/C HR-ER

- Arrange food and other amenities required for Task force and other officials at site
- Interact with District / State authorities
- To help in implementing evacuation and rehabilitation.
- Verification of crew list and identifying missing personnel
- Inform next of kin of affected personnel in case of accident/ death
- Arrange for financial compensation
- Acquisition of land as per requirement of situation

12 INCHARGE –MM

- Assist in issue of materials for site
- Assist in locating supply for additional requirement
- Coordinate procurement of material in emergency and replacement of consumables.
- Interact with customs, port and civil aviation authorities etc. for speedy delivery.
- Coordinate store functions within ONGC
- Obtain material on loan from outside organizations
- Apprise the Asset Manager and Surface Manager /Head–Drilling Services (Head AETF)/ Head CMT/Head Well Services

13 INCHARGE -LOGISTICS

- Transport men and material to / from the site.
- Transport earth-moving equipment, AETF/CMT equipment, Fire equipment, etc.
- Arrange drinking and Technical water at site.
- Ensure logistic support.
- Coordinate transportation of emergency material from other resources
- Co-ordinate with Security , Fire ,Civil ,Mechanical, Electrical and Info Com
- In case of fire/ emergency at well site water tankers should also to mobilized along with fire tender.

14 INCHARGE –MEDICAL

- Form a team of doctors & first aid trained personnel
- Arrange ambulance and supply medicines /drugs and proceed to site.
- Establish emergency medical center at site.
- Report & Record any injury / causality
- Interact with the hospitals.
- Send the injured to the nearest hospital.
- To check water and food quality in the area for poisoning in collaboration with state public health dept.
- Fill up history cards of the patients
- Apprise I/C HR-ER.

15 INCHARGE – FINANCE

- Arrange funds in coordination with Surface Manager/H-DS/ H-WS and I/C-HR/ER for rescue operation, life support and emergency purchase of essential supplies such as medicines, clothes etc
- Assist in financial sanction for procurement of materials and services.
- Obtain approval of foreign exchange from Government
- Financial assistance in mobilizing equipment / services from international agencies.
- Financial assistance in disbursement of compensation for damage to life and property.
- Insurance claim.

16 IN CHARGE-INFO-COM:

- Establish total communication network at GGS/rigs/nearest establishment of the affected area including setting-up of Emergency Control Room at base for communications
- Arrange to set up mobile communication system.
- All communications to outside with proper logging of records.

17 CORPORATE COMMUNICATIONS

- Interact with public and Media with approval of Asset Manager.
- Organize public awareness programme regarding dangers of disaster as approved by Asset Manager.

18 ENGINEERING SERVICES

18 .1 LM -WORKS

- To mobilize earth moving equipment.
- to make road approachable, if required make alternative route through possible means
- To make arrangement for technical water in coordination with I/C logistics.
- Create additional technical water storage facilities if required
- Assist in obtaining acquisition of land as per requirement of situation

18.2 LM- MAINTENANCE

- Mobilizing and checking of all equipment including CMT and Fire Equipment.
- Operational and maintenance of equipment as per site requirements.
- Man the workshop round the clock
- Provide temporary power supply/ restoration as per need of site

CHAPTER – IV

TRANSPORT EMERGENCY PLAN

CHAPTER-4
TRANSPORT EMERGENCY PLAN

A 4.0 INTRODUCTION

In oilfield operations on land, large numbers of vehicles are deployed for carrying of personnel and cargo, which are often heavy and oversized. In narrow roads of Cambay, safe operations of these vehicles is vital for efficient conduct of work. However, given the nature of drilling and production operations, driving of vehicles, including heavy vehicles like trailers and trucks, in adverse weather conditions, bad roads, as also during night cannot be avoided. Therefore there is always an element of risk of vehicle accident.

Injury or damage caused by an accident can be compounded if the people handling such emergencies are not adequately knowledgeable of the appropriate response. Therefore, Emergency planning/handling becomes a necessary element for mitigating a major accident/emergency.

This chapter provides the guidelines on emergency handling so as to mobilize the necessary help with minimum response time for rescue and relief operations in vehicle accidents.

A 4.1 Flow of Information

When any accident takes place, the information should be given to the concerned agencies at the earliest so that they can arrive at the site quickly.

While conveying the information to ONGC Base Radio Room, optimum data available on the following lines should be mentioned:

(I) Location of the accident with topography and any other identifiable landmarks viz. Village Name/Milestone Number/ Highway Number /Road Name
(II) Type (car/bus/truck) and Registration Number of the Vehicle
(III) Number of passengers/ Details of cargo.
(IV) Casualty/injury or damage
(V) Proceeding from/to
(VI) Position of the vehicle on the road after the accident.
(XI) Assistance required (Ambulance, cranes, fire fighting equipment, torch lights, etc.)

However, to minimize the time delay, any readily available information would be communicated, though all other information would be desirable.

As the movements are generally always with escort, who are equipped with walkie-talkie sets, it will be the duty of escort platoon commander to inform the ONGC Radio Room through SRP Control. The crew and/or senior most uninjured passenger will provide details/information about passengers/cargo.

A) In case movement without escort, if the driver/conductor/passenger is in a position to act, then one of them would inform ONGC Radio Room through the nearest phone or through any other available means.

C) In the absence of telephone facility or in case serious incapacitating injury, the message should be communicated through any other vehicle or person to the nearest installation of ONGC, Police outpost, Fire Brigade etc.

D) On receipt of information about accident, ONGC Radio Room shall immediately inform Head Logistics. If any serious injury/injuries or fire is reported or expected ONGC Radio room shall also inform CMO/ONGC Hospital, ONGC Fire station, Fire Brigade etc.

Depending on the nature and seriousness of accident, the following agencies would be required to be informed: -

a. ONGC Base Radio Room
b. Police station
c. Fire Brigade
d. Ambulance services/hospital
e. Transporters
f. Insurance Authorities
g. District Administration/authorities
h. Any voluntary agencies nearby

A 4.2 Rescue Operation

A. Precautionary measures at site

The rescue team i.e. ONGC response (Logistics + Fire + Medical), Fire Brigade, Police etc. on reaching the site would undertake the following activities if not already taken up:

1. Rescue the crew, passengers and third party, if injured.
2. In case of diesel tanker, remove all the firefighting equipment from the tanker and keep them in a safe place for use in case of fire and keep the public away from the site to avoid casualties in case of any explosion fire etc.
3. Provide first aid to the injured. Segregate the critically/seriously injured from others and arrange to evacuate the injured to hospital as per priority.
4. Arrange to transfer the uninjured to destination/base complex based on assessment of situation.
5. If the (accident) vehicle is repairable, repair it, else toe back the vehicle. In case of loaded truck, if required mobilize crane to unload truck.
6. Till such time as the accident vehicle or the debris of accident are removed, barricade or cordon off the site and put red flags/marks or lights at the barricade corners. Remove debris, if any, promptly to facilitate movement of rescue operations team/vehicle at site.
7. In case of Casualty the same procedure is to be adopted as the accident site is to be inspected by police/ insurance agency.
8. Divert traffic through alternate route.

9. In case of diesel tanker, if leakage has developed due to accident, stop the leakage or transfer the oil into another empty tanker, if available on the site. Otherwise, move the tanker to a safer place, if possible after ensuring a safe LEL around the tanker. Cover the oil spillage on the ground with dry sand. If the public are found to be recovering the spilled product, the same to be prevented.
10. After the rescue is over and the site has been cleared, remove the barricades and the flags.

B. Accident with fire and explosion

1. Try to control the fire with available resources, if possible. Don't allow the fire to spread.
2. Remove all the flammable or combustible material not involved in the accident, from the near vicinity of the accident site to a safer distance with a purpose to prevent spread of fire.

A 4.3 Interface with Local Agencies

The leader of rescue team assisted by other rescue team members would co-ordinate with Fire Brigade, Police and District Administration

It shall be borne in mind that casualty, if any should be left intact till the time the police personnel arrive at the scene. Injured person should be attended to at the earliest.

CHAPTER – V

BOMB THREAT CONTINGENCY PLAN

Chapter-5
BOMB THREAT CONTINGENCY PLAN

A 5.1 Introduction:

Oil and gas industry has always been a lucrative target for the militant and subversive elements in world for last two decades, wherein large number of direct attack had been launched by various militant groups across the world. ONGC Cambay Asset may also have threat of bomb attack from insurgent as well as anti-national elements. It is therefore felt that a comprehensive contingency plan should be formulated and rehearsed periodically to counter and deal with any bomb threat to any of the installation or complex of the ONGC Cambay Asset. This bomb threat contingency plan is formulated to facilitate handling any contingency that may arise due to bomb threat received in Cambay Asset.

A 5.2 Threat Analysis:

The bomb threat analysis can be described under two heads: -

(a) Detection of the threat
(b) Systematic handling of the threat.

A 5.3 Detection of the threat :

It is very important to detect the bomb threat at an early stage. Bomb can either be found planted in the installation by any person or an intimation of bomb being planted may be received through telephone call. Bomb threats calls, as experienced in various previous known incidents, are generally received through telephone calls. In either case, as soon as the threat is identified, it should be considered to have been planted and that should open the way for the second stage that is handling the threat. As the caller is the best possible source of information about the location and nature etc, of the bomb, the following line of action whenever such a call is received; would be adopted by the persons manning the telephone where the threat call has been received.

(a) Keep the caller engaged in conversation as long as possible. Ask to repeat the message and record every word spoken by the person concerned.
(b) Listen closely to the voice (male/female), voice quality (calm/excited), accent, (could denote the area of origin of the caller) and speech impediments, etc. as these voice signatures could help the police in tracing the caller later. As a matter of fact, these details should be noted and kept ready by the telephone operator/personal assistants where such calls are likely to be received.
(c) Pay particular attention to background noises, such as, sound of moving train, people, vehicles, music or motors, etc. which may give a clue as to the location of the caller.
(d) If the caller does not indicate the location of the bomb or the time of possible detonation, persuade him/her to reveal this information as well.

(c) Inform the caller that as the building/ target premises is occupied by a large number of employees/inhabitants, the detonation of a bomb could result in death or serious injuries to many innocent people. (There is a good chance that this could motivate him to reveal more information about the bomb).

Persons manning the following telephones are also educated about the above directions and must take prompt action for quick dissemination of the threat to Asset Crisis Management Group (ACMG)/ I/C Security.

(a) Security Control room
(b) SRP Control room
(c) Transport Control room
(d) Asset Manager cell (PA)
(e) Info-Com Junction line operator
(f) Info-Com Fax (Central fax)

A 5.4 Handling the threat :

Handling of bomb threat should be as per standard operating procedure of the Asset which describes all the detailed steps that are undertaken and commenced as soon as the bomb threat is received and continue till the threat is effectively dealt with. Normally the bomb threat causes considerable panic and disrupts normal activities of the installation, apart from loss of time, energy and financial loss to the corporation. Hence the threat requires careful handling at all level. As there is no appropriate expertise available with the asset to physically handle the bomb, assistance from outside agency like State police (bomb disposal squad) will have to be sought to diffuse the bomb. However, till such time the outside help arrives the threat has to be handled by a core group of crisis Management team of the Asset.

A 5.5 Asset Crisis Management group (ACMG) :

Considering the high intensity damage potential of a bomb explosion, a high level Crisis management group at the Asset level, as constituted under, should handle the threat : -

a. Asset Manager - Head ACMG
b. I/C Security - Member ACMG
c. Commandant SRP - do -
d Head HSE - do -
b. Support Manager - do -
c. DIC/Shift I/C (as the case may be)
d. SRP Company Commander (as the case may be)

The names, telephone nos. and residential address of each member of ACMG are enclosed as Appendix - A to this scheme in Page.no.80.

A 5.6 Action on detection:

As mentioned earlier bomb threat can either be detected by means of an incoming telephone call/Fax/Letter received from outside or by chance may be seen by any person inside the ONGC complex / installation. All employees of the asset to be educated from time to time, for giving immediate information, as soon as threat of bomb is received, by calling the security control room, giving all details.

Persons on duty should try to gain maximum information about the caller and also try to prolong the conversation with the caller with a view to gain the identification of the caller. In addition caller ID telephones should be placed in all of the above offices. As soon as there is any information about Bomb threat call from any employee, the Security Staff will immediately reach to the place of occurrence. If the information is not already passed to the police, then the same would have to be done after checking the following information: -

Bomb threat check list -

i) Exact location of Bomb
ii) Time set for detonations (if known)
iii) What does it look like?
iv) What is the Explusive (if known)
v) Reasons for planting the Bomb (As per caller)
vi) How do you know about it?
vii) Name of the person received the call.

Answer to all the above mentioned questions may not be accurately available at the detection stage, however all-out effort should be made from the security section officers to record accurate information as far as possible, as these information would required to be passed on to the outside agencies who would subsequently handle the bomb. Also a record of the threat call, if it is received through teleptione, may be kept in the following format which may be useful at later stage of investigation.

Tele Data Record -

i) Date _____ and time _____ of call
ii) Exact language used _____
iii) Male? Female? Adult? Child? Estimated age _____ Nationality _____
iv) Speech _____ (if known)
v) Accent _____
vi) Background noises _____
vii) Caller telephone Nos. _____

A 5.7 Handling the bomb threat :

On receipt of the information about bomb threat, the duty officer / staff in the security control room immediately contact the following persons by fastest means.

(a) I/C Security
(b) I/C Fire Section
(c) PS Cambay (02698-221133)
(d) Bomb squad of Gujarat Police (02692-262650)
(e) PHQ Control room (02692- 261033)
(f) SRP Control room (1800233019S6)
(g) ACMO, ONGC, Cambay
(h) Nearest Police Station to Installation

i. Kathana GGS - Under Virsad PS (02697-244433)
ii. Padra GGS - Under Padra PS (02662-222333)
iii. Akholjuni EPS - Under Khambhat PS (02698-255333)

I/C Security would in turn inform Asset Manager and all members of the ACMG. He would also in contact of Cambay Police or nearest police and arrange for immediate requisition of bomb squad from them. All possible information would be provided to these outside agencies for speedy simultaneous action. The suspected area should be identified and barricaded with a clear zone of 300 feet all around the suspected place till the arrival of bomb disposal squad. All employees are evacuated and moved to a safer place and ensured that every employee present on that day is accounted for.

It is the duty of the I/C Security and all security personnel to immediately rush to the spot to take precautionary measures, evacuate the area, may also cordon off the complete installation with SRP. If required SRP would provide adequate sand bags in and around the bomb cautiously. They also find out if there is any sign of flexible wire connected with the bomb if visible. They will route out the source of flexible wire upto the end point. The Security personnel will remove any sort of unnecessary traffic that stand nearby the bomb suspected spot to the safe area.

In case of necessity, a prearranged alarming system like Siren, etc. be adopted in the building to evacuate the employees. Prior rehearsal may be arranged among the staff to avoid any unnecessary panic as well as to leave the area without hazard. Arrangement and proper guidance for the employees to quietly leave the premises through pre-designated exit should be organized by the security personnel. A walking pace should be maintained and no panic evacuation be allowed.

A 5.8 Fire Services:

The utilization of fire service is very essential to meet any eventuality. The fire service should be well equipped with all sorts of fire fighting equipments near by the area for use in case of necessity. Preliminary briefing is required for the fire men on the issue of bomb threat and its after effect. I/C fire section should mobilize his resources for effectively handling the situation, if in case the bomb activates. Necessary assistance may be sought from the State fire services and bomb disposal squad of State police.

A 5.9 Action before arrival of bomb squad :

Following actions are suggested:

(a) Planned systematic evacuation of employees.
(b) Barricade the area, if specific location is unknown.
(c) Marking of area which has been found fully cleared.
(d) Ensure no panic and rumour is spread.
(e) Keep medical assistance, ambulance etc. readily available nearby.
(f) Keep the suspected area under constant surveillance.
(g) Requisition the services of police snifter dog for easy identification of the bomb.

On arrival of the Bomb disposal squad (BDS) the complex will have to be handed over to them and all assistance must be given the BDS for smooth search and deactivation of the bomb. After sanitization of the area and deactivation of the bomb a clearance certificate is required to be obtained from the BDS about the safety and reoccupation of the complex.

A 5.10 Conclusion:

Considering the disturbing trend of increasing use of bombs/IED/explosives by various militant groups in the India, ONGC, Cambay Asset, to such bomb threat, it is essential that a well formulated bomb threat contingency plan is rehearsed regularly, so that every employee of the Asset is clear about his role, in case of such contingency. It would, therefore, be imperative to sensitize the employees and the security personnel working in our vital sectors against such threats so that proper security plans to meet the challenges arising out of bomb threats/explosions are drawn & implemented and put into practice.

Appendix – A

DETAILS OF ASSET CRISIS MANAGEMENT GROUP (ACMG)

STD Code Cambay: 02698

Sl.no	Description of officer	Office. Ph.No	Residence Ph.No	Mobile. No
1	Asset Manager –Head ACMG Shri. Hari Shankar Tiwari	227502	227690	9969225674
2.	Support Manager –Member ACMG Shri. Pankaj Arora	227670	227670	9969226264
3	I/C Asset HSE –Member ACMG Shri. Rajeev Sharma	227671	227649	8259950165
4.	I/C Security –Member ACMG Shri. A.S. Chauhan	227600	227600	9426613530
5	I/C Fire Services- Member ACMG Shri. R.K.Ratnakar	227604	227904	9969220195
6	Commandant SRP- Member ACMG Shri. Maheshbhai D Choudhary	-	-	9426613870
7	Installation managers- Member ACMG V.S.Patel, KATHANA GGS	-	-	9427504117
8	Installation managers- Member ACMG M.R.Bhatt, PADRA GGS	-	-	9426613574
9	Installation managers- Member ACMG M.K.Gupta, AKHOLJUNI EPS	-	-	9426613778
10	Installation managers- Member ACMG J.Birthare, CW-IX- DRILLING RIG	-	-	9426613578
11	Installation managers- Member ACMG J.R.Chuhan, A-50-XIII WOR	-	-	9426613578
12	Installation managers- Member ACMG J.R.Chuhan, ROM-VII WOR	-	-	9426613561
13	Installation managers- Member ACMG S.P.PateL, ROM-VIII WOR	-	-	9428333019
14	Installation managers- Member ACMG Atual Kumar, John#27	-	-	9490168651
15	Installation managers- Member ACMG J.R.Chuhan, GTC-100-3	-	-	9426613561
16	Installation managers- Member ACMG D.S.Mozinder, ANKLAV EPS	-	-	9426612161
17	Installation managers- Member ACMG P.R.Vadiya, MARGINAL FIELDS	-	-	7574002572

CHAPTER – VI

NATURAL DISASTERS
EARTHQUAKE, FLOOD, CYCLONE, TSUNAMI RESPONSE PLAN

Chapter-6
EARTHQUAKE RESPONSE PLAN

A.6.1 INTRODUCTION

An earthquake is the result of a sudden movement of two blocks of rock along a break (fault) deep within the earth's crust. A moderate earthquake may last only a few seconds. A large earthquake could last several minutes. Aftershocks are smaller earthquakes that happen when the earth underneath the surface adjusts to a new position. Aftershocks may happen for some time after the initial earthquake. Over time, they generally grow weaker.

Although ground shaking is the major source of earthquake damage, secondary effects such as landslides, the liquefaction of saturated sandy soils, flooding of low-lying areas and tsunamis or tidal waves washing over coastlines can also cause loss of life and massive destruction to property and the environment. In recent years, large buildings, roadways and other infrastructures have been built on reclaimed land, steep slopes and unstable soils. Such areas are at high risk of being damaged by a large earthquake.

This also means that, in future, earthquakes in such built-up areas could affect more people and cause more damage than in the past. For example, Bhuj earthquake of 26th January 2001 claimed over 20000 lives and caused injuries to more than 165000. The total estimated loss amounts to approximately Rs.212, 620 million.

Earthquakes cannot be predicted! In an ideal situation, scientists would have been able to accurately predict earthquakes, but it is not so. scientists cannot determine when an earthquake might occur so that preparations can be made in an efficient and highly cost effective manner.

However, advance preparation and commitment of resources before an earthquake occurs is the best way of dealing with the problems associated with earthquake-prone area. Industries should ensure that they have reasonable time to prepare and implement plans that will allow them to lose as little time as possible. Also governments should have well defined plan of work to reduce or eliminate any economic downturn that earthquakes usually cause.

A.6.2. SEISMIC ZONES OF INDIA

Bureau of Indian Standards is the official agency for publication of the Seismic maps in India. BIS came out with a seismic map containing six zones in the year 1962, which was changed to a seven-zone map in 1966. A five-zone map was developed in the year 1970/84 based on MM intensities recorded in various parts of the country.

Details of the five seismic zones are being given below:

Zone V: Very High Damage Risk Zone - Covers the areas liable to seismic intensity IX and above on Modified Mercalli Intensity Scale.
Zone IV: High Damage Risk Zone - Gives the area liable to MM VIII.
The map below gives the seismic zones of India including that of Cambay.
Zone III: Moderate Damage Risk Zone - The associated intensity is MM VII.
Zone II: Low Damage Risk Zone - The probable intensity is MM VI.
Zone I: Very Low Damage Risk Zone - Here the maximum intensity is estimated as MM V or less.

The state of Gujarat falls in the earthquake zone III. Therefore installations of ONGC are required to be protected from the hazard by planning for the same to mitigate the possible effects.

A.6.3 STEPS TO PREPARE FOR AN EARTHQUAKE

1. **Staff Briefing**
   Staff to be told what they have to do before, during and after an earthquake
2. **Emergency Supplies**
   Enough emergency food, water, heat, lighting and sanitation supplies are to be ensured.
3. **Assess Building Vulnerability**
   Installations/ buildings are to be assessed as to how vulnerable they are to earthquakes.
4. **Reduce Hazards**
   Earthquake hazards within the premise are to be identified and assessed.
5. **Dangerous Goods or Hazardous Materials**
   Procedures for the storage, use, transport and disposal of hazardous materials need to be reviewed and an inventory of such materials prepared.
6. **Assign Task to Staff**
   Staff is to be assigned specific task to do during earthquake to respond as quickly as possible and to remove any uncertainty. They also are required to be trained so they know what to expect.
7. **Resources**
   Critical resources are to be determined to continue operation (e.g. supplies, equipment, and equipment stock). Also alternate source of supply of such resources is to be identified in advance.
8. **Transportation**
   Considerations are to be given as to how the critical resources could be transported when normal routes are not accessible due to the disaster.
9. **Vital Records**
   Vital records and documents of installation operations (e.g., computer records) are to be identified and adequate back-up should be taken.

10. **Communications**
    Telephone systems may be disrupted. Alternate methods of communication with employees, suppliers and customers are to be established.
11. **Review Insurance**
    Insurance coverage may be required to include earthquake damages and if required additional coverage can be taken.
12. **Coordinate Plans**
    Emergency plan is to be coordinated with other installations.
13. **Community Involvement**
    Earthquakes affect entire communities, not just the installations. Local authorities are required to be assisted to help nearby community.
14. **Practice**
    Like any other emergency preparedness, earthquake response and recovery activities are to be practiced regularly. If required, the plan is to be revised based on the lessons learned from such exercises.

Now that we understand the requirement of a sound earthquake emergency plan, the requirements have been dealt here in detail.

A.6.3.1 PREPAREDNESS OF WORKING STAFF

Basic Responses

Before an Earthquake:
Each Installation including drilling and work-over rigs will have an Earthquake Operations Plan (EOP) in place. This includes an evacuation map, an emergency telephone list and an Emergency Assembly Point (EAP).

- Evacuation routes are to be marked and no exits to be blocked.
- Valuable and shock-sensitive materials, such as computer disks and glassware in latched cabinets or closed shelves to prevent falling.
- Desk or work tables should be kept away from windows if possible.
- Each work area is to be periodically checked to maintain awareness and situations that need correction to be identified.
- Heavy objects are to be stored on low levels of shelves and cabinets.
- Anchor gas lines suitably, since fire damage can result from broken gas lines.
- Keep Safety torch for any such emergencies
- Know the locations of fire extinguishers and first aid equipment
- Have first-aid kits on hand and sufficient supply of important medicines.
- Periodic earthquake drills to be conducted.

A.6.3.2 PREPAREDNESS DURING AN EARTHQUAKE (FEW DONT'S)

- Stay calm. Think through the consequences of any action you take.
- Try to reassure others.
- If indoors, watch for falling plaster, bricks, light fixtures, cabinets, and other objects.

- Stay away from windows, mirrors, and chimneys.
- Get under a table, desk, or bed
- Get in a corner away from windows
- Get in a strong doorway--but don't let the door slam on your fingers!
- Do not run outside until the shaking has stopped, debris may be falling from roofs.
- If in a high rise office building, get under a desk. Do not dash for exits, since stairways may be broken and jammed with people. Do not use elevators.
- If outside, avoid high buildings, walls, power poles, and other objects which could fall. Do not run through streets. If possible, move to an open area away from all hazards.
- If on the road, pull over and stop until you believe it is safe to continue.
- Turn off electricity, gas, and water main switches and valves.

SAFE PLACES: Under heavy tables or desks; inside hallways; in corners of rooms or under strong archways.

UNSAFE PLACES: Near windows or mirrors; under any heavy objects that can fall; the kitchen, where the stove, refrigerator or contents of Cupboards may fall on you; doorways, where the shaking may slam the door on you.

A.6.3.3 AFTER AN EARTHQUAKE

Go directly to the Emergency Assembly Point (Near Main Gate), especially if the earthquake has been severe.

- If the situation is health-threatening, call for medical help.
- If you detect a hazardous gas or chemical, stay away from the material until it can be identified.
- If uncertain about any potential hazard in a building or work area, please do not enter that workspace
- Wear durable shues in all areas near debris and broken glass.
- Review fire hazards such as leaking gas or utility lines.
- Shut off main gas valve only if a leak is suspected or identified.
- Do not turn on gas again until you are certain it is safe to do so.
- Await further instructions from Installation manager.
- Take pictures of all damage prior to cleaning it up.
- Shut off electrical power at the control box if there is any damage to your home wiring.
- Do not use lighters or electrical equipment until you are certain no gas leaks exists (this includes candles).
- Do not operate any electrical switches or appliances if there may be a gas leak. (Sparks can ignite gas from broken lines.)
- Do not use your telephone to report a gas leak since even a small spark could be enough to cause an explosion.
- Do not search for gas leaks with a match.
- While checking closets and cupboards, open doors with caution since objects may be on the edge of the shelves

A.6.3.4 ELECTRIC AND GAS SAFETY DURING AN EARTHQUAKE

- Know where your electrical circuit box is located and how to shut off circuits.
- Know where your gas meter is and how to shut off the gas in an emergency. You should shut off your gas only if you smell gas.
- Store a battery-powered radio, a wind-up or battery-powered clock, a first aid kit, a supply of water and food and a manual can opener in a place where they can be easily reached.
- Know how to shut off your individual appliances. Place an emergency phone list that includes the number to report a gas leak or downed or damaged power line, near the phone.
- Earthquakes can cause improperly secured water heaters to move or topple. To prevent this, check the wall straps on your water heater regularly to ensure a secure fit. If your water heater isn't already secured to the wall, strap it firmly to the wall studs in the upper and lower one-third of the tank with heavy bolts and metal -tape. Be sure to place straps at least 4 inches above the thermostat controls. Materials can be found at your local hardware store.
- Check gas and electric lines and appliances for damage. However, do not use electrical switches or candles to check for damage.

DON'T

- Panic
- Light a match, candle or cigarette.
- Turn any electrical appliances or lights on or off.
- Use any phone in your house.

6.3.5 CYCLONE (Downloaded from NMDA Website http://ndma.gov.in) :

The actions that need to be taken in the event of a cyclone threat can broadly be divided into four classes, viz.,

(i) Immediately before the cyclone season;

(ii) When cyclone alerts and warnings are on;

(iii) When evacuations are advised; and

(iv) When the cyclone has crossed the coast.

6.3.5.1 Before the Cyclone season :

- Check the house; secure loose tiles, carry out repair works for doors and windows.
- Remove dead woods or dying trees close to the house; anchor removable objects like lumber piles, loose tin sheds, loose bricks, garbage cans, sign-boards etc. which can fly in strong winds.
- Keep some wooden boards ready so that glass windows can be boarded if needed.

- Keep a hurricane lantern filled with kerosene, battery operated torches and enough dry cells.
- Demolish condemned buildings.
- Keep some extra batteries for transistors.
- Keep some dry non-perishable food always ready for emergency use

6.3.5.2 When the Cyclone starts:

- Listen to the radio (All India Radio stations give weather warnings).
- Keep monitoring the warnings. This will help you to prepare for a cyclone emergency.
- Pass on the information to others.
- Ignore rumours and do not spread them; this will help to avoid panic situations.
- Believe in the official information.
- When a cyclone alert is on for your area continue normal working but stay alert to the radio warnings.
- Remember that a cyclone alert means that the danger is within 24 hours. Stay alert.
- When your area is under cyclone warning get away from low-lying beaches or other low- lying areas close to the coast.
- Leave early before your way to high ground or shelter gets flooded.
- Do not delay and run the risk of being marooned.
- If your house is securely built on high ground take shelter in the safer part of the house However, if asked to evacuate do not hesitate to leave the place.
- Board up glass windows or put storm shutters in place.
- Provide strong suitable support for outside doors.
- If you do not have wooden boards handy, paste paper strips on glasses to prevent splinters. However, this may not avoid breaking windows.
- Get extra food, which can be eaten without cooking. Store extra drinking water in suitably covered vessels.
- If you are to evacuate the house move your valuable articles to upper floors to minimize flood damage.
- Have hurricane lantern, torches or other emergency lights in working conditions and keep them handy.
- Small and loose things, which can fly in strong winds, should be stored safely in a room.
- Be sure that a window and door can be opened only on the side opposite to the one facing the wind.
- Make provision for children and adults requiring special diets.
- If the centre of the cyclone is passing directly over your house there will be a lull in the wind and rain lasting for half and hour or so. During this time do not go out; because immediately after that very strong winds will blow from the opposite direction.
- Switch off electrical mains in your house.
- Remain calm.

6.3.5.3 When Evacuation is instructed:

- Pack essentials for yourself and your family to last you a few days, including medicines, special foods for babies and children or elders.
- Head for the proper shelter or evacuation points indicated for your area.
- Do not worry about your property.

- At the shelter follow instructions of the person in charge.
- Remain in the shelter until you have been informed to leave.

6.3.5.4 Post-cyclone measures :

- You should remain in the shelter until informed that you can return to your home.
- You must get inoculated against diseases immediately.
- Strictly avoid any loose and dangling wires from the lamp posts.
- If you are to drive, drive carefully.
- Clear debris from your premises immediately.
- Report the correct loss to appropriate authorities.

6.3.6 TSUNAMI (Downloaded from NMDA Website http://ndma.gov.in) :

6.3.6.1 What to do before and during a Tsunami :

- Turn on your radio to learn if there is a tsunami warning if an earthquake occurs and you are in a coastal area.
- Be alert for Early Warnings.
- Learn to understand and notice the sea. If there is noticeable recession in water away from the shoreline become cautious and move away immediately.
- Move inland to higher ground immediately and stay there.
- Stay away from the beach.
- Never go down to the beach to watch a tsunami come in. If you can see the wave you are too close to escape it.

6.3.6.2 What to do after a Tsunami :

- Stay away from flooded and damaged areas until officials say it is safe to return.
- Stay away from debris in the water; it may pose a safety hazard to boats and people.
- Save yourself - not your possessions.

6.3.7 FLOOD (Downloaded from GSDMA Website http://gsdma.org) :

6.3.7.1 Do's and Don'ts after flood :

- There is a possibility of spread of water borne diseases after flood, and hence medical treatment should be taken immediately.
- Do not enter deep, unknown waters.
- Do not go near the riverbank even after the floodwater has receded.
- Sprinkle medicines in the stagnant dirty water.
- Inspect your house for any cracks or other damage. Check all the walls, floor, ceiling, doors and windows, so that any chance of house falling down can be known and you can be aware about the immediate danger.
- If the floodwater has entered the house or has surrounded the house, then it is advisable not to enter such house.
- Keep listening to weather forecast on radio and television. Move to your residence only when instructed by the competent authority. It is not safe to believe that the problems have ended after the flood water have receded.
- Inform the competent authority/ officer for restoration of the necessary connections like gas, electricity, telephone, drainage, etc.
- Beware of the various insects or poisonous snakes that may have been dragged inside the house along with the floodwater.

- Destroy the food commodities that have been affected by floodwater.
- Check properly all the electric circuits, floor level furnace, boilers, gas cylinders, or electric equipments like motor pump etc. Check whether any inflammable or explosive item has not entered along with the floodwater.
- Switch off the main electric supply, if any damage is noticed to the electric equipments.
- If you find any breakage in the drainage system stop using latrines and do not use tap water.
- Do not use polluted water.
- Sewage system should be checked and any damage should be repaired immediately so as to curtail spread of diseases.
- Empty the water clogged in the basement slowly with help of water pump so that damage to infrastructure can be minimized.
- Check gas leakage which can be known by smell of gas or by hearing the sound of leakage; immediately open all windows and leave the house.
- Boil drinking water before usage and drink chlorinated water
- Eat safe food
- Rescue work should be undertaken immediately after flood situation as per the instruction.
- Do not follow any shortcut for rescue work.
- Do not try to leave the safe shelter to go back home until the local officials declare normalcy after flood and instruction to return home are not given.

6.3.8 LIGHTNING & THUNDER STORM:

Thunderstorm is invariably accompanied by lightning. A single stroke of lightning has 125,000,000 volts of electricity. That's enough power to light a 100-watt bulb for more than 3 months, or enough to seriously hurt or to kill someone. Knowing what steps to take in the event of an oncoming thunder storm & lightning can save lives. Lightning is something you should not be careless about, so seek a safe shelter immediately! Be warned, lightning can and does strike just about any object in its path. When you see lightning, follow these rules.

6.3.8.1 Indoors :

- Stay or go indoors! If you hear thunder, don't go outside unless absolutely necessary. Stand clear from windows, doors and electrical appliances.
- Stay away from anything that could conduct electricity. This includes fireplaces, radiators, stoves, metal pipes, sinks, and phones. Unplug appliances well before a storm nears- never during.
- Don't use any plug-in electrical appliances like TV, music systems, mixers/ blenders, iron press, hair dryers or electric razors. If lightning strikes your house they can conduct the charge to you.
- Don't use the telephone during the storm. Lightning may strike telephone lines out side.
- Use the phone only in emergencies quickly. Avoid contact with piping including sinks, baths and faucets.

6.3.8.2 Outdoors :

- When out doors, seek shelter from lightning! Buildings are best shelter, but if no buildings are available, you can find protection in a cave, ditch or a canyon. Trees are not good cover! Tall trees attract lightning. Never use a tree as a shelter.
- Stay in tour vehicle if you are traveling. Vehicles give you excellent protection. Get in hard topped car.
- If you can't find shelter, avoid the tallest object in the area. If only isolated trees are nearby, your best protection is to crouch in the open, keeping twice as far away from isolated trees as the tress are high. Avoid areas that are higher than the surrounding landscape. Spread out don't stand in a crowd of people.
- Don't use metal objects outside. Keep away from metal objects including bikes, electric or telephone poles, fencing, machinery etc.
- Get out of the water. This includes getting off small boats on the water. Immediately get out and away from pools, lakes, and other bodies of water.
- When you feel the electric charge if your hair stands on end or your skin tingles· lightning may be about to strike you. Immediately crouch down and cover your ears. Don't lie down or place hands on the ground.
- Victims of lightning shock should be administered CPM(cardio pulmonary resuscitation) i.e. artificial respiration, if necessary. Seek medical attention immediately.

6.3.9 SOME SPECIFIC SAFETY PROVISIONS FOR THE SAFE TRANSPORTATION OF PETROLEUM PRODUCTS:
(AS PER NATIONAL DISASTER MANAGEMENT GUIDELINES 2007) :

Petroleum products are the major bulk HAZCHEM material transported by various means of transportation. The products mainly include gasoline (petrol), diesel, compressed gases and others. The Petroleum Rules, 2002, covers a majority of the safety aspects related to its handling, transportation, etc.

6.3.9.1 Recommendations for liquid products :

- No leaky tank or container shall be used for transportation of HAZCHEM.
- TREM card is to be carried while transporting petroleum products.
- Filled barrels and drums should be loaded with their bung upwards.
- No ship, vessel and vehicle shall carry petroleum if passengers or any combustible cargo is present on board.
- Smoking, matchsticks, lighters or other fire inducing appliances should be strictly prohibited during loading/ unloading and while transportation.
- Loading/ unloading of petroleum after sunset shall be prohibited unless adequate lighting and firefighting facilities with trained personnel are kept in place.
- Petroleum in bulk shall be necessarily carried in a ship or other vessel which is licensed for the stated purpose and stored in the standardized mandated manner approved by the licensing authority in water transportation.
- It should not be transported in a barge or flat-bottomed boat unless it is self propelled or is in tow of, or attended by a steamer or tug and carries fire extinguishers. After complete discharge of petroleum from the vessel, its holds, tanks and bilges shall be rendered free from inflammable vapour.

- Gas Free Certificates for dock entry, man entry and hot work by the appointed officers are obligatory.
- Petroleum in bulk is to be loaded/ unloaded into or from any ship only at locations notified/permitted by the central government in case of import.
- Handling facilities in all cases shall be approved by the chief controller after evaluating the various safety reports.
- The use of naked lights, fire or smoking on board a vessel is prohibited.
- Fire-extinguishing appliances should always be kept ready.
- Transportation of petroleum by land requires strict provisions for safety of the tank vehicle. The tank vehicle shall be built, tested and maintained as per the third schedule of The Petroleum Rules, 2002. The tanker shall be fabricated and mounted on the chassis by an approved manufacturer conforming to the approved fabrication/ mounting drawings. The schedule also gives details about correct structural relationship between various components of the tank vehicle.
- Pipelines are one of the major modes of transportation for petroleum products. The design and route of pipelines shall be approved before laying them. Pipelines shall be constructed of suitable steel and designed as per the recognized code. Pipelines are to be patrolled effectively by the company owning it and they should have efficient communication facilities.

A.6.3.10 EMERGENCY SUPPLIES AND RESOURCES

Sufficient food materials, water are required to be stored in the installation for emergency use. A week's supply could be considered as sufficient. Enough blankets and tarpaulins are required for making temporary shelters within the installation. Supply of essential medicines is also to be ensured, in the unlikely case of non-arrival of doctors and medicine supplies to the affected installation.

Communication equipment should be enough in quantity and in working order. Requirement of makeshift toilets may be felt as well. Lighting arrangement is to be pre-planned and provision of emergency power is to be ensured. Other requirements for continuity of operations (whether drilling or work-over or process) have been identified as mentioned in the Disaster Management Plan (DMP). Further, any specific need may have to be satisfied.

A.6.3.11 VULNERABILITY ANALYSIS

As mentioned earlier, Gujarat is in the probable earthquake zone III. The general Emergency Response Plan (ERP) mentioned in the DMP would follow in case of emergency also. The line of action and the emergency organogram to handle the after effects of earthquake would be the same as in case of a gas leak/fire, because the likely result of an disaster is expected to be bending and bursting of gas lines.
In the meantime, timely action as normally we take in case of a fire / gas leak would reduce the consequences of this type of disaster.

A.6.3.12 REDUCE THE HAZARDS

The hazards those are present in the installations which may assist in aggravating the consequence of an disaster, needs to be identified and reduced. For example, the stock of hazardous materials must be kept low in the installations, as far as feasible, or the storage area having such substances should be segregated, so that its effect does not fall on rest of the installation.

Hence, a hazard identification exercise, as done for making the DMP /ERP, should be carried out. The extent of the priority hazards may be reduced.

A.6.3.13 DANGEROUS GOODS AND MATERIALS

A list of such materials should be kept in the installation and be reviewed from time to time. Storage, use and transportation procedures of such goods should be established. An inventory analysis is also to be done at regular intervals so as to keep the stock as minimum as feasible. Hence timely evacuation of the product is essential.

A.6.3.14 ASSIGNING RESPONSIBILTY

The specific responsibilities have been entrusted to various emergency coordinators for fire fighting and rescue, support services and other Crisis Management activities. This should remain same in case of any emergency response also. Emergency Procedures in case of fire and gas leakage which might happen after an disaster have been outlined in Chapter – 3, Part-I of the DMP in the page no 51-56.

A.6.3.15 TRANSPORTATION OF CRITICAL RESOURCES

There is a well managed transport fleet with ONGC, Cambay Asset, having different kinds of transport vehicles which will be used for transportation of emergency supply and resources apart from mobilizing stand-by manpower to respond to the emergency. Additional supply of light and heavy vehicles would be ensured, in case the need arises. Alternate routes to the affected sites will be prepared for ensuring essential supplies, in case the normal route is disrupted.

A.6.3.16 VITAL RECORDS

Important records of installations should be identified and necessary back- up taken. Such records will include:

a) P&ID
b) Layouts
c) Commissioning details
d) Turn-around records
e) Audit Records
f) Hazardous area Drawings
g) Operating manuals
h) Test records of equipment and facilities
i) Line diagrams
j) History cards of equipment and instruments
k) Certificates and test reports,
l) Pipeline network and connected wells etc.
m) Statutory approvals

The list is not an exhaustive one.

A.6.3.17 COMMUNICATION ARRANGEMENTS

Elaborate communication arrangements are available at each installation for effective and efficient communication in any emergency. The list will include:

a) Internal and external Telephones
b) Internet Facility
c) SAP system
d) Walkie-talkie
e) WLL and GSM mobiles

f) ICENET facility

g) SCADA system -under implementation

In case of total communication breakdown in the installations, nearby public telephones outside the installations can be used for emergency communications.

A.6.3.18. COMMUNITY INVOLVEMENT

In case of an emergency and subsequent destruction in the affected installation, help from local bodies and mutual aid industry, apart from those rendered by the local population mainly for timely rescue and relief operations.

A.6.3.19 ROLE OF LOCAL ADMINISTRATION

The roles and responsibilities of various local/District Authorities have been detailed in Chapter -3 of Part -II of the offsite Disaster Management Plan (DMP) in the page no 98-100. Accordingly functions of District Magistrate, Superintendent of Police, District Transport Officer, District Medical and Health Officer, District Fire Officer, Revenue Inspector etc has been outlined which would be extended for any emergency preparation also.

A.6.3.20. PRACTICING THE PLAN

This natural disaster Response Plan is to be exercised periodically as is done during fire or gas release scenarios. The basic cause to be considered is an disaster which manifested in the resultant fire and gas release apart from collapsing structures and buildings. Mutual-aid partners may also be involved in the drills and observers to be posted. Lessons learned from such drills are to be shared with the installation people, mutual-aid members and if feasible, the nearby community.

A.6.4 CONTROL OF OPERATION

A.6.4.1 PLANNING MEDIUM TERM OPERATION

At Base Emergency Control Room (BECR), actions to be taken in the next 24, 48 and 72 hours will be prepared on the basis of situation reports received from Site Emergency Control Room (SECR) for mobilization of additional resources and man power to deal with the emergency.

A.6.4.2 DAILY INCIDENT LOG AND MANAGEMENT REPORTS

At BECR, a Daily Incident Log will be maintained and management reports will be prepared for the situation at every 12 hours interval.

A.6.4.3 PRESS BRIEFING

The press and the media will be regularly briefed on the current situation of the Disaster and the ongoing action plan. The briefs will be prepared on the basis of the Management Reports mentioned above and will be released to the press only by the Public Relation Coordinator (Corporate Communication), after it is approved by the Asset Manager.

A.6.4.4. ACTION TO BE TAKEN DURING NORMALCY

1. **Mobile Workshop**

A mobile Workshop may be made on old chassis with the equipment for fabrication jobs such as Lathe machine, Drilling machine, Vice grinder, D.C. Welding machine, Generator, Exhaust fan etc ., so that small welding, cutting and fabrication jobs can be done at the site during Emergency.

2. **Mobile Office cum Accommodation Facility at Site**

A mobile Site office van with mobile phones, two beds, small kitchen with gas facilities, toilet etc., may be kept ready. Old chassis can be used for this purpose.

3. **Items for Shelter**
Items for Shelter such as tents, folding cots, folding chairs, folding tables, blankets, drinking water containers etc ., are to be kept readily available for Emergency by HR Department.

4. **Mud Conditioning Plant**
This facility is to be created by Drilling Services to avoid delay in catering Mud at site during Emergency.

A.6.5 TERMINATION OF OPERATION ('ALL CLEAR' PROCEDURE)

A.6.5.1 DECLARATION BY CEC

After the emergency has been brought under control and eventually ceases, the Installation Manager or Incident Controller (On Scene Coordinator) will ask the installation safety officer to carry out gas check to ascertain the presence of any residual hazards at the location. After he has satisfied himself that no residual hazard exists, he will then inform the same to the CEC (Chief Emergency Coordinator) at Base Emergency Control Room (BECR) and recommend for "ALL CLEAR".
Thereafter, CEC will review the situation based on the feedbacks from other emergency coordinators for e.g. medical on the condition of injured and evacuees etc. and will declare 'All Clear' through radio communication. On hearing the announcement, the Installation Manager i.e. OSC or Incident Controller will declare "ALL Clear" at the emergency site and the "ALL CLEAR" siren will be sounded.

A.6.5.2. REPORT ON MANAGEMENT OF DISASTER

The Emergency Response Monitoring Team mobilized at BECR will prepare a detailed report on the Management of the Disaster and submit the same to the CEC. A copy of the report should be maintained at the Asset HSE.

A.6.5.3. REHABILITATION AND RECOMISSIONING

After the emergency is controlled, the rehabilitation of damaged facilities and affected persons will have to be carried out. This will include identification of damages for rebuilding; time bound rebuilding, providing necessary medical facilities to affected individuals and checking all infrastructural facilities for quick normalization.
When the rebuilding of damaged equipments and facilities required is complete, recommissioning the system will be taken up. All the necessary pre start up and the detailed start up procedure of the unit concerned shall be followed.

PART – 2

OFF-SITE DMP

CHAPTER – I

B 1.1.0 INTRODUCTION
B 1.2.0 CLASSIFICATION OF DISASTER/ HAZARDS

CHAPTER – II

EVACUATION PLAN

B 2.1 DISASTER ON DRILLING RIGS
B 2.2 DISASTER ON PRODUCTION INSTALLATIONS

CHAPTER – III

B 3 EMERGENCY COMMITTEES AND SERVICE GROUP

CHAPTER – IV

B 4.1 FUNCTIONS & RESPONSIBILITIES OF EMERGENCY
B 4.2 FUNCTIONS & RESPONSIBILITIES OF MEMBERS OF SERVICE GROUP

CHAPTER – V

B 5.1 ONGC OFF-SITE EMERGENCY PLAN

PART - II

CHAPTER – 1

INTRODUCTION SCOPE AND CLASSIFICATION OF HAZARDS

B.1.1.0 INTRODUCTION

ONGC Cambay Asset is carrying out operations in Gujarat State with its main office at Khambhat. Main activities are Drilling, Production, Work over and Transportation of Oil. Risk in Oil and Gas exploration activities are inherent. Certain types of hazards occur due to internal as well as external factors. Though efforts are made to avoid occurrence of events leading to disasters/incidents, mishaps are always to be expected. ONGC has a fair amount of preparedness by way of on-site disaster management plans, equipment and infrastructure to handle many a disaster, there may be cases when the magnitude of the disasters exceeds the capabilities of ONGC. Also, the impact of the disaster on the general public, hence damage to life and property cannot be ruled out. In such cases, it may be required to obtain the help of local authorities to assist ONGC to mitigate disaster situations. The aim of preparing this plan is to provide ready information regarding Medical, transportation, population, etc. so that necessary strategy can be worked out to minimize area that can be affected exceeding beyond a radius of 2 km. To outline procedures for co-ordinating joint action of various agencies, their duties and responsibilities, emergency committee at various levels is also a part of this plan. Production installations have been given on page no.42 and as location of Drilling site changes frequently.

B.1.1.1 SCOPE OF THE PLAN:

The scope of this plan is to protect inhabitants and their properties around ONGC's Drill Sites and Production Installations during release of Gases and Fire due to blowout, explosion, rupture / bursting of pipeline and to define the involvement of local authorities to carry out any evacuation operation that may be required during these emergencies. Classification of risks, activity wise has also been discussed. It is required to protect the property of evacuated people with the help of police and to arrange essential items like water, food and medicine for the affected personnel. However, this plan does not encompass efforts of the civil authorities to handle emergencies due to nature's calamities like cyclone, earth -quakes etc.

B.1.2.0 CLASSIFICATION OF DISASTERS / HAZARDS:

B.1.2.1 Drilling Operation:

The main hazard likely to be countered during drilling is Blowout, which means uncontrolled and violent escape of Oil / Gas or both with tremendous pressure and velocity from the wells. A Blowout may occur during work-over and wire line operation also. During the blowout gases coming out from the well can form an explosive mixture with air and may subsequently explode due to any source of ignition like spark. The risk of poisoning is also there when blowout gases contain Hydrogen sulphide (H2S). Fortunately this problem has not been encountered in Cambay Asset as the composition of hydrocarbon in Cambay does not contain H2S. MSDS of Crude oil is illustrated in chapter-2 of part –I in page. no 23-24.

B.1.2.2 PRODUCTION OPERATION:

During production of Hydrocarbon there is a chance of leakage of gas, Oil spill due to bursting of storage tanks, pipelines, failure of gaskets, blowing of safety valves etc. Also it is possible that due to adverse wind direction and speed, discharge from cold flare (if any) may accumulate around the installation in high concentration. It may also happen due to human error.

B.1.2.3 FIRE

Fire can occur in the presence of inflammable material in air. So, there is a chance of fire during drilling as well as production operation due to release of gases which are inflammable. Though ONGC possess adequate fire fighting facilities, but help may be sought from external agencies if situation becomes out of control. In this connection, a list of fire stations at page no.115. facilities and manpower available at base is given at page no. 117 to 119. The nearby fire stations may be contacted for help if situation so warrants.

B.1.2.4 EXPLOSIONS

The mixture of Hydrocarbon and Air in certain proportions can be a very highly explosive mixture. It may occur where inflammable materials are being handled. It may result in direct injury to personnel and can lead to subsequent calamities like fire, gas leak etc. this type of situation may arise due to release of gas from pipe lines and accumulation of vapours in storage tanks.

CHAPTER – 2
EVACUATION PLAN

B.2.1. DISASTER ON DRILLING RIGS / WORK OVER RIG:

As on date ONGC is operating four rigs which includes three work over rig. Since, quantitative risk analysis has not been done, it will be adequate to prepare action plan for evacuating the residents of the area within 2 kms. Radius of the Drilling rig. Since rigs are not permanent installations and their movements are very frequent. Hence it is not possible to give exact information about the place of operation for the purpose of evacuating the people. Due to this reason the information regarding facilities like Medical, Transport, Population and other information as various cannot be ascertained. It is suggested that the requirement of buses and other facilities may be worked out taking in to account the thickest population of the District. Availability of shelter points for rehabilitation of evacuated people will also to be decided as per location / site. The layout diagrams of all installations are given at annexure VIII- XI for purpose of reference during emergency.

B.2.2 DISASTER AT PRODUCTION INSTALLATIONS:

ONGC is producing oil from total 3 installations in the Cambay Asset, GGS Kathana, GGS Padra and EPS Akholjuni are supplying only oil through trunk pipe line to Koyali terminal. A few numbers of persons are working at these installations. The areas likely to be affected around installations during on site emergency may be considered as 0.5 Kms. But for the purpose of the offsite plan, it has been suggested in general to consider these areas about 2 kms. Radius. Fire fighting and mitigation system is available as per norms at all installations to prevent and control the emergency situations like fire and leakage of gas/oil spill. The layout diagrams of all installations are given at annexure V-VII for purpose of reference during emergency.

B.2.3 DISASTER ON FLOW LINES:

The net-work design of pipelines is given at annexure XI to XVIII pipelines connected from well to installation are being looked after by ONGC. These pipelines mostly, are passing through agriculture land or road side have been made to avoid the populated area for this purpose. The main risk is of leakage of oil spill/gas, which may result in fire. NRV and pressure gauges are installed for monitoring the leakages. Moreover, no major evacuation is required as pipelines are mostly passing through unpopulated areas.

CHAPTER –3

B 3 EMERGENCY COMMITTEES AND SERVICE GROUPS

B .3.1 INTRODUCTION:

Emergency Committees have been set up / proposed at District levels to formulate appropriate action plans to respond to any emergency, with a high degree of alertness. The compositions of these committees are as follows: -

B.3.2 DISTRICT LEVEL COMMITTEE

1.	District Magistrate & Collector	District Emergency Coordinator
2.	Superintendent of Police	Member
3.	Supdt. Engineer (Procurement)	Member
4.	Chief Medical Officer (CMO)	Member
5.	Supdt.Engineer (Power.)	Member
6.	Jt. Director (Fire Services)	Member
7.	Dy. Director (ICAT)	Member
8.	Jt. Director (ARDD)	Member
9.	Ex. Engineer (ENVIRONMENT)	Member
10.	Supdt. Engineer (P W D)	Member

B.3.3 SUB DIVISIONAL COMMITTEE :

1	Sub Divisional Magistrate	Chief Coordinator
2	Block Development Officer	Member
3	Sub-Divisional Police Officer	Member
4	Fire Inspector /Divisional Officer	Member
5	Sub Divisional Controller(Public) or Asst Director (Food)	Member
6	Executive Engineer .PWD	Member
7	Executive Engineer (Public Health)	Member
8	Sub Divisional Medical Officer	Member
9	DC & Magistrate of Circle	Member
10	Sr. Information Officer(ICAT)	Member

B.3. 4 VILLAGE LEVEL COMMITTEE

1	Block Development Officer	Coordinator
2	Tahasildar	Member
3	Revenue Inspector	Member
4	Gram Pradhan /Chair person	Member
5	Panchyat Secretary	Member
6	One Teacher	Member
7	One Social Worker	Member
8	One Village Volunteer	Member

NOTE: - Depending upon regional / district where emergency arise respective Regional / District. Authority will take charge accordingly.

B.3.5. SERVICE GROUP:

In the implementation of the Off-site emergency plan the Collector of respective district will be assisted by a service group. This group consists of the following members in their district and has responsibilities as indicated.

1	Superintendent of Police	Warning and Advice to the Public Security measures Rescue and Evacuation.
2	S P (Procurement)	Provide Transport.
3	Jt Director (ARDD)	Catering to the evacuees and others involved in the relief measures. Taking care of cattle in the affected area. Taking care of standing crops
4	Health and Family Welfare Officer	To take care of Public Health and medicines.
5	Chief Medical Officer	Treatment of affected persons.
6	Jt Director, Fire Services	Help the industry concerned in Fire fighting operations and rescue.
7	Superintending Engineer (Power.)	Ensure uninterrupted power supply or de-energies power supply as required.
8	Dy Director (ICAT)	Arranging broadcast/ telecast of public announcements.

B.3.6. ONGC OFF-SITE EMERGENCY PLAN:

An off –site emergency in the ONGC area, no matter from which site, will basically involve the same strategy. Just for this simple reason, common off-site plan for the ONGC area is evolved jointly by the ONGC officials in the Region and district level for combating the emergency.

This includes details and responsibilities of various committees set up for this purpose, procedure for notification of an off-site emergency, duties of the members of different service groups, and action plans of concerned agencies responsible for combating the emergency.

CHAPTER-4

B.4.1. FUNCTIONS AND RESPONSIBILITIES OF EMERGENCY COMMITTEES

B.4.1.1.DISTRICT EMERGENCY CO-ORDINATER - (DM & COLLECTOR)

The various responsibilities of the District Emergency Coordinator (i.e. District Magistrate & Collector) are:-

a) Take overall responsibility for combating the off-site emergency.
b) Declare an area of 2 km. Around the site as a **"Hazardous Zone"**
c) Request the district police for fire warning and evacuating the public with the help of Superintendent of Police.
d) Request the team of Doctors headed by District Medical Officer. Also help and support from nearby hospitals may be called for.
e) Request the Supdt. Engineer (Power) to give uninterrupted power supply or de-energise power supply as required.
f) Request the SP (Procurement) to arrange for transportation of victims and evacuation of people trapped within the hazardous zone.
g) Request the Supdt. Engineer (PHE) to provide uninterrupted water supply.
h) Request the SP (Procurement) SDM and Block Development officer (B D O) to provide safe shelter, food and other life-sustaining requirements for the evacuees.
i) Request JT Director (ICAT) Arranging broadcast/ telecast of public announcements
j) On termination of emergency give All Clear Signal in consultation with Asset Manager, ONGC, Cambay Asset.

B.4.1.2. RESPONSIBILITIES OF SUB DIVISIONAL COMMITTEE:

Chief Coordinator - Sub Divisional Magistrate

While the industrial personnel are responsible for safe handling of personnel, plant and on-site emergency, the subcommittee is responsible for carrying out following.

1. Providing assistance to the designated personnel for carrying out environmental monitoring work.
2. Coordinating the following off-site counter measures as and when emergency arises :

   a) Providing immediate Medical Aid & Health Facilities to the affected persons
   b) Evacuation.
   c) Sheltering
   d) Distribution of food packets and other essentials to evacuated persons.
   e) Rehabilitation.

3. Enforcement of access control to the affected areas.

4. Arrangement of the security and protection of the property of inhabitants during the period of their absence following evacuation.

5. Liaison with agencies such as Army, Air force, Civil, Defense, Home Guards and Voluntary Bodies for necessary assistance to cope with the emergency situation.

B.4.1.3. RESPONSIBILITIES OF VILLAGE LEVEL COMMITTEE:

Coordinator – B.D.O

- To assist in evacuation
- Information dissemination among evacuees
- Keeping records of evacuees at shelter camp
- To provide assistance in medical cases

B.4.2.0.FUNCTIONS & RESPONSIBILITIES OF THE MEMBERS OF SERVICE GROUP:

B.4.2.1. RESPONSIBILITIES OF THE SUPERINTENDENT OF POLICE

Superintendent of Police is the Officer In-charge for warning and advising the affected population through unambiguous, reliable and rapid public announcements. Following methods may be used

- Sirens (mounted on vehicles)
- Public address system (mounted on vehicles)

The information to be given to the public should be about the nature of incident, the degree of activity the steps taken to control the situation and the emergency countermeasures advised. The announcements shall be made in English. Gujarati, and Hindi.

Any untoward emission from the installation may contain fire and Health Hazard material beyond the permissible level. While detailed analysis and steps to control the situation are in progress the public are to be advised for:-

- Stay indoor: - Keep the doors and windows closed, (in certain cases.)
- Lock houses and be prepared for evacuation center for a stay of two to three days. Buses will come and pick you up. Police will guard your houses and belongings.

The superintendent of Police/ the commissioner of Police shall also initiate measures to mobilize his resources and post adequate numbers of police personnel.

a. At road junctions outside the Emergency planning zone, divert all traffic away from that zone:
b. At road junctions within the Emergency planning zone to regulate traffic;
c. In all the evacuated area to provide security to the properties of the evacuees.

B.4.3.2.RESPONSIBILITIES OF SUPDT.POLICE (PROCUREMENT)

The SP (Procurement) shall arrange for the dispatch of vehicles (with fuel at full tank level) to reach the parking yards indicated therein, immediately on receipt of request from ONGC. There should not be any delay on any score.

He shall keep contact the **officer – in – charge of parking yards**(S D P O) regarding evacuation of public during Emergency period and apprise him of the dispatch of the buses. The vehicles so dispatched shall be at the disposal of the Officer-in-charge of the parking yard, until the release orders are issued.

B.4.3.3. RESPONSIBILITIES OF THE OFFICER –IN-CHARGE OF PARKING YARDS:

SDPO will be in full charge of handling the emergency situation at parking yards, supervising dispatch of vehicles to evacuate people in the villages. He will be assisted by:

1.Circle Inspector
2.Sub-Inspector of Police
3.Head Constables
4.Constables

He will maintain proper account of incoming vehicles, crews manning vehicles, crews involved in evacuation, details of vehicles, numbers, time of their arrival names of crew members and officer –in – charge of the vehicles for re transport of the evacuees should be designated as convoy officers in the cadre of village administrative officer.

Each convoy officer shall ensure that a public address system is mounted on the vehicle; he shall have to announce the time of arrival, the place of parking. the time of departure etc., so as to avoid unnecessary delays.

He shall ensure and notify the movement of the vehicles. He will also ensure that the medical Team at the parking yard gives all the officials placed under him the required precautionary treatment before moving for evacuation.

B.4.3.4. RESPONSIBILITIES OF THE OFFICER IN- CHARGE OF RALLYING POSTS:

Dy. Collector and Magistrate of Circle shall be in charge of the Rallying posts. He will be assisted by Tahsildar, Revenue Inspector, Teacher GramPradhan / Secretary Village volunteers of the village.

He will maintain a record of the evacuees (Under the heads men, women and children) and he shall be solely responsible for information, announcing the termination of emergency to them and also coordinate with concern Department for sanitation, water, electricity

B.4.3.5. RESPONSIBILITIES OF THE JOINT DIRECTOR (ARDD) :

Jt. Director (ARDD) shall ensure to provide cooked food and readymade clothing to the evacuees till they are rehabilitated and also ensure cattle protection

B.4.3.6. FUNCTIONS & RESPONSIBILITIES OF THE CHIEF MEDICAL OFFICER (C.M. O)

The CMO shall make necessary arrangements for distribution of preventive medicines in the affected areas and for their administration. Chief Medical Officer will ensure, with help of District Authorities that adequate stocks of medicine etc are procured, maintained properly and renewed periodically.

Should the evacuation become necessary, he shall arrange for supply of sanitary items like soap, phenyl, lime etc. He shall deploy his personnel for providing preventive treatment against epidemics etc.

He shall organize well-trained medical personnel to handle patients in affected areas requiring medical attention and also arrange for medical care for people at the rallying posts. First aid centers shall be set up at the rallying posts.

B.4.3.7. RESPONSIBILITIES OF THE JT DIRECTOR (FIRE SERVICE)

He will be in charge of assisting in moving the disabled, the handicapped and the deceased person to the rallying post.
He shall prepare an action plan for handling fire in case of an off- site emergency and rescue operation in the affected areas.

B.4.3.8. DUTIES OF JOINT DIRECTOR (AGRICULTURE):

He will prepare an action plan to protect food grains and standing crops in the affected area.

B.4.3.9. RESPONSIBILITIES OF EXECUTIVE ENGINEER (ELECT).

He will ensure uninterrupted power supply to the industry concerned and help in their emergency management operations.
When he receives specific request for de-energizing power to the industry concerned or a part there of, he shall immediately comply with the request.
He will also ensure that the safety of the electrical installations meant for the power distribution in system located at the emergency site are not threatened because of the emergency in that particular vicinity.

B.4.3.10. RESPONSIBILITIES OF DY. DIRECTOR (ICAT):

On receipt of information from District Magistrate & Collector he will ensure broadcast / telecast the message through All India Radio and Doordarshan.

CHAPTER –5

OFF SITE EMERGENCY ORGANISATION NOTIFICATION AND LINE OF ACTION

B.5.1 ONGC OFF –SITE EMERGENCY PLAN

A common off-site plan for the ONGC areas evolved jointly by the ONGC officials and District level agencies involved in combating the emergency.

This includes details and responsibilities of various committees set up for the purpose, procedure for notification of an off-site emergency as shown in chapter 4. Duties of the members of different service groups, and action plans of concerned agencies responsible for combating the emergency.

B.5.2 OFF-SITE EMERGENCY ORGANISATION:

Figure at Page no.109 depicts the proposed organization structure of the emergency core group. In case of an off-site emergency, the on-site chief co-ordinator, Asset Manager will report the matter to the collector of concerned Districts who is also the chairman of district emergency committee. The collector will initiate the district level action plan to combat the emergency.

B.5.3 LINE OF ACTION:

The link chart of the offsite emergency management programme is shown on page no. 109. It is proposed that joint action may be taken by ONGC and civil authorities in accordance to the requirements of situation.

B.5.4 NOTIFICATION OF OFF-SITE EMERGENCY;

The on-site emergency co-ordinator i.e. Asset Manager, Cambay Asset shall inform District Collector or personal Assistant (General) to the collector of respective district about the on-site and off-site emergency in writing.

Likewise the District Collector in writing shall acknowledge the receipt of messenger the communication about the off-site emergency shall be followed by a written confirmation through a special messenger.

Simultaneously, the emergency message will also be communicated to the nearby police station for onward communication to the District Collector and other concerned authorities using their wireless communication network.

The District Collector, on receipt of information about the emergency, shall alert the members of the District Sub-Committee members and the service group members and initiate action in accordance with action plan.

The Superintendent of Police /Police Commissioner shall be notified of the occurrence of an emergency by the District Collector, the initial message to the superintendent of police shall include the following details:

a. Type of emergency.
b. Details concerning the extent of emergency to probable effected areas.

Acknowledgement of the information from the Superintendent of Police shall be in writing and in the following format.

"Acknowledged receipt of the following message from the District Collector"/ " start emergency operation in probable affected area."

The District Collector, when satisfied with the modus operandi of handling emergency in the affected areas and when there is no threat of fresh development of emergency in any other areas, will declare termination of emergency operation in respective area.

B.5.5 MEDIA PUBLICITY:

Message has to be given to media by the Supld. of Police after receiving data from ONGC through District Magistrate and Collector. The necessary matter may be finalized with the help of concerned section depending on the type of emergency. Message may be published in local as well as English dailies and through the electronic media.

Formats are available to inform DGMS, OISD and Ministry of Petroleum and Natural Gas Etc. about the incident shown as below

MODEL MESSAGE:

"There is a gas leakage at very high pressure from ONGC's Gas Collecting station / drilling well. The gas is highly flammable (and also has considerable effect on Environment). Meanwhile, all residents nearby may be cautioned."

1. Stay indoor: Keep the Doors and Window closed.
2. When the security personnel advice, lock your house and be prepared for evacuation to the nearest centre for a stay of two to three days. Buses will come and pick you up. Police will guard your house and belongings during your absence.

B.5.6. MOCK DRILL FOR OFF-SITE EMERGENCY MANAGEMENT

Periodic Mock drills are to be conducted by ONGC and district emergency committee from time to time to check the effectiveness of the off-site emergency plan for review and updating. The frequency for mock drill is once in two years.

B.5.6.1 METHODOLOGY FOR MOCK DRILL:

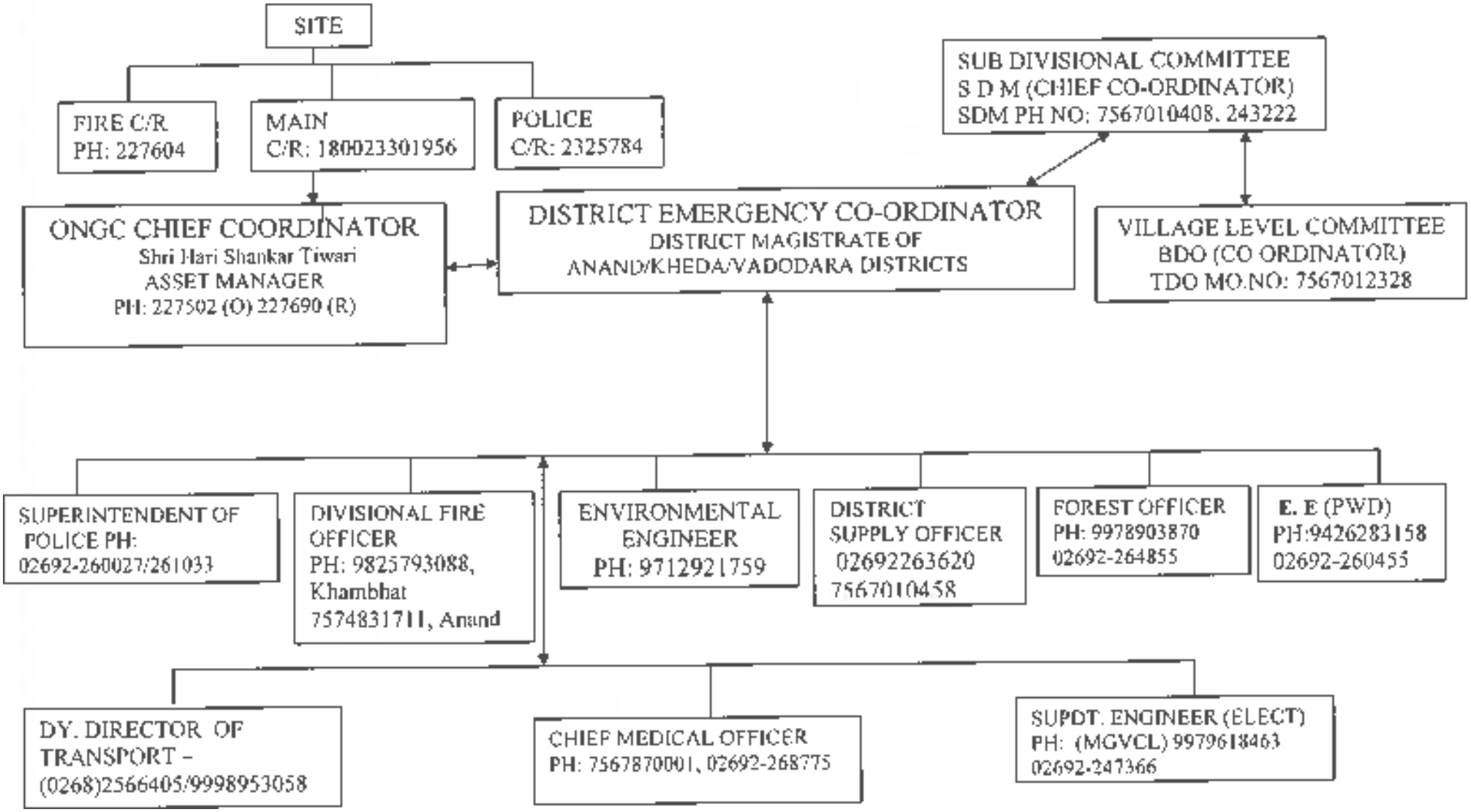
Just prior to conducting the mock drill a workshop will be held, in which District emergency committee and its sub-committee will discuss the steps involved in conducting the mock drill. The responsibility of each member is to be clearly spelt out and understood by the individuals.

Help may be sought from defense services in using smoke bombs for simulating emergency scene. The entire mock drill operations may be picturised in videotape to optically analyze and review the effectiveness of different agencies involved. The observations on the mock drill and the conclusions arrived at subsequently will be widely circulated.

B.5.7 REVIEW OF THE PLAN

ONGC and District Emergency committee will review the off-site Emergency plan once in a year and they will jointly update the plan. The changes from the master plan will be sent to all concerned, as per the distribution chart. The relevant papers may be replaced in the master document provided.

ORGANIZATION CHART FOR AN OFF SITE EMERGENCY MANAGEMENT



Important Telephone Numbers of ONGC at Corporate office, New Delhi

Corporate Emergency Control Room:

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Designation	Name	Mobile No.	OFFICE NO.	FAX NO.
CMD	Sh. Shashi Shanker	9868282019	011-26129001/11	011-26129021
Dir(HR)	Sh. D.D. Misra	9411114466	011-26129005/15	011-26129025
Dir(Exploration)	Dr. A. K. Dwivedi	9811636271	011-26129007/17	011-26129027
Dir(T&FS)	Sh. Shashi Shanker	9868282019	011-26129001/11	011-26129021
Dir(Finance)	-	-	011-26129008/18	011-26129028
Dir(Offshore)	Sh. T. K. Sengupta	9868282009	011-26129003/13	011-26129023
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OIL & NATURAL GAS CORPORATION LTD.
CAMBAY ASSET, CAMBAY-388630

STD CODE : 02698 FAX NOS. : 02698-221136/227614

ASSET DISASTER MANAGEMENT CONTROL ROOM PHONE NOS.:-1800 2330 1956

Sl. No	Name & Designation	EPABX No		Direct Lines		Mobile No.
		Office	Residence	Office	Residence	
1	HARI SHANKAR TIWARI GGM-ASSET MANAGER	6502	6690	227502	227690	9969225674
2	K.C.TRIVEDI, GM(D), Head DRILLING SERVICES	6530	-	227530	227955	9426614061
3	C. BHARALI, DGM(P) SURFACE MANAGER	6510	6938	227526	227938	9426613632
4	H V NENE,DGM(P) HEAD WELL SERVICES	6526	6810	227510	-	9428828368
5	BHUMRA RAJINDER SINGH, GM (Geol) SUB SURFACE MANAGER	6545	6940	227545	227940	9428828110
6	A.K.GADIWAN Head - ENGINEERING SERVICES	6660	6956	227616	227956	9426613853
7	PANKAJ ARORA, MANAGER(LOG.), I/C LOG ASSET SUPPORT MNGR	6670	6959	227670	227959	9969226264
8	SATYABAN SABAR, CE(D) HEAD-MAINTAINENCE	-	-	-	-	9426612105
9	A.SRINIVASA RAO, DGM(HR), I/C HR-ER	6580	-	227580	-	9445005523
10	P.R.MISHRA, DGM (Geol) HEAD-FORWARD BASE	6550	6954	227550	227954	9426612067
11	R.N.PANDEY, DGM(Elx), I/C INFOCOMM)	6616	6751	227616	227751	9410390183
12	MADHAWA NAND PANDE DGM(Chem)-LM (DFS)	6560	6930	227560	227930	9426614694
13	A.BHATTACHARJEE DGM(MM) I/C MM	6649	6937	227649	227937	9428007954
14	RAJEEV SHARMA CE(D) I/C ASSET HSE	6671	6991	227671	227991	8259950165
15	RAJ KUMAR ASH , CM (F&A), I/C FINANCE	6573	6952	227573	227952	9868393340
16	ATTAR SINGH CHAUHAN, MGR.(S),I/C SECURITY	6600	6963	227600	227963	9426613530
17	DR. RAVINDRA TRIPATHI, Sr.MO, I/C MEDICAL SERVICES	6610	6950	227610	227950	9428828498
18	R.K.RATNAKAR, DM(Fire) I/C FIRE SERVICES	6604	6820	227604	227820	9969220195

IMPORTANT TELEPHONE NOS. OF GUJARAT STATE

Sr. No.	AUTHORITY	LOCATION	CONTACT NUMBER	MOBILE
1.	D.M. & Collector	Anand	02692-262271(o)	9978406203
2.	D.M. & Collector	Kheda	0268-2553334	
3.	District Magistrate	Baroda	0265-2433000	9978406224
4.	Dist. S.P.	Anand	02692-261633	
5.	Dist. S.P.	Kheda	02694-222033	9979115101
6.	Commissioner of	Baroda	0265-2431515,	
7.	Dist. S.P. (Rural)	Baroda (Rural)	0265-2412255	
8	Dy. S.P.	Khambhat	02698-222000	
9.	Mamlatdar	Khambhat	02698-221343	9824267274/ 7567001175
10.	Mamlatdar	Padra	02662-222590	7600060122
11.	Police Inspector	Khambhat	02698-221133	9712301979
12.	Police Inspector	Padra	02662-222333	8980047007
13.	Police Inspector	Nadiad (Rural)	0268-2561745	9925015363
14.	Police Inspector	Borsad	02696-220180	8980045961
15	SRPF Barrack	Cambay		9426613870
15.	P.S.I	Tarapur	02698-255817	9427453687
16.	Police Inspector	Khambhat (Rural)	02698-255333	8980988686
17.	Police Inspector	Baroda (Rural)	0265-2562600	9828176945
18.	P.S.I	Kheda	02694-222033	
19	P.S.I	Anklav	02696-262633	9909575999
20.	MGVCL Khambhat	Cambay	02698-221354	9925215281

TELEPHONE NOs OF STATE FIRE SERVICES

AGENCY	PHONE NO.
FIRE SERVICES KHAMBHAT MUNCIPALITY	02698-101/928/20222
FIRE SERVICES, ANAND MUNCIPALITY	02692-243944
FIRE SERVICES, BARODA	0265-2426313/2513014/24220882/2642444
FIRE STATION, MAHUWAD GIDC PADRA	9879833707
FIRE SERVICES , NADIAD MUNCIPALITY	(0268)2550106.2560101
DHUVARAN POWER STATION	02698-42625/42815/42623
GUJRAT GAS CO. EMERGENCY NOS.	9924003000 To 5000

NAMES OF INSTALLATION MANAGER

INSTALLATION/ RIG	INSTALLATION MANAGER	INDIVIDUAL MOBILE	MOBILE AT INSTALLATION
GGS KATHANA	V.S.PATEL	9427504117	9426613821
GGS PADRA	M.R.BHATT	9426613574	9426613826
EPS AKHOLJUNI	M.K.GUPTA	9426613778	9426613825
TW-50-VII WOR	J R CHAUHAN	9426613561	94266 13824
TW-50-VIII WOR	S.P.PATEL	94283 33019	94266 12085
A-50-XIII WOR	J.R. CHAUHAN	9426613561	94266 13823
CW-IX DRILLING RIG	JAYDEEP BIRTHARE	9426613578	9426613822
John-27	ATUAL KUMAR	9490168651	-
GTC-100-3	J.R. CHAUHAN	9426613561	-
ANKLAV EPS	D.S.MOZINDER	9426612161	9426693883
MARGINAL FIELDS	P.R.VAIDYA	7574002572	-

ADDRESSES OF THE PRODUCTION INSTALLATION (G G S)

1. **KATHANA G G S**
   a) VILLAGE : KATHANA
   b) POST OFFICE : KANKAPURA, BORSAD (TALUKA)
   c) POLICE STATION : VIRSAD
   d) DIST. : ANAND

2. **PADRA G G S**
   a) POST OFFICE : PADRA
   b) POLICE STATION : PADRA
   c) DIST. : VADODARA

3. **AKHOLJUNI EPS**
   a) POST OFFICE : GUDEL
   b) POLICE STATION : KHAMBHAT (RURAL)
   c) DIST : ANAND

MAJOR FIRE FIGHTING EQUIPMENT
CAMBAY ASSET
CAMBAY
FIRE CONTROL ROOM- 6604, 6904 / 02698-227604

HOUSE FIRE FIGHTING FACILITIES (MOBILE) AT CAMBAY ASSET

SR. NO.	NAME OF FIRE STATION	WATER /FOAM/DCP TENDER(MULTI PURPOSE)	WATER/FOAM ZEEP	DCP ZEEP
1.	BASE FIRE STATION CAMBAY	1	-	-
2.	GGS KATHANA	2	1	1

OTHER MAJOR FIRE EQUIPMENT & CHEMICALS

Sr No	Item	Quantity
1.	Trailer Fire Pump	6
2.	Portable Pump	1
3.	Floter Pump	0
4.	Portable Water Tank 20,000 Ltrs.	0
5.	Hallow Jet Water Monitor 1000-2000 GPM	0
6.	Water Cum Foam Monitor With Foam Tank,	0
7.	Trolley Mounted Hydraulic Rescue Cutter & Spreader	0
8.	Rescue Cutter - Concrete	0
9.	Rescue Cutter - Wood	0
10.	Fire Entry Proximity Suit	5
11.	Breathing Apparatus	7
12.	Aqueous Film Forming Foam	7,295 Litre
13.	Dry Powder	330 Kg
14.	Hallow Jet Water Monitor 500-1000 GPM	1
15.	Water Cum Foam Monitor 500-1000 GPM	1

2.3 Details of fire fighting equipment – Cambay Asset:

S.N.	Location	TYPES OF EXTINGUISHERS													
		DCP 5 Kg SP	DCP 10 kg	DCP 25 kg	DCP 50 kg	Foam 9 lit	Foam 50 lit	Water 50 lit	Water type 9 lit	CO2 22 kg	CO2 9 kg	CO2 6.8 kg	CO2 4.5 kg	CO2 2 kg	Total Extinguishers
1.	Base Office	24	2							2		6	5	8	4
2.	Officers club												2		
3.	Guest House	2	1											1	
4.	Dispensary	1											1		
5.	LPG godown			2			1	2							
6.	Gas station		2												
7.	KV School	2												1	
8.	EPS Chaklasi		3			5							1		
9.	EPS Akholjuni		9	2		9	1			1		1	16		3
10.	Daheda Magzin		4									2			
11.	TW-50-VII		9	1		3						1	3		1
12.	TW-50-VIII		10	1		3						1	3		1
13.	CW-IX, Drilling Rig		11	1	1	5	1					2	5		2
14.	A-50-XIII,WOR		8	1		3						1	4		1
15.	Kathana GGS	1	16		1		1			1		2	2		2
16.	Padra GGS		16	2	2	10	1				1	4	30		6
17.	Bilodra #8		2												
18.	Lunej #1	1											1		
19.	Gorwa #39		2												
20.	Padra #31		2												
21.	Padra #49		4		1										
22.	Padra #50														
23.	Padra #76														
24.	Padra #82		2												
25.	Padra #83		2												
26.	Anklav #3														
27.	Anklav #7		2												
28.	Siswa #2														
29.	Siswa #9		2												
30.	FIRE TENDERS		3												
31.	SPARE			1						1	3	2	19	2	2
32.	EMPTY	15				3			1			2	3	3	1
33.	Hydrolic Fail	1				1			3	1	4	6	3	3	2
34.	VADTAL #01		1			5			1				2		
35.	NADIAD #01					5									
36.	ANKLOV # 10		2												
	TOTAL	47	115	11	5	52	5	2	5	6	8	30	100	18	40

2.4 Distance to nearest fire station:

Sr. No.	Installation	Addresss	Nearest Fire Station	Distance (km)
1	GGS – Kathana	Kathana, Anand	Dhuvaran Power Plant	15
2	GGS – Padra	Padra, Vadodara	GIDC Mhuvad, Fire station	12
3	EPS – Akholjuni	Akholjuni, Anand	Cambay Fire Station, Base Office	17
4	EPS - Chaklasi	Chaklasi, Anand	Nadiad Fire Station	10
5	Padra #49 EPS	Padra, Vadodara	GIDC Mhuvad, Fire station	23

BREATHING APPARATUS SET:-

- At Fire Section - 04 nos.
- Kathana GGS - 04 nos
- Padra GGS/Akholjuni EPS - 02 nos.

MAN POWER STATUS OF FIRE SECTION

At present man power strength of fire Section:-

Sl. No.	Designation	Nos.
1	Dy. Manager	01
2	Sr.Fire Officer	01
3	Fire Officer	01
4	Jr. Fire Supervisor	03
5	Fire Man GD III	13
6	Jr. Fireman	02
	TOTAL	21

* At present all the installations are covered by base Fire Station situated in our office complex. However Cambay Asset Fire Service can get help for any emergency help from nearby State Fire Brigade.

CAMBAY ASSET EMERGENCY TASK FORCE (AETF) 2017-18

Sl. No.	Name	Designation	Contact nos.		
	Shri		Office	Residence	Cell
1	**K.C.TRIVEDI / C BHARALI, LEADER AETF***	GM(D), HDS / DGM(P), SM	6530 / 6510	6955 / 6938	9426614061 / 9426613632
2	SATYABAN SABAR	HEAD MAINTANANCE	6731	-	9436584417
3	AVINASH ROOPNARAYAN SRIVASTAVA	DGM (D), I/c CMT	0265-2603410	0265-2330485	9428007952
4.	H V NENE	DGM(P),HWS	6526	6938	9428828368
5.	T K MOHANTY	DGM(P)	6506	-	9426614519
6.	R.K.SHARMA	DGM(D), LM-DS	-	-	9435716835
7.	R K MISHRA	DGM(P.)	-	-	9427504218
8.	MADHAWA NAND PANDE	DGM(CHEM, LM-MUD SERVICES	6560	6930	9426614694
10.	R.N.PANDEY	DGM (Info)-I/C INFOCOM	6616	6751	9410390183
11	M.K.TIWARI	CE (D) LM- Cementing	-	-	9426613575
12.	A.S.CHAUHAN	I/C Security	6600	-	9426613530
13.	R.K.RATNAKAR	I/C Fire Services	6604	6820	9969220195

NOTE:- * In case of emergency on Drilling or Work over Rig, Shri C BHARALI, DGM(P), SM will lead AETF and in case of emergency in Production Installation, Shri K.C.TRIVEDI, GM(D), HDS will lead AETF.

CMT / RCMT CONTACT NOS.

SL. NO.	CMT CENTRE	NAME & DESGN.	CPF NO	POSITION	STD CODE	CONTACT NUMBER P&T PHONE	EMAIL ID / Fax No.
1	CORPORATE CMT, MUMBAI	D.PRAMANIK GM (D)	51319	HEAD CMT-CORPORATE	022	24088208(O) 6540226(R) Cell : 9969222371	
2	CENTRAL CMT, AHMEDABAD	AJAY DIXIT DGM(D)	77233	HEAD-CENTRAL CMT	03772	246353 (R) Cell: 9428331087	ajavdixy @yahoo.com
3	RCMT, BARODA	AVNISH ROOPNARAYAN SRIVASTAVA DGM(D)	77332	HEAD RCMT	0265	2603410 (O) 2330485(R) 09428007952 (M)	
4	ACMT, CAMBAY	AVNISH ROOPNARAYAN SRIVASTAVA DGM(D)	77332	HEAD RCMT	0265	2603410 (O) 2330485(R) 09428007952 (M)	

DETAILS OF CMT EQUIPMENT'S

FIRE FIGHTING PUMPS

MAKE	ENGINE MODEL	PUMP SIZE IN	RPM	GPM	HEAD FT/MT.	QTY.	REMARKS
KIRLOSKAR CUMM.	VTA-1710-F	12X10	1800	4000	425/129.5	1	MAIN
KIRLOSKAR CUMM.	VT-1710-F	12X10	1800	3500	350/106.7	1	MAIN
VIJAY FIRE.KIRL-CUMM.	NT-495-F	12X10	2000	4000	80/24.4	1	TRANSFER

ATHEY-WAGON

LENGTH FT.	CAPACITY IN TON	REMARKS
60	10	WITH HYDRAULIC WINCH & BULL DOZER

CASING CUTTER

Model	Size	Quantity
Air operated	18"-20" Casing	01
-do-	9"-13" Casing	01
-do-	5"-8" Casing	01
-do-	3"-6" Casing	01

Other equipment for blow out control :

Generator set - 1 No.
Smoke stack - 1 No.
Mud tank - 1 Set
Compressor for breathing apparatus charging - 1 No.

STATUS OF WELL CONTROL EQUIPMENTS OF CAMBAY ASSET,CAMBAY

Sl. No.	ITEM DESCRIPTION / RIG	CW-IX Dr.Rig	A-50-XIII WOR	ROM-VII WOR	ROM-VIII WOR
1	ANNULAR BOP	A	NA	NA	NA
2	RAM BOP	A	A	A	A
3	BOP CONTROL UNIT	A	A	A	A
4	REMOTE PANEL ON DERRICK	A	NA	NA	A
5	REMOTE PANEL AUXILARY	NA	NA	A	A
6	CHOKE MANIFOLD	A	A	A	A
7	KILL MANIFOLD	A	A	A	A
8	KELLY COCK UPPER	NA	NA	NA	NA
9	KELLY COCK LOWER	A	A	A	A
10	FOSV	A	A	A	A
11	HCR IN CHOKE LINE	A	A	A	A
12	HCR IN KILL LINE	NA	NA	NA	NA
13	TRIP TANK	A	NA	A	A
14	INSIDE BOP	A	NA	NA	NA

A - AVAILABLE, NA – NOT AVAILABLE

ANNEXURE-I

FORM IV-A
(Regulation no 7)

NOTICE OF ACCIDENT/OCCURRENCE

FROM:
Mines Manager
Drilling / Production/ Work Over
Cambay Asset: CAMBAY.

TO,

1.The Chief Inspector of Mines, Dhanbad-826001.
2.The Regional Inspector of Mines
_____Region_____
3.The District Magistrate.(Anand)
4.The Electrical inspector of Mines (in case of electrical accident only), Dhanbad-826001.

Sir,

I have to furnish the following particulars of a fatal accident/serious accident/dangerous occurrence/major accident, which occurred at_____mine of_____(owner).

1. Particulars of the mine:

Situation of mine	Name and postal address of owner (Also state telephone & telex number)
Village: Post Office: Police Station: District: State:	
Place and location in mine (site) of accident/occurrence:	
Nature of operation undertaken at the place of accident/ occurrence:	

2. Particulars of the accident/ occurrence

(a) Date, shift and hour of accident/ occurrence:

(b) Classification of accident/ occurrence:

(c) Cause, circumstances and description of accident / occurrence,
(if cause not yet established information to be sent as soon as possible).

3. Nature of extent of damage

	Within the Establishment	Outside the Establishment
(i)Number of person-		
--Exposed to the accident / occurrence		
--Killed		
--Seriously injured		
--Affected by gas		

(ii) Particulars of material damage

(ii) State whether the danger is still present / no longer exist.

4. Particulars of injuries etc.

Name of person(s) (in block capital)	Nature of employment	Age	Sex	Nature of injury and if fatal, cause of Death.
Killed:				
1.				
Injured:				
1.				

5. Measures taken or envisaged:

(a) To alleviate the effects of the accidents occurrence

(i) Short term

(ii) Medium or long term.

(b) to prevent recurrence of similar accident occurrence.

6. Any other relevant information_____

Particulars in respect of every person killed or injured, in Form IV-B are enclosed /shall be forwarded within a week.

Yours faithfully,

Signature
Designation /Owner /Agent / Manager
Date:

ANNEXURE-II

FORM IV-B
(Regulation no 7)

PARTICULARS OF DECEASED/INJURED PERSON

1. General:
   - (i) Name of mine :
   - (ii) Owner :
   - (iii) District :
   - (iv) State :

2. Name of injured worker :
3. Time of Accident :
   - (ii) Date :
   - (iii) Time :
   - (iv) Shift :
   - (v) Number of shift worked per day at the mine :
   - (vi) Time when the worker began work on the day of the accident :

4. Occupation and experience of the worker:
   - (i) State the nature of job he was doing at the time of accident :
   - (ii) Was it his regular occupation?
   - (a) If "yes" state length of experience at the occupation at your mine Previous experience, if any :
   - (b) If no, state how long employed at this job :
   - (iii) State total experience in mining :
   - (iv) Give details of experience in mining work :

5. Place of accident:
6. Nature of injury:
   - (i) State whether fracture, amputation, laceration, bruise, sprain, crushing injury or other (to be specified) :
   - (ii) Part of body injured (to be specified precisely) :

7. Degree of disability:
   - (i) If fatal, date and time of expiry :
   - (ii) If permanent disablement, specify :
   - (a) The part or parts of the body lost, if any :
   - (b) The parts or parts of body gone out of use :
   - (c) Whether disablement was total or partial :
   - (iii) If temporary disablement, state number of days forced to remain idle :

8. Responsibility for the accident:
   - (i) Was any safety provision(s) contravened?
   - (ii) If so, by whom?
   - (iii) What action was taken against the offender?
   - (iv) Could the accident have been avoided?
   - (v) If so, how?

Signature_____
Designation: Owner/Agent/Manager
Date:

ANNEXURE-III

FORM IV-C
(Regulation no 7)

PARTICULARS OF INJURED PERSON RETURN TO DUTY

1. General:
   (i) Name of mine:
   (ii) Owner :
   (iii) District :
   (iv) State :

2.Date of accident :

3.Name of injured worker :

4.Return to duty :
   (i) Date when return to work :
   (iii) Whether returned to regular job or some other job (To be specified)

5.Compensation :

State amount of compensation paid or to be paid if any :

Signature :
Designation: Owner/Agent/ Manager
Date :

ANNEXURE-IV

FAX MESSAGE

Chairman-and-Managing Director ONGC, New Delhi/ Dehradun Fax # 0135- 2758569 (Dehradun) Fax # 011- 23313028 (New Delhi)	Secretary, Ministry of Petroleum & Natural Gas Govt. of India, New Delhi Fax # 011-23070723
Director (On-Shore) ONGC, New Delhi Fax # 011-23725369	Director General, DGMS, Dhanbad (Jharkhand) Fax # 0326-2221027
Director of Mines Safety, Ahmedabad Region, Ahmedabad (Gujarat) Fax#079-27912195	Director of Mines Safety, Surat Region, Surat (Gujarat) Fax # 0261-2274651
PS to Minister for P&NG New Delhi Fax # 011- 23386118	Director of Mines Safety, Udaipur North Western region, Udaipur (Rajastan) Fax # 0294-2461925
Executive Director - OISD, 8th Floor, OIDB Bhavan, Sector-73, NOIDA (UP) Fax # 0120-2593802/2593858	ED-Chief HSE, CHSE, 3rd Floor Tower-A, ONGC Complex, PDDU Urja Bhawan, New Delhi Fax # 011-26129088

Regret to inform that a fatal/ Major accident took place at.....Cambay Asset, Cambay .....Date.....at.....(Time).
Details are as under:-

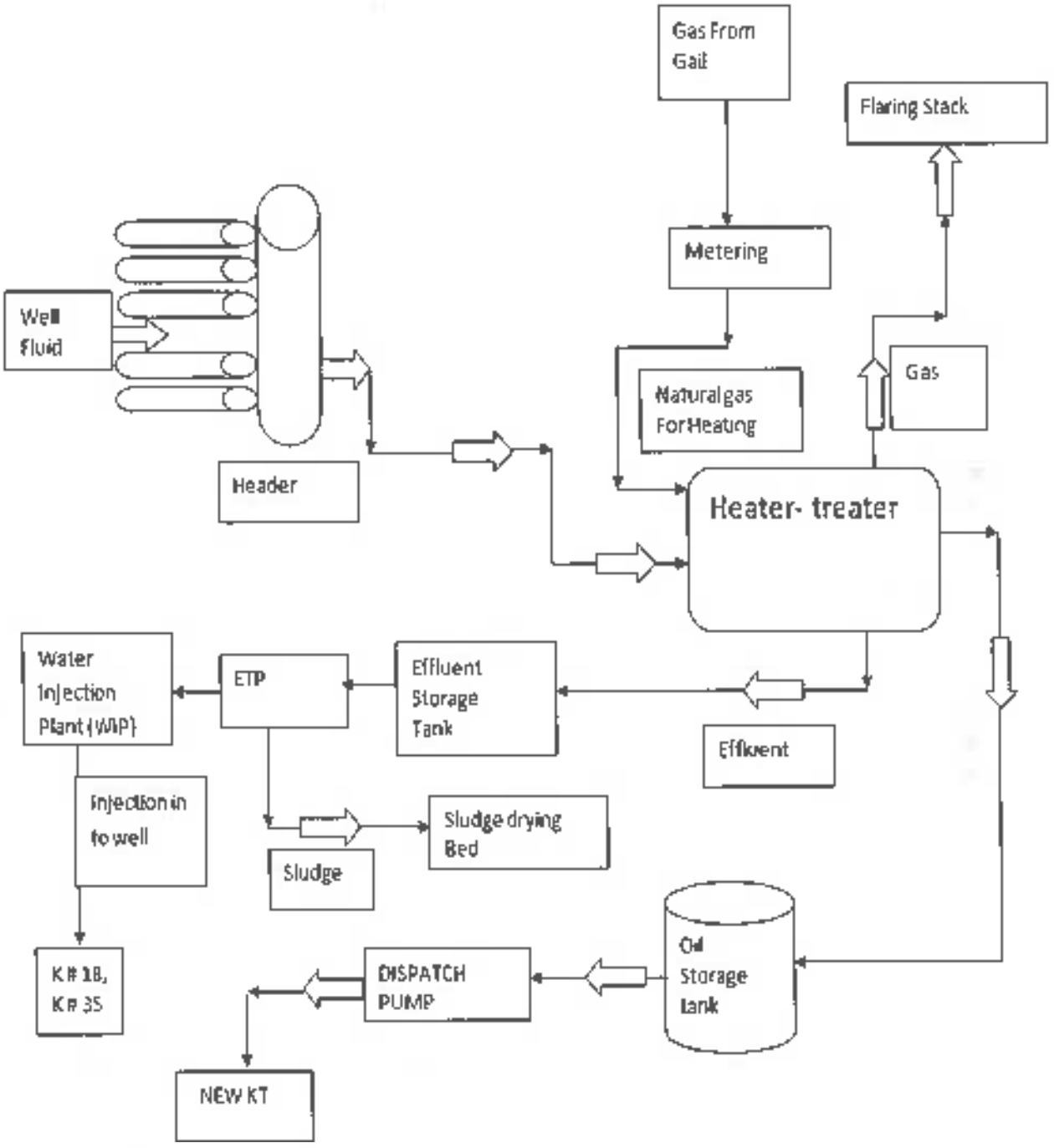
1. Type of Accident / Incident :
2. Details of Accident / Incident:
3. No of causalities :
4. Name :
5. ID NO. :
6. Designation :
7. ONGC Personnel or Contractors:
8. Place of Accident :

Brief cause of Accident:-

Asset Manager
Cambay Asset
CAMBAY

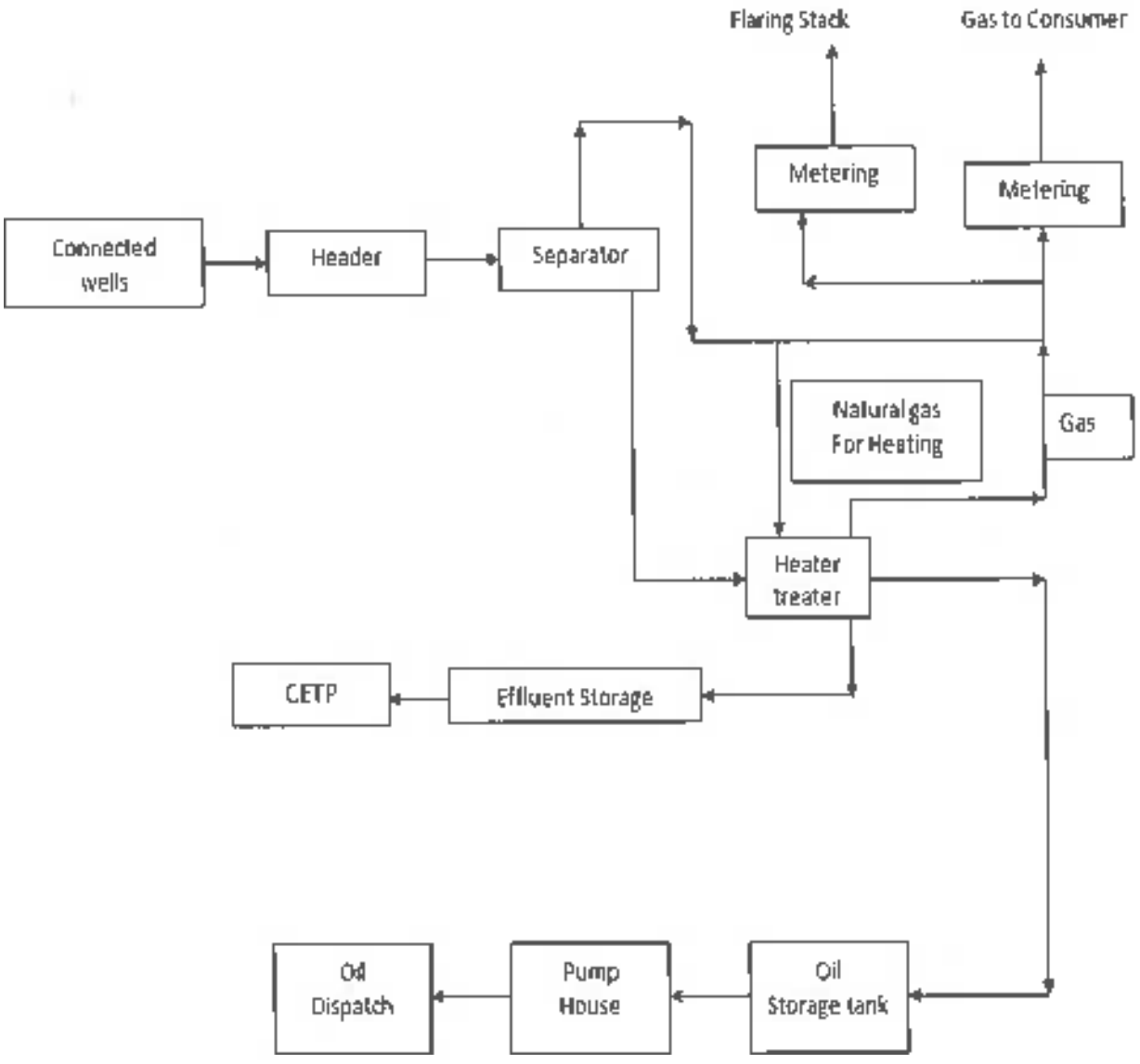
ANNEXURE-V

Process Flow Diagram of Kathana GGS



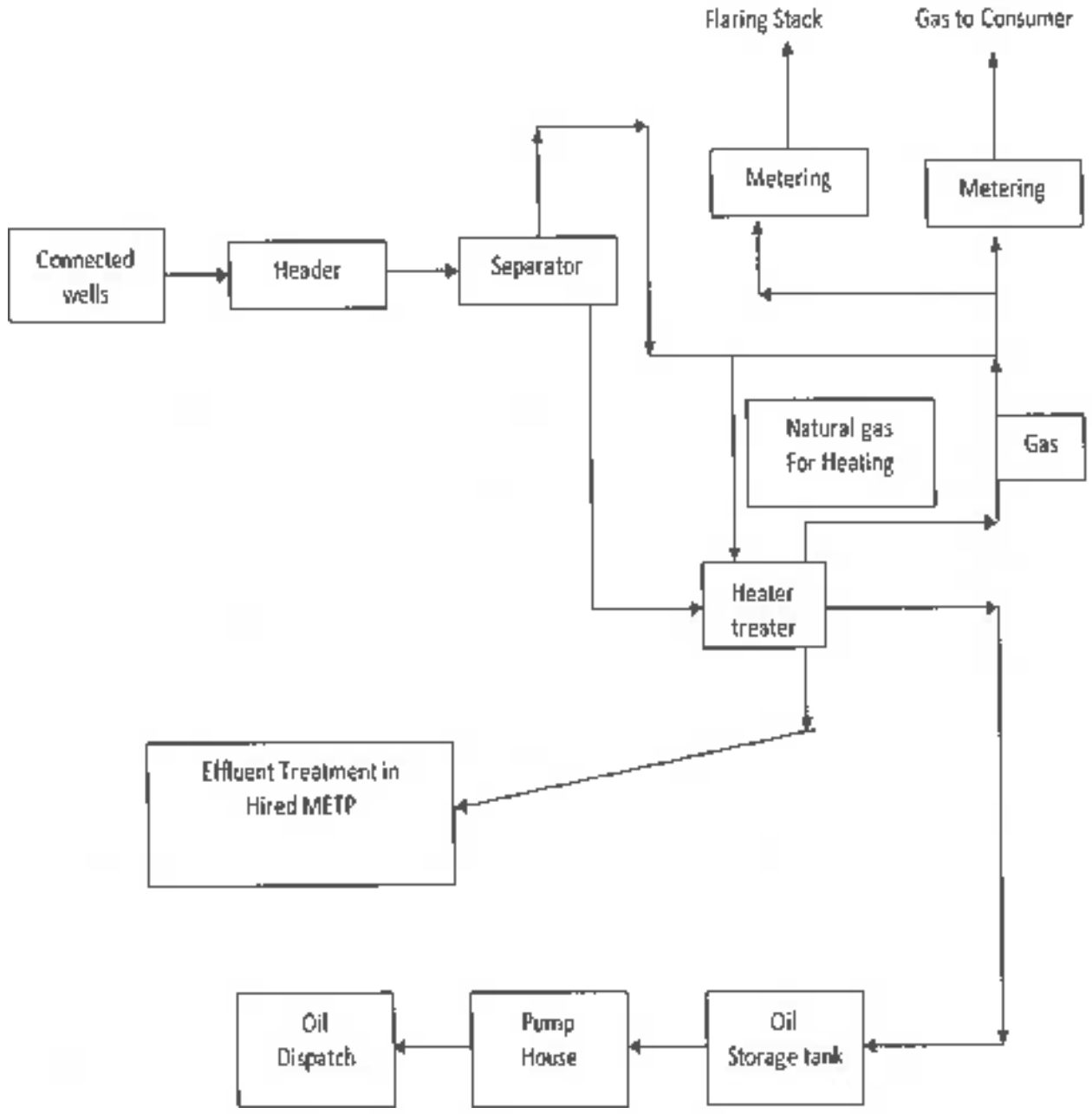
ANNEXURE-VI

Flow Diagram of PADRA GGS

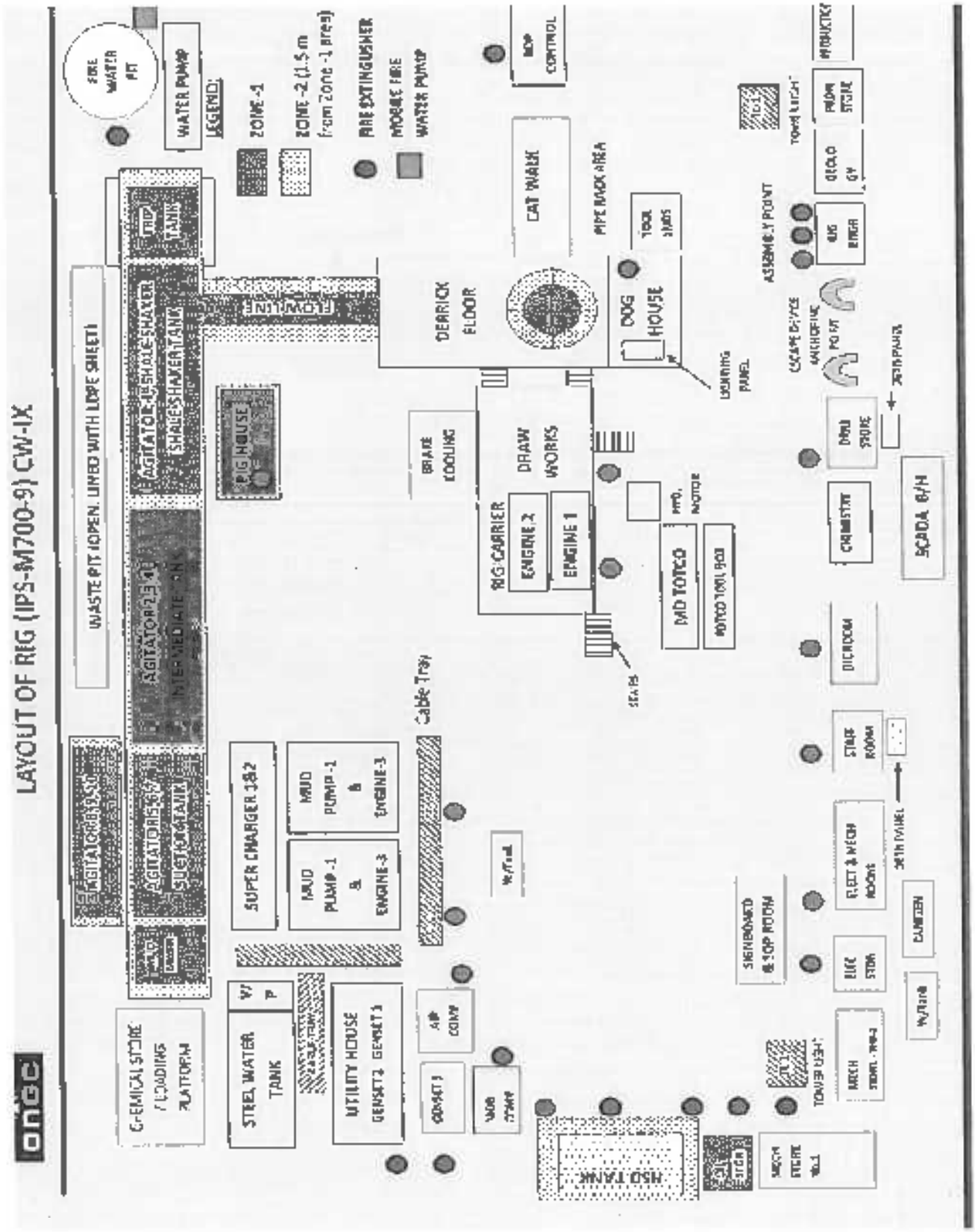


ANNEXURE-VII

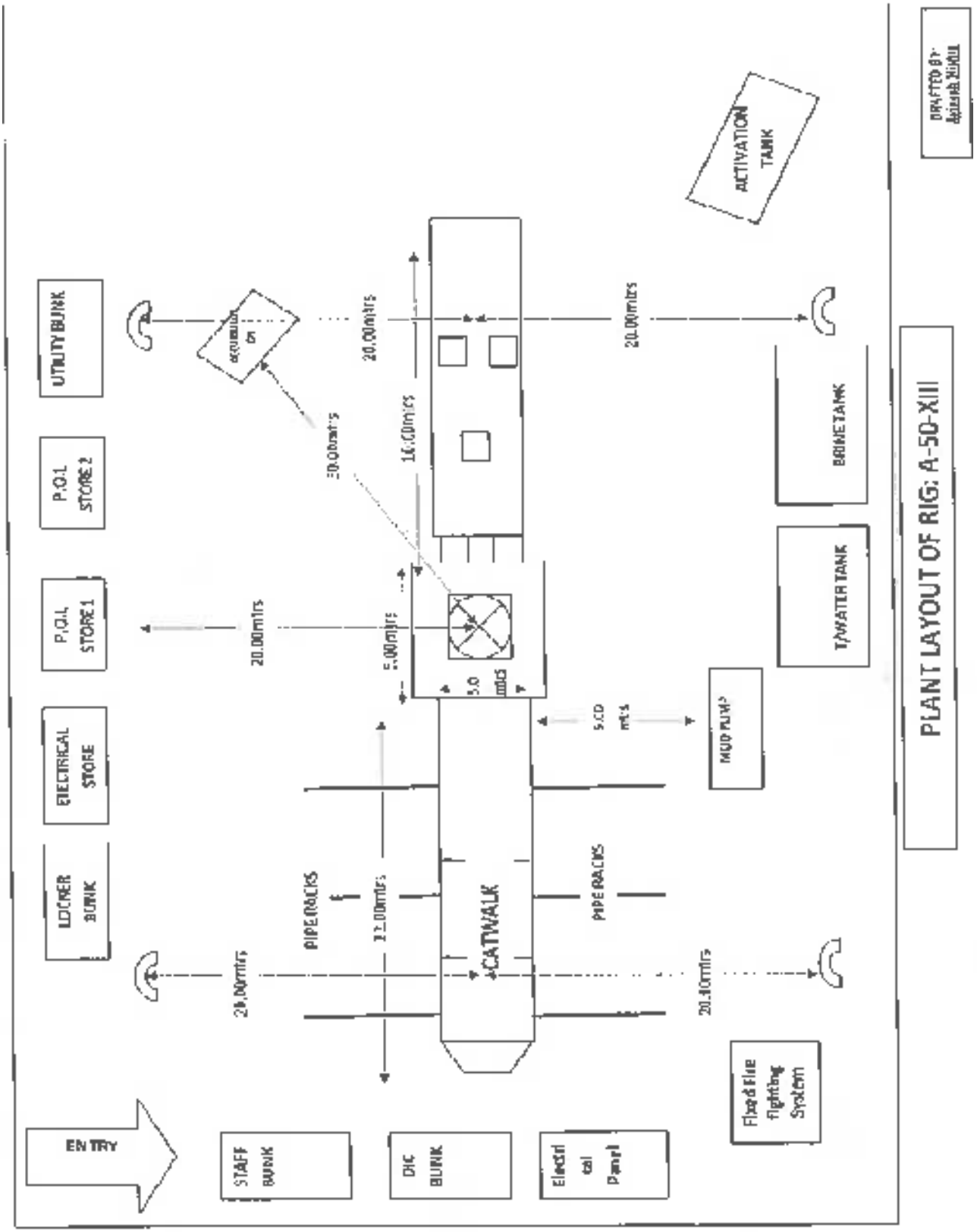
PROCESS FLOW DIAGRAM Akholjuni EPS



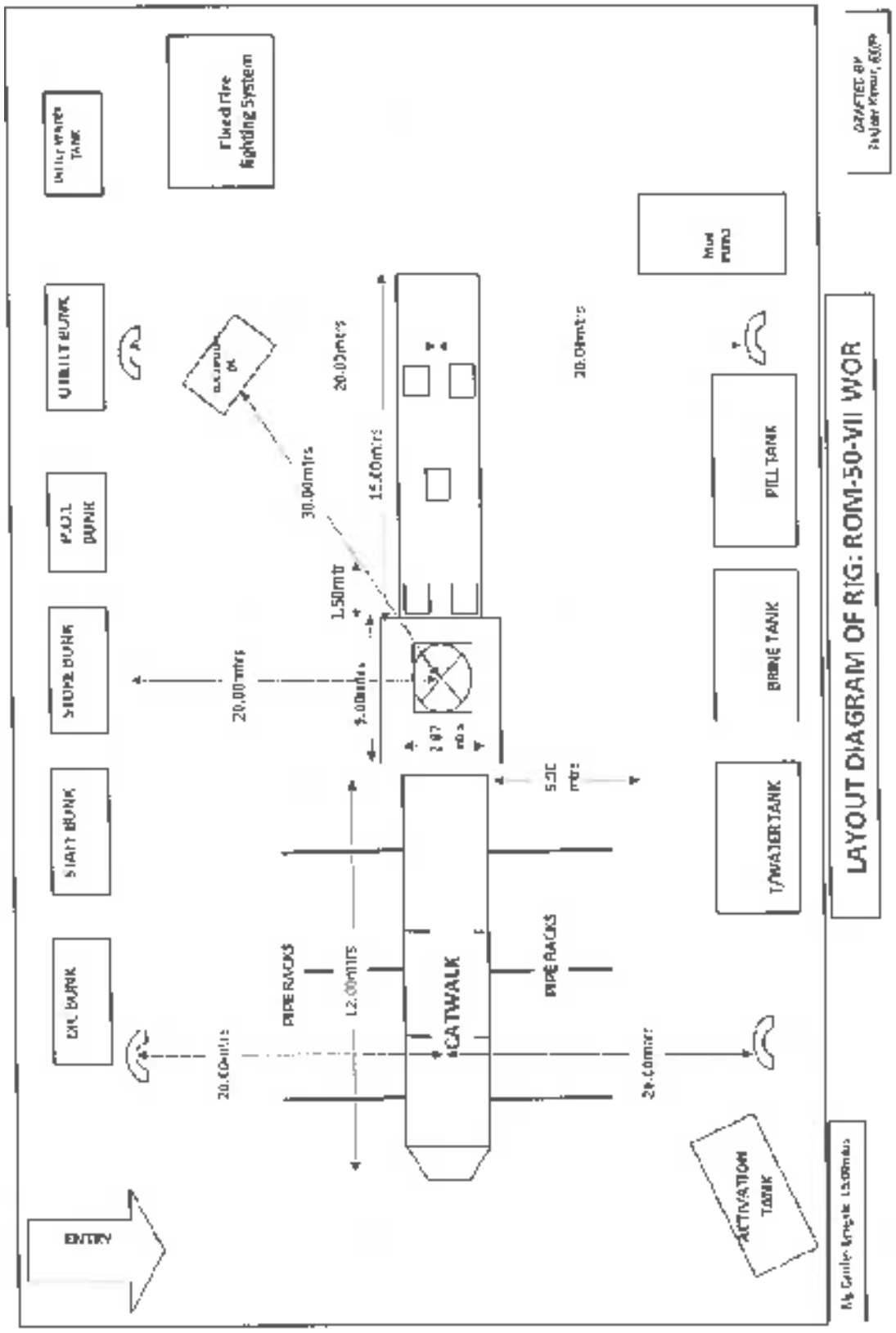
ANNEXURE-VIII



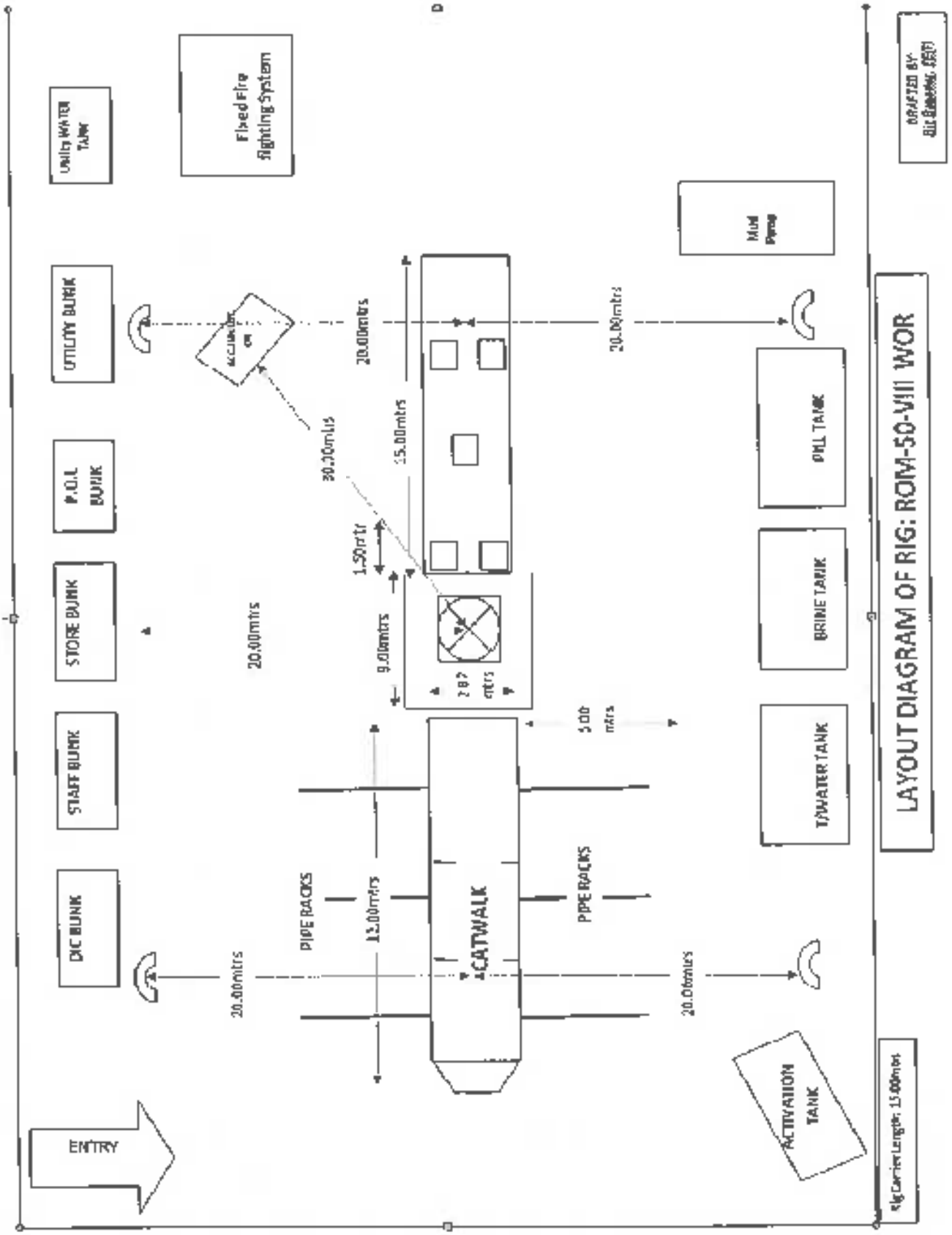
ANNEXURE-IX


PLANT LAYOUT OF RIG: A-50-XIII
UTILITY BUNK
P.O.L STORE 2
P.O.L STORE 1
ELECTRICAL STORE
LOCKER BUNK
ACTIVATION TANK
BRINE TANK
T/WATER TANK
MUD PUMP
PIPE RACKS
CATWALK
PIPE RACKS
STAFF BUNK
DHC BUNK
Electrical Panel
Flood Fire fighting System
ENTRY
20.00mtrs
20.00mtrs
20.00mtrs
20.00mtrs
5.00mtrs
5.0 mts
5.00 mts

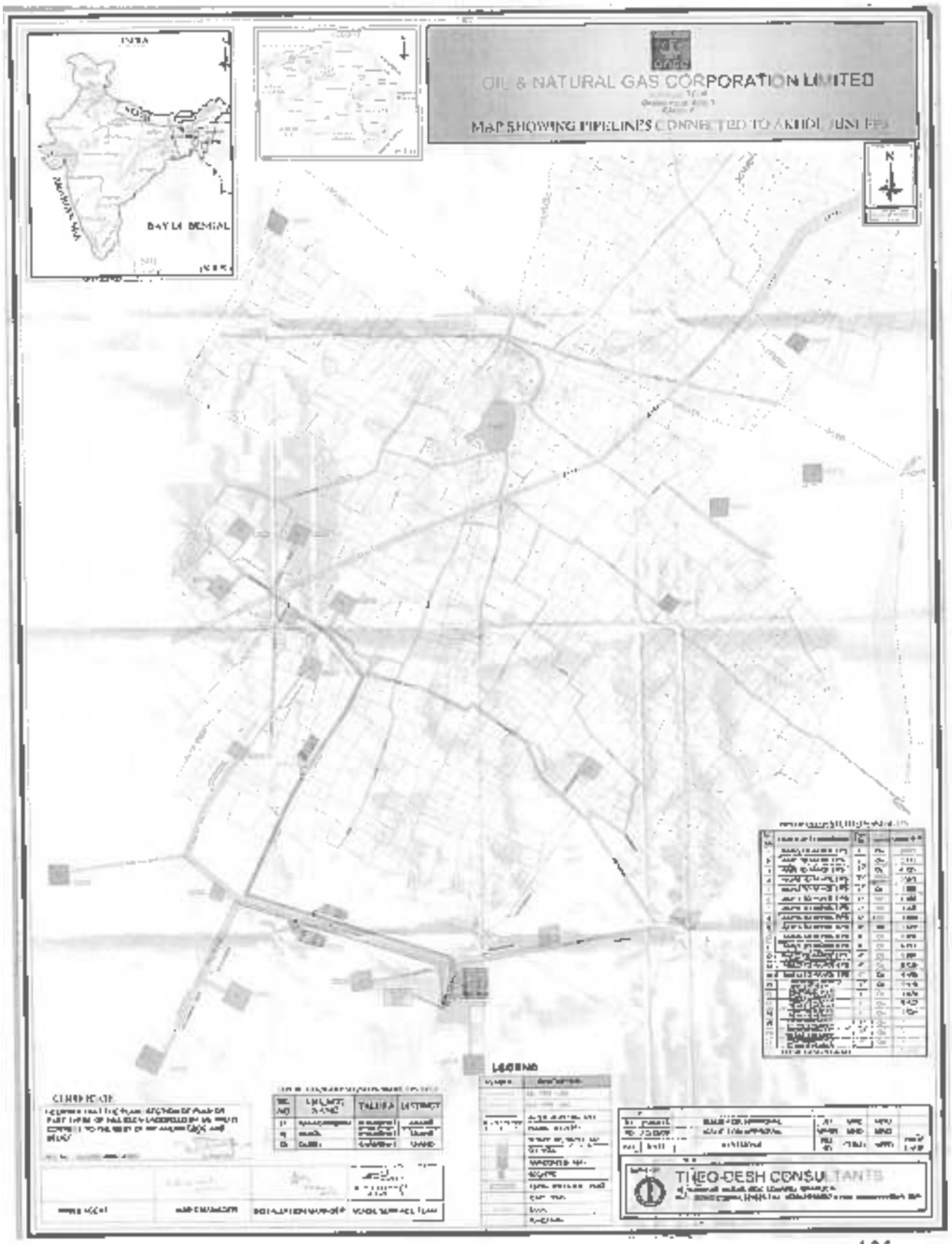
ANNEXURE-X


LAYOUT DIAGRAM OF RIG: ROM-50-VII WOR
ENTRY
CATWALK
PIPE RACKS
PIPE RACKS
PILL TANK
BRINE TANK
T/WATER TANK
Mud Pump
Filwed Fire fighting System
ACTIVATION TANK
20.00mtrs
30.00mtrs
15.00mtrs
1.50mtr

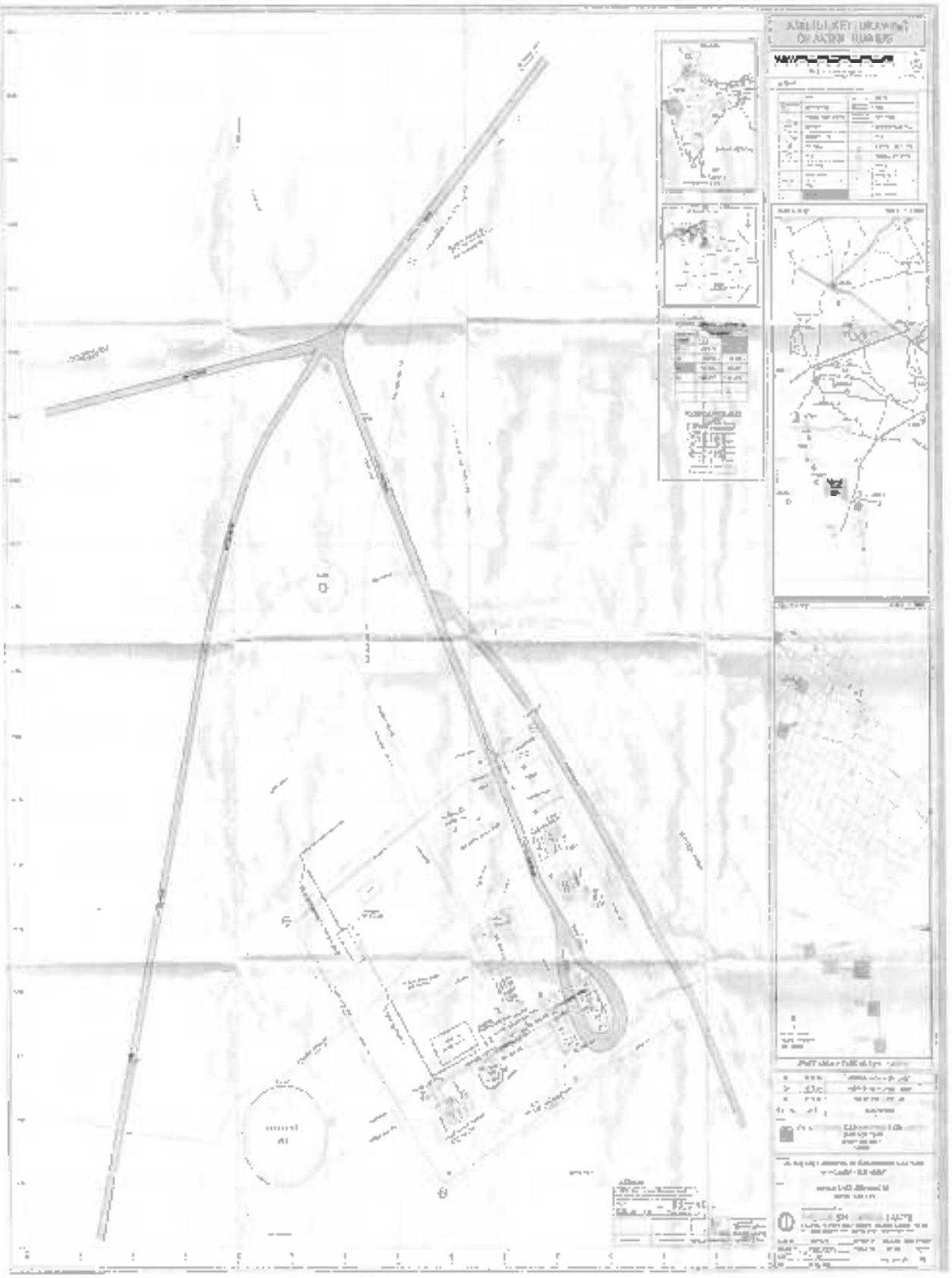
ANNEXURE-XI


LAYOUT DIAGRAM OF RIG: ROM-50-VIII WOR
Utility Water Tank
Fixed Fire fighting System
UTILITY BUNK
P.O.L BUNK
STORE BUNK
STAFF BUNK
DIC BUNK
Mud Pump
PHL TANK
BRINE TANK
T/WATER TANK
ACTIVATION TANK
ENTRY
CATWALK
PIPE RACKS
PIPE RACKS
20.00mtrs
20.00mtrs
20.00mtrs
20.00mtrs
30.30mtrs
15.00mtrs
1.50mtr
9.00mtrs
13.00mtrs
5.00 mtrs

ANNEXURE-XII



ANNEXURE-XIII

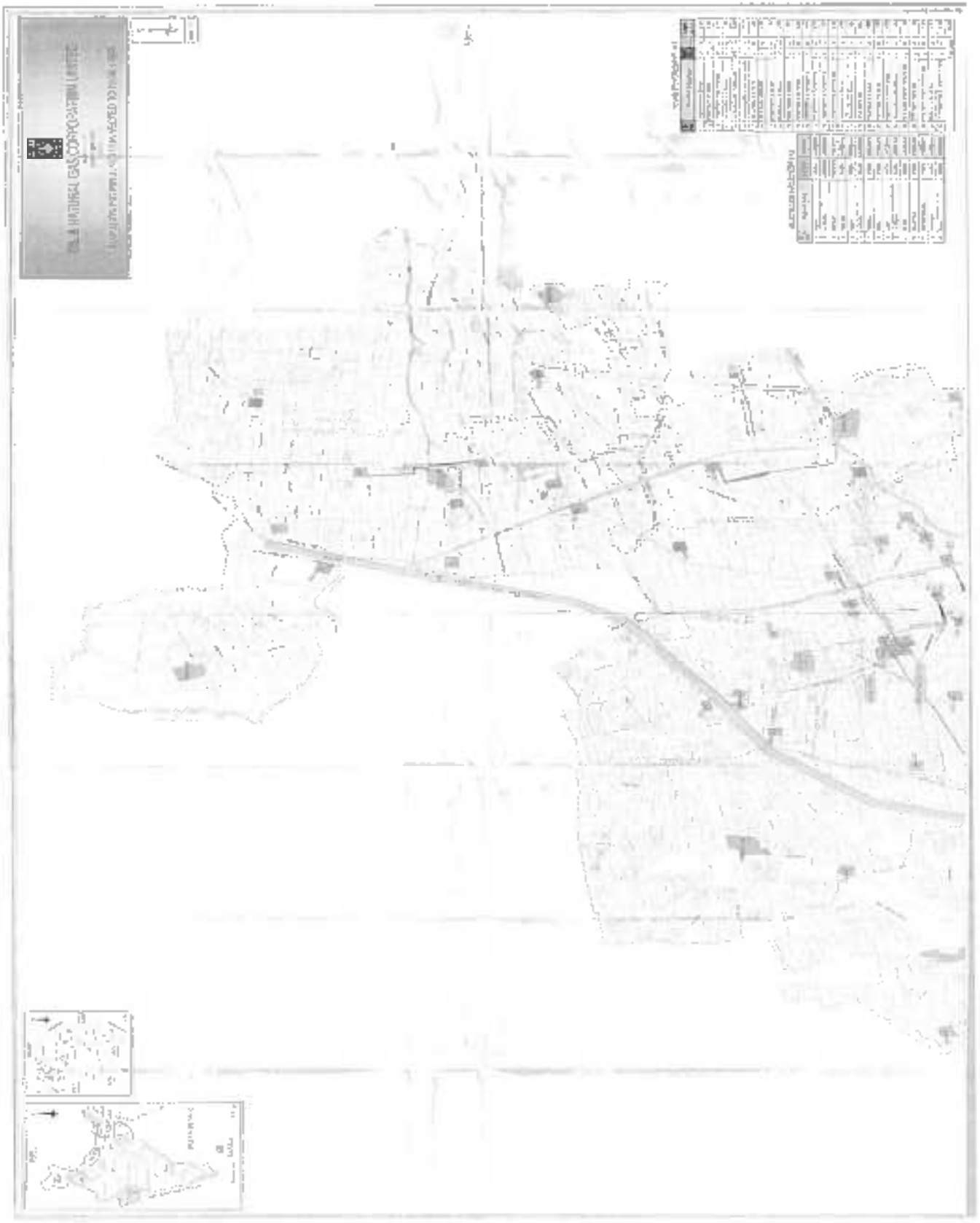


ANNEXURE-XIV

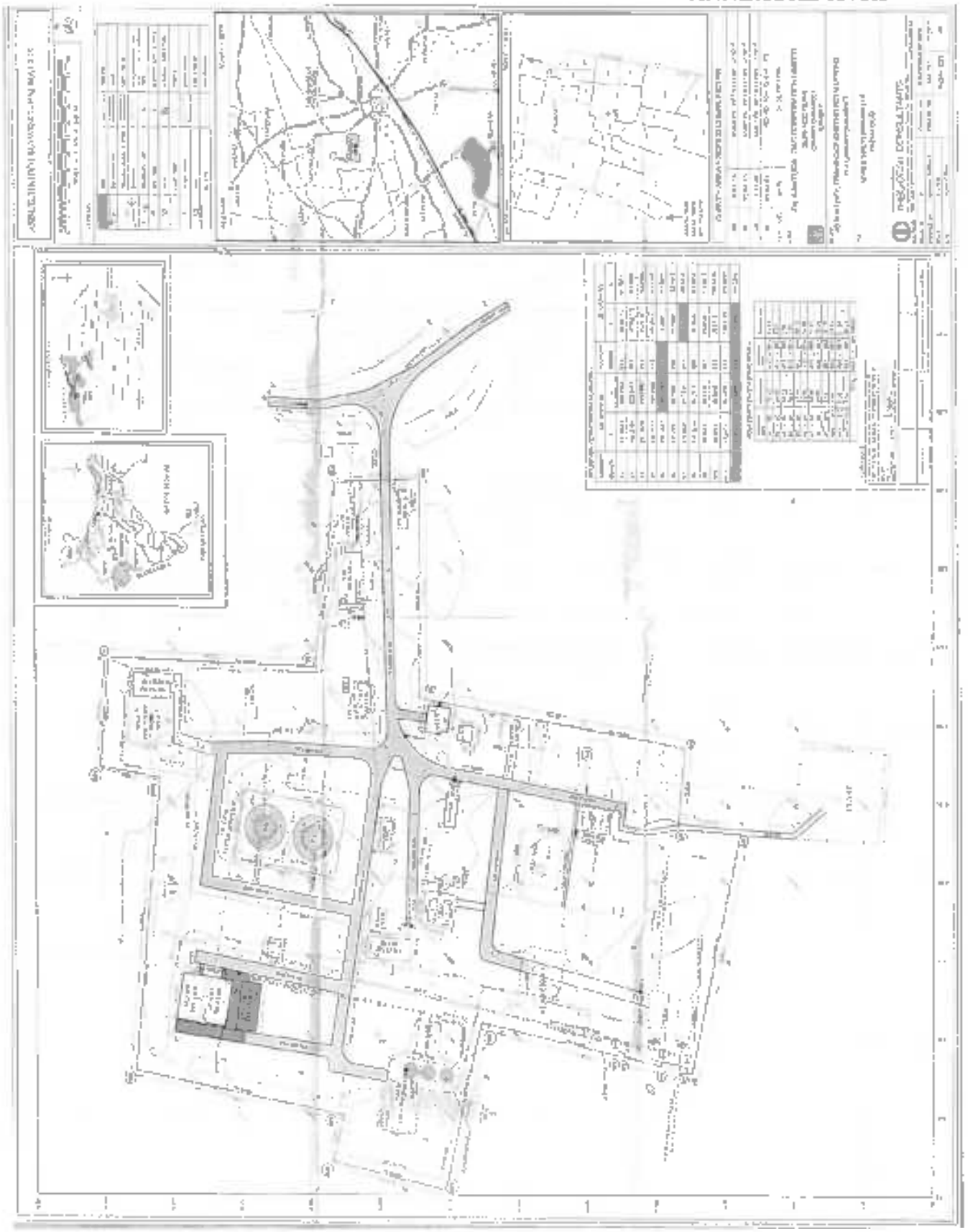
ANNEXURE-XV

ANNEXURE-XVI

ANNEXURE-XVII



ANNEXURE-XVIII



ANNEXURE-XIX

List of Chemicals used in Drilling Rigs

Sl. No.	Chemical Name
1	Al.Stearate
2	Barytes
3	Bentonite
4	Caustic Soda
5	CL
6	CMC
7	D.D
8	E.P Lube
9	CLS
10	Lime
11	Spotting Fluid(W)
12	Spotting Fluid(N/W)
13	Resinex
14	Sul.Asphalts
15	Soda ash
16	Linseed oil
17	Lignite
18	Sodium dichromate
19	Graphite
20	Rice Husk
21	Thermo Gel
22	PAC(R)
23	COMMON SALT
24	Mica Flakes
25	HEC

ANNEXURE-XX

List of Chemicals used in Installations/GGS/ETP

Sl. No.	Chemical Name
1	Alum (Aluminium Sulphate)
2	PE (Poly Electrolyte)
3	HEDP (Hydroxyethylidenediphosphonic acid)
4	Sodium Sulphite
5	Bactericide Aldehyde
6	Bactericide Amine
7	Sodium Hypochlorite
8	Xylol (Industrial Xylene)
9	Toluene
10	Demulsifier
11	EGMBE (Ethylene Glycol Monobutyl Ether)
12	Ethyl Acetate
13	Hexamine
14	Hydroquinone
15	PHPA-HT Water Shut Off Ploymer Grade (Partially Hydrolyzed Poly Acrylamide- High Temperature)
16	PPD/Flow-Improver (Pour Point depressant)
17	NP-9.5 Mole (Nonyl Phenol Ethoxylate)
18	LABSA-95% (Linear Alkyl Benzene Sulphonic Acid)
19	TEA (Tri-ethanol Amine)

DMP Mock-Exercise Format **ANNEXURE-XXI**

(Onsite/Off-site)

Name of the Installation/Plant_____ Date:

Part-A: Pre-Drill Checks

S.No.	Description	Observation
1.	Whether the Unit/Installation is Running normal?	
2.	Whether Emergency equipments are in position, in case of any abnormality during the drill?	:
3.	Whether alternate power supply is available, if power supply is to be disconnected?	:
4	Whether Transport arrangements have been made?	:
5	Whether there is any abnormality in nearby units or any civil unrest in and outside the plant like road blockage etc?	:

Part-B: During the Mock-drills:

S.No.	Description	Observation	
1.	No. of employees present within the Installation/plant	:	
2.	Location of Drill	:	
3.	Scenario(s) specified for the Drill	:	
4.	Time when somebody reported the incident	:	
5.	Whether Fire station was informed, if so when?	:Yes/No/NA	Time:
6	Whether appropriate siren sounded, if so when?	:Yes/No/NA	Time:
7.	Whether Mutual-Aid agencies were informed, if so when?	:Yes/No/NA	Time:
8.	Whether Emergency Coordinators were informed, if so when?	:Yes/No/NA	Time:
9.	Whether Mutual aid agencies reached the site, if so when?	:Yes/No/NA	Time:
10.	Whether Emergency Control Room established, if so when?	.Yes/No/NA	Time:
11.	Emergency Coordinators reached the location or the Emergency Control Room (as the case may be), if so when?	:Yes/No/NA	Time.
12.	Whether any other External agency reported, if so when?	:Yes/No/NA	Time:
	a) Police		
	b) City Fire		
	c) Media		
	d) Statutory agencies		
	e) Medical team etc.		
13	Wind direction		
14.	Power supply switched off? If so when?	.Yes/No/NA	Time.
15.	All hot jobs stopped near the area, If so, when?	:Yes/No/NA	Time:
16.	Whether Fire tenders (/ second turn out) reached the location, if so when?		
	a) First Turnout	:Yes/No/NA	Time:
	b) Second Turnout	:Yes/No/NA	Time:

17.	Fire pumps started at	:	
18.	Process Isolation done? If so, when?	:Yes/No/NA	Time.
19.	Area Cordoned off?, if so when	:Yes/No/NA	Time:
20.	Whether adequate pressure achieved in the fire header?	:Yes/No	
21.	Time when First hydrant/monitor was started?	:	
22.	Contractor men/visitors sent out of premises	:Yes/No/NA	Time:
23.	Rescue/Fire team reached the spot, if so when?	:Yes/No/NA	Time:
24.	Medical team with stretcher and first aid reached the spot, if so when?	:Yes/No/NA	Time.
25.	Whether Evacuation was attempted, if so when?	:Yes/No/NA	Time:
26.	Whether people reported at Assembly point, If so, when?	:Yes/No/NA	Time:
27.	Whether 'Mustering' was done, if so when?	:Yes/No/NA	Time:
28.	Time when emergency was controlled?	:	
29.	Whether 'residual hazards' were checked before re-entry, if so when?	:Yes/No/NA	Time:
30.	Whether 'All clear' signal was ordered, if so when?	:Yes/No/NA	Time:
31.	Whether 'All clear' siren sounded, if so when?	:Yes/No/NA	Time:

Part-C: Post- Mock-Drill Recordings & Efficiency Evaluation

S.No.	Description	Observation
1	Whether Post-Mock-drill meeting conducted?	: Yes/No/NA
2	No. of Fire tenders, other appliances (vehicles) and consumables(DCP, Foam Concentrate etc) used including that of the Mutual aid and external agencies	:
3.	Was the response, role played by individual/team satisfactory?	
	(A) Fire combat team	: Yes /No/NA
	(B) Rescue/Medical team	: Yes /No/NA
	(C) Auxiliary team	: Yes /No/NA
	(D) Security group	: Yes /No/NA
	(E) Contractors' Personnel	: Yes /No/NA
	(F) Mutual aid agencies	: Yes /No/NA
	(G) Municipal Fire Brigade	: Yes /No/NA
	(H) Emergency Coordinators etc.	
4.	Whether special rescue and fire appliances e.g. Breathing Air set, Fire entry suit, rescue equipments etc) were used?	: Yes /No/NA

5.	Whether Fire pump started in AUTO/MANUAL MODE.	: Yes /No/NA
	a No of fire pumps provided	:
	b. No of fire pumps started during the drill	:
	c. No of fire pumps in working condition	:
6.	Did following safety devices function in AUTO mode?	
	a Power Supply Tripping System b.	: Yes /No/NA
	Sprinkler System (if provided)	: Yes /No/NA
	c. Fire Hydrant and monitors (manual)	: Yes /No/NA
7.	Was the fire siren audible to all?	: Yes/No/NA
8	Fire tank water level	: Full/ Exact level
9.	a. Any rupture of fire hydrant hoses, snapping of monitor nozzles and improper? functioning/leaks of hydrant/monitor valves?	: Yes/No/NA
	b. Was the throw of water jet from hydrant points/ monitors sufficient?	: Yes/No/NA
10.	Whether search for casualties done and injured given first-aid or hospitalized?	: Yes/No/NA
	No. of injured :	
	No. of casualties :	
11.	Whether site people used portable fire extinguishers initially	: Yes/No/NA
12.	No. of People Evacuated	:
13.	Whether any discrepancy found during 'head count'?	: Yes/No/NA
14	Whether the performance shared with the employees?	: Yes/No/NA
15	Whether records of all actions taken against observed deficiencies have been recorded?	: Yes/No/NA
16.	Whether attendance taken in the post-Mock-drill meeting?	: Yes/No/NA
17.	Any shortfall of equipment/manpower/ consumables observed?	: Yes/No/NA
18.	Any other deficiencies observed with respect to the Fire Order/ERP/onsite DMP/Offsite DMP	:
19.	Remedial actions suggested	:
20.	Note-worthy Points observed	
21.	Overall Lessons Learned	:

Note: The above checklist is generic for use in all types of mock-drills. Tick the points which are not applicable for a particular type of drill.

Format-III

Format for Notifying Emergency *

Name of Unit	:
Nature of Incident /Emergency	:
Date & Time of Incident	:
Cause of Emergency	:
Location of Emergency	:
Extent of Damage, If Any	:
No. of Persons Who Were Working In The Unit at the Time of Emergency	:
No. of Persons Who Were Working At The Location of Emergency	:
No. of Persons Injured	:
No. of Persons Dead	:
Actions Taken At the Unit	:
Actions & Assistance Required From	:
Any other Information	:

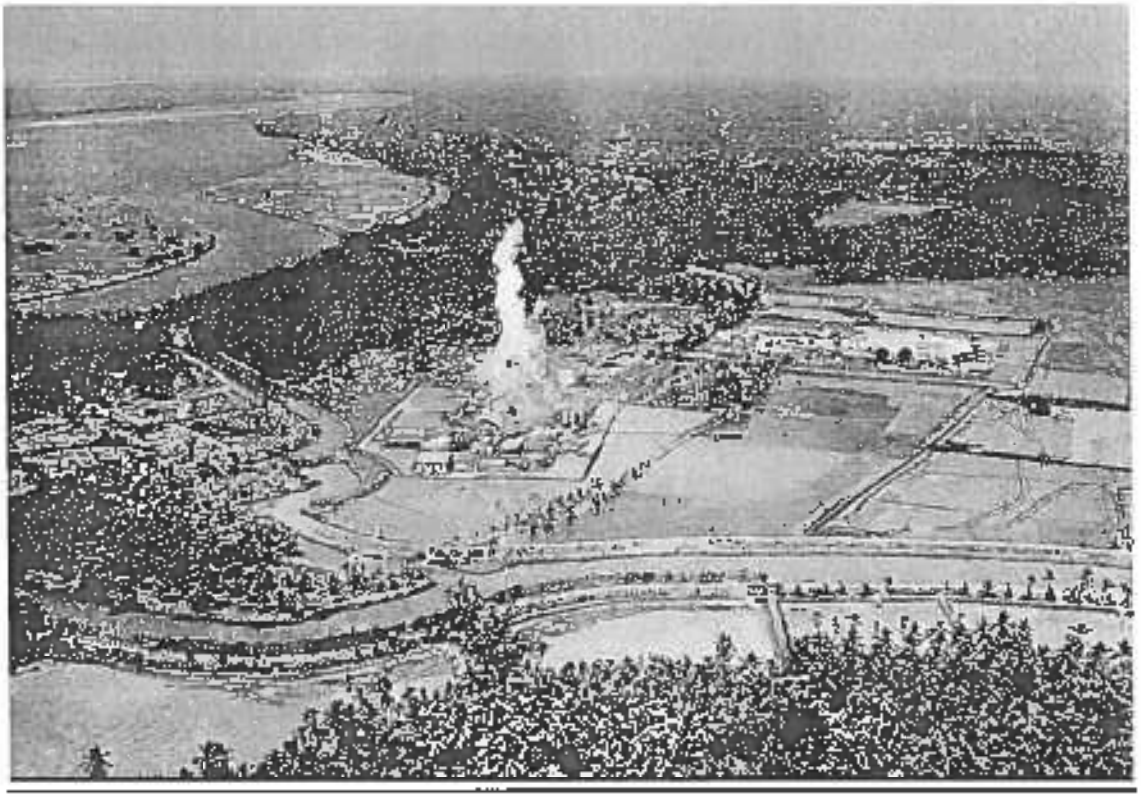
- For all major or Fatal incidents O.O. No. DLH/Dir(Onshore)/Office/16/09 dated 05.05.2009 may please be referred for further clarification

Annexure-V

EMERGENCY PLAN 2018

ONGC CAMBAY ASSET

(ONGC/CBY/EP)



Prepared by :	Reviewed by :	Approved by :
19.02.18 19.02.2018	19.02.2018	
RK RAINAKAR / U.HARIBABU	RAJEEV SHARMA	HARI SHANKAR TIWARI
I/C FIRE / Asset HSE	I/C Asset HSE	Asset Manager

DISTRIBUTION LIST

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6.	Sub Surface Manager-Soft Copy
7.	Head Forward Base-Soft Copy
8.	Head HSE-Hard Copy
9.	I/C HSE-DS-Soft Copy
10.	I/C HSE-Surface-Soft Copy
11.	I/C HSE-Well Services-Soft Copy
12.	I/C HR-ER-Soft Copy
13.	I/C MM-soft Copy
14.	I/C Infocom-Soft Copy
15	I/C Logistics-Soft Copy
16.	I/C Chemistry-Soft Copy
17.	I/C Cementing-Soft Copy
18.	I/C Fire-Soft Copy
19.	I/C Security-Soft Copy
20..	I/C Finance-Soft Copy
21.	I/C Medical services-Soft Copy
22	Installations & Rigs of Cambay Asset

REVISION HISTORY

S/N	DOCUMENT NO.	REASON AND NATURE OF REVISION	REVISION		REMARKS
			NO.	DATE	
1.	DOC. NO ONGC/CBY/EP	New Issue in guidelines with OMR 2017on 10th January 2017	00	00	

NOTE: The plan shall be update as and when necessary preferable once in a year

CONTENTS

1. OBJECTIVE

In pursuance of Reg. no. 102 of the OIL MINES REGULATIONS, 2017, an EMERGENCY PLAN is to be prepared for implementation in the event of an emergency specifying:

- Fire
- Blowout, explosion, ignition, inflammable or noxious gas.
- Bursting of equipment, pipeline or uncontrolled escape of petroleum.
- Failure of structures
- Chemical spillage
- Natural calamities
- Medical Evacuation; and
- Any other emergencies

The emergency plan shall contain-

- the action to be taken in the event of any major accident including when and how the said action is to be taken;
- Organization plan clearly stating the line of command and the responsibilities of each Person involved in case of emergency situation;
- Equipment plan such as the make, type, capacity, location, field of operation, and Operating procedure in respect of every equipment; and
- Strategy plan specifying the number of steps to be taken in any particular case of emergency.

The emergency plan shall clearly stipulate –

- Alarm and communication system;
- System of notifying the authorities;
- The duties and responsibilities of each key personnel including measures to be adopted to avert or minimize the consequences of the emergency;
- When and how the equipment shall be used and when and how the action shall be carried out;
- Help or information that would be available from associated and external agencies including Government agencies;

- Guidelines for terminating the action; and
- Plan for training of personnel and for mock-drills.

The overall objective of **EMERGENCY PLAN** is to identify emergency scenarios, to evaluate the consequences and to muster a prompt, planned, collective and well-coordinated remedial action during emergency situation in least possible time with minimum loss to human life, equipment and environment.

SCOPE:

The purpose of this Emergency Plan (EP) is to set out the appropriate mechanism and course of action to mitigate the impact of an emergency event. The plan provides a procedure allowing all those involved in ONGC to mobilize their resources in an orderly way and react in time and effectively.

The emergency situations in present context mean an occurrence resulting in uncontrolled release of oil and/or gas and other associated developments.

The plan, therefore, aims at immediate response to an emergency event to prevent escalation to a disaster and also the response in the event of such escalation

The scope has been developed taking into consideration the emergency anticipated in and around the Installations.

2. TERMS USED

BOP	*Blow out Preventer*
BIS	*Bureau of Indian Standard*
CEC	*Chief Emergency Coordinator*
CMT	*Crisis Management Team*
CPR	*Cardiopulmonary Resuscitation*
DS	*Drilling Services*
DMP	*Disaster Management Plan*
ECR	*Emergency Control Room*
ED	*Executive Director*
EP	*Emergency Plan*
EPS	*Early Production System*
EMC	*Emergency Management Committee*
GGS	*Group Gathering Station*
GPCB	*Gujarat Pollution Control Board*
HDS	*Head Drilling Services*
HES	*Head Engineering Services*
HSE	*Health Safety Environment*
HWS	*Head Well services*
HVAC	*Heating, Ventilation & Air conditioning system*
HR-ER	*Human Resources-Employment Relations*
HSD	*High Speed Diesel*
IP	*Injured Person*
LAQ	*Land Acquisition*
LPG	*Liquefied Petroleum Gas*
LM	*Location manager*
MM	*Material management*
MSV	*MilliSevert (measurement of radiation)*
MLU	*Mud Logging Unit*
NRV	*Non Return Valve*
OSC	*On Scene Coordinator*
OISD	*Oil Industry Safety Directorate*
SM	*Surface Manager*
ST	*Surface Team*
SCR	*Site Control Room*
SRP	*Sroker Rod Pump*
WS	*Well Services*

3. ONGC CAMBAY ASSET - OVERVIEW

Cambay the youngest onshore Asset in Western Region located 80km to the West from Vadodara, 100km to the south from Ahmadabad. Cambay drilled its first successful oil well called Lunej #01, in the year 1960 located 15 km from Cambay Asset Office.

The production facilities are located at GGS at Kathana (30km*), Padra (75km*),Early Production System (EPS) at Akholjuni (17 km*), Anklav (50 Km*) and Vadtal(55 Km*).

Drilling of wells is done by one departmental Drilling Rig CW-IX & one Charted Hired Rig JOHN #27.

Servicing of wells is done by four Work over Rigs namely A-50-XIII, TW-50-VII, TW-50-VIII and GTC

4. EMERGENCY RESPONSE SETUP IN ONGC CAMBAY ASSET

When an Emergency situation arises at any of the ONGC Cambay Asset working areas, the emergency is responded at the following Levels:

SCENARIO 1- Installation Level:
In case of an emergency at any Installation/Rig, Installation/Rig specific EP shall be activated.

SCENARIO 2 - Asset Level:
In case the emergency cannot be contained by the installation/Rig, Asset level EP shall be activated by the Asset Manager, who is the Chief Emergency Coordinator for Cambay Asset.The Asset Level Emergency Plan for different emergencies and function, roles & responsibilities of ONGC personnel in responding the emergency are provided in this document.

SCENARIO 3 - Asset Level:
In case the emergency requires mobilization of resources beyond the Cambay Asset's capability, the Offsite Disaster Management Plan (DMP) shall be activated by theAsset Manager Cambay in consultation with District Magistrate as per DMP issued by Cambay Asset.

SCENARIO 4 - Corporate Level:
Corporate DMP shall be activated by the CMD, as & when, in his opinion, a national level intervention is required for handling the crisis.

*Approximate distance from Cambay Asset Office

ACTIVATION OF ASSET LEVEL EMERGENCY PLAN

When the onsite emergency goes beyond the control of the particular Rig/Installation/On-site capabilities, Asset Manager who is the Chief Emergency Coordinator (CEC) shall activate the Asset Level EP.
On the activation of Asset Level EP,

- Emergency Management committee shall assume the control of the situation
- Site Control Room (SCR) will be formed near to emergency location.
- Resources such as manpower & materials required to tackle the emergency situation will be mobilized to the location through concerned HDS/HWS or SM.

5. EMERGENCY MANAGEMENT COMMITTEE (EMC):

The functions and responsibilities of various functionaries of the EMC are given below:

(a) CHIEF EMERGENCY COORDINATOR

Asset Manager will be the Chief Emergency Coordinator of the EMC in the Asset. He will take overall control of the emergency operations. His responsibilities are as under:

- All major decisions regarding handling of emergency including activation of EP.
- Formation of task forces and assignment of responsibilities to control the situation.
- Liaison with appropriate civil authorities, higher authorities of ONGC etc.
- Hold review meeting with regard to progress.

(b) ALTERNATE CHIEF EMERGENCY COORDINATOR:

Next senior most officers in the Asset will act as alternate chief emergency coordinator.

(c) EMERGENCY MANAGEMENT COMMITTEE - COMPOSITION & FUNCTIONS:

Following members shall be the part of Asset level EMC. All Emergency Management Committee members will report to the Chief Emergency Coordinator on all-important matters. Their responsibilities are as follows:

1. SURFACE MANAGER/HEAD - DRILLING SERVICES/HEAD - WELL SERVICES:
   - Will take charge of emergency situation.
   - Setting up of a control room at base and site in case of emergency with the following facilities- telephone with STD, fax, computer etc. with the assistance of I/C - Infocom, Control rooms should work on round the clock basis.
   - Partial or complete shutdown of the affected units, connected wells, nearby facilities as per emergency scenario.
   - Reporting to the Chief Emergency Coordinator on all-important matters.

- Surface Manager, Head-Drilling Services and Head-Well Services will request to depute Crisis Management Team (CMT) of Asset, if required.
- Surface Manager, Head-Drilling Services and Head-Well Services will nominate the On-Scene Coordinator (OSC) who is close enough to the location to control emergency situation.
- Interaction with On scene coordinator & Emergency Response Teams and provide necessary guidance & support in their efforts.
- Mobilization (logistics) of requisite resources (man, machine & material).
- Procurement, deployment and maintenance of necessary equipment.
- Restoration of emergency site keeping environmental damage to minimum.

II. ON-SCENE COORDINATOR (OSC):

In the initial phase, only someone close enough to the scene of emergency can exercise emergency Coordination. Accordingly, the Installation Manager or Senior most available officer will assume the role of On-Scene Coordinator (OSC).Otherwise the Chief Emergency Coordinator (CEC) at Asset level may appoint a person to take over the task of OSC at Site Control Room (SCR).

FUNCTION OF OSC:

The OSC will make an assessment of the situation; the type and quantity of assistance required and communicate the same to the Asset Emergency Control Room (ECR). The OSC will mobilize the resources available at scene, deal with the situation and take such actions as directed by the Chief Emergency Coordinator. He will transmit situation reports at regular intervals prefixing a numerical sequence to each message.

III. HEAD HSE:

- Monitoring of Health, Safety & Environment aspects.
- Liaison with statutory authorities like DGMS, GPCB, OISD etc. as per requirements in association with Chief Emergency Coordinator & concerned Mines Manager.

IV. HEAD-ENGINEERING SERVICES:

- Responsible for providing services of Works (Civil and C&M), Workshop, alternate power supply etc. at emergency site as per requirement.
- Preparation of site, approach road and other related civil works.
- Laying and repair of pipelines etc.

V. **IN CHARGE CHEMISTRY:** Ensure availability of Chemicals required to control the emergency situation at site.

VI. **LM-CEMENTING:** To ensure the availability of the pumping system as per requirement.

VII. **IN CHARGE HR/ER**

- Arrangement for food & other basic amenities at site.
- Evacuation & setting of relief camps if required.
- Land acquisition, compensation etc. as required.
- Liaison with local villagers, civil authorities etc.
- Public relation as per policy.

VIII. **IN CHARGE INFOCOM:**

Arrangement of communication facilities at control rooms at site &at base.

IX. **IN CHARGE MEDICAL SERVICES:**

To mobilize Medical facilities along with ambulance at site.

X. **IN CHARGE MM:**

To provide necessary assistance for emergency procurement.

X. **IN CHARGE LOGISTICS:**

Arrangement for transport of men, material, water tankers etc.

XII. **SUB SURFACE MANAGER/ FORWARD BASE MANAGER:**

Providing technical inputs, details, data, suggestions relating with surface.

XIII. **IN CHARGE HSE (ST, WS, DS)**

- Coordinating with respective Mines Managers for Monitoring of Health, Safety & Environment aspects.
- Updation of status/information to Head-HSE.

XIV. **IN CHARGE SECURITY:**

- Mobilize security forces (In house security, CISF, Civil, defense, TA personnel etc) at the Emergency site.
- Ensurecordoning off the emergency site area, banning entry of unauthorized persons and Security of property of the ONGC, inclusive of important records etc.
- Prohibiting carrying of mobile phones in hazardous areas.

XV. IN CHARGE FIRE:

- Depute fire tenders, fire personnel & additional equipment as required to emergency site.
- Carry out rescue operation, if required.
- Identify special firefighting equipment & mobilize. To request nearby fire fighting services other than ONGC as per the requirement.
- Provide the mutual aid to Emergency Team.

XVI. IN CHARGE FINANCE:

Ensure the availability of funds required to tackle the emergency situation.

6. SITE CONTROL ROOM (SCR)

- Location: The Site Control Room (SCR) will function at the installation depending upon situation. Alternate site control room will be set up at the closest installation.
- Mobilization: The On-Scene Coordinator (OSC) will set up SCR as soon as he becomes aware of the emergency situation.
- Function: To make situation reports from time to time and take steps to fight the emergency. Determine the type of assistance required & mobilize the same through SCR.

7. RESOURCE MOBILIZATION

Depending on the Emergency scenario HDS/HWS/SMwill mobilize the necessary resources such as Men, Machine & Materials to the site to tackle the emergency situation.

8. COMMUNICATION DURING EMERGENCY:

A communication flow-chart after the activation of Asset Level Emergency Response Plan is outlined in Annexure-1

9. EMERGENCY PLAN (EP) FOR MAJOR SCENARIOS

Emergency Plan for various scenarios has been given in the installation/ Rig specific Emergency Plans documents. EP for major scenarios such as Kick/Blow out, Oil Spill, Pipeline Emergency have been given below:

9A. FIRE EMERGENCY PLAN for

1.	STORAGE TANK FIRE	2.	DYKE FIRE
3.	MANIFOLD FIRE	4.	FIRE IN SEPARATOR
5.	FIRE IN SWGR & ELECTRICAL PANEL	6.	HEATER TREATER
7.	SPILL FIRE	8.	BLOWOUT & FIRE
9.	FIRE IN DRY VEGETATION	10.	FIRE IN OFFICE BUILDING/BUNK HOUSE

INSTALLATION MANAGER/SHIFT IN CHARGE OF DRILL SITE/ PRODUCTION INSTALLATIONS:

TAKES CHARGE OF SITUATION AT INSTALLATION AND FOLLOWS THE STANDING INSTRUCTIONS AS BELOW	
IN CASE OF FIRE IN STORAGE TANK	
1.	Raise the Fire Alarm
3.	Inform Fire Station (s) and Key Persons
4.	Shut Down Process / Plant Operation
5.	Assemble at Assembly Point / Evacuate the Non-Essential Person to Safe Location.
6.	Cordon Off the Area and Do Not Allow Entry of Any Unauthorized Person.
7.	Start Water Spry to Tank On Fire and Other Tank in Same Dyke
8.	Start fighting fire with application of foam monitor and inline inductor
9.	Pull Out All Flammable Materials i.e. HSD, Gas Cylinders Chemicals etc. from Nearby Premises
10.	Warn Nearby Inhabitants if Required
11.	In Addition to above, Offsite Emergency Procedures according to DMP if Fire Spread and Beyond Control
12.	KEEP NEARBY INSTALLATION ALERT Contact Nearby ONGC Installations/ Fire Stations for All Possible Help in terms of Man/Materials/Machinery
13.	keep in touch with control room through radio for all help and instructions
14.	Do not Drain or Transfer the Oil from One tank to Other in Case of Fire

IN CASE FIRE IN DYKE	
1.	Raise the Fire Alarm
3.	Inform Fire Station (s) and Key Persons
4.	Shut Down Process / Plant Operation
5.	Assemble at Assembly Point / Evacuate the Non-Essential Person to Safe Location.
6.	Cordon Off the Area and Do Not Allow Entry of Any Unauthorized Person.
7.	Start Water Spry to Tanks On the Dyke which caught Fire

8.	Start Fighting with application of Foam Monitor and Inline Inductor
9.	Pull Out All Flammable Materials i.e. HSD, Gas Cylinders Chemicals etc. from Nearby Premises
10.	Warn Nearby Inhabitants if Required
11.	In Addition to above, Offsite Emergency Procedures according to DMP if Fire Spread To Tank and Beyond Control
12.	KEEP NEARBY INSTALLATION ALERT Contact Nearby ONGC Installations/ Fire Stations for All Possible Help in terms of Man/Materials/Machinery
13.	keep in touch with control room through radio for all help and instructions
14.	Do not Drain or Transfer the Oil from One tank to Other in Case of Fire

IN CASE OF FIRE IN MANIFOLD	
1.	Raise the Fire Alarm
2.	Inform Fire Station (s) and Key Persons
3.	Shut Down Process / Plant Operation
4.	Assemble at Assembly Point / Evacuate the Non-Essential Person to Safe Location.
5.	Cordon Off the Area and Do Not Allow Entry of Any Unauthorized Person.
6.	Start Water Spry to Tank if storage if Storage tank within vicinity
	Use appropriate fire extinguishers available at site if fire is small
8.	Start Fighting with application of Foam Monitor and Inline Inductor
9.	Pull Out All Flammable Materials i.e. HSD, Gas Cylinders Chemicals etc. from Nearby Premises
10.	In Addition to above, Offsite Emergency Procedures according to DMP if Fire Spread near the Storage Tank and Beyond Control
11.	KEEP NEARBY INSTALLATION ALERT Contact Nearby ONGC Installations/ Fire Stations for All Possible Help in terms of Man/Materials/Machinery

IN CASE FIRE IN SEPARATOR AND SEPARATOR AREA	
1.	Raise the Fire Alarm
3.	Inform Fire Station (s) and Key Persons
4.	Shut Down Process / Plant Operation
5.	Assemble at Assembly Point / Evacuate the Non-Essential Person to Safe Location.
6.	Cordon Off the Area and Do Not Allow Entry of Any Unauthorized Person.
7.	Start Water Spry to Separator and Separator area for Cooling
8.	Start Fighting Fire with application of foam monitor and inline inductor
9.	Warn Nearby Inhabitants if Required
10.	In Addition to above, Offsite Emergency Procedures according to DMP if Fire Spread and Beyond Control
11.	KEEP NEARBY INSTALLATION ALERT Contract Nearby ONGC Installations/ Fire Stations for All Possible Help in terms of Man/Materials/Machinery

12.	keep in touch with control room through radio for all help and instructions
13.	Do not Drain or Transfer the Oil from One Separator to Other in Case of Fire

IN CASE FIRE IN SWGR & ELECTRICAL PANEL	
1.	Raise the Fire Alarm
3.	Inform Fire Station (s) and Key Persons
4.	Shut Down Electric Power Supply from main Switch
5.	Assemble at Assembly Point / Evacuate the Non-Essential Person to Safe Location.
6.	Cordon Off the Area and Do Not Allow Entry of Any Unauthorized Person.
7.	Use CO2 fire extinguishers available at site
8.	Pull Out All Flammable Materials if any from Nearby Premises
9.	Call Electrician/authorize person to put power on/Electrical repair& Maintenance

IN CASE FIRE IN HEATER	
1.	Raise the Fire Alarm
3.	Inform Fire Station (s) and Key Persons
4.	Shut Down Heater Treater Operation
5.	Assemble at Assembly Point / Evacuate the Non-Essential Person to Safe Location.
6.	Cordon Off the Area and Do Not Allow Entry of Any Unauthorized Person.
7.	Cut off power supply/ Gas supply from main source.
	Start Water Spry to Heater Treater for Cooling
8.	Start Fighting Fire with application of foam monitor and inline inductor
9.	In Addition to above, Offsite Emergency Procedures according to DMP if Fire Spread and Beyond Control
10.	KEEP NEARBY INSTALLATION ALERT Contact Nearby ONGC Installations/ Fire Stations for All Possible Help in terms of Man/Materials/Machinery
11.	Do not Drain or Transfer the Oil from One vessel to Other in Case of Fire
12.	keep in touch with control room through radio for all help and instructions

IN CASE OF SPILL FIRE	
1.	Raise the Fire Alarm
3.	Inform Fire Station (s) and Key Persons
4.	Shut Down process Operation if spill fire is within plant
5.	Assemble at Assembly Point / Evacuate the Non-Essential Person to Safe Location.
6.	Cordon Off the Area and Do Not Allow Entry of Any Unauthorized Person.
7.	Cut off power supply/ Gas supply from main source.
	Start Water Spry to Storage Tank for Cooling if spill fire is within 15 m
8.	Apply suitable Fire Extinguishers to extinguisher fire if fire is in initiation stage .
9.	Start Fighting Fire with application of foam monitor and inline inductor
10.	Pull Out All Flammable Materials ie HSD, Gas Cylinders Chemicals etc. from Nearby Premises
11.	In Addition to above, Offsite Emergency Procedures according to DMP if Fire

	Spread and Beyond Control
12.	KEEP NEARBY INSTALLATION ALERT Contact Nearby ONGC Installations/ Fire Stations for All Possible Help in terms of Man/Materials/Machinery
13.	keep in touch with control room through radio for all help and instructions

IN CASE BLOWOUT & FIRE	
1.	Raise the Fire Alarm
3.	Inform Fire Station (s) and Key Persons
4.	Shut Down Operation immediately / Close BOP as per standard Procedure.
5.	Assemble at Assembly Point / Evacuate the Non-Essential Person to Safe Location.
6.	Cordon Off the Area and Do Not Allow Entry of Any Unauthorized Person.
7.	Cut off power supply
	Activate Offsite Emergency and inform CMT
8.	Start Water Spray for Cooling with help of monitor from safe location
9.	Pull Out All Flammable Materials ie HSD, Gas Cylinders Chemicals etc. from Nearby Premises
10.	KEEP NEARBY INSTALLATION ALERT Contact Nearby ONGC Installations/ Fire Stations for All Possible Help in terms of Man/Materials/Machinery
11.	keep in touch with control room through radio for all help and instructions

IN CASE FIRE IN DRY VEGETATION	
1.	Raise the Fire Alarm
3.	Inform Fire Station (s) and Key Persons
4.	Shut Down Process Operation
5.	Assemble at Assembly Point / Evacuate the Non-Essential Person to Safe Location.
6.	Cordon Off the Area and Do Not Allow Entry of Any Unauthorized Person.
7.	Cut off power supply/ Gas supply from main source.
	Start Water Spray for Cooling and Extinguishing the Fire
8.	Start fighting fire with application of Water monitor and Fire Hose with Nozzle.
9.	Pull Out All Flammable Materials ie HSD, Gas Cylinders Chemicals etc. from Nearby Premises
10.	In Addition to above, Offsite Emergency Procedures according to DMP if Fire Spread and Beyond Control
11.	KEEP NEARBY INSTALLATION ALERT Contact Nearby ONGC Installations/ Fire Stations for All Possible Help in terms of Man/Materials/Machinery
12.	keep in touch with control room through radio for all help and instructions

IN CASE FIRE IN OFFICE BUILDING/ BUNK HOUSE	
1.	Raise the Fire Alarm
3.	Inform Fire Station (s) and Key Persons
4.	Assemble at Assembly Point / start mustering for head count.

5.	Evacuate the Non-Essential Person to Safe Location.
6.	Cordon Off the Area and Do Not Allow Entry of Any Unauthorized Person.
7.	Cut off power supply from main source.
	Apply suitable Extinguisher to put fire off if you trained to do so.
8.	Start Fighting Fire with application of Fire Hose & Nozzle
9.	Enter in Bunk House using SCBA sets for Search & Rescue of missing Persons if Any.
10.	Pull Out All Flammable Materials ie HSD, Gas Cylinders Chemicals etc. from Nearby Premises
11.	In Addition to above, Offsite Emergency Procedures according to DMP if Fire Spread and Beyond Control
12.	KEEP NEARBY INSTALLATION ALERT Contact Nearby ONGC Installations/ Fire Stations for All Possible Help in terms of Man/Materials/Machinery
13.	keep in touch with control room through radio for all help and instructions

Fire Siren Codes:

The following fire siren codes shall be followed for notifying emergency situations:-

FIRE: A wailing siren for two minutes. Sirens will be sounded three times for thirty seconds each with an interval of fifteen seconds in between.

DISASTER: Same type of siren as in case of Fire but the same will be sounded for three times for 2 minutes each at the interval of one minutes i.e.(wailing siren2min + gap1min + wailing siren 2min +gap 1min + wailing siren 2min) total duration of Disaster siren to be eight minutes.

ALL CLEAR (For fire): Straight run siren for two minutes followed by announcement.

TEST: Straight run siren for two minutes at frequency at least once a week with announcement prior to use.

NOTE: The tone of fire siren shall be different from shift siren.

INSTALLATION MANAGER/SHIFT IN CHARGE OF DRILL SITE/ PRODUCTION INSTALLATIONS:

SENDS FIRST HAND S.O.S./ INFORMATIONS THROUGH WIRELESS/PABX/EXPABEX/MART/MOBILE TO THE FOLLOWING	
1.	ASSET MANAGER
2	HEAD DRILLING SERVICES
3	HEAD WELL SERVICES
4	SURFACE MANAGER
5	RIG/INSTALLATION IN CHARGE
6	INCHARGE FIRE
7	INCHARGE – SECURITY
8	INCHARGE HSE
ON FOLLOWING LINES	
	(A) DANGEROUS OCCURRENCE AT THE SITE
	(B) PRESENT SITUATION
	(C) ACTION IN HAND/ ACTION UNDER PROGRESS
	(D) MEASURES INITIATED TO MEET THE SITUATION
	(E) NUMBER, NAMES AND DESIGNATION OF PERSONS AT SITE
	(F) SUPPORT REQUIRED

CONTACT NOs. OF FIRE SERVICES ONGC CAMBAY ASSET

EMERGENCY TOLL FREE NO. 1800-233-0935

SR. NO.	FIRE STATION NAME	TELEPHONE NO.	MOBILE NO.
1.	BASE FIRE STATION, CAMBAY ASSET	02698-227606	9426613787
2.	KATHANA FIRE STATION, CAMBAY ASSET	02696-273437	94266 13818
3.	FIRE SERVICE MUNICIPALITY, KHAMBHAT	101, 02698-220222	98257 93088
4.	FIRE SERVICE, MUNICIPALITY, ANAND	02692-243101	98797 53101
5.	FIRE SERVICE, MUNICIPALITY, BARODA	0265-2420881,2420882	98796 15031
6.	FIRE STATION GIDC, MAKARPURA BARODA	0265- 2420881	-
7.	MAHUVAD G.I.D.C. PADRA	-	98798 33707
8.	CHIEF FIRE OFFICER NAGAR PALIKA, PADRA	02662- 222655	-
9.	FIRE SERVICE, MUNICIPALITY, NADIAD	0268- 2550106	-
10.	POWER STATION, DHUVARAN	02698-242625 (Ext.333)	-
11.	EMERGENCY RESPONSE CENTRE (ERC), Baroda	0265-241688	8347033611

FIRE FIGHTING EQUIPMENTS & APPLIANCES AT CAMBAY ASSET

S. NO.	Name of Fire Fighting Equipments/ appliances	Available	Remarks
1.	Multipurpose Fire Tender 16 Ton	03	
2.	Ultra High Pressure Jeep	01	
3.	DCP Jeep	01	
4.	Trailer pump	6	
5.	Portable pump	02	
6.	SCBA SET	8	
7.	Proximity Suit	05	
8	Bolt cutter	01	
9	Spreader/ Door Breaker	01	
10.	Multi Gas Detector	03	
11.	Portable Monitor-500 GPM	02	
12.	Potable monitor 1000 GPM	02	
13	Foam Branch FB-5	02	
14	Foam Branch FB-10	05	
15.	Foam Branch FB-10X	01	
16.	Fire Blanket	02	
17.	Inline Inductor	12	

9B. EP FOR KICK/ BLOW OUT

INDICATORS OF A KICK:

WHILE DRILLING

- Sudden increase in drilling rate.(Drilling Break)
- Return of flow rate increases .(Pit Gain)
- Mud Tank volume increases.
- Pump Pressure Decreases.
- Pump SPM increases.
- Self-flow shows +ve sign.
- Increase in string weight due to lighter fluids in the hole.
- At a quite late stage when the kick comes near surface, a great deal of surging and splashing of mud occurs.

WHILE PULLING OUT

- Failure of well to take mud equal to the metallic volume of string remove.
- The hole flows.

NOTE: 60% of blow out occurred in the past during tripping operations.

WHILE RUNNING IN

- Mud tank level will increase more than the steel volume of the string run in.
- The hole does not stop flowing during time gap between running in of one pipe stand and other.

WHEN OUT OF HOLE

- The Hole flows.

Note:

- ✓ *As soon as any one of the above mentioned indications is observed, shift In charge should immediately take action for kick control.*
- ✓ *Information should immediately be sent to higher ups including In charge safety D.S .when any kick is detected.*

EMERGENCY POSITIONING OF DRILL SITE PERSONNEL'S AT THE TIME OF KICK.

- Shift In charge
  - ✓ On Brake and will supervise all the operations as per the procedure to be followed for well control.
- Top Man I
  - ✓ On hearing alarms go to hopper/mud channel and help to raise mud wt.
  - ✓ When pumping starts, keep constant check on mud level and mud Wt.
- Top Man II
  - ✓ Line up mud gas separator and degasser.
  - ✓ Stand by at shale shaker and follow Tool Pusher/chemist

- Rig Man
  - ✓ Help the SIC in Fitting NRV/Kelly etc and will be available at Rig floor.
- Field Operator
  - ✓ Standby at mud channel to follow instructions from chemist/Top man.
- Sr. & Shift Chemist & Sr. & Shift Geologist
  - ✓ Report to drill floor assist tool pusher in completing pressure control work sheet.
  - ✓ Shift Geologist- Checkup data from MLU every 15 min. & report to tool pusher.
  - ✓ Shift chemist - go to mud channel and check proper mud wt. build up and maintenance. He also has to assist SIC for all killing operations.
  - ✓ Shift geologist standby at Geo lab.
- SIC (Mech) SIC (Elec)
  - ✓ Stand by at generators & engine rooms waiting for directives from SIC.
- Fitter
  - ✓ Available near Pump and will give pump connection as and when advised by SIC/ Chemist
- Electrician
  - ✓ Available near BOP Panel Board and will attend electrical work if any needed for charging the accumulator.
- In charge Cementing
  - ✓ Standby at Cementing unit
- Crane Operator
  - ✓ Standby at crane.
- Emergency vehicle Driver
  - ✓ On driving seat of emergency vehicle.

KICK CONTROL PROCEDURES AS PER OISD-RP-174

DURING DRILLING

- Stop drilling
- Pick up Kelly to position tool joint
- Stop mud pump.
- Check for self-flow.
- If positive, proceed further to close the well by any one of the following procedures (Refer Table-1).

✓ Soft shut in
✓ Hard shut in

Sl. No.	Soft Shut – in	Hard Shut – in
1.	Open hydraulic control valve (HCR valve) /manual valve on choke line.	Close Blow out Preventer. (Preferably Annular Preventer)
2.	Close Blowout Preventer.	Open HCR/Manual valve on choke line when choke is in fully closed

		position.
3.	Gradually close adjustable /remotely operated choke, monitoring casing pressure.	Allow pressure to stabilize and record SIDPP, SICP and Pit Gain.
4.	Allow the pressure to stabilize and record SIDPP, SICP and Pit gain.	————

- Monitor the casing pressure. If the casing pressure is about to exceed MAASP, follow the Contingency plan.
- Calculate the drilling fluid density required to kill the kick.
- Initiate the approved / selected well kill method.
- Check rig crew duties and stations.
- Review and update the well control worksheet.
- Check pressures of all annuli of the well.

DURING TRIPPING

During tripping whenever flow is observed:

- Position tool joint above rotary table and set pipe on slips.
- Install Full Opening Safety Valve (FOSV) in open position on the drill pipe and close it.
- Close the well following any one of the procedures as per above table. (table - 1)
- Monitor the casing pressure. If the casing pressure is about to exceed MAASP, follow the contingency plan.
- Calculate the drilling fluid density required to kill the kick.
- Initiate the approved / selected well kill method.
- Check rig crew duties and stations.
- Review and update the well control worksheet.
- Check pressures of all annuli of the well.

WHEN STRING IS OUT OF HOLE

- Close blind / blind-shear ram.
- Record shut in pressure.
- Monitor the casing pressure. If the casing pressure is about to exceed maximum allowed (MAASP), follow the contingency plan.
- Calculate the drilling fluid density to kill the kick
- Initiate the approved /selected well kill method.
- Check rig crew duties and stations.
- Review and update the well control worksheet.
- Check pressures on all annuli of the well.

BLOW OUT:

In case kick could not be controlled, it will lead to a blowout. Well will be takeover by crisis management team.

9C. EP FOR PIPELINE EMERGENCIES

During the time of pipeline emergencies, the Pipeline Management Group will assume the control of the situation. The structure of Pipeline Management Group is given in Annexure-2. The EP procedure for Pipeline Management Group is as follows

CATEGORIZATION OF EMERGENCIES ON ANY PIPELINE.

- Leak of oil/gas detected en-route the pipeline
- Fire at any leakage point
- Explosion occurred due to leak of petroleum
- Leak/ fire due to natural disaster

Preparation:

- All non essential persons should evacuate the fire/ leakage site.
- Stop all the supplies to the pipeline and close the upstream valve.
- If possible, depressurize the line by flaring.
- Take gas readings of the surrounding areas and barricade 20% LEL zone.
- Switch off all mobiles in the hazardous area zone.

Emergency procedure:

- Allow the line to cool off.
- Wait for LEL at the surrounding to reduce below 20%.
- Keep the fire tender standby.
- Mobilize men and materials

Response:

- Clear the debris
- Excavate and expose the pipeline. Look for extent of damage.
- Decide repair method; clamping/ part replacement/ replacement of segment.
- Remove the affected portion by cold cutting after cleaning and isolating the pipeline. (Positive isolation)
- Make the line free of hydrocarbon by purging, before taking any hot job.
- Pipeline or part pipeline is welded into the removed portion.
- Weld portions are x-rayed for detecting the flaws & tested.
- Pipeline is coated suitably.
- Pipeline buried and site is cleared off all materials.

All clear:

- The OSC will give 'all clear' signal for resuming normal operation.

9D. FAILURE OF STRUCTURES

Loss of the load-carrying capacity of a component or member within a structure or of the structure itself. Structural failure is initiated when the material in a structureis stressed to its strength limit, thus causing fracture or excessive deformations.

Rig failures include:

- Sub structure collapse
- Mast failure

After a Structural failure occurred, the courses of action will be as follows:

- In case of injury first aid shall be given without delay to injured personnel and MO shall be called to the incident scene.
- Installation Manger or company man shall be informed and all assistance shall be provided to him for further processing in the emergency situation.
- Once a structure failure has taken place, the IM, in coordination with Safety Officer, must establish if the well can be shut in by considering the following:
  - Are the BOPs functioning normally?
  - Is the BOP accumulator still operating?
  - Can a stab-in valve or Kelly cock be installed in the string?
- In case answer to any of the following is negative, first considerations must be given to restoring the capability of securing the well.
- If secondary well control is not possible, then the first priority must be to secure the well by restoring secondary well control or by plugging the well bore using cement or barite plug.
- If the string in the well cannot be moved any cement job will result in cement left in the pipe and will require remedial operations at a later date and must therefore only be carried out as a last resort.
- In all cases the communication Flow chart At Annexure 1 has to follow:

9E. CHEMICAL SPILLAGE

On being informed that a chemical spill has occurred, the following actions should be taken:

- In the event of chemical spill that could be hazardous to personnel or equipment, the first person at site shall inform the same to IM, who in turn shall inform the Mines Manager.
- The IM shall assemble the spill control team.
- The identification of the source of the chemical spill, type of chemical and quantity (volume) is ascertained by spill control team.
- The spill area should be separated and marked off by hazard tape or drums etc. Chemical spillage onto roads and vehicle access ways should be similarly marked off at a good distance and suitable position to allow for vehicles to slow down and stop.
- In case the chemical spill poses any hazard i.e. poisonous or combustible gases, self-contained breathing apparatus, personal protective equipment needed to handle the chemical is used.
- The procedure for chemical spill control shall be followed to mitigate the situation.
- If any of the crew personnel is injured, communication coordinator will inform the medical officer so that injured are given immediate first aid.
- The IM shall provide the company man with information concerning the requirement of necessary equipment such as vacuum trucks, pumps, crude tanks, transporters, loaders, dump trucks, piping barriers etc. if required.
- Spill team should make concentrated effort on means of isolation of the source, basic containment of the chemical spill and removal of ignition sources.
- IM will declare end of the emergency in consultation with the company man once:
  - ✓ The chemical spill has been removed from the site.
  - ✓ There is no immediate possibility of further chemical spillage
- HSE Officer will make an incident report and send to AM.
- The company man shall send the initial incident notification report to operator office within 24 hours of the incident.

9E. EP FOR NATURAL DISASTERS

9E.1 FLOODS

Preparation:

SL. No	ACTIVITY	ACTION BY
1.	Clean all storm water channels & Oil-Water Sump (OWS)	Installation Manager
2.	Keep emergency ration like biscuits, instant noodles, milk powder, sugar, tea-coffee powder, mineral water bottles, rice, dal etc. sufficient for five days for crew.(Special advance may be provided for the purpose during monsoon)	Installation Manager
3.	Drill site locations/accommodations, GGS/EPS to beequipped with extra ration before onset of monsoon for site people entrapped. DG set to be placed on raised platform for uninterrupted power supply.	Installation Manager / DIC
4.	Purchase of one raft (fixed or inflatable) with life jackets, ropes, life rings, bamboos, powerful torch, first aid kit, walkie-talkie set etc. to be kept at Fire stations of Kathana.	I/C Fire in consultation with I/C HSE(ST,WS,DS)
5.	Purchase of one emergency rescue van with high chasisal l wheel drive equipped with small DG set, oxygen-acetylene set for cutting & welding, one inflatable raft, ropes of different size & attachments, life jackets/ rings, emergency ration/drinking water, radio communication facility, stretcher, first aid kit, portable lights, computer loaded with maps, wells details, contact nos. etc.	I/C Fire in consultation with I/C HSE(ST,WS,DS)
6.	Maps of operational areas showing our Installations, wells, rivers, streams, channels, roads including village & approach roads. Low lying areas & vulnerable Installation & wells during monsoon to be marked in the map.	Surface Manager/I/C HSE(ST,WS,DS)
7.	While preparing drill sites in low lying area for monsoon period, foundation of DG set, PCR, electrical equipment etc.to be raised to prevent water ingress.	Head- Engineering Services
8.	Based on past experience of floods, suitable measures on fixed Installations may be taken to raise foundation of DG set, electrical panel room, control room etc. to ensure uninterrupted power supply.	Surface Manager/Head Engineering Services

Do's and Don'ts after flood:

- There is a possibility of spread of water borne diseases after flood, and hence medical treatment should be taken immediately.
- Do not enter deep, unknown waters.

- Do not go near the riverbank even after the floodwater has receded.
- Sprinkle medicines in the stagnant dirty water.
- Inspect your house for any cracks or other damage. Check all the walls, floor, ceiling, doors and windows, so that any chance of house falling down can be known and you can be aware about the immediate danger.
- If the floodwater has entered the house or has surrounded the house, then it is advisable not to enter such house.
- Keep listening to weather forecast on radio and television. Move to your residence only when instructed by the competent authority. It is not safe to believe that the problems have ended after the flood water has receded.
- Inform the competent authority/ officer for restoration of the necessary connections like gas electricity, telephone, drainage, etc.
- Beware of the various insects or poisonous snakes that may have been dragged inside the house along with the floodwater.
- Destroy the food commodities that have been affected by floodwater.
- Check properly all the electric circuits, floor level furnace, boilers, gas cylinders, or electric equipments like motor pump etc. Check whether any inflammable or explosive item has not entered along with the floodwater.
- Switch off the main electric supply, if any damage is noticed to the electric equipments.
- If you find any breakage in the drainage system stop using latrines and do not use tap water.
- Do not use polluted water.
- Sewerage system should be checked and any damage should be repaired immediately so as to curtail spread of diseases.
- Empty the water clogged in the basement slowly with help of water pump so that damage to infrastructure can be minimized.
- Check gas leakage which can be known by smell of gas or by hearing the sound of leakage; immediately open all windows and leave the house.
- Boil drinking water before usage and drink chlorinated water.
- Eat safe food.
- Rescue work should be undertaken immediately after flood situation as per the instruction.
- Do not follow any shortcut for rescue work.
- Do not try to leave the safe shelter to go back home until the local officials declare normalcy after flood and instruction to return home are not given.

9F.2 EARTHQUAKE

What to do before an earthquake:

- Repair deep plaster cracks in ceilings and foundations. Get expert advice if there are signs of structural defects.
- Anchor overhead lighting fixtures to the ceiling.
- Follow BIS codes relevant to your area for building standards.
- Fasten shelves securely to walls.
- Place large or heavy objects on lower shelves.
- Store breakable items such as bottled foods, glass, and china in low, closed cabinets with latches.
- Hang heavy items such as pictures and mirrors away from beds, settees, and anywhere people sit.
- Brace overhead light and fan fixtures.
- Repair defective electrical wiring and leaky gas connections. These are potential fire risks.
- Secure a water heater, LPG cylinder etc., by strapping it to the wall studs and bolting it to the floor.
- Store weed killers, pesticides, and flammable products securely in closed cabinets with latches and on bottom shelves.
- Identify safe places indoors and outdoors:

  - ✓ Under strong dining table, bed.
  - ✓ Against an inside wall.
  - ✓ Away from where glass could shatter around windows, mirrors, pictures, or where heavy bookcases or other heavy furniture could fall over.
  - ✓ In the open, away from buildings, trees, telephone and electrical lines, flyovers, bridges.

- Educate yourself and family members.
- Know emergency telephone numbers (doctor, hospital, police, etc.).
- Have a disaster emergency kit ready :

  - ✓ Battery operated torch.
  - ✓ Extra batteries.
  - ✓ Battery operated radio.
  - ✓ First aid kit and manual.
  - ✓ Emergency food (dry items) and water (packed and sealed).
  - ✓ Candles and matches in a waterproof container.
  - ✓ Knife.
  - ✓ Chlorine tablets or powdered water purifiers.

- ✓ Can opener.
- ✓ Essential medicines.
- ✓ Cash and credit cards.
- ✓ Thick ropes and cords.
- ✓ Sturdy shoes.

➢ Develop an emergency communication plan :

- ➢ In case family members are separated from one another during an earthquake (a real possibility during the day when adults are at work and children are at school), develop a plan for reuniting after the disaster.
- ➢ Ask an out-of-state relative or friend to serve as the 'family contact' after a disaster; it's often easier to call long distance. Make sure everyone in the family knows the name, address, and phone number of the contact person.

➢ Help your community get ready :

- ✓ Publish a special section in your local newspaper with emergency information on earthquakes. Localize the information by printing the phone numbers of local emergency services offices and hospitals.
- ✓ Conduct a week-long series on locating hazards in the home.
- ✓ Work with local emergency services and officials to prepare special reports for people with mobility impairments on what to do during an earthquake.
- ✓ Provide tips on conducting earthquake drills in the home.
- ✓ Interview representatives of the gas, electric, and water companies about shutting off utilities.
- ✓ Work together in your community to apply your knowledge to building codes, retrofitting programmes, hazard hunts, and neighborhood and family emergency plans.

What to Do during an Earthquake:

Stay as safe as possible during an earthquake. Be aware that some earthquakes are actually fore-shocks and a larger earthquake might occur. Minimize your movements to a few steps to a nearby safe place and stay indoors until the shaking has stopped and you are sure exiting is safe.

If indoors:

- ➢ DROP to the ground; take COVER by getting under a sturdy table or other piece of furniture; and HOLD ON until the shaking stops. If there isn't a table or desk near you, cover your face and head with your arms and crouch in an inside corner of the building.
- ➢ Protect yourself by staying under the lintel of an inner door, in the corner of a room, under a table or even under a bed.

- Stay away from glass, windows, outside doors and walls, and anything that could fall, such as lighting fixtures or furniture.
- Stay in bed if you are there when the earthquake strikes. Hold on and protect your head with a pillow, unless you are under a heavy light fixture that could fall. In that case, move to the nearest safe place.
- Use a doorway for shelter only if it is in close proximity to you and if you know it is a strongly supported, load bearing doorway.
- Stay inside until the shaking stops and it is safe to go outside. Research has shown that most injuries occur when people inside buildings attempt to move to a different location inside the building or try to leave.
- Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on.
- DO NOT use the elevators.

If outdoors:

- Stay there.
- Move away from buildings, trees, streetlights, and utility wires.
- Once in the open, stay there until the shaking stops. The greatest danger exists directly outside buildings, at exits, and alongside exterior walls. Most earthquake-related casualties result from collapsing walls, flying glass, and falling objects.

If in a moving vehicle:

- Stop as quickly as safety permits and stay in the vehicle. Avoid stopping near or under buildings, trees, overpasses, and utility wires.
- Proceed cautiously once the earthquake has stopped. Avoid roads, bridges, or ramps that might have been damaged by the earthquake.

If trapped under debris:

- Do not light a match.
- Do not move about or kick up dust.
- Cover your mouth with a handkerchief or clothing.
- Tap on a pipe or wall so rescuers can locate you. Use a whistle if one is available. Shout only as a last resort. Shouting can cause you to inhale dangerous amounts of dust.

After an earthquake:

- Keep calm, switch on the radio/ TV & obey any instruction you hear on it.
- Keep away from beaches & low banks of rivers. Huge waves may sweep in.
- Expect aftershocks. Be prepared.
- Turn off the water, gas and electricity.
- Do not smoke and do not light matches or use a cigarette lighter. Do not turn on switches. There may be gas leaks or short-circuits. Use a torch.
- If there is a fire, try to put it out. If you cannot, call the fire brigade.
- If people are seriously injured, do not move them unless they are in danger.

- Immediately clean up any inflammable products that may have spilled (alcohol, paint, etc).
- If you know that people have been buried, tell the rescue teams. Do not rush and do not worsen the situation of injured persons or your own situation.
- Avoid places where there are loose electric wires and do not touch any metal object in contact with them.
- Do not drink water from open containers without having examined it and filtered it through a sieve, a filter or an ordinary clean cloth.
- If your home is badly damaged, you will have to leave it. Collect water containers, food, and ordinary and special medicines (for persons with heart complaints, diabetes etc.)
- Do not re-enter badly damaged buildings and do not go near damaged structures.

9F.3 CYCLONE (Downloaded from NMDA Website (http://ndma.gov.in):

The actions that need to be taken in the event of a cyclone threat can broadly be divided into four classes, viz.

- ✓ Immediately before the cyclone season;
- ✓ When cyclone alerts and warnings are on;
- ✓ When evacuations are advised; and
- ✓ When the cyclone has crossed the coast.

Before the Cyclone season:

- Check the house; secure loose tiles, carry out repair works for doors and windows.
- Remove dead woods or dying trees close to the house; anchor removable objects like lumber piles, loose tin sheds, loose bricks, garbage cans, sign-boards etc. which can fly in strong winds.
- Keep some wooden boards ready so that glass windows can be boarded if needed.
- Keep a hurricane lantern filled with kerosene, battery operated torches and enough dry cells.
- Demolish condemned buildings.
- Keep some extra batteries for transistors.
- Keep some dry non-perishable food always ready for emergency use.

When the Cyclone starts:

- Listen to the radio (All India Radio stations give weather warnings).
- Keep monitoring the warnings. This will help you to prepare for a cyclone emergency.
- Pass on the information to others.
- Ignore rumors and do not spread them; this will help to avoid panic situations.
- Believe in the official information.
- When a cyclone alert is on for your area continue normal working but stay alert to the radio warnings.
- Remember that a cyclone alert means that the danger is within 24 hours. Stay alert.
- When your area is under cyclone warning get away from low-lying beaches or other low-lying areas close to the coast.
- Leave early before your way to high ground or shelter gets flooded.
- Do not delay and run the risk of being marooned.
- If your house is securely built on high ground take shelter in the safer part of the house.
- However, if asked to evacuate do not hesitate to leave the place.
- Board up glass windows or put storm shutters in place.
- Provide strong suitable support for outside doors.
- If you do not have wooden boards handy, paste paper strips on glasses to prevent splinters. However, this may not avoid breaking windows.

- Get extra food, which can be eaten without cooking. Store extra drinking water in suitably covered vessels.
- If you are to evacuate the house move your valuable articles to upper floors to minimize flood damage.
- Have hurricane lantern, torches or other emergency lights in working conditions and keep them handy.
- Small and loose things, which can fly in strong winds, should be stored safely in a room.
- Be sure that a window and door can be opened only on the side opposite to the one facing the wind.
- Make provision for children and adults requiring special diets.
- If the centre of the cyclone is passing directly over your house there will be a lull in the wind and rain lasting for half and hour or so. During this time do not go out; because immediately after that very strong winds will blow from the opposite direction.
- Switch off electrical mains in your house.
- Remain calm.

When Evacuation is instructed:

- Pack essentials for yourself and your family to last you a few days, including medicines, special foods for babies and children or elders.
- Head for the proper shelter or evacuation points indicated for your area.
- Do not worry about your property.
- At the shelter follow instructions of the person in charge.
- Remain in the shelter until you have been informed to leave.

Post-cyclone measures:

- You should remain in the shelter until informed that you can return to your home.
- You must get inoculated against diseases immediately.
- Strictly avoid any loose and dangling wires from the lamp posts.
- If you are to drive, drive carefully.
- Clear debris from your premises immediately.
- Report the correct loss to appropriate authorities.

9F. 4 TSUNAMI (Downloaded from NMDA Website (http://ndma.gov.in) :

What to do before and during a Tsunami:

- Turn on your radio to learn if there is a tsunami warning if an earthquake occurs and you are in a coastal area.
- Be alert for Early Warnings.
- Learn to understand and notice the sea. If there is noticeable recession in water away from the shoreline become cautious and move away immediately.
- Move inland to higher ground immediately and stay there.
- Stay away from the beach.
- Never go down to the beach to watch a tsunami come in. If you can see the wave you are too close to escape it.

What to do after a Tsunami:

- Stay away from flooded and damaged areas until officials say it is safe to return.
- Stay away from debris in the water; it may pose a safety hazard to boats and people.
- Save yourself - not your possessions.

9F.5 LIGHTNING & THUNDER STORM:

Indoors:

- Stay or go indoors! If you hear thunder, don't go outside unless absolutely necessary. Stand clear from windows, doors and electrical appliances.
- Stay away from anything that could conduct electricity. This includes fireplaces, radiators, stoves, metal pipes, sinks, and phones. Unplug appliances well before a storm nears- never during.
- Don't use any plug-in electrical appliances like TV, music systems, mixers/ blenders, iron press, hair dryers or electric razors. If lightning strikes your house they can conduct the charge to you.
- Don't use the telephone during the storm. Lightning may strike telephone lines out side.
- Use the phone only in emergencies quickly. Avoid contact with piping including sinks, baths and faucets.

Outdoors:

- When outdoors, seek shelter from lightning! Buildings are best shelter, but if no buildings are available, you can find protection in a cave, ditch or a canyon. Trees are not good cover! Tall trees attract lightning Never use a tree as a shelter.
- Stay in your vehicle if you are traveling. Vehicles give you excellent protection. Get in hard topped car.
- If you can't find shelter, avoid the tallest object in the area. If only isolated trees are nearby, your best protection is to crouch in the open, keeping twice as far away from isolated trees as the tress are high. Avoid areas that are higher than the surrounding landscape. Spread out don't stand in a crowd of people.
- Don't use metal objects outside. Keep away from metal objects including bikes, electric or telephone poles, fencing, machinery etc.

- Get out of the water. This includes getting off small boats on the water. Immediately get out and away from pools, lakes, and other bodies of water.
- When you feel the electric charge if your hair stands on end or your skin tingles- lightning may be about to strike you. Immediately crouch down and cover your ears.
- Don't lie down or place hands on the ground.
- Victims of lightning shock should be administered CPM (cardio pulmonary resuscitation) i.e. artificial respiration, if necessary. Seek medical attention immediately.

Other Precautionary Measures in all cases

- Install all the guy ropes of mobile rigs as per OEM recommendation and check their condition regularly.
- Do not keep any loose items on raised platforms which can fall during earthquake.
- Keep all the dip hatches and other openings of storage tanks closed.
- All hazardous chemicals/ POL should be stored under shed cover to protect them& to avoid their mixing with rain & flood water.
- Hazardous waste should be stored under shed cover to avoid their mixing with rain & flood water.
- Boundary/ bund of proper height is to be constructed around installation/ storage tanks etc. to contain oil/ effluent within the boundary/ bund.

Notification:

- For natural disasters like cyclone, floods etc., prior intimation is given by local administration.
- For natural disasters like earthquake etc., anyone hearing a warning/ anticipating disaster will shout & raise the siren.

Response:

- Communication shall be as per communication flow chart given in Annexure-1.
- Other crew members will switch off all engines and generators/ cut off power supply & take shut down, if required.
- If situation demands, close the well from surface or by operating sub surface safety valve, if installed.
- In case of suspected spillage of crude oil/ chemicals, follow procedure given in oil spill response section 7.6.

Evacuation:

- All personnel in the facility will evacuate to the predetermined assembly point.
- The OSC will assume control of situation &will:
  - Head count the personnel to ensure that every one has evacuated safely;
  - Keep in contact with control room for latest developments & instructions.

All clear/ reconstitution:

The OSC will give all clear signal, when the threat has passed & will ask personnel to return to the facility & begin clean-up activities.

10. MEDICAL EVACUATION:

Introduction:

Evacuation to a person due to either to illness or injury imply the evacuation from the place of an incident to the safe surface area for administering essential medical help for the purpose of reanimation, keeping alive and stabilization of injuries as well as evacuation from the place of an incident to the nearest health centre where the injured person can be provided with more complex medical help and surgical interventions.

The procedure foresees:

- Assessment and the first aid treatment on the spot of the accident.
- Evaluation of situation and the decision to;
- Transport the patient to the nearest medical point (Primary Evacuation) to stabilize his condition.
- Evacuation has priority over other normal operations and includes usage of the ambulance or other available means of transportation.

  - ✓ A patient, whose illness or injury may be serious but does not require immediate medical treatment. Special evacuation arrangements are not required, and the patient may be sent to the clinic. This is not EMERGENCY Medical Evacuation.

  - ✓ A patient who seriously ill or injured, requiring urgent medical treatment. The patient must be transported to the clinic as fast as possible. This is an EMERGENCY Medical Evacuation.

Various scenes/situations are described and the action to be followed is given below with the duties of various personnel.

INJURED PERSON LYING IN OPEN SPACE:

- First man to see the injured person raises alarm as he goes to the injured person (IP).
- Inform Medical Officer & Safety Officer regarding the patient location and anything of importance.
- MO proceeds to inspect the IP and provide necessary medical assistance.
- The doctor has to take the decision on transfer of IP to nearby hospital.
- Simultaneously, the ambulance driver prepares for emergency transfer of patient to the hospital as advised by MO.
- The doctor will accompany the IP to the hospital till the IP is admitted and till the Doctor of the hospital takes charge of the IP.

INJURED PERSON LYING IN ENCLOSED SPACE:

- First man to see the injured person raises alarm by shouting.
- If nobody is in sight then rush and raise alarm kept outside the office.
- Inform MO & Safety Officer regarding the patient location and anything of importance.
- MO proceeds to the IP along with the Safety Officer.
- Simultaneously, the ambulance driver prepares for emergency transfer of patient to hospital as advised by MO.
- The MO will accompany the IP to the hospital till the IP is admitted and till the Doctor of the hospital takes charge of the IP.

Warning:

- Do not enter enclosed space unless it has been declared safe by Safety Officer.
- On declaration of the enclosed space as safe by Safety Officer.
- Either the MO enters the enclosed space or trained persons in fire rescue operations bring the IP out of the closed space.
- The MO inspects the patient and if stretcher is needed, guides the crew in getting the IP onto the stretcher for taking him out of the enclosed space or onto the ambulance.
- The basket stretcher kept on the rig/installation tied with 4 nylon/wire ropes can be used for lifting out patients from tanks & cellar pit.
- On the advice of MO further action will be initiated. If needed the IP will be transferred to the medical bunk at site or to the hospital.

Injured Person on Rig Floor:

- First man to see the injured person will inform the Driller/SIC, Safety Officer.
- Driller to supervise the transfer of IP onto the basket stretcher or by First aid trained personnel.
- The IP will be taken to the medical bunk house for treatment by MO.
- On the advice of MO further action will be initiated. If needed the IP will be transferred to the medical bunk at site or to the hospital.

Injured Person on the Monkey board:

- First man to see the injured person will inform the driller, MO & Safety Officer.
- If the IP is not in a position to come down, send the basket upon the man riding winch with tag line. Meanwhile send three or more crew to the monkey board.
- Transfer the patient to the basket and gently lower him to the rig floor From there on proceed as per the procedures for "Injured Person on Rig Floor".

Injured Person in a normally inaccessible area:

- In such cases use of crane, forklift, air winch etc, to be used to somehow to get the IP onto a stretcher, if not possible to reach IP, immediately inform MO & Safety Officer.
- On the advice of MO further action will be initiated. If needed the IP will be transferred to the medical bunk at site or to the hospital.

REMEMBER: Before rescuing, make sure the rescuers are safe.

11. ANY OTHER EMERGENCY:

11A. EP FOR MAJOR INJURY OR HEALTH EFFECTS/ ELECTRICAL SHOCK

Preparation:

- Installation manager will maintain & display a list of first aid trained personnel. At least two such personnel should be available in each shift.
- At least two first aid kits shall be maintained in appropriate locations by Installation Manager.
- Installation Manager will maintain details of employees as follows:
  - Name, Designation, Age, Address, Emergency Contact nos.
  - Blood Group
  - Known Allergies
  - Special medical considerations (hypertension, diabetes etc.)
  - PME of employees should be carried out as per following schedule:
    - ✓ Age less than 45 years - once in 5 years
    - ✓ Age between 46 to 55 years - once in 3 years
    - ✓ Age more than 55 years - once in 2 years

Record of PME in form 'O' is to be maintained by Installation Manager. List of centers on panel for PME as per Annexure XII

- First Aid Chart for electrical shock should be displayed in Electrical control room.
- All electrical equipments, tanks, skids, bunk houses, rig mast etc. Should be properly earthed. Earth resistance should be measured once in every six monthsfor installation& once at start of each well for rig. Earth resistance should be low as per statutory requirement.
- Relays and circuit breakers should be maintained & periodically tested/ calibrated.

Response:

- In case of injury/ sudden illness, intimate shift In-charge.
- Further communication shall be as per communication flow chart given in Annexure-1.

On-scene:

- Other crew members will not crowd around injured person.
- If serious, victim will be shifted in Ambulance/ emergency vehicle to nearby hospital with escort.
- First aider/ Doctor shall ensure that necessary medical equipment and facility is made available on the Ambulance/ emergency vehicle during transit.

- Following information should be provided to the hospital like:
  - Details of accident & symptoms exhibited by the sick or injured person.
  - First aid treatment administered on the site.
  - Patients blood group
  - Known allergies
  - Special medical considerations (hypertension, diabetes etc...)
- Site incharge will immediately contact I/c medical services, who will further co-ordinate for outdoor/indoor treatment as required with concerned hospital.
- Switch off the supply immediately, in case of electrical shock.
- Remove the patient from the source of danger.
- Check the patient's breathing.
- If breathing of victim has ceased, attempt to restore natural breathing by artificial respiration (CPR) by first aid trained person.

11B. PROCEDURES: SNAKEBITE

Snakes are a natural part of the environment and may be encountered at any time, especially in the warmer months. Snakes are not normally aggressive and tend to bite only when threatened or handled.

When sighted in the built-up areas of the campus, observe the following:

- Do not approach or attempt to capture or kill the snake
- Snakes have poor hearing but heightened reaction to vibration which, for them, indicates movement of potential prey. The overwhelming majority of bites occur when the snake is threatened; left alone they are unlikely to attack.
- Alert those working in, or passing through, the area of the snake's presence and warn them not to approach it.

Signs and symptoms of snakebite:

- ✓ Sleepiness
- ✓ Difficulty in breathing
- ✓ Headache
- ✓ Double and blurred vision.
- ✓ Puncture mark or sketches.
- ✓ Nausea, Vomiting and Diarrhea
- ✓ Faintness, dizziness
- ✓ abdominal pain
- ✓ oozing of blood from the bite site or gums
- ✓ drooping eyelids
- ✓ difficulty in speaking or swallowing
- ✓ limb weakness or paralysis

Do's and Do not

Do's

- Rest and reassure the casualty.
- Clear and open airway
- keep a close watch on respiration and bleeding
- wash with soap and water- If there is bleeding, stop it first by applying pressure on the bite wound. When the bleeding stops, clean the wound with soap and water to prevent infection. Dress up the wound. Do not wash the wound under running water.
- Apply a broad pressure bandage (preferably crepe) over the bite site as soon as possible.
- Ensure the casualty does not move.
- Write down the time of the bite and when the bandage was applied.
- Stay with casualty and check circulation in fingersand toes.
- Ensure call for ambulance and Doctor has been made.

Do not:

- Do not waste time
- Do not keep the patient starved
- Do not move the limb/ do not run
- Do notcut the bitten area.
- Don't apply ice on the snake bite as the ice may block blood circulation
- Do not try to suck venom out of wound. Germs in the mouth may cause infection in the bite wound and you may be also exposing yourself to the venom.
- Do not use the tourniquet.
- Do not try to catch the snake.
- Do not give the person any medications unless directed by a doctor.

Prevention Strategies

- ✓ Ensure long grass is cut back
- ✓ Remove snakes access to water within the site where possible
- ✓ Remove snake habitats such as ponds, piles of timber and sheets of galvanized iron.
- ✓ Maintain clean yards and surroundings to reduce the mice population
- ✓ Spraying of Carbolic Acid in and around walls, closed space etc.
- ✓ Ensure an action plan is ready should a snakebite occur.

11C. HANDLING OF EXPLOSIVES (BASED ON OISD-STD- 183 & 191):

Preparation:

- Logging crew will hold Safety meeting at site.
- Get all the Arc/ gas Welding Machines and Cathodic Protection equipment switched off.
- Get Radio Transmitters/ Receivers, mobile phones and all generators turned off within 300m of work area well before arming the explosive device and shall remain switched off till the device is 100m down inside the well.
- State Electricity Board power connection to SRP (Sucker Rod Pump) within 30m from well head must be switched off.
- The work area, if, has high-tension line running over or underground, power has to be disconnected.
- If a large transmitter (radio or television) exists within 4km from the site, it must be ensured that the same is switched off.
- Look for the possibility of thunder storm/ sand storm. If one, suspend operation till it subsides.
- All open fires must be put off.
- Check for BOP testing, working of cat line and clear parking/working place in front of rig/mast/ work-over.
- Ensure that the hole is completely filled with completion fluid except in cases of under balance perforations.
- Install casing to rig voltage monitor: Check voltage between rig, casing and cable armor. If any voltage exceeds 0.25 volt, investigate the cause. Eliminate before proceeding. The voltage level must be less than 0.25 volt.
- When residual voltage is less than 0.25 volt, install safety grounding cable between unit/ truck to rig and casings. Leave the voltage monitor connected between rig and casing. Watch the meter during whole operation.
- During perforation activity minimum required persons shall be allowed in the vicinity of works.

Response:

- In case of accident due to explosive, intimate concerned Location Manager/ Area Manager & Head Logging Services. Follow further communication as per Annexure-1.
- Follow procedure given in7.7 as per emergency situation.

11D. HANDLING OF RADIOACTIVE MATERIAL (BASED ON (OISD-STD- 183):

Preparation:

- All non-essential personnel must be cleared from the rig floor area.
- Appropriate signs and barriers shall be provided in the controlled work areas if a 20 msv (2 mRem) possible exposure is expected during a 40 hr week. For higher levels, ropes, fences or even barricades with controlled check-in and check-out should be utilized.
- After the source is fixed in the housing of the tool, the personnel must keep a distance of at least 1 meter from source region.
- Once the logging tool is loaded with the source, it should be lowered in to the well as soon as possible.
- Under no circumstances is the tool with a source in place be handled directly with the hands within 1 foot of the source.

Emergency procedures:

The emergency action is called for under the following situations:

- Well logging device falls into the well along with the radioactive source.
- Source is lost or misplaced during storage or transportation.
- Road accident or fire or explosion during transportation.
- Fire or explosion in the well or rig.
- Leakage or rupture of the radioactive source.

Response:

- In case of accident due to radioactive material, intimate concerned Location Manager/ Area Manager, Head Logging Services & I/C Security. Follow further Communication as perAnnexure-1.
- Follow procedure given in7.4.2 to 7.4.6 as per emergency situation.
- If a tool containing a source is lost in a well, all efforts must be made to fish it out, failing which, sources are to be left in the well, sealed with a thick concrete plug.
- In case a radiation source is lost elsewhere or damaged, AERB and BARC have to be immediately informed, in no case later than twenty four (24) hours from such occurrence.

11E. EP FOR ILLEGAL ACTIVITIES

11E.1 TERRORIST ATTACKS

- If a suspected device is encountered, it should not be handled and the area should be secured. Improvised explosive devices are very unstable. They are extremely sensitive to shock, friction, impact and heat and may detonate without warning. Even the smallest devices can cause serious injury or death.
- Always assume that there ismore than one device present, whether any other bomb or a device.
- Train security personnel and employees regarding unattended packages of any type. Never pick up or open any suspicious package or piece of luggage. If an IED is discovered, call the police and do not touch the device.

11E.2. CHEMICAL ATTACKS/ CHEMICAL RELEASE:

A chemical emergency occurs when a hazardous chemical has been released and has the possibility of harming people's health. Potentially lethal, chemical agents are difficult to deliver in deadly amounts. If released outdoors, the agents often dissipate rapidly. As such, the most lethal area for a chemical release is inside a confined space, such as a building, public place, or subway system. Industrial chemicals, while not as lethal, can be just as effective if released in sufficient quantities. Chlorine, ammonia, benzene, and other toxic chemicals are routinely transported through densely populated areas in rail tankers or truck tankers and could be the target of a terrorist attack. Chemical terrorist attacks will most likely be overt because the effects of most chemical agents are immediate and obvious. Your response will have tobe thought out and practiced in advance to be effective.

Evacuation:

Some types of chemical emergencies will require evacuation from the immediate area. If you are in up-wind and in the open, evacuate up-wind and away from the incident. Cover your mouth and nose with a damp cloth. If you have been exposed, you will have to be decontaminated by first responders.

Shelter in place:

If you are already in down-wind and/or in a multistory building, you may be instructed to shelter in place or to make that decision on your own. Most likely you will only need to shelter for a few hours.

The procedure includes:

- ✓ Go inside as quickly as possible shut and lock all windows and doors; turn off all HVAC equipment and any fans.
- ✓ If you have multiple floors, go as high as practical, three to five floors. (Most chemical agents are heavier than air.)

- ✓ If you have duct tape, tape over door and window cracks, vents, electrical outlets, and any opening to the outside.
- ✓ Wait for instructions from first responders before leaving.

11E.3. BIOLOGICAL ATTACKS:

A bioterrorist attack could happen in any workplace, yet most company personnel know little about potential biotoxins or biopathogens or how to recognize these agents and respond in the event of an attack.

There are several ways a bio-terrorist event may manifest itself. The biological event may result from a covert attack. A covert attack may be unleashed by the receipt of an object, such as a package or piece of mail, accompanied by a warning or threat. For example, release of a biological agent could occur through delivery of a package contaminated with anthrax spores or another pathogen. Biological agent release also could occur via the ventilation system (HVAC) in a building, where dispersal could take place within a matter of minutes. Because the covert release is not witnessed, the effects of such an event can be widespread and difficult to isolate or recognize.

While terror is intended to produce casualties, disruption & fear, the use of biological agents is particularly injurious. Biological attacks are delayed events. The sudden appearance of generalized symptoms in victims who present themselves to medical providers may initially disguise the true source of exposure. Only when a trickle of patients turns into a flood or mysterious pathogens quickly make their presence felt does the magnitude of the event reveal itself.

The goal of the medical care community (i.e., hospitals, physicians, and other health care providers) is to recognize and diagnose the disease (which frequently may be unfamiliar to most clinicians) and to provide treatment. The goal of public health authorities is to detect and control the outbreak of the illness. Public health officials will focus on identifying and treating exposed persons and preventing the spread of disease.

In response to a covert release, it is important for ONGC health officials to recognize the signs and symptoms of an emerging disease among employees. If an overt release is recognized, take immediate action to isolate the exposed employees and/or area of agent dispersion and to remove others from the area of release. Notify local public health authorities immediately and follow their directions. Decontamination may also be warranted in response to an overt release.

11E.4. RADIOLOGICAL ATTACKS:

A radiological weapon or "dirty bomb" is a crude device that combines a conventional explosive with highly radioactive material. When detonated, the blast vaporizes the radioactive material and propels it across a wide area.

The main danger from a dirty bomb is the initial blast, which could cause serious injury or property damage. The radioactive materials will likely not be concentrated enough to cause immediate serious illness, except to those very close to the blast

site or those who inhale smoke and dust. Dirty bombs are designed to cause tremendous psychological damage by exploiting the public's fear of radiation. These are not weapons of mass destruction, but weapons of mass disruption aimed at wreaking economic havoc by making target area sun inhabitable for extended periods.

There are three basic ways to reduce your exposure:

- Reduce the time near the source of radiation,
- Increase the distance from the source of radiation,
- Increase the shielding between person and the source of radiation. Shielding is anything that puts distance and mass between person and the radiation source.

Evacuation:

If a person is outside, evacuate up-wind from the blast site cover the nose and mouth with a wet cloth to reduce the risk of inhaling radioactive smoke or dust. Once out of the immediate area, seek shelter and wait for instructions from first responders. If a person is close to the blast and inside a building; stay inside if the building is intact. Move to the basement and turn off all HVAC equipment and fans bringing in outside air it is not necessary to seal doors and windows, but it may be helpful. Wait for instructions from first responders.

11E.5. EXTORTION AND LOOTING OF EXPLOSIVES/ WEAPONS:

The activities of extremists have spread across the country. The extremists are always on the lookout for money, explosives and weapons. We need to be careful and take required preventive measures against the designs of these extremists.

Certain important precautionary actions are:

- Explosive licenses are to be obtained for storage and transportation of explosives.
- Storage, transportation & uses of explosives to be done as per laid down guidelines of PESO.
- Establish temporary explosives magazine as per the guidelines.
- Temporary explosives magazine are to be guarded by armed guards, preferably from local Police.
- These magazines should have first aid, fire fighting equipments.
- Logging party personnel should be able to handle first aid, fire fighting equipments.
- Proper record of explosives stored and used should be maintained in temporary magazines.

12. EMERGENCY SHUT DOWN PROCEDURES

GGS (GROUP GATHERING STATION):

Separator platform:

- Close all the wells by closing isolation valves in oil manifold.
- Release gas pressure from manifold through separator to the flare.
- Take action to close all the wells from well head.
- Start fire water pump and prepare to meet the emergency.
- Inform to near-by installation and fire station and operational control room at base.

HEATER TREATER/ BATH HEATER:

- Divert and by pass the heater treater and the separator oil directly to tanks.
- Cut gas supply to the heater treater.
- Cut power supply to heater treater transformer.
- If situation demands follow:
  - ✓ Close all the wells by closing isolation valves in oil manifold;
  - ✓ Release gas pressure from manifold through separator to the flare;
  - ✓ Take action to close all the wells from well head;
  - ✓ Start fire water pump and be ready to meet the emergency;
  - ✓ Inform to near-by installations, fire station and operational control room at base;
  - ✓ Stop the oil dispatch pump.

STORAGE TANKS:

- Close valves of all tanks - in case they are not on fire
- Ensure fire water sprinkling on tanks to cool the liquid - in case tank is not on fire.
- Keep dyke valve open to drain out water.
- In case of tank under fire, use foam on that tank only & spray water on remaining tanks.
- Keep dyke valve of tank on fire closed.

PUMP HOUSE:

- Stop the pumps and disconnect the power supply.
- Close the suction and delivery valves of the pumps, if possible.
- Close outlet valve of the tank concerned and the pump delivery line at the scrapper point.
- Inform to near-by installations, fire station and operational control room at base.

EPS (EARLY PRODUCTION SYSTEM):

- Divert all the flow from separator to tanks, instead of Heater treater, if any.
- Subsequently, if situation demands close the wells at Well sites.
- Ask the loading tanker to leave the EPS immediately.

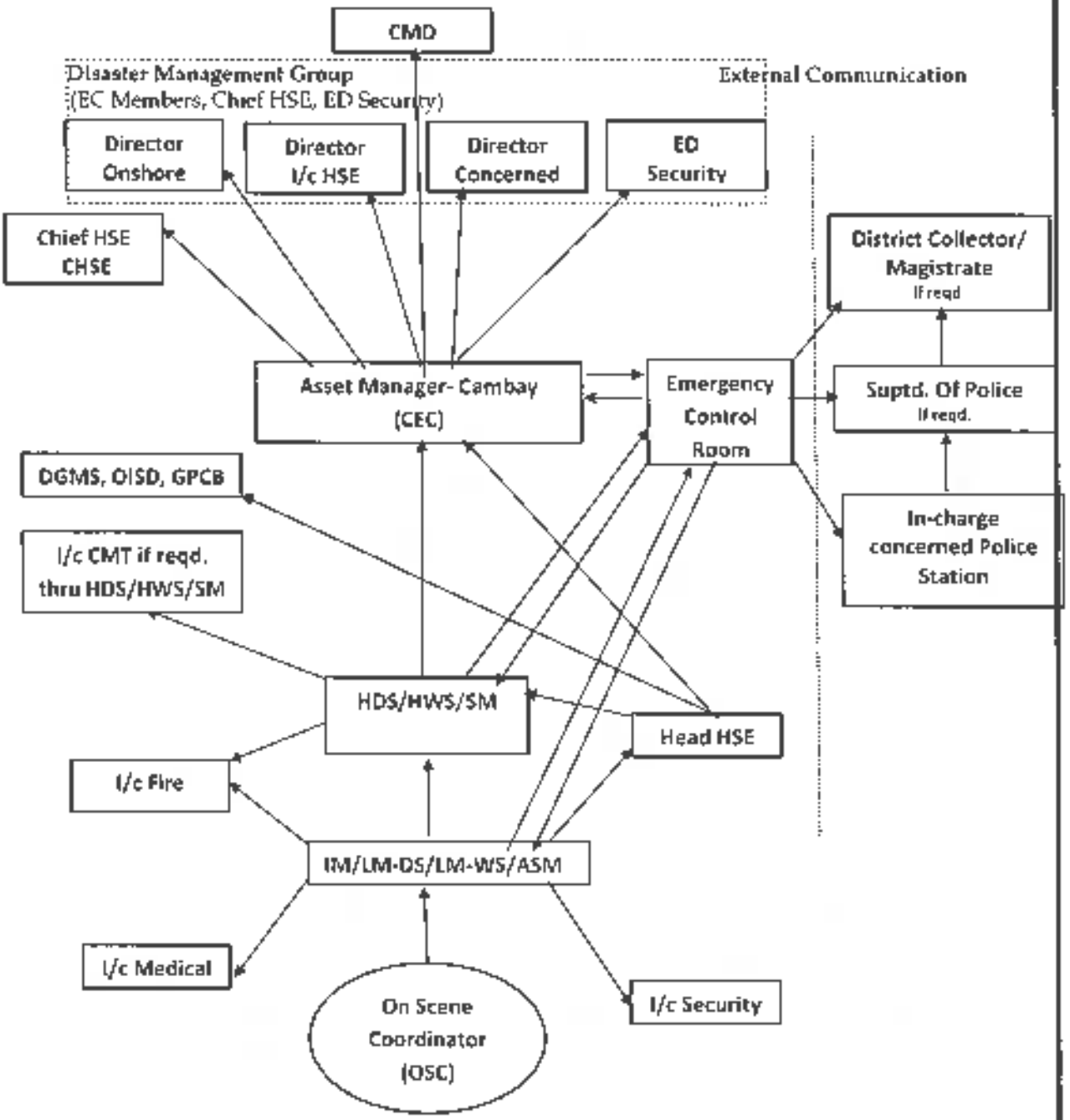
- Inform to nearby installations, fire station and
- Operational control room at base.

SUCKER ROD PUMPS (SRP)

- Shut down power by isolating main power (DO switch, MCB or DG set)
- Bring main power switch on SRP panel to zero.
- Only after completing power shutdown sequence and ensuring no current flow, SRP fencing to be opened.

Note: Specific shut down procedures to be prepared at installation level.

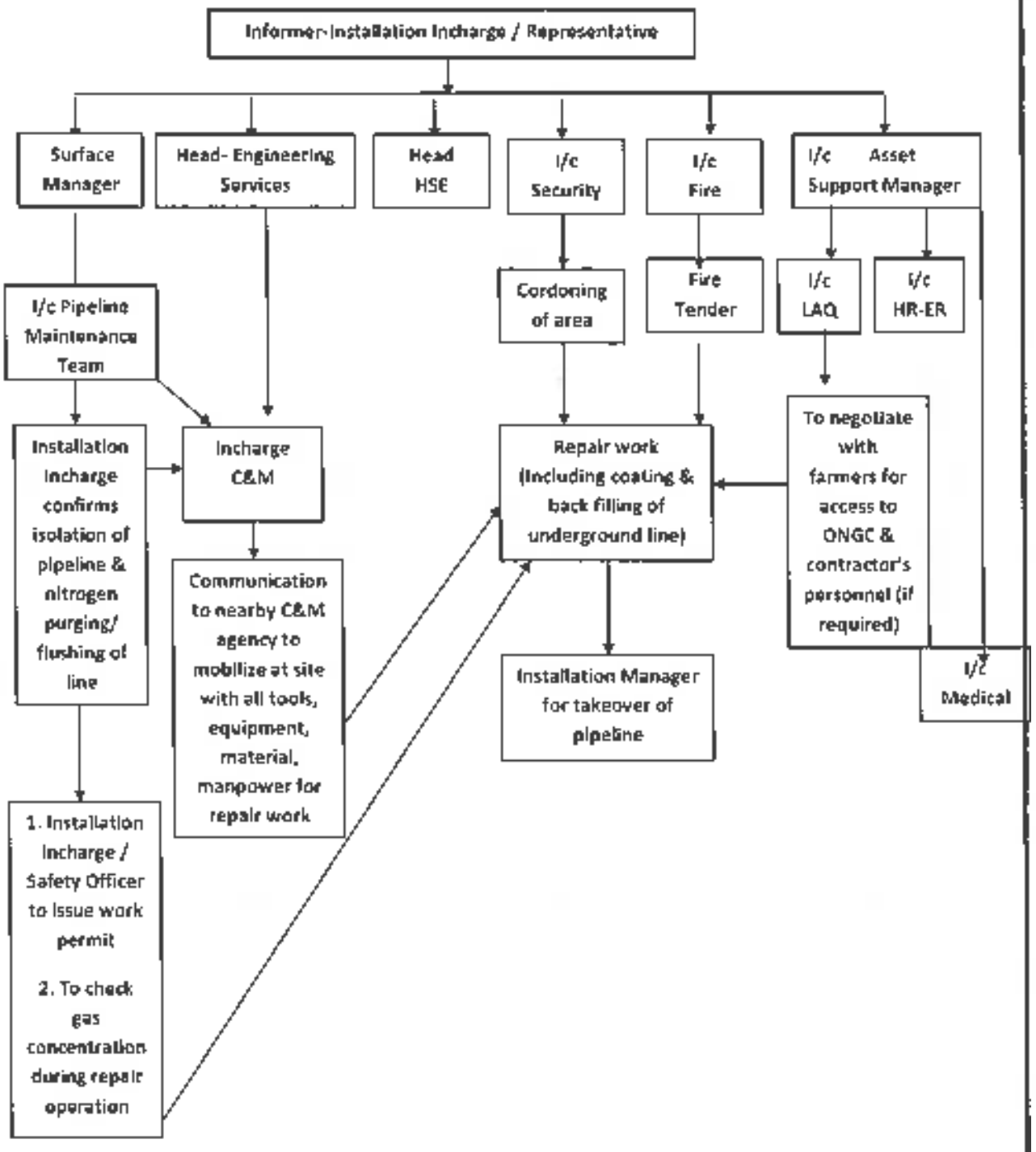
Annexure-1: Communication Flowchart



Note: All incidents are required to be entered in SAP transaction zlseaccd. By Installation Manager

Annexure-2

Action Plan for Pipeline Emergency Management Group



Annexure-3

Format for Notifying Emergency *

Name of Unit	:
Nature of Incident / Emergency	:
Date & Time of Incident	:
Cause of Emergency	:
Location of Emergency	:
Extent of Damage, If Any	:
No. of Persons Who Were Working	:
In The Unit at the Time of Emergency	
No. of Persons Who Were Working	:
At The Location of Emergency	
No. of Persons Injured	:
No. of Persons Dead	:
Actions Taken At the Unit	:
Actions & Assistance Required From	:
Any other Information	:

(Signature of Installation Manager)

*For all major or Fatal incidents O.O. No. DLH/Dir(Expl)/HSE/2017 dated 21st Feb 2017 may please be referred for further clarification.

Annexure-4

Emergency Contact Numbers -ONGC, Cambay Asset

Sl. No	Name of Officer	EPABX No.		Direct Lines		Mobile No.
		Office	Residence	Office	Residence	
1	HARISHANKAR TIWARI ASSET MANAGER	6501	6690	227502	227690	9969225674
2	KIRITKUMAR C TRIVEDI, HDS	6530		227530		9426614061
3	CHATRADHAR BHARALI, SM	6510	6938	227510	227938	9426613632
4	H V NENE, HWS	6526		227510		9428828368
5	PANKAJ ARORA, ASM	6670	6959	227670	227959	9969226264
6	A.K.GADIWAN, HES	6660	6956	227616	227956	9426613853
7	RAJEEV SHARMA , I/C HSE	6671		227671		8259950165
8	BHUMRA RAJINDRA SINGH, SSM	6545		227545		9428828110
9	P.R.MISHRA, FBM	6550	6954	227550	227954	9426612067
10	R.N.PANDEY, I/C INFOCOMM	6616	6751	227616	227751	9410390183
11	RAJ KUMAR ASH , I/C FINANCE	6573		227573		9868393340
12	MADHAWA NAND PANDE , LM -MUD	6560	6930	227560	227930	9426614694
13	A S RAO, I/C HR-ER	6580		227580		9445005523
14	ATTAR SINGH CHAUHAN, I/C SECURITY	6600	6963	227600	227963	9426613530
15	DR. RAVINDRA TRIPATHI, I/C MEDICAL SERVICES	6610		227610		9428828498
16	R.K.RATNAKAR, I/C FIRE SERVICES	6606	6820	227604	227820	9969220195
17	A.BHATTACHARJEE, I/C MM	6649	6937	227649	227937	9428007954

ANNEXURE 5:

List of centers on panel for PME

S.N	Name & Address of the PME Centre
1.	Sterling Addlife India Limited, Opp. Inox Multiplex Race course Circle (West), Vadodara, Gujarat.Pin code: 390007, Emergency No.: (0265) 232 3500 Ph. No: (0265) 2354455.
2.	Zydus Hospital, Anand-Lambhvel Road, Anand - 388001 Tel: 02692-619501 / 502 Fax: +91-2692-619517, Emergency No.: (02692) 619500/619563.
3.	Baroda Heart Institute & Research Centre, 44, Haribhakit Colony, Old Padra Road, Vadodara - 390007, Ph: 0265-2322021, Emergency No.: 9898500101
4	Apollo Hospitals International, 1A, Bhat GIDC Estate, Gandhinagar-382428. Ph:079-66701800, 66701801

ANNEXURE-VI

ओएनजीसी
ONGC
Oil and Natural Gas Corporation Limited
Corporate Health, Safety and Environment
8th Floor, South Tower, Scope Minar,
Laxminagar, New Delhi - 110092
Phone: 22406020; Fax: 22406681

No.: CHSE/LAQ-SOP-Restoration/2015-16 **Date: 02.12.2015**

From: ED- Chief HSE, Delhi

To: ED Chief – BR, Dehradun

Sub: SOP for restoration of abandoned drill sites after incorporating the suggestions of EC

A committee was constituted by Director (Onshore) to frame a Standard Operating Procedure (SOP) for restoration of abandoned drill sites keeping in view the constraints being faced for restoration of the abandoned drill sites and to be coordinated by CHSE.

After taking inputs from all the work centers the draft SOP was put up to EC for approval. EC while approving the SOP in its 471st meeting advised following:

I. Lessons learnt by peer companies and in other industries be also studied and if found suitable, the same be included in the SOP. Further EC desired that civil jobs in the restoration be done through Rate Contract.

II. LAQ manual be suitably amended to incorporate the SOP for Restoration of abandoned drill sites.

The committee along with CHSE studied the procedure for abandonment of drill site by Oil India and Cairn India Ltd. Both the companies are following the guidelines and regulations issued by DGMS, MoEF, SPCB, CPCB etc. These procedures are similar to the SOP proposed by the Committee. In fact, the SOP prepared by ONGC is more comprehensive as it also suggests timelines for carrying out various activities. Hence, no changes have been proposed in this regard. Long term rate contract for civil jobs have been included in the SOP.

The final SOP for restoration of abandoned drill site is enclosed for your necessary action to incorporate the same in the LAQ Manual.

The concerned Assets/Basins are advised to take necessary action in this regard.

Dhamindra C.A. Das
(M.C. Das) 02.12.15

Copy for kind information to:

1. Director (T&FS)
2. Director (HR)
3. Director (Expl) - I/C HSE
4. Director (Onshore)
5. Director (Finance)
6. **Asset Managers** - Ahmedabad/Mehsana/Ankleshwar/Rajahmundry/Assam
7. **Asset Managers** - Agartala/Cambay/ Cauvery/CBM
8. **Basin Managers** - Jorhat/FB, Dehradun/Head - CFB, Silchar/RFB, Jodhpur

places (landfill) should be identified – one for demolished civil construction material and another for waste chemical & drilling mud fluid, drill cutting etc
Responsibility of constructing required disposal pits, fencing / boundary wall etc. and to maintain these places shall be with Surface team for hazardous waste disposal and with civil engg. Section for disposal of civil materials respectively.

Action LAQ, Civil, Asset HSE, Surface group.

v. All civil structural material to be taken to the identified sites. All drill cuttings, oil, sludge to be transported to identified pit and quantified.
Action: Drilling services, Sub Surface group (Development location) / Basin (Exploratory locations), Asset HSE.

vi. Convey the decision for surrender of land and status of waste chemical, drilling mud fluid, drill cuttings etc. (Treated or untreated) to LAQ, Asset HSE & Civil Engg. Section.
Action: Sub Surface group (Development location) / Basin (Exploratory locations)

vii. Obtaining necessary approval of identified disposal land (Land fill for drilling waste) by ONGC from statutory body.

Action. Asset HSE

viii. To explore the feasibility to re-use demolished construction materials.

Action: Civil Engg. Section.

ix Administrative approval and Expenditure sanction is to be accorded by Sub Surface group (Development location) / Basin (Exploratory locations) as per provision of BDP. Estimates shall be prepared by civil engg. Section as per frozen scope of work by the committee.

Action: Sub Surface / Basin, Civil

x. Convey completion of restoration work to LAQ, Asset HSE, Sub Surface group (Development location) / Basin (Exploratory locations).

Action : Civil Engg. Section.

xi. Convey completion of restoration work to State pollution control board / MoEF / other statutory bodies.

Action : Asset HSE

xii. Surrender of Land to Land owners.

Action : LAQ Section

Note :

i. Asset HSE shall be nodal section to monitor restoration process.
ii. Prior to undertaking site restoration of site, the well should be appropriately plugged in accordance to the applicable Regulation(s).
iii Committee comprising of representatives from civil engg. Section, Sub Surface group (Development location) / Basin (Exploratory locations) & HSE (Asset / Basin) should prepare scope of work for restoration.

Restoration by Civil Engg. section : (Estimation based on joint inspection report complying regulatory requirement) Committee for JIR shall consist of members from Civil, SST/FB/ST and HSE.	Civil	30 days	35 days
Submission of estimate to LAQ.	I/C Civil	3 days	38 days
Proceedings and recommendations of estimate by in house board comprising of Civil, Forward base/SST/ST, Finance and LAQ. Creation of PR	LAQ/Board I/C Civil	10 days	48 days
Administrative Approval & expenditure sanction under 8.9 of SOP 2014	I/C LAQ I/C HR-ER Head SST/ FB ASM L1	20 days	68 days
Concurrence, Expenditure Sanction and convey the same to I/C Civil	I/C Finance L1	7 days	75 days
Tendering Process a. Normal tendering as per requirement b. Through Rate Contract*	I/c Civil	60 days 90 days	135 days
Execution / restoration work	I/c Civil	90 days	225 days
Intimation to be given to HSE and LAQ after restoration.	I/C Civil	5 days	230 days
Restoration information to State Pollution Control Board and Regional MOEF.	HSE	3 days	233 days
Surrendering of restored land.	LAQ	45 days	278 days

*** In case of tendering in each case, the total execution and tendering time for each site shall be 278 days. In case of long term rate contract, one time activity of finalising the rate contract shall be 90 days and thereafter execution of restoration work for each site shall be 218 days.**

ANNEXURE-VII

OIL AND NATURAL GAS CORPORATION LIMITED
(CORPORATE POLICY GROUP)
TEL BHAVAN: DEHRADUN

No. ONGC/ER/CP/MED/013 Dated: 5th July, 2007

OFFICE ORDER (50/2007)

Sub: **PERIODIC MEDICAL EXAMINATION POLICY.**

Technological advances while making the oil industry competitive, have also multiplied the hazards to the operating personnel in the form of complex process and application of various hazardous chemicals. Manpower in the organization is the most important resource and maintaining their health is vital for productivity and effectiveness. As such, promotion of health of employees in the widest sense has become a high priority, both a goal and a challenge for the organization. With a view to provide a structured programme to look after and promote the health of human resource, the Executive Committee in its 308th meeting held on 16-17th May, 2007 has approved a comprehensive policy on periodic medical examination as detailed hereunder for implementation throughout ONGC:

2.1 Applicability-

Periodic Medical Examination (PME) shall be applicable to:

a. All regular employees;
b. Deputationists;
c. Tenure/term based employees and
d. Casual/Contingent workers

2.2 Periodicity-

2.2.I PME shall be carried out at regular intervals for all eligible employees as tabulated below:

Type of PME	Employees to be covered	Periodicity
General/PME	Employees upto 45 years age	5 years
	Employees in age group of 46 to 55 years.	3 years
	Employees in age group of 56 years & above.	2 years
Specific PME	Employees having hazard based profiles	As indicated in **Annexure-A**
Intermediate PME	On need basis- Upto 10 % of employees examined in a particular year.	Every year

Contd...2/-

2.2.II Specific PME will be conducted in respect of employees working in hazardous locations/jobs as per periodicity laid down in various acts/rules/guidelines, more precisely indicated in **Annexure-A.**

2.2.III Intermediate PME will be carried out in between the general PMEs for those employees who have suffered from major diseases/accidents, or in whose case re-valuation is advocated for various causes

2.2.IV The employees whose PME has been conducted within the last one year, will not be re-examined again in pursuance of these guidelines. In such cases, PME would be carried out whenever it is due.

2.3 Scope-

PME will be conducted in two stages i.e. laboratory tests and clinical examination including interview, as mentioned below:

2.3.I Laboratory tests-

The laboratory tests and other investigations as prescribed in **Annexure-B** shall be carried out either in-house or at empanelled lab/diagnostic center.

2.3.II Clinical examination-

The clinical examination will include the following tests/evaluations:

a. The Physical parameters indicated in **Annexure-C.**
b. Spirometry and Audiometry test.
c. The flexibility tests (P4) for all male and female employees.
d. Physical evaluation for male field personnel.
e. Interview to fill in the Personal and Family History Sheets of Periodic Medical Profile.
f. Psychological Evaluation.
g. Entry of the findings of tests & other investigations in 'Examination Data Sheets' of Periodic Medical Profile and simultaneously in an Access Data Base 'Occupational Health System'.

2.4 Periodic Medical Profile-

A detailed medical profile of eligible employees shall be built-up as per format given in **Annexure-D.**

2.5 Conduct of laboratory tests & other investigations-

2.5.I The laboratory tests and other investigations would be carried out in-house wherever such facilities exist. In case of non-existence of in-house facility,

Contd.....3/-

tests/ investigations would be carried out in lab/diagnostic center specifically empanelled for occupational health investigations

2.5.II In case, certain tests e.g. Spirometry and Audiometry are neither currently carried out in-house nor are done by the private agencies, they will be carried out by the MO(OH) after procuring necessary equipments

2.5.III Physical/ Psychological evaluation, flexibility tests (P4), interview and entry of findings in Periodic Medical Profile and Occupational Health System would be carried out by the MO(OH).

2.6 Procedure-

2.6.I MO (OH) will issue a call letter for PME as per format given in **Annexure-E**, to the eligible employees with endorsement to concerned Incharge, HR/ER and Incharge, HSE. The call letter should be accompanied with the individual reference, to the empanelled lab/diagnostic center for carrying out the tests/investigations. A specimen of reference note to be issued to the lab/diagnostic center is given in **Annexure-F**.

2.6.II The employee appearing for PME shall be treated on duty for maximum two days.

2.6.III The individual will have to report to empanelled lab/diagnostic center within a week from the date of receipt of call.

2.6.IV The individual will collect the finding reports of tests/investigations and will report to MO (OH) for clinical examination with in a week from the date of collection of reports.

2.6.V In case, he/she fails to report in a month's time to the MO(OH) for PME, non-compliance will be intimated to the Incharge, HR/ER for issue of reminder/necessary action.

2.6.VI MO (OH) will interview the individual for psychological evaluation and to provide guidance for filling in the Personal and Family History Sheets of Periodic Medical Profile.

2.6.VII MO (OH) will record the pertinent findings in Periodic Medical Profile and simultaneously in Occupational Health System. He will record these findings in a register also which is required to be maintained in compliance with the provisions of Indian Factories Act.

2.6.VIII MO (OH) will issue form 'O' required under the provision of Mines Act 1952, certifying the fitness of field employees to the concerned Sectional Head and individual. A copy of said document will also be kept in record at Occupational Health Center.

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2.6.IX On expiry of prescribed period, MO (OH) will repeat the above procedure to conduct the PME again.

2.7 Empanelment of laboratories/diagnostic centers-

2.7.I The private laboratories/diagnostic centers which confirm to the standards laid down by any of the following accredited agencies shall be empanelled after following the laid down procedure explained in **Annexure-G-**

a. Department of Clinical Biochemistry (EQAS for Clinical Biochemistry) – CMC Vellore, Tamilnadu – 632 004
b. NABL – National accreditation Board for testing & calibration Laboratory. Department of Science and Technology New Delhi 110 016
c. IAPM – National Quality Programme in Clinical Biochemistry, Department of Pathology, Institute of Medical Sciences B.H.U. Varanasi, UP.

2.7.II In case, labs/diagnostic centers in a city/location do not confirm to the above accredited criteria, a lab/diagnostic center of repute being monitored by MD(Pathology/Radiology) with minimum three years experience, may be empanelled.

2.8 Deployment of Occupational Health Physicians-

2.8.I In order to conduct the PME effectively for all eligible employees at regular intervals, thirteen full time medical doctors preferably having a training in occupational health/public health or occupational medicine will be engaged on contract basis and designated as Medical Officer(Occupational Health). They would be deployed in following manner:

Gp	Location	Co-located work centers	Total requirement of MO(OH)	MO(OH) available	Addl. MO(OH) to be engaged.
1	Mumbai	RO, Assets, Basin, Institutes, Plant and other work centers.	2	2	-
2	Hazira	-	1	1	-
3	IPSEM,Goa	-	1	1	-
4	Channai	RO & Basin	1	-	1
5	Rajamundry		1	-	1
6	Karaikal		1	-	1
7	Baroda	Ro, Basin & W/S	1	1	-
	Cambay	-			

Contd....5/-

Gp	Location	Co-located work centers	Total requirement of MO(OH)	MO(OH) available	Addl. MO(OH) to be engaged.
8	Ahemdabad	Asset, IRS & WSS	1	-	1
9	Ankleshwar	-	1	-	1
10	Mehsana		1	-	1
	Jodhpur				
11	Sibsagar	-			
12	Nazira	-	2	1	1
13	Jorhat	Basin & INBIGS	1	-	1
14	Silchar		1	-	1
15	Agartala		1	-	1
16	Kolkata	RO, Basin,T&S and other work centers	1	-	1
17	Dehradun	Hqrs.,F/Basin and Institutes	1	-	1
18	Delhi	All offices	1	-	1
	Total:		19	6	13

2.8.II The guidelines set out for engagement of doctors on contract vide office order no. ONGC/ER/ CP/MED/18 dated 2nd January, 2007 will be followed for engagement of MO (OH) also.

2.8.III Medical Officer (Occupational Health) shall report as under-

a. Administrative reporting to - Incharge, HSE

b. Functional reporting to - Chief, HSE through Head, Occupational Health

2.9 Record Management-

2.9.I The investigation reports, X-rays and hard copies of Periodic Medical Profile would be properly maintained by the MO (OH) for a period of ten years in pursuance of applicable laws, in a allocated record room. In case of transfer of the employee, his PMP along with investigation reports shall be transferred to the MO (OH) at new place of posting.

2.9.II The PME data would be maintained in Occupational Health System at local level.

2.9.III The findings of PME shall be kept confidential. In case of abnormal finding/ notifiable disease, the same may be confidentially communicated to the Head, Occupation Health for necessary action.

Contd...6/-

3. This office order shall come into force from the date of issue and will supersede all previous instructions on Periodic Medical Examination, which is currently conducted as a measure of health awareness.

5.7.2017

(Amarendra Sahu)
Chief Manager (HR)-Corp. Policy

Distribution:

All concerned through ongcreports.net- copy may be downloaded -hard copies not being circulated.

COMPLIANCE OF CONDITIONS IN ENVIRONMENTAL CLEARANCE
(COMPLIANCE REPORT)

Environmental Clearance No. J-11011/102/2012-IA II(I), dated 22.08.2013

Well No.: PDCJ

Sl.No.	Conditions	Compliance status as on 30.06.2019
i	this EC is only for Exploratory Drilling. In case Development drilling is to be done in future prior clearance must be obtained from the Ministry.	**Complied** This EC and conditions prescribed therein are only for drilling exploratory wells whereas for drilling development wells separate EC will be taken.
ii	As proposed, no drilling shall be carried out within 10 km distance from that Wild life sanctuary	**Complied.** As proposed the exploratory well PDCJ was not drilled in the environmental sensitive zone (ESZ) of THOL wild life sanctuary as has been notified vide SO 3202 (E), dt: 19.10.2013. The extent of eco-sensitive zone has been modified by MoEFCC vide notification dt: 09.02.2015 and it now ranges from 0.308 km to 2.244 km from the boundary of the sanctuary.
iii	Gas produced during testing shall be flared with appropriate flaring booms the flare system shall be designed as per good oil field practices and Oil Industry Safety Directorate (OISD) guidelines. The stack height shall be provided as per the regulatory requirement and emissions from stacks will meet the MoEF/ CPCB guidelines	**Complied.** If any quantity of gas is produced during testing there is a provision of flaring in place which is in accordance to OISD guidelines and as prescribed by CPCB vide its letter dt: 27.04.2016. All the quantity of gas come across testing is flared through elevated flare equipped with separator and knock out drum. No ground flaring is resorted to.
iv	Ambient air quality should be monitored near the closest human settlements as per the National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No.826(E) dated 16th November,2009 for PM10, PM2.5, SO_2, NO_x, CO, methane & Non-methane HC etc.	**Complied** Ambient air quality was monitored through 3rd party for PM10, PM2.5, SO_2, NO_x, CO, methane & Non-methane HC, within and upto the premises of drill site. It is evident from the monitoring reports placed as Annexure - I that the concentration of all parameters are within prescribed limits.
v	Mercury should also be analyzed in air, water and drill cuttings twice during drilling period.	**Complied.** Mercury was analyzed in waste water & drill cuttings during drilling period. Report placed as Annexure – II
vi	Approach road should be made pucca to minimize generation of suspended dust	**Complied.** Approach road to drill site are made of metals to minimize generation of suspended dust during transportation of rig equipment, etc. In case of this well approach road of dimension 1125m x 5.0 m was constructed
vii	The company should make the arrangement for control of noise from the drilling activity Acoustic enclosure should be provided to DG Sets and proper stake height should be provided as per CPCB guidelines.	**Complied.** Acoustic enclosure have been provided to DG sets to reduce noise within permissible limits (Noise level monitoring divulge the efficiency of the acoustic enclosures when the noise levels were monitored within the perimeter of the drill site. However, the noise levels are slightly higher near the engine house and mud pump area and personnel working in these areas are always using ear muff/plug, pl refer reports placed as Annexure-III). The stack height of the rig engines (engine capacity 380 KVA each) are as per CPCB guidelines on stack height.

viii	total water requirement should not exceed 50 M3/day and prior permission should be obtained from the competent authority.	**Complied.** During the drilling activity the water consumption was approx. 35 m3 per day on an average.
ix	The Company should construct the garland drain all around the drilling site to prevent run off any oil containing waste it to the nearby water bodies. Separate drainage system should be created for oil contaminated and non-oil contaminated. Effluent should be properly treated and treated waste water should confirmed to CPCB standards.	The garland drains are not constructed to prevent run off any oil contaminating waste as all the vulnerable processes like diesel storage tank, POL shed have their dedicated containment whereas Drains are constructed throughout the drill site near mud pumps, cellar pit, mud tanks which drain waste water in HDPE lined waste pit. No garland drains are constructed around drill sites as these are not required since the waste pits have enough volume to accumulate waste water and prevent any run off. The drilled cuttings and other wastes are collected in HDPE lined waste pits and solar dried. It is notable that Gujarat is rain deficient area and chance of run off from drill site area is very remote. As the drill site effluent is a soft effluent, the suspended particles like bentonite clay are settled leaving clear supernatant water which at times is recycled for washing purpose. Please refer to Annexure-II. In view of above the same may be considered as **Complied**
x	Drilling waste water including drill cuttings wash water shall be collected in disposal pit lined with HDPE lining evaporated or treated and shall comply with the notified standards for on-shore disposal. The membership of common TSDF shall be obtained for the disposal of drill cuttings and hazardous waste. Otherwise secured land fill shall be created at the site as per design approved by the CPCB and obtain Authorization from the SPCB. Copy of authorization or membership od TSDF should be submitted to Ministry's Regional Office at Bhopal.	**Complied.** Drilling waste water including drill cuttings wash water is collected in disposal pit lined with HDPE lining and solar dried. Drill cuttings from water based mud have been removed from the category of hazardous waste [Schedule I - rule 3 (1) (17) (i) of MOEFCC notification dt: 14.04.2016]. ONGC Cambay is member of TSDF of M/S Recycling Solutions Pvt. Ltd. - same as enclosed with report of wef SSAH as Annexure - IV.
xi	Good sanitation facility should be provided at the drilling sites. Domestic sewage should be disposed of through septic tank/soft pit.	**Complied.** Domestic sewage is disposed through adequate septic tanks and soak pits
xii	Oil spillage prevention scheme should be prepared. In case of oil spillage/contamination, action plan should be prepared to clean the site by adopting proven technology. The recyclable waste (oily sludge) and spent oil should be disposed of to the authorized recycler.	**Complied.** Oil spillage prevention plan like containments of diesel storage tank, POL shed and testing tank (during production testing) and drainage leading to waste pit are in place. However, in case of oil spill and contamination of soil thereof, ONGC is equipped with the technology of bio remediation to address such eventualities. It is notable that ONGC has a step down company M/S ONGC TERI BIO REMEDIATION LIMITED (OTBL) which has developed a consortium of bacteria capable of digesting entire range of hydrocarbon. Recyclable hazardous waste like Spent oil, POL barrels etc. are recycled centrally through authorized re-cyclers

xiii	The company shall comply with the guidelines for disposal of solid waste, drill cutting and drilling fluids for onshore drilling issued vide GSR 546 (E) dated 30th August, 2005	**Complied.** Solid waste like drill cuttings and left over drilling fluids are collected in HDPE lined waste pits which is eventually back filled and covered with local soil after the drilling operations are over. Other solid wastes like oil contaminated hand gloves, cotton waste, filters, chemical sack, etc are disposed at ISDF site
xiv	The company should take necessary measures to prevent fire hazards, containing oil spill and soil remediation as needed. Possibility of using ground flare should be explored. At the place of ground flaring, the overhead flaring stack with knock out drums should be installed to minimize gaseous emissions during operation	**Complied.** Each drilling rig in ONGC has fixed and lighting system and portable extinguishers in accordance to OISD 189. All personnel posted at Drill site are trained in firefighting. Hot jobs are controlled through a permit system i.e. 'Hot Work Permit' system. As mentioned above in point 12, in case of oil spill and contamination of soil thereof, ONGC is equipped with the technology of bio remediation to address such eventualities. It is notable that ONGC has a step down company M/S ONGC TERI B O REMEDIATION (MUMBAI) (OTBL) which has developed a consortium of bacteria capable of digesting entire range of hydrocarbon. All the quantity of gas come across testing is flared through a elevated flare equipped with separator and knock out drum. No ground flaring is resorted to.
xv	The company shall develop a contingency plan for H2S release including all necessary aspects from evacuation to resumption of normal operations. The workers should be provided with personal H2S detectors in locations of high risk of exposure along with self-containing breathing apparatus.	**Complied.** Emergency response plans for H2S release is available. H2S detector are available at drilling rigs. However, it is pertinent to mention that H2S is usually not encountered during drilling operations in oil fields of Vadodara district.
xvi	On completion of drilling, the company have to plug the drill wells safely and obtain certificate from the environment safety angle from the concerned authority.	**Complied.** On completion of drilling the well is equipped with a Christmas tree which safely regulates the flow of oil& gas. However, if any well is abandoned, it is plugged with a cement column as prescribed in OMR 2017 and the same is communicated to DGMS
xvii	Blow Out Preventer (BOP) system should be installed to prevent well blowouts during drilling operations. BOP measures during should focus on maintaining well bore hydrostatic pressure by proper pre-well planning and drilling fluid logging etc	**Complied.** Appropriate Blow Out Preventer (BOP) systems having a set of Annular and RAM BOPs is installed to prevent well blowouts during drilling operations. Function test of BOPs are carried out frequently and care is taken to maintain proper hydrostatic pressure in the well bore during drilling, logging and other well operations by maintaining mud weight.
xviii	Emergency response plan(ERP) should be based on the guidelines prepared by OISD, DGMS and Government of India	**Complied.** ONGC has Site Specific Emergency Plan (ERP) and Contingency Plans and Disaster management Plan (DMP) based on relevant and realistic emergency scenarios. ERP and contingency plan are duly approved by DGMS whereas offsite DMP is approved by local district authorities (some of enclosed with report of well SSAH as Annexure - V)
xix	The company shall take measures after completion of drilling process by well plugging and secured enclosures, decommissioning of rig upon abandonment of the well and drilling site shall be restored to original condition.	**Complied.** ONGC has formulated a well-defined and possible abandonment and restoration procedure which is being followed in the event of decision taken to abandon the well. The procedure is placed as same as enclosed with report of well SSAH as Annexure - VI

	the event that no economic quantity of hydrocarbon is found a full abandonment plan shall be implemented for the drilling site in accordance with the applicable Indian Petroleum Regulations	
xx	Abandoned well inventory and remediation plan shall be submitted with in six month from the date of issue of letter.	**Complied.** Remediation plan is already addressed at point no xi above. This well is to be tested.
xxi	Occupational health surveillance of the workers shall be carried out as per the prevailing Acts and Rules	**Complied.** PME of all employees is carried out as per company policy (some of is enclosed with report of well SSA – as Annexure -VII)
xxii	In case commercial viability of the project is established, the company shall prepare a detailed plan for development of oil and gas fields and obtain fresh environmental clearance from the Ministry	**Complied.** In case of commercial viability of oil/gas, fresh EC is obtained for the entire block.
xxiii	Restoration of the project site should be carried out satisfactorily and report should be sent to Ministry's Regional Office at Bhopal.	**Complied.** This well is oil bearing. In case the well is abandoned, restoration of land will be taken up and the report shall be sent to Ministry's regional office Bhopal after the job is over.
xxiv	Oil content in the drill cuttings should be monitored by some Authorized agency and report should be sent to the Ministry's Regional Office at Bhopal.	**Complied.** Cuttings are analyzed for oil content through M/S Eco system management pvt. Ltd., which is a reputed laboratory in the area. (Annexure-III)
xxv	Under Enterprise Social Commitment (ESC), sufficient budgetary provision should be made for health improvement, education, water and electricity supply etc. in and around the project	**Complied.** 2% of average net profit of ONGC is earmarked for CSR(Corporate Social Responsibility) projects which includes components of health, education, water, solar lights, ecological development in an around operational area, as directed by GOI
xxvi	An audit should be done to ensure that the Environment Management Plan is implemented in totality and report should be submitted to Ministry's Regional Office	**Complied.** An annual environment audit is carried out through schedule auditors and the reports are submitted to Gujarat Pollution control Board, apart from its annual internal audit and surveillance audit of Environment Management system is carried out in accordance to the protocol of ISO 14001. It is notable that all drilling rigs are maintaining 3rd party certified EMS based on ISO 14001 (Annexure - VIII)
xxvii	A social audit shall be carried out for the whole operational area with the help of reputed institute like Madras Institute of Social Science etc	**Complied.** CSR schemes for social areas around the work centers of ONGC are usually rendered through reputed 3rd parties which keep an auditing on the progress of the CSR project.
xxviii	All personnel including those of contractors should be trained and made fully aware of the hazards, risks and controls in place.	**Complied.** MVT (Mines Vocational Training) are imparted to all contractual workers before deployment at site. MVT trainings are specially designed to develop competence and skill of employees including contractual employees w r t risk management
xxix	Company shall have own Environment Management Cell having qualified persons with proper background.	**Complied.** EM Cell is at Corporate HSE of ONGC, New Delhi. HSE set up at unit level are also having qualified safety & environment officers.
xxx	Company should prepare operating manual in respect of all activities. It should cover all safety & environment related issues and system. Measures to be taken for protection. One set of environment manual should be made available at the drilling site/project site. Awareness should	**Complied.** Standard Operating Procedures for drilling operations covering safety and environmental aspects of operations and management thereof, have been given to supervisors and concerned persons at all drilling rigs. Safe Work Practices is also made available at all rigs. Regular safety and environment training is being

	be created at each level of the management. All the schedules and results of environment monitoring should be available at the project site office.	provided to the employees by our various in- house training institutes like IPSHEM Goa, IDT and ONGC Academy, Dehradun and RTI Vadodara etc. Ambient/stack, noise level and potable water report is available at rigs
B	**GENERAL CONDITIONS**	
i	The project authorities must strictly adhere to the stipulations made by the Gujarat State Pollution Control Board (GPCB) State Government and any other statutory authority	**Complied**. Consent to Establish (CTE) for exploratory drilling is taken from Gujarat Pollution Control Board prior to commencement of drilling. Conditions stipulated in CTE are complied to. Apart from it all the oil and gas processing installations wherein the oil and gas produced during exploratory and development drilling is processed are operating under consolidated consent and authorization (CCA) from GPCB. Monthly and annual returns are filed online on XGN site as per the conditions stipulated in CCA
ii	No further expansion or modification in the project shall be carried out without prior approval of the Ministry of Environment & Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.	**Complied.** So far no expansion or modification in the project has been carried out. In future if any expansion and modification happens the stipulated condition shall be complied.
iii	The project authorities must strictly comply with the rules and regulations under Manufacture Storage and import of Hazardous Chemicals Rules, 2000 as amended subsequently. Prior approvals from Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. must be obtained, wherever applicable.	**Complied.** During drilling water base mud is used and no hazardous /toxic chemicals are used. All the mud systems got tested through National Institute of Oceanography (NIO), Goa and found non-hazardous and non-toxic. Hence this point is not applicable. However as precautionary measure MSDS of chemicals are displayed at site. Permission for storage, transportation and use of explosives for perforation of well are taken from controller of explosive
iv	The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).	**Complied.** The overall noise levels in and around the rig area is kept well within the standards by keeping provision of Acoustic enclosures and regular condition monitoring of equipment. The ambient noise levels are monitored during day and night time (Recent monitoring reports are annexed) which reveals that the ambient noise level is with in prescribed standards.
v	A separate Environmental Management Cell equipped with full-fledged laboratory facilities must be set up to carry out the environmental management and monitoring functions.	**Complied**. Environment Management cell is functional under Head HSE which is responsible for environment management, monitoring and compliance to regulatory bodies.
vi	A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad /Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions/representations, if any, were	**Complied.** The communication of the environmental clearance has been made to all the relevant stake holders by way of publishing the same in the leading newspapers. The EC is also posted on the Web Site of ONGC as well as communicated to concerned panchayat and local authorities

	received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent.	
vii	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their web site and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MOEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; PM10, SO2, NOx, HC (Methane) & Non Methane VOCs (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	**Complied.** The compliance of the stipulated environment clearance conditions including results of monitored data are uploaded on our waste [link http://www.ongcindia.com/wps/wcm/connect/ongcindia/Home/Archives/HSF/Environmental Clearance/] and updated periodically. It is sent to the Regional Office of the MOEF. The criteria pollutant levels viz. PM10, PM2.5, SO2, NOx, CO, methane & Non-methane HC, indicated for the projects are monitored and displayed at the main gate of the rig.
viii	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environment conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEF, the respective Zonal Office of CPCB and CPCB. The Regional Office of this Ministry/CPCB/SPCB shall monitor the stipulated conditions. Environment Clearance and six monthly compliance status reports shall be posted on the website of the company.	**Complied.** The compliance of the stipulated environment clearance conditions, including results of monitored data are uploaded on our website [link http://www.ongcindia.com/wps/wcm/connect/ongcindia/Home/Archives/HSF/Environmental_Clearance/] and updated periodically. It is sent to the Regional Office of the MOEF. The criteria pollutant levels viz. PM10, PM2.5, SO2, NOx, CO, methane & Non-methane HC, indicated for the projects are monitored and displayed at the main gate of the rig.
ix	The environment statement for each financial year ending 31st March in Form V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environment conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail.	**Complied.** After completion of exploratory drilling and if any oil and gas produced through it is anticipated to be put to production it is routed for processing and thus becomes part of that installation. As the installations are operating under CCA from SPCB and accordingly environmental statement as per prescribed form-V is filed annually. If no oil is found the well is abandoned and land restored as per company policy.
x	The Project Proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen on Website of the Ministry of Environment and Forests at http://www.envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, in at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of	**Complied.** Information regarding grant EC for the project was passed on to all stake holders and the same was advertised in two newspapers.

	the locality concerned and a copy of the same shall be forwarded to the Regional offices.	
xi	The Project Authorities must inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	Complied. The details prescribed in condition regarding commencement of exploratory drilling are furnished in six monthly compliance to Regional Office MOEF,CC Bhopal.

ANNEXURE-I

99 GREEN
Head Office & Lab: [illegible] National Highway No. 8, Opp APMC Market Gate-1, [illegible], District Ahmedabad 387 [illegible], Gujarat, INDIA
+91 [illegible] 72001 | info@gogreenmechanisms.com | www.gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number : GGMPL/[illegible]/01
Reporting Date : 08.01.2019

OIL AND NATURAL GAS CORPORATION

Well - [illegible]
Drilling Services, ONGC Cambay, Kalsari Khambhat Anand 388632

Kind Attention : Mr. Sudarshan Kumar
Contact No. : [illegible]
Mail ID : [illegible]

SAMPLE DETAILS

Lab ID	: [illegible]	Sampling Start Date	: 05.01.2019
Sample Drawn By	: [illegible]	Sampling End Date	: 06.01.2019
Sample Type	: Ambient Air	Sample Receipt Date	: 06.01.2019
Sample Description	: [illegible] Gate	Analysis Start-End Date	: 07.01.2019 to 07.01.2019
Env. Cond. (Sampling)	: Ambient [illegible]	Total Sampling hours	: 24
Env. Cond. (Sample Receipt)	: Satisfactory	Env. Cond. (Testing)	: 25 [illegible]

Sr. No.	Parameters	Results	Unit	Test Method	NAAQ Standards
1	Particulate Matter (PM_{10})	79.6	µg/m³	IS 5182 (Pt 23) : RA 2012	100
2	Particulate Matter ($PM_{2.5}$)	35.4	µg/m³	GGMPL/SOP/AA/01	60
3	Sulphur Dioxide (SO_2)	21.3	µg/m³	IS 5182 (Pt 02) : RA 2012	80
4	Nitrogen Dioxide (NO_2)	15.7	µg/m³	IS 5182 (Pt 06) : 2006	80
5	Carbon Monoxide	BDL(DL=1)	mg/m3	IS 5182 (Pt 10) : RA 2003	2
6	Hydrocarbon (HC)*	5.2	ppmv	IS 5182 (Pt 31) : 2003	25

* Indicates these parameters are not covered under NABL Scope
NS = Not Specified, BDL = Below Detection Limit, DL = Detection Limit

Analyzed By
Arpit Tiwari, Lab Chemist

Authorized Signatory
[illegible], Sr. Scientist

Terms & Conditions
[illegible]

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CERTIFICATE OF ANALYSIS

Report Number : GGMPL/[illegible]

Reporting Date : [illegible] 01 2019

OIL AND NATURAL GAS CORPORATION

[illegible]

Kind Attention : [illegible] Sudarshan Kumar

Contact No. : [illegible]

Mail ID : [illegible]

SAMPLE DETAILS

Lab ID	: [illegible]	Sampling Start Date	: [illegible] 01.2019
Sample Drawn By	: [illegible]	Sampling End Date	: [illegible] 01.2019
Sample Type	: Ambient Air	Sample Receipt Date	: [illegible] 01.2019
Sample Description	: [illegible]	Analysis Start/End Date	: [illegible] 01.2019 to [illegible] 01.2019
Env. Cond. -Sampling	: Ambient Temperature	Total Sampling hours	: 24
Env. Cond. -Sample Receipt	: Satisfactory	Env. Cond. - Testing	: [illegible]

Sr. No.	Parameters	Results	Unit	Test Method	NAAQ Standards
1	Particulate Matter (PM_{10})	40.2	µg/m³	IS 5182 (Pt 23): RA 2012	100
2	Particulate Matter ($PM_{2.5}$)	29.7	µg/m³	GGMPL/SOP/AAQ/01	60
3	Sulphur Dioxide (SO_2)	15.5	µg/m³	IS 5182 (Pt 02): RA 2012	80
4	Nitrogen Dioxide (NO_2)	20.1	µg/m³	IS 5182 (Pt 06) : 2006	80
5	Carbon Monoxide	BQL(QL=1)	mg/m³	IS 5182 (Pt 10): RA 2003	2
6	Hydrocarbon (HC)*	6.3	ppm	IS 5182 (Pt 21): 2004	35

[illegible]

[illegible]

Analysed By

[illegible], Lab Chemist

Authorized Signatory

[illegible], Sr. Scientist

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[illegible]

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CERTIFICATE OF ANALYSIS

Report Number : GGMPL/1395/02

Reporting Date : 08.01.2019

OIL AND NATURAL GAS CORPORATION

Well : PDC

Drilling Services, ONGC Complex, Cambay, Khambhat, Anand-388630

Kind Attention : Mr. Sachidanand Kumar
Contact No : 9426013670
Mail ID :

SAMPLE DETAILS

Lab ID	: Lab 1395/02	Sampling Start Date	: 05.01.2019
Sample Drawn By	: Pravin Patel	Sampling End Date	: 05.01.2019
Sample Type	: Ambient Air	Sample Receipt Date	: 06.01.2019
Sample Description	: Nr. PIC Office	Analysis Start-End Date	: 07.01.2019 to 08.01.2019
Env. Cond.-Sampling	: Ambient Temperature	Total Sampling Hours	: 24
Env. Cond. - Sample Receipt	: Satisfactory	Env. Cond. - Testing	: 25±5°C

Sr. No	Parameters	Results	Unit	Test Method	NAAQ Standards
1	Particulate Matter (PM_{10})	26.4	µg/m³	IS 5182 (P: 23): RA 2012	100
2	Particulate Matter ($PM_{2.5}$)	11.0	µg/m³	GGMPL/SOP/AAQ/	60
3	Sulphur Dioxide (SO_2)	24.5	µg/m³	IS 5182 (P: 02): RA 2012	80
4	Nitrogen Dioxide (NO_2)	19.8	µg/m³	IS 5182 (P: 06): 2006	80
5	Carbon Monoxide	1.2	mg/m3	IS 5182 (P: 10): RA 2003	2
6	Hydrocarbon (HC)*	2.1	ppm	IS 5182 (P: 21): 2001	25

* Indicates these parameters are not covered under NABL Scope
NA: Not Specified, BQL: Below Quantification Limit, QL: Quantification Limit

Analyzed By
Ankit Tiwari, Lab Chemist

Authorized Signatory
Priyanka Rawat, Sr. Scientist

Terms & Conditions
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Report can not be used as an evidence ...
Samples will be retained ... only for 15 days from the date of ...
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Reporting Date : 08.01.2019

Report Number : GGMPL/139504

OIL AND NATURAL GAS CORPORATION

Drilling Services, ONGC Cambay, [illegible]

Kind Attention : Mr. [illegible] Kumar
Contact No : [illegible]
Mail ID : [illegible]@gmail.com

SAMPLE DETAILS

Lab ID	: [illegible]139504	Sampling Date	: 05.01.2019
Sample Drawn By	: [illegible]	Sample Receipt Date	: 06.01.2019
Sample Type	: Stack Emission	Analysis Start/End Date	: 05.01.2019 to 08.01.2019
Stack Height & Dia (m)	: 2 and 0.2	Stack Temperature (°C)	: 68
Stack Attached To	: Eng No.01 Pump [illegible]	Stack Gas Velocity (m/sec)	: 4.10
Fuel Used	: Diesel	Volume of Air Sampled in Ltrs.	: 0.556

Sr. No	Parameters	Results	Unit	Test Method	CPCB Norms
1	Particulate Matter (PM)	68.1	mg/Nm³	IS 11255 (Pt 1): RA 2009	150
2	Sulphur Dioxide (SO_2)	BDL(QL=3)	ppm	IS 11255 (Pt 2): RA 2009	100
3	Oxides of Nitrogen(NO_x)	35.9	ppm	IS 11255 (Pt 7): RA 2009	50
4	Carbon Monoxide (CO)	39.4	ppm	GGMPL/SOP/STACK/07	[illegible]
5	Hydrocarbon	5.1	mg/Nm3	Gas Chromatography	[illegible]

[illegible]

Analyzed By
[illegible], Lab Chemist

Authorized Signatory
[illegible], Sr. Scientist

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CERTIFICATE OF ANALYSIS

Report Number : GGMPL/1395/05

Reporting Date : [illegible] 2019

OIL AND NATURAL GAS CORPORATION

GWI - PSCJ
Drilling Services, ONGC Cambay, Kansari Kapadvanj, Anand 388630

Kind Attention : Mr. Sudershan Kumar
Contact No : [illegible]
Email ID : [illegible]

SAMPLE DETAILS

Lab ID	: Lab/1395/05	Sampling Date	: 05.01.2019
Sample Drawn By	: Denang Patel	Sample Receipt Date	: 06.01.2019
Sample Type	: Stack Emission	Analysis Start-End Date	: 07.01.2019 to 09.01.2019
Stack Height & Dia (M)	: 2 and 0.2	Stack Temperature (°C)	: 139
Stack Attached To	: Eng No 04 Pump 2	Stack Gas Velocity (m/sec)	: 7.50
Fuel Used	: Diesel	Volume of Air Sampled in Nm³	: 0.672

Sr. No.	Parameters	Results	Unit	Test Method	GPCB Norms
1	Particulate Matter (PM)	125.8	mg/Nm³	IS 11255 (Pt 1): RA 2009	150
2	Sulphur Dioxide (SO_2)	11.4	ppm	IS 11255 (Pt 2): RA 2009	100
3	Oxides of Nitrogen (NO_x)	39.6	ppm	IS 11255 (Pt 7): RA 2009	50
4	Carbon Monoxide (CO)	55.0	ppm	GGMPL/SOP/STACK/07	
5	Hydrocarbon	19.2	mg/Nm³	Gas Chromatography	38

[illegible]

Analysed By
Ajay Tiwari , Lab Chemist

Authorized Signatory
Pradeep Rawal, Sr. Scientist

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CERTIFICATE OF ANALYSIS

Report Number : GGMPL/1395/06

Reporting Date : 09.01.2019

OIL AND NATURAL GAS CORPORATION

Well - PDCI
Drilling Services ONGC Campus, Kalol, Khambhat, Gujarat-388620

Kind Attention : Dr. Sudarshan Kumar
Contact No : [illegible]
Mail ID : [illegible]@gmail.com

SAMPLE DETAILS

Lab ID	: Lab/1395/06	Sampling Date	: 05.01.2019
Sample Drawn By	: Unilab Field	Sample Receipt Date	: 06.01.2019
Sample Type	: Stack Emission	Analysis Start End Date	: 07.01.2019 to 09.01.2019
Stack Height & Dia (m)	: 3 and 0.2	Stack Temperature (°C)	: 113
Stack Attached To	: Carrier Engine-01	Stack Gas Velocity (m/sec)	: 5.01
Fuel Used	: Diesel	Volume of Air Sampled in Nm³	: 0.555

Sr. No	Parameters	Results	Unit	Test Method	GPCB Norms
1	Particulate Matter (PM)	134.3	mg/Nm³	IS 11255 (Pt 1): RA 2009	150
2	Sulphur Dioxide (SO_2)	BQL(QL=5)	ppm	IS 11255 (Pt 2): RA 2009	100
3	Oxides of Nitrogen(NO_x)	50.2	ppm	IS 11255 (Pt 7): RA 2009	50
4	Carbon Monoxide (CO)	51.0	ppm	GGMPL/SOP/STACK/07	[illegible]
5	Hydrocarbon*	12.9	mg/Nm3	Gas Chromatography	24

* Indicates these parameters are not covered under NABL Scope
NS - Not Specified, BQL - Below Quantification Limit, QL - Quantification Limit

Analysed By
Arpit Tiwari, Lab Chemist

Authorized Signatory
Prashant Rawal, Sr. Scientist

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Report Number : GGHPL/1395/07 | Reporting Date : 09.01.2019

OIL AND NATURAL GAS CORPORATION

Well - PDCJ
Drilling Services,ONGC Cambay, Kansari Khambhat,Anand-388620

Kind Attention : Mr. Sudarshan Kumar
Contact No : [illegible]
Email ID : [illegible]@gmail.com

SAMPLE DETAILS

Lab ID	: Lab/1395/07	Sampling Date	: 05.01.2019
Sample Drawn By	: Umang Patel	Sample Receipt Date	: 06.01.2019
Sample Type	: Stack Emission	Analysis Start-End Date	: 07.01.2019 to 08.01.2019
Stack Height & Dia (m)	: 2.4m 0.2	Stack Temperature (°C)	: 176
Stack Attached To	: Air Compressor [illegible]	Stack Gas Velocity (m/sec)	: 7.7
Fuel Used	: Diesel	Volume of Air Sampled in Std.	: 0.684

Sr. No.	Parameters	Results	Unit	Test Method	GPCB Norms
1	Particulate Matter (PM)	87.4	mg/Nm³	IS 11255 (Pt 1): RA 2009	150
2	Sulphur Dioxide (SO₂)	BQL(QL=5)	ppm	IS 11255 (Pt 2): RA 2009	100
3	Oxides of Nitrogen(NOₓ)	9.2	ppm	IS 11255 (Pt 7): RA 2009	50
4	Carbon Monoxide (CO)	50.0	ppm	GGMPL/SOP/STACK/02	
5	Hydrocarbons	5.3	mg/Nm3	Gas Chromatography	34

* Indicates these parameters are not covered under NABL Scope
BSP: Not Specified, BQL: Below Quantification Limit, QL: Quantification Limit

Analysed By
Anuj Tiwari, Lab Chemist

Authorised Signatory
Prakruti Rawal, Sr. Scientist

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CERTIFICATE OF ANALYSIS

Report Number : GGMPL/19/05/08 | Reporting Date : 22.01.2019

OIL AND NATURAL GAS CORPORATION

[illegible]
Drilling Services ONGC Campus, [illegible]

Kind Attention : Mr. [illegible]
Contact No. : [illegible]
Mail ID : [illegible]@gmail.com

SAMPLE DETAILS

Lab ID	: [illegible]	Sampling Date	: 05.01.2019
Sample Drawn By	: [illegible]	Sample Received Date	: 07.01.2019
Sample Type	: Stack Emission	Analysis Start-End Date	: 07.01.2019 to [illegible].01.2019
Stack Height & Dia (m)	: 7 and 0.2	Stack Temperature (°C)	: 180
Stack Attached To	: DG Set - [illegible] 500 KVA	Stack Gas Velocity (m/sec)	: [illegible]
Fuel Used	: Diesel	Volume of Air Sampled (Nm³)	: [illegible]

Sr. No.	Parameters	Results	Unit	Test Method	GPCB Norms
1	Particulate Matter (PM)	[illegible]	mg/Nm^3	IS 11255 (Pt 1), RA 2009	150
2	Sulphur Dioxide (SO_2)	BQL (QL=5)	ppm	IS 11255 (Pt 2), RA 2009	100
3	Oxides of Nitrogen (NO_x)	42.0	ppm	IS 11255 (Pt 7), RA 2009	50
4	Carbon Monoxide (CO)	45.6	ppm	GGMPL/SOP/STACK/02	-
5	Hydrocarbon	[illegible]	mg/Nm3	Gas Chromatography	[illegible]

[illegible]
[illegible]

Analysed By
[illegible], Lab Chemist

Authorised Signatory
[illegible], Sr. Scientist

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CERTIFICATE OF ANALYSIS

Reporting Date: 09.01.2019

Report Number: GGMPL 1395-09

OIL AND NATURAL GAS CORPORATION

Well - [illegible]
Drilling Services, ONGC Cambay, Kansari Khambhat, Anand-388630

Kind Attention: Mr. Sudarshan Kumar
Contact No.: [illegible]
Mail ID: [illegible]

SAMPLE DETAILS

Lab ID	: Lab/1395-09	Sampling Date	: 05.01.2019
Sample Drawn By	: [illegible]	Sample Received Date	: 06.01.2019
Sample Type	: Stack Emission	Analysis Start-End Date	: 07.01.2019 to 09.01.2019
Stack Height & Dia (m)	: 2 m & 0.2	Stack Temperature (°C)	: 90
Stack Attached To	: Eng No - 02 ([illegible])	Stack Gas Velocity (m/sec)	: 6.20
Fuel Used	: Diesel	Volume of Air Sampled in Nm³	: 0.418

Sr. No	Parameters	Results	Unit	Test Method	GPCB Norms
1	Particulate Matter (PM)	25.0	mg/Nm³	IS 11255 (Pt 1): RA 2009	150
2	Sulphur Dioxide (SO_2)	BQL(QL=5)	ppm	IS 11255 (Pt 2): RA 2009	100
3	Oxides of Nitrogen (NO_x)	28.4	ppm	IS 11255 (Pt 7): RA 2009	50
4	Carbon Monoxide (CO)	60.0	ppm	GGMPL/SOP/SEMCO/02	
5	Hydrocarbon	7.3	mg/Nm³	Gas Chromatography	25

* Indicates these parameters are not covered under NABL Scope
NS – Not Specified, BQL – Below Quantification Limit, QL – Quantification Limit

Analyzed By
[illegible], Lab Chemist

Authorized Signatory
[illegible], Sr. Scientist

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ANNEXURE -II

TEST REPORT

EFFLUENT SAMPLE ANALYSIS REPORT

TEST REPORT NO: ERM/QE/5.10/02 A/EFFLUENT/ONGC-Cambay/Rev.0-01/01-2019

Name of Industry	Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat. PDCJ, Padra
Sample Description	: Drill Cutting Sample [Semi Solid]
Sampling Location	: PDCJ, Padra
Mode of sampling	: Grab
Sample Collected on	: 16/01/2019
Sample Received on	: 17/01/2019
Sample Analyzed & Completion	: 17/01/2019 to 28/01/2019
Sample ID No.	: ERM/2019/01/173
Quantity/No. of Sample	: 2 L in Plastic carboys for each location. /1 Nos.
Protocol (Purpose)	: As per work order
Packing/ Seal	: Packed
Sample Collected By	: Mr. Krishna Patel

Sr. No.	Parameters	Unit	Results	Test Method
1.	pH at 25° C	pH Unit	7.42	IS 3025 (Part 11):1983(Reaffirmed 2017)
2	Total Dissolved Solid (TDS) at 180°C	mg/100gm	418	IS 3025 (Part 16):1984(Reaffirmed 2017)
3.	Chloride	mg/100gm	18.4	IS 3025 (Part 32).1988 (Reaffirmed 2014) Argentometric Method
4.	Sulphide	mg/100gm	10.2	IS 3025 (Part 29)-1986
5.	Chemical Oxygen Demand (COD)	mg/100gm	387	APHA 23rd Edition- 2017,Part - 5000 Section:5220-B (Open Reflux Method)
6.	Biochemical Oxygen Demand(BOD) 3 days at 27° C	mg/100gm	139	IS 3025 (Part 44):1993 (Reaffirmed 2014)
7.	Sulphate	mg/100gm	0.37	APHA 23rdEd. - 2017, Part-4000 Section : 4500-E SO4-2(Turbidity Method)
8.	Fluoride	mg/100gm	97	APHA 23nd Ed. - 2017, Part 4000 Section: 4500-F-D
9.	Total Chromium	mg/100gm	0.015	IS 3025 (Part 52)2003 (Reaffirmed2014)(Diphenylcarbazide method)
10.	Hexavalent Chromium	mg/100gm	<0.03	IS 3025(Part 52):2003(Reaffirmed 2014) Diphenylcarbazide method
11.	Oil & Grease	mg/100gm	0.12	IS 3025 (Part 39) – 1991(Reaffirmed 2014) (Partition Gravimetric Method)
12.	Phenolic Compounds	mg/100gm	7.1	IS 3025 (Part 43):1992 (Reaffirmed 2014) (4- Aminoantipyrine method without Chloroform Extraction)

P.T.O

Name of Industry: **Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat.**
PDCJ, Padra
Sample ID: EAM/2019/01/173

13.	Cyanide	mg/100gm	0.04	APHA, 23nd Edition, 2017, 4500 CN E
14.	% Sodium	%	34.1	IS 3025 (Part 45):1993 (Reaffirmed 2014) Flame Photometric Method
15	Copper	mg/100gm	0.10	AAS Method (Direct)IS 3025 (Part 42):1992(Reaffirmed 2014)
16.	Nickel	mg/100gm	4.31	AAS method (Direct) IS 3025 (Part 54) : 2003 (Reaffirmed 2014)
17.	Zinc	mg/100gm	0.06	IS 3025 (Part 49) : 1994 (Reaffirmed 2014) AAS method (Direct)
18.	Cadmium	mg/100gm	<0.01	APHA 23nd Ed. - 2017, Part 4000 Section: 4500-F-D
19.	Mercury	mg/100gm	0.04	APHA 23rd Edition - 2017, Part -3000 Section : 3500 Hg (AAS)
20.	lead	mg/100gm	1.01	IS 3025 (Part 47) : 1994 (Reaffirmed 2014)

Remark: (1) Results expressed as '<' denotes the detection limit of testing. These results are below detection limit (BDL).
(2) Results are expressed in Dry weight/weight basis.

Note: (1) These results relate to the sample tested only.
(2) The report shall not be reproduced except in full without written approval of the laboratory.

Chemist

Authorized Signatory
(Sunilkumar Pandey)

TEST REPORT

EFFLUENT SAMPLE ANALYSIS REPORT

TEST REPORT NO: ERM/QF/5.10/02 A/EFFLUENT/ONGC-Cambay/Rev.0-01/01-2019

Name of Industry	: **Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat.** PDCI, Padra
Sample Description	: Effluent Sample
Sampling Location	: PDCI, Padra
Mode of sampling	: Grab
Sample Collected on	: 16/01/2019
Sample Received on	: 17/01/2019
Sample Analyzed & Completion	: 17/01/2019 to 28/01/2019
Sample ID No.	: ERM/2019/01/174
Quantity/No. of Sample	: **5 L** in Plastic carboys for each location. /1 Nos.
Protocol (Purpose)	: As per work order
Packing/ Seal	: Packed
Sample Collected By	: Mr. Krishna Patel

Sr. No.	Parameters	Unit	Results	Test Method
1	Temperature	°C	23	IS 3025 (part 09) – 1984 (Reaffirmed 2017)
2	pH at 250 C	pH Unit	8.21	IS 3025 (Part 11):1983(Reaffirmed 2017)
3	Total Suspended Solid(TSS)	mg/L	1512	IS 3025 (Part 17): 1984 (Reaffirmed 2017)
4	Total Dissolved Solid (TDS) at 180°C	mg/L	4236	IS 3025 (Part 16):1984(Reaffirmed 2017)
5	Chemical Oxygen Demand (COD)	mg/L	2422	APHA 23rd Edition- 2017,Part 5000 Section:5220-B (Open Reflux Method)
6	Biochemical Oxygen Demand(BOD) at 27° C for 3 days	mg/L	625	IS 3025 (Part 44):1993 (Reaffirmed 2014)
7	Oil & Grease	mg/L	412	IS 3025 (Part 39) – 1991 (Reaffirmed 2014)(Partition Gravimetric Method)
8	Phenolic Compounds	mg/L	0.65	IS 3025 (Part 43):1992 (Reaffirmed 2014) (4- Aminoantipyrine method without Chloroform Extraction)
9	Chloride	mg/L	425	IS 3025 (Part 32):1988 (Reaffirmed 2014) Argentometric Method
10	Sulphate	mg/L	132	APHA 23rdEd. - 2017, Part-4000 Section : 4500-F SO4-2 (Turbidity Method)
11	Hexavalent Chromium	mg/L	<0.02	IS 3025(Part 52):2003 (Reaffirmed 2014) Diphenylcarbazide method
12	Total Chromium	mg/L	2.19	IS 3025 (Part 52)-2003(Reaffirmed 2014) (Diphenylcarbazide method)

P.T.O

Name of Industry: Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat.
PDCI, Padra
Sample ID: ERM/2019/01/174

13.	Sulphide	mg/L	1.5	IS 3025 (Part 29)-1986
14.	Copper	mg/L	0.6	AAS Method (Direct) IS 3025(Part 42):1992 (Reaffirmed 2014)
15.	Nickel	mg/L	0.3	AAS method (Direct) IS 3025(Part 54) : 2003 (Reaffirmed 2014)
16.	Zinc	mg/L	1.2	IS 3025 (Part 49) : 1994 (Reaffirmed 2014) AAS method (Direct)
17.	Fluoride	mg/L	0.5	APHA 23rd Ed - 2017, Part 4000 Section: 4500-F-D
18.	Cyanide	mg/L	0.01	APHA, 23nd Edition, 2017, 4500 CN E
19.	Mercury	mg/L	<0.01	APHA 23rd Edition - 2017, Part -3000 Section : 3500 Hg (AAS)
20	lead	mg/L	0.28	IS 3025 (Part 47) : 1994 (Reaffirmed 2014)
21.	% Sodium	%	42.4	IS 3025 (Part 45):1993 (Reaffirmed 2014) Flame Photometric Method

Remark: (1) Results expressed as "<" denotes the detection limit of testing. These results are below Detection limits (BDL).

Note: (1) These results relate to the sample tested only.
(2) The report shall not be reproduced except in full without written approval of the laboratory.

Chemist

Authorized Signatory
(Sunilkumar Pandey)

Issue Date: 29/01/2019

TEST REPORT

DRINKING WATER SAMPLE ANALYSIS REPORT

TEST REPORT NO: ERM/OF/5.10/02 A/DRINKINGWATER/ONGC-Cambay/Rev.0-01/01-2019

Name of Industry	: Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat. PDCJ, Padra
Sample Description	: Drinking Water sample
Sampling Location	: PDCJ, Padra
Mode of sampling	: Grab
Sample Collected on	: 16/01/2019
Sample Received on	: 17/01/2019
Sample Analyzed & Completion	: 17/01/2019 to 28/01/2019
Sample ID No.	: ERM/2019/01/175
Quantity/No. of Sample	: 2 L in Plastic carboys for each location/1 Nos.
Protocol (Purpose)	: As per work order
Packing/ Seal	: Packed
Sample Collected By	: Mr. Krishna Patel

Sr. No.	Parameters	Unit	Results	Test Method
1.	pH at 25°C	pH Unit	7.05	IS 3025 (Part 11):1983 (Reaffirmed 2017)
2.	Color	Hazen	<5	APHA 23rd Edition - 2017, Part - 2000 Section - 2120-C
3.	Turbidity	NTU	<1	APHA [21st Edition, 2005] - 2130-B (Nephelometric Method)
4.	Total Dissolved Solids (TDS) at 180 °C	mg/L	110	IS 3025 (Part 16):1984 (Reaffirmed 2017)
5.	Total Hardness as $CaCO_3$	mg/L	22	IS 3025 (Part 21):2009 (Reaffirmed 2014)
6.	Calcium (as Ca)	mg/L	9	IS 3025 (Part 40):1991 (Reaffirmed 2014)
7.	Magnesium (as Mg)	mg/L	2.1	IS 3025 (Part 46):1994 (Reaffirmed 2014)
8.	Chloride (as Cl)	mg/L	17	IS 3025 (Part 32):1988 (Reaffirmed 2014)
9	Sulphate(as SO4)	mg/L	1.6	APHA 23rd Edition- 2017, Part-4000 Section : 4500-E SO4-2
10.	Iron(as Fe)	mg/L	<0.05	IS 3025 (Part 53):2003 (Reaffirmed 2014)
11.	Copper (as Cu)	mg/L	<0.05	IS 3025 (Part 42):1992 (Reaffirmed 2014)
12.	Zinc (as Zn)	mg/L	<0.02	IS 3025 (Part 49) : 1994 (Reaffirmed 2014)
13.	Manganese	mg/L	<0.1	IS 3025 (Part 46)
14	Mineral oil	mg/L	<0.01	IS: 3025;Part 39), 1992
15	Nitrates	mg/L	<7.0	IS 3025 (part 34) – 1988 (Devadra Alloy Method) Reaffirmed (2014)
16	Fluorides	mg/L	<0.1	APHA 23nd Ed. - 2017, Part 4000 Section: 4500-F-D,

P.T.O

Name of Industry: Oil & Natural Gas Corporation Ltd (Cambay Asset), Khambhat-
PDCJ, Padra

Sample ID No.: ERM/2019/01/175

Sr. No.	Parameters	Unit	Results	Test Method
17.	Phenol	mg/L	<0.001	IS 3025 (Part 43):1992 (Reaffirmed 2014) (4- Aminoantipyrine method Chloroform Extraction)
18.	Hexavalent chromium	mg/L	<0.03	IS 3025(Part 52):2003 (Reaffirmed 2007) (clause 6) APHA 22nd Ed.-3500 Cr B
19	Residual Free Chlorine	mg/L	<0.1	IS 3025(Part 26) Iodometric method
20.	Mercury	mg/L	0.003	APHA 23rd Ed.- 2017, Part -3000 Section - 3500 Hg (AAS)
21	Cadmium	mg/L	<0.003	IS 3025 (Part 41): 1992, (Reaffirmed 2014)
22.	Selenium	mg/L	<0.005	IS 3025 (Part 56)
23.	Arsenic	mg/L	<0.005	APHA 23rd Edition,2017 (Part 3000 Section 3500 As B
24.	Cyanide	mg/L	NIL	APHA, 23rd Edition, 2017, 4500 CN E
25.	Lead	mg/L	<0.01	IS 3025 (Part 47) : 1994, (Reaffirmed 2014)
26.	Pesticide	mg/L	Absent	USEPA method 508 &507

Remark: (1) Results expressed as "<" denotes the detection limit of testing. These results are below detection limit (BDL).

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Chemist

Authorized Signatory
(Sunilkumar Pandey)

ANNEXURE-III

QHSE FORMATS

NOISE SURVEY REPORT

Document No. HS/QHSE/PT/[illegible]	Date: [illegible].2018
Issue No. 01	Date:
Rev. No. 0	
Page 1 of 1	

Name of Rig: [illegible]

Date: [illegible]

Time: [illegible]

Sl. No.	Equipment / Area / Plant	Noise Level (dB)	Exposure Time	Recommendations	Remarks
	[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	[illegible]		
	[illegible]	[illegible]	[illegible]		
	Compressor House	[illegible]	[illegible]		
	Mud Pump-1	[illegible]	[illegible]	[illegible]	
	Mud Pump-2	[illegible]	[illegible]	[illegible]	
	Rig Floor	[illegible]	[illegible]		
	[illegible]	[illegible]	[illegible]		
	[illegible]	[illegible]	[illegible]		

Ear protection is must in the area where noise level is 90 dB(A) or more.

Signature: [illegible]

Permissible Noise Exposure for Industrial Workers (Ref: OISD-GDN-166)

Exposure Time (in Hr/Day)	Limit in dB(A)	Exposure Time (in Hr/Day)	Limit in dB(A)	Exposure Time (in Hr/Day)	Limit in dB(A)
8	90	3	97	1	105
6	92	2	100	[illegible]	110
4	95	[illegible]	102	[illegible] or less	115

Ambient Air Quality (In respect of Noise)

Area Code	Category of Area / Zone	Limits in dB(A) Leq: Day Time	Limits in dB(A) Leq: Night Time
(A)	Industrial Area	75	70
(B)	Commercial Area	65	[illegible]
(C)	Residential Area	55	45
(D)	Silent Zone	50	40

Day Time: [illegible] am to [illegible] pm Night Time: [illegible] pm to [illegible] am

ANNEXURE-VIII

VEXIL BUSINESS PROCESS SERVICES

Certificate

This Certificate is issued to

Oil and Natural Gas Corporation Limited
Ahmedabad Asset
Drilling Rig: IPS–M700–1
Gujarat
INDIA

who have implemented an Environmental Management System, which meets the requirements laid down in ISO 14001:2015, with the following scope:

Drilling Services for Exploration and Production of Hydrocarbons

Certificate No. . E9122733.45
Original Issue : 05 June 2018
Latest Issue : 05 June 2018
Valid Till . 04 June 2021

The continuing validity of this certificate is subject to timely conduct of surveillance audits

Surveillance 1 due before . 09 April 2019
Surveillance 2 due on : 09 April 2020

for Vexil Business Process Services Private Limited

ISO 14001:2015

To check the validity of this certificate, please call +91 11 2875 5001 or email to info@vexilbps.com
The validity of the certificate can also be verified at http://www.jas-anz.org/register and at http://www.vexilbps.com
Coloured reproduction of this certificate is not permitted
Upon request, this Certificate shall be returned to Vexil Business Process Services Private Limited

VEXIL BUSINESS PROCESS SERVICES

Certificate

This Certificate is issued to

Oil and Natural Gas Corporation Limited
Ahmedabad Asset
Drilling Rig: IPS–M700–1
Gujarat
INDIA

who have implemented a Occupational Health and Safety Management System, which meets the requirements laid down in OHSAS 18001:2007, with the following scope:

Drilling Services for Exploration and Production of Hydrocarbons

Certificate No. : H9122611.45
Original Issue : 05 June 2018
Latest Issue : 05 June 2018
Valid Till : 04 June 2021

The continuing validity of this certificate is subject to timely conduct of surveillance audits

Surveillance 1 due before : 09 April 2019
Surveillance 2 due on : 09 April 2020

for Vexil Business Process Services Private Limited

JAS-ANZ

OHSAS 18001:2007

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