

Ref No. EOL/CBM-RG(E)/E&F/2017/3332

Date: 31<sup>st</sup> May, 2017

To,  
The Director  
Ministry of Environment and Forests  
Eastern Regional Office  
A/3 Chandrasekharpur  
Bhubaneswar-751 023  
Orissa

Essar Oil Limited  
Exploration & Production Division  
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Sub: Submission Half-yearly Compliance Report of the Environmental Clearance (Phase-III) by  
Essar Oil Limited (E&P Division) reg.


Ref: Environmental Clearance of Phase-III granted by MoEF vide letter no.J-11011/491/2011-IA  
II(I) dated 26<sup>th</sup> February, 2013

Dear Sir

We are enclosing herewith the half-yearly compliance report in respect of the stipulated prior environmental clearance terms and conditions for the Phase-III CBM project activities for the period of October, 2016- March, 2017.

Thanking you.

Yours faithfully  
For Essar Oil Limited (E&P Division)



21/05/2017

Authorized Signatory

Encl: Phase-III Compliance Report

Copy to:

1. Member Secretary (Industry), MoEF, CGO Complex, Paryavan Bhavan, New Delhi-110003
2. The Environmental Engineer, Durgapur Regional Office, WBPCB, Durgapur-713216

**Essar Oil Limited (E&P Division)**

**RG (East)-CBM-2001/1 (Phase-III) Half Yearly Environment Clearance Compliance Report**

**(October'16- March'17)**

**Ref: Environmental Clearance F.No.J-11011/491/2011-IA II (I), Govt. of India, MoEF (I.A.Division) dated 26<sup>th</sup> February, 2013**

<b>S. No</b>	<b>Condition</b>	<b>Compliance Status</b>
<b>A</b>	<b>Specific Conditions</b>	
i.	Compliance to all the environmental conditions stipulated in the environmental clearance letter nos.J-11011/660/2007-IA-II(I) dated 6 <sup>th</sup> May, 2008, J-11011/351/2009-IA-II(I) dated 23.09.2011 and its subsequent amendment shall be satisfactorily implemented	Compliance to the environmental conditions of Phase-I, II & II(A) are being satisfactorily implemented and the compliance reports are regularly submitted to the Regional office of the MoEF.
ii.	Compensation for the land acquisition to the land oustees, if any, and also for standing crop shall be paid as per the National Resettlement and Rehabilitation Policy (NRRP) 2007 or State Government norms. It may be ensured that compensation provided shall not be less than the norms of the NRRP, 2007	Land acquisition is in progress. The acquisition is directly being done with the concerned land owners and compensation is paid above the prevailing market rates. There is no involvement of Rehabilitation and Resettlement.
iii.	Prior permission from the Ministry of Defence shall be obtained regarding impact of proposed plant on Panagarh, if any	NOC obtained from MoD for the proposed project The compliance of the conditions prescribed by MoD is satisfactorily complying. (A copy of the letter is attached with previous compliance report)
iv.	As proposed, no forest land shall be used for the proposed facilities	Forest land is not being used for proposed activities
v.	Ambient Air Quality shall be monitored near the closest human settlements as per the National Ambient Air Quality Emission Standards (NAAQES) issued by the Ministry vide G.S.R No. 826(E) dated 16 <sup>th</sup> November, 2009 for PM10, PM2.5, SO2, NOx, CO, CH4, VOCs, HC, Non-Methane HC etc. Efforts shall be made to improve the ambient air quality of the area	Ambient Air Quality Monitoring has been carried out near to the closest human settlements as per the Ambient Air Quality Emission Standards (NAAQES) issued by the Ministry vide G.S.R No. 826(E) dated 16 <sup>th</sup> November, 2009. Periodic & Preventive maintenance is carried out for all the equipment.  Environmental monitoring plan is prepared for the CBM Project as a whole and being duly carried out. The monitoring results have been attached as <b>Annexure-I.</b>

S. No	Condition	Compliance Status
vi.	Mercury shall also be analysed in air, water and drill cuttings twice during drilling period	Mercury has been analysed in produced water and ambient air for the previous phases (Ph-I, II & IIA). Mercury levels in ambient air quality are within the Below Detection Limits (<1ng/m <sup>3</sup> ).
vii.	The flare system shall be designed as per good oil field practices and Oil Industry Safety Directorate (OISD) guidelines. The company shall take necessary measures to prevent fire hazards and soil remediation as needed. At the place of ground flaring, the flare pit shall be lined with refractory bricks and efficient burning system. In case of overhead flare stacks, the stack height shall be provided as per the regulatory requirements and emission from stacks shall meet the MoEF/CPCB guidelines.	Elevated flare system was designed as per OISD guidelines. Measures delineated in the EIA/EMP have been taken to prevent fire hazards. The overhead flaring was installed with height of 30 m. The following measures have been implemented to prevent fire hazard. <ul style="list-style-type: none"> <li>▪ Installation of electrical equipment as per approved hazardous zone classification as communicated to DGMS</li> <li>▪ Provided dry chemical fire extinguishers</li> <li>▪ Portable methane gas analyzers (CH<sub>4</sub>)</li> <li>▪ Use of flame proof type lighting fixtures, push buttons and switches in the drill site facilities</li> </ul>
viii.	The company shall make the arrangement for control of noise from the drilling activity, compressor station and DG sets by providing necessary mitigation measures such as proper acoustic enclosures to DG sets and meet the norms notified by the MoEF. Height of all the stacks/vents shall be as per the CPCB guidelines.	Only CPCB approved models of Silent DG sets has been installed with acoustic enclosures. Once the gas production starts at the well site, these DG sets will be replaced by Gas based Generator Sets. In operational wells gas generator sets are running. Noise monitoring has been carried out periodically in the activity area as part of compliance of previous project phases & noise levels are below CPCB standards.  A copy of the report is attached as <b>Annexure-II</b> .
ix.	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 30 <sup>th</sup> August, 2005	Drill cuttings disposal is in compliance as per GSR 546(E) dated 30 <sup>th</sup> August, 2005. However as per Schedule 1 of Notification GSR 395 (E), New Hazardous Waste Rules, 4/4/2016; categorizes “drill cutting excluding those for water based mud” is hazardous.
x.	Total fresh water requirement should not exceed 125m <sup>3</sup> for each well during drilling phase 1 m <sup>3</sup> /day for GGS/MCS. Prior permission shall be obtained from the Competent Authority and a copy submitted to the Ministry’s Regional Office at	Total fresh water requirement is being restricted to 125m <sup>3</sup> during drilling.  Produced water generated from wells in the previous phases has been reused for the drilling of new well.

S. No	Condition	Compliance Status
	Bhubaneswar	
xi.	During well drilling, wastewater should be segregated into waste drilling fluid and drill cuttings. Drill cutting should be stored onsite impervious HDPE lined pit for solar evaporation and drying. Effluent should be properly treated and treated effluent should conform to CPCB standards. As proposed, produced water should be treated by reverse osmosis and reuse in drilling of new wells, fire hydrant system and other beneficial purposes. Domestic effluent should be disposed-off through septic tank followed by soak pit.	Drill cuttings are separately collected and stored in HDPE lined pits. Produced water is treated through Reverse Osmosis System. The treated produced water is reused in further drilling and other operations. Domestic effluent is disposed of through septic tank by soak pit.
xii.	Ground water quality monitoring should be done to assess if produced water storage or disposal has any effect	The copy of the ground water level reports are attached as <b>Annexure-III</b> and analysis reports of ground water monitoring is attached in <b>Annexure III (a)</b> .
xiii.	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 on land. Proper toxicological analysis shall be done to ensure there is no hazardous material. Copy of toxicological analysis shall be submitted to Ministry's Regional Office at Bhubaneswar	Drill cuttings are washed and separated. The drilling fluids including waste mud are disposed in HDPE lined pits.  Comprehensive analysis of drill cuttings which are generated in the phase-II project have been carried out as per the Schedule-II of Hazardous Wastes (Management, Handling & Transboundary Movement) Rules, 2016. The drilling cutting report is attached as <b>Annexure IV</b> .
xiv.	Water base drilling mud or synthetic based mud shall be used	Water based mud is used in the drilling.
xv.	The company shall take necessary measures to prevent fire hazards, containing oil spill and soil remediation as needed. At place of ground flaring, the overhead flaring stack with knockout drums shall be installed to minimize gaseous emissions during operation.	All the precautionary measures is implemented to prevent fire hazards & Oil Spills. Elevated flaring is carried out. No ground flaring is done.
xvi.	The company shall take necessary measures to prevent fire hazards and soil remediation as needed. The stacks of adequate height	Gas detectors & sensors available to prevent the fire hazards. Flare stack height of 30m is maintained at Gas Gathering Stations and Main Compressor

S. No	Condition	Compliance Status
	shall be provided to flare the gas, if required, to minimize gaseous emissions and heat load during flaring	Stations.
xvii.	To prevent underground coal fire, preventive measures shall be taken for ingress of ambient air during withdrawal inside the coal seams by adopting technologies including vacuum suction. Gas detectors for the detection of CH <sub>4</sub> and H <sub>2</sub> S shall be provided.	Gas detectors for Methane, H <sub>2</sub> S and other gases are provided at the drilling and production sites. There is not any ingress of ambient air since the well is arrested at the head with drive head and progressive cavity pump.
xviii.	The design, material of construction, assembly, inspection, testing and safety aspects of operations and maintenance of pipeline and transporting the natural gas/oil shall be governed by ASME/ANSI B 31.8/B31.4 and OISD standard 141. Pipeline wall thickness and minimum depth of burial at river crossing and casings at rails, major road crossings should be in conformity with ANSI/ASME requirements.	All the surface facilities are installed as per the ASME/ANSI B 31.8 standards. Pipelines design and laying are confirmed to the ANSI/ASME standards and OISD 141 Guideline.
xix.	The company shall develop a contingency plan for H <sub>2</sub> S release including all necessary aspects from evacuation to resumption of normal operations. The workers shall be provided with personal H <sub>2</sub> S detectors in locations of high risk of exposure along with self-containing breathing apparatus.	H <sub>2</sub> S is not present as per the analysis of gas tapped from the test wells & pilot wells. However all the necessary safety measures are delineated in emergency response plan. Gas detectors are kept at the drilling and production sites to check any presence of gases which are beyond threshold values. All workers are provided with standard PPEs according to job requirement.
xx.	Adequate well protection system shall be provided like Blow Out Preventor (BOP) or diverter systems as required based on the geological formation of the blocks.	CBM well hydrostatic pressures are found to be less than 2psi. However considering the hydrostatic pressures and sensitivity of well, Blow Out Preventers or diverter systems are provided at the well head during drilling along with other well control measures such as proper pre-well planning and drilling fluid logging to maintain the hydrostatic pressure.
xxi.	The top soil removed shall be stacked separately for reuse during restoration process	The top soil being spread in the designated Green Belt area of the major facility. In future it has been planned that top soil will be spread along the periphery of new facility to develop greenbelt and the practice will be continued.
xxii.	Emergency Response Plan shall be based on the guidelines prepared by OISD, DGMS and	Emergency Response plan has been prepared as per the OISD & DGMS guidelines and sent for the DGMS

S. No	Condition	Compliance Status
	Govt. of India. Recommendations mentioned in the Risk Assessment & Consequence Analysis and Disaster Management Plan shall be strictly followed.	approval and has been certified. The certificate has already attached with previous compliance report.
xxiii.	Project proponent shall comply with the environment protection measures and safeguards recommended in the EIA/EMP/risk analysis report/disaster management plan	Environmental protection measures and safeguards recommended in EMP/risk analysis report/disaster management plan are implemented.
xxiv.	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 in original condition. In the event that no economic quantity of hydrocarbon is found a full abandonment shall be implemented for the drilling site in accordance with the applicable Indian Petroleum Regulations.	Wells will be abandoned and restored to natural position if found not suitable for hydrocarbon extraction.  Wells will be fully abandoned in compliance with Indian Petroleum Regulations in the event of no economic quality of hydrocarbon is found.
xxv.	Occupational health surveillance of the workers shall be carried out as per the prevailing Acts and Rules.	Occupational health surveillance of the workers has been carried out as per the Mines Act 1952. Periodical Occupational Health Surveillance records are being maintained.
xxvi.	Company shall adopt Corporate Environment Policy as per the Ministry's O.M.No.J-11013/41/2006-IA.II(I) dated 26 <sup>th</sup> April, 2011 and implemented.	Company has framed Corporate Environment Policy which is duly implemented.
xxvii.	All the commitments made to the public during the Public Hearing/Public Consultation meeting held on 24 <sup>th</sup> May, 2012 shall be satisfactorily implemented and a separate budget for implementing the same shall be allocated and information submitted to the Ministry's Regional Office at Bhubaneswar.	Commitments given in the public hearing are strictly implemented. A separate budget has already been provided for the FY 2017-2018 as part of pervious phases of the project for the welfare of surrounding villages in thrust areas like Health, Education & Empowerment etc under CSR budget.
xxviii.	At least 5% of the total cost of the project should be earmarked towards the enterprise social commitment and item-wise details along with time bound action plan shall be	The budget for enterprise social commitment has been allocated for the CBM Project as a whole (Ph-I, II, IIA, III). The expenditure towards enterprise social commitment activities for the period Oct'16-Mar'17 is

S. No	Condition	Compliance Status
	prepared and submitted to the Ministry's Regional Office at Bhubaneswar. Implementation of such program shall be ensured after the completion of the project.	<p>INR 44,76,328.00. The details of activities done in various areas like health, education and empowerment and it's beneficiaries are attached in the <b>Annexure-V</b></p> <p>The revised budgetary allocation has been made for the FY 2017-18 for the CBM Project. These funds has been judicially utilised for the development of villages and people in the vicinity of the project area.</p>
<b>B</b>	<b>General Conditions</b>	
i.	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board (SPCB), State Government and any other statutory authority.	We comply with the stipulations made by the State Pollution Control Board (SPCB), State Government and all other statutory bodies.
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.	<p>We restrict to the project configuration that is described in the Environmental Clearance.</p> <p>For any further expansion and modification in project configuration, we would approach MoEF for the prior Environmental Clearance.</p>
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	We comply with the rules and regulations under Manufacture, Storage and Import of Hazardous Chemicals Rules, 2000 as amended subsequently. Prior approvals will be obtained from appropriate authority.
iv.	The project authorities must strictly comply with the rules and regulation with regarding to handling and disposal of Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 wherever applicable. Authorization from the State Pollution Control Board must be	<p>We comply with the rules and regulations with regard to handling and disposal of Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008.</p> <p>Authorization from the West Bengal Pollution Control Board has been obtained with regard to storage, treatment and disposal of hazardous waste, valid till</p>

S. No	Condition	Compliance Status
	obtained for collections/treatment/storage/disposal of hazardous wastes.	October, 2018.
v.	The overall noise levels in and around the plant area shall be kept 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. 75dBA (daytime) and 70 dBA (night time)	<p>Acoustic hoods, silencers, enclosures are provided to high noise generating equipment. Noise levels will be restricted to the standards prescribed under EPA Rules, 1989.</p> <p>Personal Protective Equipment (earmuffs and plugs) have been provided to the working personnel.</p>
vi.	A separate Environmental Management Cell equipped with full-fledged laboratory facilities must be set up to carry out the environmental management and monitoring functions.	<p>A dedicated environment management Cell consist of 14 persons (10 person for water and drill waste Management &amp; 4 person for other environmental compliance) is currently in operation and functioning for implementation of environment management plan at large.</p> <p>However, total Nine persons (three teams of 3 persons each) are engaged through contactor dedicatedly for green Belt development, Waste Management and Environment Monitoring and Sampling.</p> <p>In addition, the Project management has engaged one person from each department as Environment Champion for implementing the environmental Management system at site. The Departmental Champion will implement the system and inform the observation to EMC personnel for further action, if any.</p> <p>The sampling and analysis of environmental parameters iss been carried out by Scientific Research laboratory (MoEF recognized).</p>
vii.	As proposed, Rs.2.80 Crores earmarked for environment pollution control measures shall be used to implement the conditions	<p>Rs.2.80 Crores earmarked for environment pollution control measures has been judicially utilised. The former expenditure towards environmental protection has been submitted with previous compliance reports of EC Phase I (EC no. F. No. J-11011/660/2007- IA II (I) dated 06.05.2008) &amp; EC Phase II (EC no. F. No. J-11011/351/2009- IA II (I) dated 23.09.2011)</p> <p>The environmental protection expenditure from October'16 till March'17 is attached with this report as <b>Annexure VI</b>.</p>



S. No	Condition	Compliance Status
viii.	The Regional Office of this Ministry/Central Pollution Control Board/State Pollution Control Board will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation shall be submitted to them regularly.	Support is being extended to the Regional office of this Ministry/Central Pollution Control Board/State Pollution Control Board for monitoring the stipulated conditions. Six Monthly Compliance Reports will be regularly be submitted to MoEF Regional Office.
ix.	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.	A copy of Clearance letter has been uploaded on the company's website. The notice of obtaining environmental clearance has been published two new papers. Also a copy of clearance has been circulated to major administrative offices.
x.	The project proponent shall upload the status of compliance for 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 WBPCB. The criteria pollutant levels namely; PM10, PM2.5, 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.	Compliance reports have been uploaded on company's website & sent to Regional Office of the MOEF, the respective Zonal Office of CPCB and the WBPCB.  The Ambient air quality monitoring is already being carried out in the nearest settlements as per revised NAAQM criteria. The criteria pollutant levels namely; SPM, RSPM, SO2, NOx, HC (Methane & Non-methane), VOCs are being monitored periodically and displayed at the main entrance of the existing Gas Gathering Stations.
xi.	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 WBPCB. The Regional Office of this Ministry/CPCB/WBPCB shall monitor the stipulated conditions.	We are submitting the six monthly compliance 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 WBPCB.

S. No	Condition	Compliance Status
xii.	The environmental statement for each financial year ending 31 <sup>st</sup> 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 environmental conditions and shall also be sent to the respective Regional Offices of the MoEF by e-mail	The environmental statement for each financial year ending 31st March in Form-V as is being regularly submitted to West Bengal Pollution Control Board and the same will be uploaded on the company's website along with the status of compliance report.
xiii.	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 WBPCB and may also be seen at Website of the Ministry of Environment and Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a> . 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.	The advertisement regarding the grant of environmental clearance has been published in two newspapers viz The Statesman (English) and Anand Bazaar Pathrika (Bengali/Vernacular) on 28 <sup>th</sup> February, 2013. A copy of the advertisement is already submitted with Half yearly compliance of Oct 12 – Mar 13 period
xiv.	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.	We are currently working with financial institutions regarding funding for the phase-III project activities. The date of financial closure will be informed to the MoEF (Eastern Regional Office) as and when achieved. The approval from concerned authorities and the commencement of the activities will also be informed to your kind office.

**Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)**

**ANNEXURE I**

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	GGs 1					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	29.1	54.5	58.9	58.3	62.7	35.8
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	77.19	156.84	145.98	108.60	173.26	64.73
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	32.19	32.78	37.32	31.80	5.72	6.06
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	6.21	6.14	6.8261007	5.84	36.47	33.18
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.4	0.4	0.4	0.4	0.3	0.4
6	THC as Methane	mg/m <sup>3</sup>	-	1.96	1.17	1.88	1.33	1.52	1.83
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	3.1	-	-	3.9	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.61	-	-	0.56	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	26.46	-	-	21.6	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	36	-	-	35.02	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.11	-	-	0.18	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	8.52	-	-	14.96	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.12	-	-	1.32	-	-
16	Benzene	µg/m <sup>3</sup>	5	2.03	-	-	2.76	-	-

## Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	JATGORIA					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	25.42	70.63	46.18	57.36	59.93	34.42
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	68.35	176.88	88.92	146.32	155.35	75.33
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	31.4	34.9	37.67	37.1	5.6	6.4
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	6.1	6.8	6.90	7.3	35.7	32.7
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.40	0.35	0.354	0.36	0.37	0.40
6	THC as Methane	mg/m <sup>3</sup>	-	1.62	1.59	1.47	1.76	1.38	1.56
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	2.9	-	-	4.6	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.5	-	-	0.9	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	20.83	-	-	20.24	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	34.54	-	-	29.26	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.09	-	-	0.17	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	8.56	-	-	15.65	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.26	-	-	1.3	-	-
16	Benzene	µg/m <sup>3</sup>	5	1.92	-	-	3.39	-	-

Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	MCS					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	42.21	51.7	51.33	50.3	28.28	48.85
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	99.24	122.56	90.21	135.22	67.29	129.36
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	34.94	28.95	30.80829	32.62	6.44	6.2
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	6.22	6.18	6.212357	5.9	34.84	34.5
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.434	0.462	0.462	0.398	0.422	0.34
6	THC as Methane	mg/m <sup>3</sup>	-	1.48	1.48	1.31	1.45	1.56	1.32
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	3.04	-	-	4.22	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.69	-	-	0.82	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	22.52	-	-	21.37	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	44.68	-	-	40.37	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.15	-	-	0.14	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	12.36	-	-	10.42	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.32	-	-	1.28	-	-
16	Benzene	µg/m <sup>3</sup>	5	2.12	-	-	3.04	-	-

## Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	KULDIHA					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	51.79	57.6	47.38	55.07	68.74	48.5
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	122.53	134.16	82.27	135.89	168.76	104.61
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	36.5	32.1	33.05	35.58	6.38	6.19
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	7.52	6.6	6.71	6.29	35.36	34.28
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.356	0.284	0.284	0.368	0.402	0.38
6	THC as Methane	mg/m <sup>3</sup>	-	1.3	1.39	1.24	1.58	1.54	1.66
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	4.02	-	-	4.13	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.95	-	-	0.68	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	26.49	-	-	20.97	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	47.16	-	-	34.26	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.17	-	-	0.22	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	11.51	-	-	15.6	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.39	-	-	1.2	-	-
16	Benzene	µg/m <sup>3</sup>	5	3.17	-	-	3.25	-	-

**Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)**

**ANNEXURE I**

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	GOPALPUR					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	32.13	68.2	68.29	42.66	41.70	45.43
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	83.38	187.91	173.52	93.25	116.78	113.94
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	32.12	34.89	32.26562	31.8	5.6	5.8
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	5.5	6.17	6.188845	5.1	36.6	38.1
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.426	0.398	0.398	0.40	0.41	0.34
6	THC as Methane	mg/m <sup>3</sup>	-	1.64	1.88	1.96	1.24	1.56	1.49
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	2.39	-	-	2.73	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.82	-	-	0.37	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	24.27	-	-	17.64	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	42.63	-	-	36.26	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.15	-	-	0.15	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	11.29	-	-	9.78	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.1	-	-	1.2	-	-
16	Benzene	µg/m <sup>3</sup>	5	1.75	-	-	1.89	-	-

**Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)**

**ANNEXURE I**

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	GGs 2					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	43.24	55.64	64.75	57.52	50.95541	55.51
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	101.47	153.64	143.33	152.3	142.8296	145.03
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	34.25	30.26	31.8623	39.73	6.01	5.47
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	6.3	6.4	6.796678	6.22	32.91	31.56
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.472	0.418	0.418	0.466	0.478	0.419
6	THC as Methane	mg/m <sup>3</sup>	-	1.52	1.32	1.75	1.75	1.64	1.78
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	3.57	-	-	4.76	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.74	-	-	0.89	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	27.84	-	-	26.13	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	36.46	-	-	37.26	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.16	-	-	0.18	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	14.43	-	-	12.87	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.2	-	-	1.21	-	-
16	Benzene	µg/m <sup>3</sup>	5	2.39	-	-	3.89	-	-



**Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)**

**ANNEXURE I**

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	SARENGA					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	30.4	69.46	77.60	41.12	45.75	51.99
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	75.29	169.58	169.50	99.58	84.55	143.78
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	35.32	30.02	37.66	39.68	6.07	5.73
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	5.94	5.55	6.58	6.52	34.15	32.24
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.416	0.392	0.392	0.384	0.398	0.408
6	THC as Methane	mg/m <sup>3</sup>	-	1.44	1.36	1.71	1.39	1.62	1.74
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	2.57	-	-	3.68	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.71	-	-	0.45	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	24.21	-	-	18.43	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	42.1	-	-	40.36	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.14	-	-	0.16	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	10.48	-	-	13.17	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.11	-	-	1.3	-	-
16	Benzene	µg/m <sup>3</sup>	5	1.64	-	-	2.37	-	-

Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	DHABANI					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	55.39	69.68	67.68	57.05	56.20	81.13
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	122.13	167.51	169.04	148.89	161.51	177.15
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	40.11	36.63	33.53133998	41.42	6.18	5.84
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	6.9	6.63	6.018432322	5.14	34.24	34.41
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.464	0.388	0.388	0.432	0.455	0.284
6	THC as Methane	mg/m <sup>3</sup>	-	1.53	1.55	1.89	1.98	1.62	1.43
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	4.05	-	-	4.74	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.94	-	-	0.93	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	23.65	-	-	18.26	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	33.76	-	-	39.82	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.16	-	-	0.19	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	12.37	-	-	11.72	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.41	-	-	1.42	-	-
16	Benzene	µg/m <sup>3</sup>	5	3.14	-	-	3.77	-	-

## Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	NACHAN					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	43.55	44.71	53.28	68.54	46.72	37.61
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	119.13	96.25	116.25	148.57	129.94	80.29
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	38.58	31.8	41.25519593	36.62	6.43	6.59
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	6.62	6.98	7.642543358	6.87	35.24	36.55
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.506	0.464	0.464	0.484	0.432	0.398
6	THC as Methane	mg/m <sup>3</sup>	-	1.42	1.69	1.63	1.64	1.78	1.53
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	4.04	-	-	4.91	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.87	-	-	0.79	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	16.89	-	-	15.73	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	36.14	-	-	38.26	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.15	-	-	0.24	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	12.47	-	-	14.15	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.16	-	-	1.13	-	-
16	Benzene	µg/m <sup>3</sup>	5	3.05	-	-	4.02	-	-

Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	GHATAKDANGA					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	40.47	59.52	67.22	62.16	42.68	42.19
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	99.37	144.47	132.89	155.51	103.85	100.51
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	33.4	34.26	33.30400542	35.55	6.11	6.87
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	5.56	6.64	6.4973073	6.21	36.41	42.53
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.348	0.308	0.308	0.322	0.356	0.324
6	THC as Methane	mg/m <sup>3</sup>	-	1.24	1.66	1.85	1.91	1.88	2.02
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	3.13	-	-	4.88	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.76	-	-	0.91	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	18.02	-	-	17.13	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	37.73	-	-	36.28	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.14	-	-	0.2	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	9.24	-	-	16.72	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.1	-	-	1.31	-	-
16	Benzene	µg/m <sup>3</sup>	5	2.24	-	-	4.06	-	-

Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	KANTABERIA					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	53.57	67.07	51.06	50.12	61.67	30.49
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	113.93	195.14	107.85	136.55	152.44	66.64
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	38.76	36.54	39.826258	32.76	5.76	6.29
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	7.11	6.92	6.9760563	6.85	37.73	42.91
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.584	0.476	0.476	0.488	0.426	0.392
6	THC as Methane	mg/m <sup>3</sup>	-	1.38	1.84	1.57	1.51	1.84	1.97
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	3.97	-	-	4.48	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.82	-	-	0.71	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	21.96	-	-	27.42	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	33.53	-	-	37.36	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.15	-	-	0.2	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	12.5	-	-	16.1	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.21	-	-	1.11	-	-
16	Benzene	µg/m <sup>3</sup>	5	2.84	-	-	3.64	-	-

## Ambient Air Quality of Surrounding Villages of CBM Raniganj Project by Essar Oil Limited (EP Division)

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	PRATAPPUR					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m <sup>3</sup>	60 (24 hrs)	32.26	47.57	57.05	67.82	36.53	49.34
2	Particulate Matter 10 (PM10)	µg/m <sup>3</sup>	100 (24 hrs)	82.92	119.39	120.45	161.74	60.09	87.62
3	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	34.69	28.6	35.537967	36.39	6.06	6.82
4	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	80 (24 hrs)	6.18	5.35	6.8004601	6.78	34.98	41.47
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	2 (8 hrs)	0.418	0.386	0.386	0.386	0.386	0.358
6	THC as Methane	mg/m <sup>3</sup>	-	1.3	1.24	1.66	1.67	1.74	1.67
7	Mercury	µg/m <sup>3</sup>	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m <sup>3</sup>	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m <sup>3</sup>	-	2.82	-	-	4.58	-	-
10	Benzo(a)Pyrene	ng/m <sup>3</sup>	1	0.64	-	-	0.98	-	-
11	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	400	20.83	-	-	23.36	-	-
12	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	100	36.14	-	-	40.37	-	-
13	Lead (Pb)	µg/m <sup>3</sup>	1	0.16	-	-	0.19	-	-
14	Nickel (Ni)	ng/m <sup>3</sup>	20	10.37	-	-	14.54	-	-
15	Arsenic	ng/m <sup>3</sup>	6	1.22	-	-	1.27	-	-
16	Benzene	µg/m <sup>3</sup>	5	1.97	-	-	3.52	-	-

**Noise Analysis Report of CBM Raniganj Project (E P Division)**  
**Compliance Period Oct'16 -Mar'17**

**ANNEXURE II**

<b>Noise in Operational Areas</b>							
<b>Permissible Limit as per CPCB</b>	<b>Location</b>	<b>Gopalpur</b>	<b>GGs-2</b>	<b>GGs-1</b>	<b>EDH-31</b>	<b>ESSAR CAMP</b>	<b>EDN-98</b>
	<b>Sampling Date</b>	<b>12.01.17 to 13.01.17</b>	<b>09.01.17 to 10.01.17</b>	<b>17.01.17 to 18.01.17</b>	<b>07.02.17 to 08.02.17</b>	<b>08.02.17 to 09.02.17</b>	<b>09.02.17 to 10.02.17</b>
<b>75</b>	<b>Day time</b>	54.4	72.4	74.0	55.7	48.8	53.4
<b>70</b>	<b>Night Time</b>	48.2	72.3	73.7	59.2	55.7	51.8

<b>Noise in Operational Areas</b>				
<b>Permissible Limit as per CPCB</b>	<b>Location</b>	<b>EDN-169</b>	<b>EDD-19</b>	<b>EDP-49</b>
	<b>Sampling Date</b>	<b>11.02.17 to 12.02.17</b>	<b>13.02.17 to 14.02.17</b>	<b>17.02.17 to 18.02.17</b>
<b>75</b>	<b>Day time</b>	50.2	60.0	55.4
<b>70</b>	<b>Night Time</b>	49.6	60.3	54.8



# SCIENTIFIC RESEARCH LABORATORY

(Analytical & Environmental Engineering Laboratory)

Laboratory Recognised By West Bengal Pollution Control Board  
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 90, Lake East (4th Road) Santoshpur, Jadavpur, Kolkata - 700 075  
 Tele Fax : (033) 2416 2267, Tel. : (033) 2416 1311, E-mail : jyotirmoysrl@gmail.com  
 Website : www.scientificlab.org

## DETAILS OF GROUND WATER LEVEL MEASUREMENT

[Format No. SRL/FM/48]

Name & Address of the Customer : M/s. Essar Oil Ltd  
 Webel IT Park, Surya Sen Sarani,  
 Near Gandhi More, Durgapur-713208

Sample Identification No. : GWLM-01-2016 to GWLM-07-2016

Instrument Used : PIEZOMETER

Environmental Condition : Dry

Sampling Date : 05.11.2016

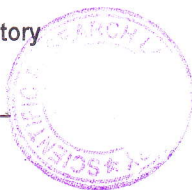
## REPORT OF GROUND WATER LEVEL MEASUREMENT

[Report No. SRL / EOL / GWLM-01-2016 to GWLM-07-2016 Dated: 10.11.2016]

SL No.	Location Details	Land Mark	Latitude	Longitude	Measurement Result (In Meters)			
					Parapet Height	Diameter of Well	DTW from Parapet top	DTW bgl
1.	GWLM-01-2016 : Nachon Village	House of Arup Ghatak	23°36'42.4"N	87°19'58.9"E	0.68	1	1.77	1.09
2.	GWLM-02-2016 : Kalikapur Village	Behind Durga Mandir	23°37.464"N	87°20.151"E	0.8	1.85	1.47	0.67
3.	GWLM-03-2016 : Dhabani (Bauripara)	Bauripara	23°35'519"N	87°22.085"E	0.95	1.8	2.82	1.87
4.	GWLM-04-2016 : Dhabani (Rana)	Rana Bari	23°35'31.2"N	87°22'00.9"E	0.7	0.68	1.22	0.52
5.	GWLM-05-2016 : Labnapara	Near High School	23°35'05.36N	87°22'15.8"E	1.2	1.5	3.13	1.93
6.	GWLM-06-2016 : Akandara	Adhibasi Para(Choto)	23°34'461"N	87°23'013"E	0.65	1.85	2.65	2.0
7.	GWLM-07-2016 : Saraswatiganj	House of Sibhu Saha	23°35'226"N	87°24'784"E	0.6	1.75	2.33	1.73

For Scientific Research Laboratory

*Shirendu Das*  
 (Senior Chemist)



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- Results relate only to the parameters tested.
- No Repeat Analysis will be entertained after 15 days from the date of sampling.





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Website : www.scientificlab.org

## DETAILS OF GROUND WATER LEVEL MEASUREMENT

[Format No. SRL/FM/48]

Name & Address of the Customer : M/s. Essar Oil Ltd  
Webel IT Park, Surya Sen Sarani,  
Near Gandhi More, Durgapur-713208

Sample Identification No. : GWLM-08-2016 to GWLM-14-2016

Instrument Used : PIEZOMETER

Environmental Condition : Dry

Sampling Date : 05.11.2016

## REPORT OF GROUND WATER LEVEL MEASUREMENT

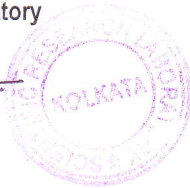
[Report No. SRL / EOL / GWLM-08-2016 to GWLM-14-2016 Dated: 10.11.2016]

SL No.	Location Details	Land Mark	Latitude	Longitude	Measurement Result (In Meters)			
					Parapet Height	Diameter of Well	DTW from Parapet top	DTW bgl
1.	GWLM-08-2016 : Ghatak Danga	New Atchala	23°34'147"N	87°24'308"E	1	2.4	2.4	1.4
2.	GWLM-09-2016 : Saranga (Kesabpur)	House of Damal Lohar	23°31'665"N	87°24'400"E	0	0.6	0.91	0.91
3.	GWLM-10-2016 : Gopalpur (Chatal Danga)	Near EDN 178	23°30'639"N	87°23'408"E	0.5	1.53	1.77	1.27
4.	GWLM-11-2016 : Jatgoria	Near Masjid	23°36'973"N	87°23'432"E	0.6	1.8	1.56	0.96
5.	GWLM-12-2016 : Kantaberia	Near Mandir	23°36'829"N	87°22'242"E	0.6	1.3	1.48	0.88
6.	GWLM-13-2016 : Bargoria	Near EDT-006	23°37'580"N	87°21'397"E	0.7	2.5	2.16	1.46
7.	GWLM-14-2016 : Khatgoria	Near Rabindra Sanga	23°37'52.5"N	87°21'08.3"E	0.8	0.8	2.1	1.3

For Scientific Research Laboratory

*Shirsendu Das*

(Senior Chemist)



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Ground water analysis of surrounding areas off CBM Raniganj Project by Essar Oil Limited  
Compliance Period: Oct'16 to Mar'17

ANNEXURE III a

S. No.	Parameter	Unit	Limits of IS:10500 -1991 Reaffirmed 2009		Gopalpur Village	Saranga School	Nachan Village near Nachan Uposastho Kendra
			Desirable limit (Max.)	Permissible limit in the Absence of Alternate Source (Max.)			
Date :					05.11.2016	05.11.2016	05.11.2016
1	pH at 27 C		6.5 to 8.5	No Relaxation	7.25	7.32	7.91
2	Colour in Hazen unit		5	15	<5	<5	<5
3	Odour		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Total Suspended Solids	mg/l	---	---	<2	<2	12.5
5	Total Dissolved Solids	mg/l	500	2000	92	96	382
6	Turbidity	NTU	1	5	2.1	<1	39.4
7	Nitrate	mg/l	45	No Relaxation	1.38	1.25	2.55
8	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	200	600	18.7	17.4	37.9
9	Chloride	mg/l	250	1000	26.7	22.2	88.9
10	Total Hardness (as CaCO <sub>3</sub> )	mg/l	200	600	35.6	27.7	83.1
11	Sulphate	mg/l	200	400	<2.5	<2.5	10
12	Calcium	mg/l	75	200	7.9	6.3	20.6
13	Magnesium	mg/l	30	100	3.8	2.8	7.6
14	Anionic Detergents (as MBAS)	mg/l	0.2	1	<0.1	<0.1	<0.1
15	Mineral Oil	mg/l	0.5	No Relaxation	<1	<1	<1
16	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001
17	Fluoride	mg/l	1	1.5	0.42	0.31	3.22
18	Residual Free Chlorine	mg/l	0.2	1	<0.1	<0.1	<0.1
19	Iron	mg/l	0.3	No Relaxation	0.14	<0.1	1.87
20	Sodium	mg/l	---	---	16.5	14.7	52.7
21	Total Chromium	mg/l	0.05	No Relaxation	<0.05	<0.05	<0.05
22	Zinc	mg/l	5	15	0.011	<0.01	0.024
23	Copper	mg/l	0.05	1.5	<0.05	<0.05	<0.05
24	Nickel	mg/l	0.02	No Relaxation	<0.05	<0.05	<0.05
25	Arsenic	mg/l	0.01	0.05	<0.01	<0.01	<0.01
26	Lead	mg/l	0.01	No Relaxation	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001

Ground water analysis of surrounding areas off CBM Raniganj Project by Essar Oil Limited  
Compliance Period: Oct'16 to Mar'17

ANNEXURE III a

S. No.	Parameter	Unit	Limits of IS:10500 -1991 Reaffirmed 2009		Gopalpur Village	Saranga School	Nachan Village near Nachan Uposastho Kendra
			Desirable limit (Max.)	Permissible limit in the Absence of Alternate Source (Max.)			
Date :					05.11.2016	05.11.2016	05.11.2016
28	Boron	mg/l	0.5	1	<1	<1	<1
29	Phosphorus	mg/l	---	---	0.18	0.23	0.46
30	Potassium	mg/l	---	---	2.2	1.8	3.5
31	Aluminium	mg/l	0.03	0.2	<0.01	<0.01	<0.01
32	Manganese	mg/l	0.1	0.3	<0.05	<0.05	0.142
33	Selenium	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
34	Cadmium	mg/l	0.003	No Relaxation	<0.01	<0.01	<0.01
35	Cyanide	mg/l	0.05	No Relaxation	<0.02	<0.02	<0.02
36	Electrical Conductivity at 25° C	us/cm	---	---	163	152	602
37	Hexavalent Chromium	mg/l	---	---	<0.01	<0.01	<0.01
38	Total Coliform	MPN/100ml	---	---	22	36	23

Ground water analysis of surrounding areas off CBM Raniganj Project by Essar Oil Limited  
Compliance Period: Oct'16 to Mar'17

ANNEXURE III a

S. No.	Parameter	Unit	Limits of IS:10500 -1991 Reaffirmed 2009		Kalikapur Village	Khatgoria Village (GGS- 1)	Kantaberia Village
			Desirable limit (Max.)	Permissible limit in the Absence of Alternate Source (Max.)			
Date :					05.11.2016	05.11.2016	05.11.2016
1	pH at 27 C		6.5 to 8.5	No Relaxation	7.87	7.45	7.57
2	Colour in Hazen unit		5	15	<5	<5	<5
3	Odour		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Total Suspended Solids	mg/l	---	---	2.7	<2	<2
5	Total Dissolved Solids	mg/l	500	2000	382	176	68
6	Turbidity	NTU	1	5	2.6	<1	<1
7	Nitrate	mg/l	45	No Relaxation	0.62	<0.5	<0.5
8	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	200	600	62.8	28.5	18.7
9	Chloride	mg/l	250	1000	73.6	48.7	19.7
10	Total Hardness (as CaCO <sub>3</sub> )	mg/l	200	600	39.6	27.7	11.9
11	Sulphate	mg/l	200	400	12.5	9.8	<2.5
12	Calcium	mg/l	75	200	9.5	4.7	1.5
13	Magnesium	mg/l	30	100	3.8	3.8	1.9
14	Anionic Detergents (as MBAS)	mg/l	0.2	1	<0.1	<0.1	<0.1
15	Mineral Oil	mg/l	0.5	No Relaxation	<1	<1	<1
16	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001
17	Fluoride	mg/l	1	1.5	0.73	0.82	0.33
18	Residual Free Chlorine	mg/l	0.2	1	<0.1	<0.1	<0.1
19	Iron	mg/l	0.3	No Relaxation	0.14	<0.1	<0.1
20	Sodium	mg/l	---	---	48.6	31.2	12.9
21	Total Chromium	mg/l	0.05	No Relaxation	<0.05	<0.05	<0.05
22	Zinc	mg/l	5	15	0.044	<0.01	<0.01
23	Copper	mg/l	0.05	1.5	<0.05	<0.05	<0.05
24	Nickel	mg/l	0.02	No Relaxation	<0.05	<0.05	<0.05
25	Arsenic	mg/l	0.01	0.05	<0.01	<0.01	<0.01
26	Lead	mg/l	0.01	No Relaxation	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001

Ground water analysis of surrounding areas off CBM Raniganj Project by Essar Oil Limited  
Compliance Period: Oct'16 to Mar'17

ANNEXURE III a

S. No.	Parameter	Unit	Limits of IS:10500 -1991 Reaffirmed 2009		Kalikapur Village	Khatgoria Village (GGS- 1)	Kantaberia Village
			Desirable limit (Max.)	Permissible limit in the Absence of Alternate Source (Max.)			
<b>Date :</b>					<b>05.11.2016</b>	<b>05.11.2016</b>	<b>05.11.2016</b>
28	Boron	mg/l	0.5	1	<1	<1	<1
29	Phosphorus	mg/l	---	---	0.23	0.41	0.12
30	Potassium	mg/l	---	---	4.23	1.24	1.12
31	Aluminium	mg/l	0.03	0.2	<0.01	<0.01	<0.01
32	Manganese	mg/l	0.1	0.3	0.059	<0.05	<0.05
33	Selenium	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
34	Cadmium	mg/l	0.003	No Relaxation	<0.01	<0.01	<0.01
35	Cyanide	mg/l	0.05	No Relaxation	<0.02	<0.02	<0.02
36	Electrical Conductivity at 25° C	us/cm	---	---	658	305	124
37	Hexavalent Chromium	mg/l	---	---	<0.01	<0.01	<0.01
38	Total Coliform	MPN/100ml	---	---	36	51	12

Ground water analysis of surrounding areas off CBM Raniganj Project by Essar Oil Limited  
Compliance Period: Oct'16 to Mar'17

ANNEXURE III a

S. No.	Parameter	Unit	Limits of IS:10500 -1991 Reaffirmed 2009		Jatgoria Village	Dhabani Village	Labnapara Village
			Desirable limit (Max.)	Permissible limit in the Absence of Alternate Source (Max.)			
Date :					05.11.2016	05.11.2016	05.11.2016
1	pH at 27 C		6.5 to 8.5	No Relaxation	7.26	7.39	6.55
2	Colour in Hazen unit		5	15	<5	<5	<5
3	Odour		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Total Suspended Solids	mg/l	---	---	9.8	2.5	3.2
5	Total Dissolved Solids	mg/l	500	2000	78	66	42
6	Turbidity	NTU	1	5	40.6	1.8	9.8
7	Nitrate	mg/l	45	No Relaxation	<0.5	<0.5	<0.5
8	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	200	600	18.7	12.6	9.7
9	Chloride	mg/l	250	1000	22.5	18.3	9.2
10	Total Hardness (as CaCO <sub>3</sub> )	mg/l	200	600	15.8	7.9	7.9
11	Sulphate	mg/l	200	400	4.2	3.5	<2.5
12	Calcium	mg/l	75	200	3.1	1.5	1.5
13	Magnesium	mg/l	30	100	1.9	1	1
14	Anionic Detergents (as MBAS)	mg/l	0.2	1	<0.1	<0.1	<0.1
15	Mineral Oil	mg/l	0.5	No Relaxation	<1	<1	<1
16	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001
17	Fluoride	mg/l	1	1.5	0.39	0.21	0.18
18	Residual Free Chlorine	mg/l	0.2	1	<0.1	<0.1	<0.1
19	Iron	mg/l	0.3	No Relaxation	1.78	0.42	0.6
20	Sodium	mg/l	---	---	9.8	7.9	3.2
21	Total Chromium	mg/l	0.05	No Relaxation	<0.05	<0.05	<0.05
22	Zinc	mg/l	5	15	<0.01	0.021	0.034
23	Copper	mg/l	0.05	1.5	<0.05	<0.05	<0.05
24	Nickel	mg/l	0.02	No Relaxation	<0.05	<0.05	<0.05
25	Arsenic	mg/l	0.01	0.05	<0.01	<0.01	<0.01
26	Lead	mg/l	0.01	No Relaxation	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001

**Ground water analysis of surrounding areas off CBM Raniganj Project by Essar Oil Limited**  
**Compliance Period: Oct'16 to Mar'17**

**ANNEXURE III a**

S. No.	Parameter	Unit	Limits of IS:10500 -1991 Reaffirmed 2009		Jatgoria Village	Dhabani Village	Labnapara Village
			Desirable limit (Max.)	Permissible limit in the Absence of Alternate Source (Max.)			
<b>Date :</b>					<b>05.11.2016</b>	<b>05.11.2016</b>	<b>05.11.2016</b>
28	Boron	mg/l	0.5	1	<1	<1	<1
29	Phosphorus	mg/l	---	---	0.18	0.16	0.1
30	Potassium	mg/l	---	---	2.2	1.9	1.2
31	Aluminium	mg/l	0.03	0.2	<0.01	<0.01	<0.01
32	Manganese	mg/l	0.1	0.3	0.14	<0.05	<0.05
33	Selenium	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
34	Cadmium	mg/l	0.003	No Relaxation	<0.01	<0.01	<0.01
35	Cyanide	mg/l	0.05	No Relaxation	<0.02	<0.02	<0.02
36	Electrical Conductivity at 25° C	us/cm	---	---	136	118	70
37	Hexavalent Chromium	mg/l	---	---	<0.01	<0.01	<0.01
38	Total Coliform	MPN/100ml	---	---	16	12	11

Ground water analysis of surrounding areas off CBM Raniganj Project by Essar Oil Limited  
Compliance Period: Oct'16 to Mar'17

ANNEXURE III a

S. No.	Parameter	Unit	Limits of IS:10500 -1991 Reaffirmed 2009		Akandara Village	Saraswatiganj Village	Ghatakdanga Village
			Desirable limit (Max.)	Permissible limit in the Absence of Alternate Source (Max.)			
Date :					05.11.2016	05.11.2016	05.11.2016
1	pH at 27 C		6.5 to 8.5	No Relaxation	6.87	6.89	6.25
2	Colour in Hazen unit		5	15	<5	<5	<5
3	Odour		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Total Suspended Solids	mg/l	---	---	2.4	<2	3.5
5	Total Dissolved Solids	mg/l	500	2000	88	124	38
6	Turbidity	NTU	1	5	3.7	<1	19
7	Nitrate	mg/l	45	No Relaxation	1.87	1.24	<0.5
8	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	200	600	22.7	28.3	9.4
9	Chloride	mg/l	250	1000	31.8	37.5	14.2
10	Total Hardness (as CaCO <sub>3</sub> )	mg/l	200	600	11.9	19.8	7.9
11	Sulphate	mg/l	200	400	5.8	7.3	<2.5
12	Calcium	mg/l	75	200	3.1	4.7	1.5
13	Magnesium	mg/l	30	100	1	1.9	1
14	Anionic Detergents (as MBAS)	mg/l	0.2	1	<0.1	<0.1	<0.1
15	Mineral Oil	mg/l	0.5	No Relaxation	<1	<1	<1
16	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001
17	Fluoride	mg/l	1	1.5	0.43	0.67	0.31
18	Residual Free Chlorine	mg/l	0.2	1	<0.1	<0.1	<0.1
19	Iron	mg/l	0.3	No Relaxation	0.12	<0.1	0.62
20	Sodium	mg/l	---	---	18.8	20.7	2.4
21	Total Chromium	mg/l	0.05	No Relaxation	<0.05	<0.05	<0.05
22	Zinc	mg/l	5	15	0.018	0.014	<0.01
23	Copper	mg/l	0.05	1.5	<0.05	<0.05	<0.05
24	Nickel	mg/l	0.02	No Relaxation	<0.05	<0.05	<0.05
25	Arsenic	mg/l	0.01	0.05	<0.01	<0.01	<0.01
26	Lead	mg/l	0.01	No Relaxation	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001



Ground water analysis of surrounding areas off CBM Raniganj Project by Essar Oil Limited  
Compliance Period: Oct'16 to Mar'17

ANNEXURE III a

S. No.	Parameter	Unit	Limits of IS:10500 -1991 Reaffirmed 2009		Akandara Village	Saraswatiganj Village	Ghatakdanga Village
			Desirable limit (Max.)	Permissible limit in the Absence of Alternate Source (Max.)			
Date :					<b>05.11.2016</b>	<b>05.11.2016</b>	<b>05.11.2016</b>
28	Boron	mg/l	0.5	1	<1	<1	<1
29	Phosphorus	mg/l	---	---	0.13	0.19	0.16
30	Potassium	mg/l	---	---	2.4	1.8	<1
31	Aluminium	mg/l	0.03	0.2	<0.01	<0.01	<0.01
32	Manganese	mg/l	0.1	0.3	<0.05	<0.05	<0.05
33	Selenium	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
34	Cadmium	mg/l	0.003	No Relaxation	<0.01	<0.01	<0.01
35	Cyanide	mg/l	0.05	No Relaxation	<0.02	<0.02	<0.02
36	Electrical Conductivity at 25° C	us/cm	---	---	151	219	67
37	Hexavalent Chromium	mg/l	---	---	<0.01	<0.01	<0.01
38	Total Coliform	MPN/100ml	---	---	12	23	16

**Test Report No. DEL/E(S)/16/003793****Dated**

**Issued To** : **Essar Oil Limited**  
 Webel IT,  
 Park, Surya Sen Sarani, Near Gandhi More,  
 Durgapur, West Bengal  
 India-713208

**Attention** : Mr. Biju Thankappan,

**Customer Ref. No.** : PO No. 15AP/M06/4600001514 Dated 16/08/2016

**Sample Particulars** :

**Sample Name** : Sludge sample

**Sample Description** : Sludge sample was collected from Drill cutting EDI-069

**Sample Package & Quantity** : Poly Bag & 2kg

**Sampling Location** : Drill cutting EDI-069

**Date of Sampling** : 22.10.2016

**Sampled by** : TUV Representative

**Client's Representative** : Mr. Sukanto Roy

**Date of Sample Receipt** : Received on 29/10/2016 10:28 am

**Date of Analysis** : 29/10/2016

**Date of Completion** :

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*Note : The submitted sample is Drawn by the Laboratory*

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Authorised By

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Report Reviewer

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Authorized Signatory

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**Note: The test report is electronically generated. Hence original signature is not required. For any technical query, please contact at and for any complaint please contact at .**

Note : (1) General Terms & Conditions as mentioned overleaf, (2) The results relate only to the items tested, (3) the test report shall not be reproduced except in full without the written approval of the laboratory

Laboratory:

TUV SUD South Asia Pvt. Ltd.  
 G-11, First Floor, Sector - 11, Gautam Budh Nagar  
 Noida-201301, Uttar Pradesh, India.

Phone :0091 120 4073000  
 Fax :0091 120 4073005  
 E-Mail :vinay.vikramsingh@tuv-sud.in  
 Url : www.tuv-sud.in/Environment  
 ControlNo:291016.006

Regd. Office:  
 TUV SUD South Asia Pvt. Ltd.  
 Off Saki Vihar Road, Saki naka,  
 Andheri (East),  
 Mumbai-400072. India

**TUV®**

**Test Report No. DEL/E(S)/16/003793****Dated**

S. NO.	PARAMETERS	UNIT	TEST RESULT	TEST METHOD
1	Oil & Graese ,	mg/kg	<50.0	USEPA 1664
2	Arsenic [as As],	mg/kg	2.0	USEPA-3050B/3051/3052
3	Cadmium [as Cd],	mg/kg	<2.0	USEPA -3051/3052
4	Mercury [as Hg],	mg/kg	<1.0	USEPA- 7471 A
5	Lead [as Pb],	mg/kg	8.0	USEPA – 3051/3052
6	Selenium [as Se],	mg/kg	<1.0	USEPA –3050B/3051/3052
7	Silver [as Ag],	mg/kg	<2.0	USEPA 3050/3051/3052
8	Barium (as Ba),	mg/kg	191.0	USEPA - 3050B
9	Chromium [as Cr],	mg/kg	45.0	USEPA – 3051/3052
10	Reactivity,	mg/kg	Absent	As per CPCB Manual
11	Ignitibility,	°C	>65.0	As per CPCB Manual
12	Benzene,	mg/kg	<1.0	USEPA 8260
13	Corrosivity ,	-	11.5	By Langelier Saturation Index Calculator
14	Vinyl Chloride,	mg/kg	<1.0	USEPA 8260
15	1,1-Dichloroethane,	mg/kg	<1.0	USEPA 8260
16	Chloroform,	mg/kg	<1.0	APHA 6232
17	1,2-Dichloroethane,	mg/kg	<1.0	USEPA 8260
18	Carbon tetrachloride	mg/kg	<1.0	USEPA 8260
19	Chlorobenzene,	mg/kg	<1.0	USEPA 8260
20	1,4-Dichlorobenzene,	mg/kg	<1.0	USEPA 8260
21	Hexachlorobutadiene,	mg/kg	<1.0	USEPA 8260
22	Methanesulfonate methyl,	-	-	USEPA 8260
23	Hexachloroethane,	mg/kg	<1.0	USEPA 8270D
24	Nitrobenzene,	-	-	USEPA 8270 D
25	2,4,6-Trichlorophenol,	-	-	USEPA 8270D
26	2,4,5-Trichlorophenol,	-	-	USEPA 8270D
27	2,4-Dinitrotoluene,	-	-	USEPA 8270D
28	Hexachlorobenzene,	-	-	USEPA 8270D
29	Heptachlor,	mg/kg	<1.0	USEPA 8270D

**Test Report No. DEL/E(S)/16/003793****Dated**

S. NO.	PARAMETERS	UNIT	TEST RESULT	TEST METHOD
30	Pyrene,	mg/kg	<1.0	USEPA 8270D
31	Endrin,	-	-	USEPA 8270D
32	Tetrachloroethene,	mg/kg	<1.0	USEPA 8270D
33	2,4-D,	-	-	USEPA 515.1
34	Lindane,	mg/kg	<1.0	USEPA 8270D
35	o-Cresol	-	-	8270C
36	m-Cresol	-	-	8270C
37	p-Cresol	-	-	8270C
38	Cresol	-	-	8270C
39	Pentachlorophenol	-	-	USEPA 8270
40	Chlordane	-	-	8081A
41	Methoxychlor	-	-	8081A
42	Toxaphene	-	-	8081A
43	2,4,5-TP(Silvex)	-	-	8150
44	Methyl ethyl ketone	-	-	USEPA-8270D
45	Pyridine	-	-	USEPA-8270D
46	Phenol Mix(27 compounds)	-	-	USEPA-8270D

Authorised By

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- END OF TEST REPORT -

**Test Report No. DEL/E(S)/16/003792**  
**Dated**

**Issued To** : **Essar Oil Limited**  
Webel IT,  
Park, Surya Sen Sarani, Near Gandhi More,  
Durgapur, West Bengal  
India-713208

**Attention** : Mr. Biju Thankappan,

**Customer Ref. No.** : PO No. 15AP/M06/4600001514 Dated 16/08/2016

**Sample Particulars** :

**Sample Name** : Sludge sample

**Sample Description** : Sludge sample was collected from Drill cutting EDN 162

**Sample Package & Quantity** : Poly Bag & 2kg

**Sampling Location** : EDN-162

**Date of Sampling** : 22.10.2016

**Sampled by** : TUV Representative

**Client's Representative** : Mr. Sukanto Roy

**Date of Sample Receipt** : Received on 29/10/2016 10:28 am

**Date of Analysis** : 29/10/2016

**Date of Completion** : 31/01/2017

---

*Note : The submitted sample is Drawn by the Laboratory*

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Authorised By

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Report Reviewer

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Authorized Signatory

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E-Mail :vinay.vikramsingh@tuv-sud.in  
Url : www.tuv-sud.in/Environment  
ControlNo:291016.005

Regd. Office:

TUV SUD South Asia Pvt. Ltd.  
Off Saki Vihar Road, Saki naka,  
Andheri (East),  
Mumbai-400072. India

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**Test Report No. DEL/E(S)/16/003792****Dated**

S. NO.	PARAMETERS	UNIT	TEST RESULT	TEST METHOD
1	Oil & Graese ,	mg/kg	<50.0	USEPA 1664
2	Arsenic [as As],	mg/kg	<1.0	USEPA-3050B/3051/3052
3	Cadmium [as Cd],	mg/kg	<2.0	USEPA -3051/3052
4	Mercury [as Hg],	mg/kg	<1.0	USEPA- 7471 A
5	Lead [as Pb],	mg/kg	11.4	USEPA – 3051/3052
6	Selenium [as Se],	mg/kg	<1.0	USEPA –3050B/3051/3052
7	Silver [as Ag],	mg/kg	<2.0	USEPA 3050/3051/3052
8	Barium (as Ba),	mg/kg	153.8	USEPA - 3050B
9	Chromium [as Cr],	mg/kg	73.3	USEPA – 3051/3052
10	Reactivity,	mg/kg	Absent	As per CPCB Manual
11	Ignitibility,	°C	>65.0	As per CPCB Manual
12	Benzene,	mg/kg	<1.0	USEPA 8260
13	Corrosivity ,	-	9.6	By Langelier Saturation Index Calculator
14	Vinyl Chloride,	mg/kg	<1.0	USEPA 8260
15	1,1-Dichloroethane,	mg/kg	<1.0	USEPA 8260
16	Chloroform,	mg/kg	<1.0	APHA 6232
17	1,2-Dichloroethane,	mg/kg	<1.0	USEPA 8260
18	Carbon tetrachloride	mg/kg	<1.0	USEPA 8260
19	Chlorobenzene,	mg/kg	<1.0	USEPA 8260
20	1,4-Dichlorobenzene,	mg/kg	<1.0	USEPA 8260
21	Hexachlorobutadiene,	mg/kg	<1.0	USEPA 8260
22	Methanesulfonate methyl,	-	-	USEPA 8260
23	Hexachloroethane,	mg/kg	<1.0	USEPA 8270D
24	Nitrobenzene,	-	-	USEPA 8270 D
25	2,4,6-Trichlorophenol,	-	-	USEPA 8270D
26	2,4,5-Trichlorophenol,	-	-	USEPA 8270D
27	2,4-Dinitrotoluene,	-	-	USEPA 8270D
28	Hexachlorobenzene,	-	-	USEPA 8270D
29	Heptachlor,	mg/kg	<1.0	USEPA 8270D

**Test Report No. DEL/E(S)/16/003792****Dated**

S. NO.	PARAMETERS	UNIT	TEST RESULT	TEST METHOD
30	Pyrene,	mg/kg	<1.0	USEPA 8270D
31	Endrin,	-	-	USEPA 8270D
32	Tetrachloroethene,	mg/kg	<1.0	USEPA 8270D
33	2,4-D,	-	-	USEPA 515.1
34	Lindane,	mg/kg	<1.0	USEPA 8270D
35	o-Cresol	-	-	8270C
36	m-Cresol	-	-	8270C
37	p-Cresol	-	-	8270C
38	Cresol	-	-	8270C
39	Pentachlorophenol	-	-	USEPA 8270
40	Chlordane	-	-	8081A
41	Methoxychlor	-	-	8081A
42	Toxaphene	-	-	8081A
43	2,4,5-TP(Silvex)	-	-	8150
44	Methyl ethyl ketone	-	-	USEPA-8270D
45	Pyridine	-	-	USEPA-8270D
46	Phenol Mix(27 compounds)	-	-	USEPA-8270D

Authorised By

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- END OF TEST REPORT -

**Test Report No. DEL/E(S)/16/004121**  
**Dated**

**Issued To** : **Essar Oil Limited**  
Webel IT,  
Park, Surya Sen Sarani, Near Gandhi More,  
Durgapur, West Bengal  
India-713208

**Attention** : Mr. Biju Thankappan,

**Customer Ref. No.** : PO I5AP/M06/4600001514 Dated 19/08/2016

**Sample Particulars** :

**Sample Name** : Sludge sample

**Sample Description** : Sludge sample was collected from Drill cutting EDD-406

**Sample Package & Quantity** : Polythene bag & 2 Kg

**Sampling Location** : Drill cutting EDD-406

**Date of Sampling** : 21.11.2016

**Sampled by** : TUV Representative

**Client's Representative** : Mr. Sukanto Roy

**Sampling Protocol** : LAB\_P(e)\_SOP\_24

**Date of Sample Receipt** : Received on 28/11/2016 3:50 pm

**Date of Analysis** : 29/11/2016

**Date of Completion** :

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*Note : The submitted sample is Drawn by the Laboratory*

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Authorised By

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Report Reviewer

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Authorized Signatory

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Noida-201301, Uttar Pradesh, India.

Phone :0091 120 4073000  
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E-Mail :vinay.vikramsingh@tuv-sud.in  
Url : www.tuv-sud.in/Environment  
ControlNo:281116.005

Regd. Office:  
TUV SUD South Asia Pvt. Ltd.  
Off Saki Vihar Road, Saki naka,  
Andheri (East),  
Mumbai-400072. India

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Page 1 of 3



**Test Report No. DEL/E(S)/16/004121**  
**Dated**

S. NO.	PARAMETERS	UNIT	TEST RESULT	TEST METHOD
1	Oil & Graese ,	mg/kg	<50.0	USEPA 1664
2	Arsenic [as As],	mg/kg	<1.0	USEPA-3050B/3051/3052
3	Cadmium [as Cd],	mg/kg	<1.0	USEPA -3051/3052
4	Mercury [as Hg],	mg/kg	<1.0	USEPA- 7471 A
5	Lead [as Pb],	mg/kg	7.1	USEPA – 3051/3052
6	Selenium [as Se],	mg/kg	<1.0	USEPA –3050B/3051/3052
7	Silver [as Ag],	mg/kg	<2.0	USEPA 3050/3051/3052
8	Barium (as Ba),	mg/kg	<5.0	USEPA - 3050B
9	Chromium [as Cr],	mg/kg	14.2	USEPA – 3051/3052
10	Reactivity,	mg/kg	Absent	As per CPCB Manual
11	Ignitibility,	°C	>65.0	As per CPCB Manual
12	Benzene,	mg/kg	<1.0	USEPA 8260
13	Corrosivity ,	-	9.8	40 CFR 261.22
14	Vinyl Chloride,	mg/kg	<1.0	USEPA 8260
15	1,1-Dichloroethane,	mg/kg	<1.0	USEPA 8260
16	Chloroform,	mg/kg	<1.0	USEPA 8270D
17	1,2-Dichloroethane,	mg/kg	<1.0	USEPA 8260
18	Carbon tetrachloride	mg/kg	<1.0	USEPA 8260
19	Chlorobenzene,	mg/kg	<1.0	USEPA 8260
20	1,4-Dichlorobenzene,	mg/kg	<1.0	USEPA 8260
21	Hexachlorobutadiene,	mg/kg	<1.0	USEPA 8260
22	Hexachloroethane,	mg/kg	<1.0	USEPA 8270D
23	Heptachlor,	mg/kg	<1.0	USEPA 8270D
24	Pyrene,	mg/kg	<1.0	USEPA 8270D
25	Tetrachloroethene,	mg/kg	<1.0	USEPA 8270D
26	Lindane,	mg/kg	<1.0	USEPA 8270D

**Test Report No. DEL/E(S)/16/004121**  
**Dated**

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- END OF TEST REPORT-

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**Test Report No. DEL/E(S)/16/004120**  
**Dated**

**Issued To** : **Essar Oil Limited**  
Webel IT,  
Park, Surya Sen Sarani, Near Gandhi More,  
Durgapur, West Bengal  
India-713208

**Attention** : Mr. Biju Thankappan,

**Customer Ref. No.** : PO I5AP/M06/4600001514 Dated 19/08/2016

**Sample Particulars** :

**Sample Name** : Sludge sample

**Sample Description** : Sludge sample was collected from Drill cutting EDD-407

**Sample Package & Quantity** : Polythene bag & 2 Kg

**Sampling Location** : Drill cutting EDD-407

**Date of Sampling** : 21.11.2016

**Sampled by** : TUV Representative

**Client's Representative** : Mr. Sukanto Roy

**Sampling Protocol** : LAB\_P(e)\_SOP\_24

**Date of Sample Receipt** : Received on 28/11/2016 3:50 pm

**Date of Analysis** : 29/11/2016

**Date of Completion** :

*Note : The submitted sample is Drawn by the Laboratory*

Authorised By

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Authorized Signatory

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Fax :0091 120 4073005  
E-Mail :vinay.vikramsingh@tuv-sud.in  
Url : www.tuv-sud.in/Environment  
ControlNo:281116.004

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Mumbai-400072. India

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Page 1 of 3

**Test Report No. DEL/E(S)/16/004120****Dated**

S. NO.	PARAMETERS	UNIT	TEST RESULT	TEST METHOD
1	Oil & Graese ,	mg/kg	<50.0	USEPA 1664
2	Arsenic [as As],	mg/kg	6.1	USEPA-3050B/3051/3052
3	Cadmium [as Cd],	mg/kg	<1.0	USEPA -3051/3052
4	Mercury [as Hg],	mg/kg	<1.0	USEPA- 7471 A
5	Lead [as Pb],	mg/kg	13	USEPA – 3051/3052
6	Selenium [as Se],	mg/kg	<1.0	USEPA –3050B/3051/3052
7	Silver [as Ag],	mg/kg	<2.0	USEPA 3050/3051/3052
8	Barium (as Ba),	mg/kg	115.3	USEPA - 3050B
9	Chromium [as Cr],	mg/kg	50.3	USEPA – 3051/3052
10	Reactivity,	mg/kg	Absent	As per CPCB Manual
11	Ignitibility,	°C	>65.0	As per CPCB Manual
12	Benzene,	mg/kg	<1.0	USEPA 8260
13	Corrosivity ,	-	11.3	40 CFR 261.22
14	Vinyl Chloride,	mg/kg	<1.0	USEPA 8260
15	1,1-Dichloroethane,	mg/kg	<1.0	USEPA 8260
16	Chloroform,	mg/kg	<1.0	USEPA 8270D
17	1,2-Dichloroethane,	mg/kg	<1.0	USEPA 8260
18	Carbon tetrachloride	mg/kg	<1.0	USEPA 8260
19	Chlorobenzene,	mg/kg	<1.0	USEPA 8260
20	1,4-Dichlorobenzene,	mg/kg	<1.0	USEPA 8260
21	Hexachlorobutadiene,	mg/kg	<1.0	USEPA 8260
22	Hexachloroethane,	mg/kg	<1.0	USEPA 8270D
23	Heptachlor,	mg/kg	<1.0	USEPA 8270D
24	Pyrene,	mg/kg	<1.0	USEPA 8270D
25	Tetrachloroethene,	mg/kg	<1.0	USEPA 8270D
26	Lindane,	mg/kg	<1.0	USEPA 8270D

**Test Report No. DEL/E(S)/16/004120**  
**Dated**

Authorised By

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- END OF TEST REPORT-

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**Test Report No. DEL/E(S)/16/004416**  
**Dated**

**Issued To** : **Essar Oil Limited**  
Webel IT,  
Park, Surya Sen Sarani, Near Gandhi More,  
Durgapur, West Bengal  
India-713208

**Attention** : Mr. Biju Thankappan,

**Customer Ref. No.** : PO No. 15AP/M06/4600001514 Dated 16/08/2016

**Sample Particulars** :

**Sample Name** : Sludge sample

**Sample Description** : Sludge sample was collected from Drill cutting EDD 052

**Sample Package & Quantity** : Poly bag & 1kg

**Sampling Location** : EDD 052

**Date of Sampling** : 19.12.2016

**Sampled by** : TUV Representative

**Date of Sample Receipt** : Received on 27/12/2016 11:37 am

**Date of Analysis** : 27/12/2016

**Date of Completion** :

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*Note : The submitted sample is Drawn by the Laboratory*

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Authorised By

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Report Reviewer

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Authorized Signatory

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Phone :0091 120 4073000  
Fax :0091 120 4073005  
E-Mail :vinay.vikramsingh@tuv-sud.in  
Url : www.tuv-sud.in/Environment  
ControlNo:271216.016

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Page 1 of 3

**Test Report No. DEL/E(S)/16/004416****Dated**

S. NO.	PARAMETERS	UNIT	TEST RESULT	TEST METHOD
1	Oil & Graese ,	mg/kg	<50.0	USEPA 1664
2	Arsenic [as As],	mg/kg	2.7	USEPA-3050B/3051/3052
3	Cadmium [as Cd],	mg/kg	<2.0	USEPA -3051/3052
4	Mercury [as Hg],	mg/kg	<1.0	USEPA- 7471 A
5	Lead [as Pb],	mg/kg	5.3	USEPA – 3051/3052
6	Selenium [as Se],	mg/kg	<1.0	USEPA –3050B/3051/3052
7	Silver [as Ag],	mg/kg	66.2	USEPA 3050/3051/3052
8	Barium (as Ba),	mg/kg	48.8	USEPA - 3050B
9	Chromium [as Cr],	mg/kg	66.2	USEPA – 3051/3052
10	Reactivity,	mg/kg	Absent	As per CPCB Manual
11	Ignitibility,	°C	>65	As per CPCB Manual
12	Benzene,	mg/kg	<1.0	USEPA 8260
13	Corrosivity ,	-	9.8	40 CFR 261.22
14	Vinyl Chloride,	mg/kg	<1.0	USEPA 8260
15	1,1-Dichloroethane,	mg/kg	<1.0	USEPA 8260
16	Chloroform,	mg/kg	<1.0	APHA 6232
17	1,2-Dichloroethane,	mg/kg	<1.0	USEPA 8260
18	Carbon tetrachloride	mg/kg	<1.0	USEPA 8260
19	Chlorobenzene,	mg/kg	<1.0	USEPA 8260
20	1,4-Dichlorobenzene,	mg/kg	<1.0	USEPA 8260
21	Hexachlorobutadiene,	mg/kg	<1.0	USEPA 8260
22	Hexachloroethane,	mg/kg	<1.0	USEPA 8270D
23	Heptachlor,	mg/kg	<1.0	USEPA 8270D
24	Pyrene,	mg/kg	<1.0	USEPA 8270D
25	Tetrachloroethene,	mg/kg	<1.0	USEPA 8270D
26	Lindane,	mg/kg	<1.0	USEPA 8270D

**Test Report No. DEL/E(S)/16/004416**  
**Dated**

Authorised By

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- END OF TEST REPORT-

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**Test Report No. DEL/E(S)/16/004415**  
**Dated**

**Issued To** : **Essar Oil Limited**  
Webel IT,  
Park, Surya Sen Sarani, Near Gandhi More,  
Durgapur, West Bengal  
India-713208

**Attention** : Mr. Biju Thankappan,

**Customer Ref. No.** : PO No. 15AP/M06/4600001514 Dated 16/08/2016

**Sample Particulars** :

**Sample Name** : Sludge sample

**Sample Description** : Sludge sample was collected from Drill cutting EDI 069

**Sample Package & Quantity** : Poly bag & 1kg

**Sampling Location** : EDI 069

**Date of Sampling** : 19.12.2016

**Sampled by** : TUV Representative

**Date of Sample Receipt** : Received on 27/12/2016 11:37 am

**Date of Analysis** : 27/12/2016

**Date of Completion** :

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*Note : The submitted sample is Drawn by the Laboratory*

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Authorised By

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Report Reviewer

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Authorized Signatory

**Note: The test report is electronically generated. Hence original signature is not required. For any technical query, please contact at and for any complaint please contact at .**

Note : (1) General Terms & Conditions as mentioned overleaf, (2) The results relate only to the items tested, (3) the test report shall not be reproduced except in full without the written approval of the laboratory

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TUV SUD South Asia Pvt. Ltd.  
G-11, First Floor, Sector - 11, Gautam Budh Nagar  
Noida-201301, Uttar Pradesh, India.

Phone :0091 120 4073000  
Fax :0091 120 4073005  
E-Mail :vinay.vikramsingh@tuv-sud.in  
Url : www.tuv-sud.in/Environment  
ControlNo:271216.015

Regd. Office:  
TUV SUD South Asia Pvt. Ltd.  
Off Saki Vihar Road, Saki naka,  
Andheri (East),  
Mumbai-400072. India

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Page 1 of 3

**Test Report No. DEL/E(S)/16/004415****Dated**

S. NO.	PARAMETERS	UNIT	TEST RESULT	TEST METHOD
1	Oil & Graese ,	mg/kg	<50.0	USEPA 1664
2	Arsenic [as As],	mg/kg	1.6	USEPA-3050B/3051/3052
3	Cadmium [as Cd],	mg/kg	<2.0	USEPA -3051/3052
4	Mercury [as Hg],	mg/kg	<1.0	USEPA- 7471 A
5	Lead [as Pb],	mg/kg	10.7	USEPA – 3051/3052
6	Selenium [as Se],	mg/kg	<1.0	USEPA –3050B/3051/3052
7	Silver [as Ag],	mg/kg	7.1	USEPA 3050/3051/3052
8	Barium (as Ba),	mg/kg	17.9	USEPA - 3050B
9	Chromium [as Cr],	mg/kg	29.6	USEPA – 3051/3052
10	Reactivity,	mg/kg	Absent	As per CPCB Manual
11	Ignitibility,	°C	>65	As per CPCB Manual
12	Benzene,	mg/kg	<1.0	USEPA 8260
13	Corrosivity ,	-	9.7	40 CFR 261.22
14	Vinyl Chloride,	mg/kg	<1.0	USEPA 8260
15	1,1-Dichloroethane,	mg/kg	<1.0	USEPA 8260
16	Chloroform,	mg/kg	<1.0	APHA 6232
17	1,2-Dichloroethane,	mg/kg	<1.0	USEPA 8260
18	Carbon tetrachloride	mg/kg	<1.0	USEPA 8260
19	Chlorobenzene,	mg/kg	<1.0	USEPA 8260
20	1,4-Dichlorobenzene,	mg/kg	<1.0	USEPA 8260
21	Hexachlorobutadiene,	mg/kg	<1.0	USEPA 8260
22	Hexachloroethane,	mg/kg	<1.0	USEPA 8270D
23	Heptachlor,	mg/kg	<1.0	USEPA 8270D
24	Pyrene,	mg/kg	<1.0	USEPA 8270D
25	Tetrachloroethene,	mg/kg	<1.0	USEPA 8270D
26	Lindane,	mg/kg	<1.0	USEPA 8270D

**Test Report No. DEL/E(S)/16/004415**  
**Dated**

Authorised By

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- END OF TEST REPORT-

**DRAFT COPY**

**Test Report No. DEL/E(S)/17/000532**  
**Dated**

**Issued To** : **Essar Oil Limited**  
Webel IT,  
Park, Surya Sen Sarani, Near Gandhi More,  
Durgapur, West Bengal  
India-713208

**Attention** : Mr. Biju Thankappan,

**Customer Ref. No.** : PO No. 15AP/M06/4600001514 Dated 16/08/2016

**Sample Particulars** :

**Sample Name** : Sludge sample

**Sample Description** : Sludge sample was collected from Drill cutting EDI 429

**Sample Package & Quantity** : Polythene bag & 2 Kg.

**Sampling Location** : Drill cutting EDI 429

**Date of Sampling** : 30.01.2017

**Sampled by** : TUV Representative

**Client's Representative** : Mr. Sukanto Roy

**Sampling Protocol** : LAB\_P(e)\_SOP\_24

**Date of Sample Receipt** : Received on 10/02/2017 2:58 pm

**Date of Analysis** : 11/02/2017

**Date of Completion** :

*Note : The submitted sample is Drawn by the Laboratory*

Authorised By

Report Reviewer

Authorized Signatory

**Note: The test report is electronically generated. Hence original signature is not required. For any technical query, please contact at and for any complaint please contact at .**

Note : (1) General Terms & Conditions as mentioned overleaf, (2) The results relate only to the items tested, (3) the test report shall not be reproduced except in full without the written approval of the laboratory

Laboratory:

TUV SUD South Asia Pvt. Ltd.  
G-11, First Floor, Sector - 11, Gautam Budh Nagar  
Noida-201301, Uttar Pradesh, India.

Phone :0091 120 4073000  
Fax :0091 120 4073005  
E-Mail :vinay.vikramsingh@tuv-sud.in  
Url : www.tuv-sud.in/Environment  
ControlNo.:100217.003

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**Test Report No. DEL/E(S)/17/000532****Dated**

S. NO.	PARAMETERS	UNIT	TEST RESULT	TEST METHOD
1	Oil & Graese ,	mg/kg	<50.0	USEPA 1664
2	Arsenic [as As],	mg/kg	<1.0	USEPA-3050B/3051/3052
3	Cadmium [as Cd],	mg/kg	6.25	USEPA -3051/3052
4	Mercury [as Hg],	mg/kg	7.4	USEPA- 7471 A
5	Lead [as Pb],	mg/kg	13.9	USEPA – 3051/3052
6	Selenium [as Se],	mg/kg	<1.0	USEPA –3050B/3051/3052
7	Silver [as Ag],	mg/kg	<2.0	USEPA 3050/3051/3052
8	Barium (as Ba),	mg/kg	138.3	USEPA - 3050B
9	Chromium [as Cr],	mg/kg	101.5	USEPA – 3051/3052
10	Reactivity,	mg/kg	Absent	As per CPCB Manual
11	Ignitibility,	°C	>65.0	As per CPCB Manual
12	Benzene,	mg/kg	<1.0	USEPA 8260
13	Corrosivity ,	-	9.5	40 CFR 261.22
14	Vinyl Chloride,	mg/kg	<1.0	USEPA 8260
15	1,1-Dichloroethane,	mg/kg	<1.0	USEPA 8260
16	Chloroform,	mg/kg	<1.0	USEPA 8270D
17	1,2-Dichloroethane,	mg/kg	<1.0	USEPA 8260
18	Carbon tetrachloride	mg/kg	<1.0	USEPA 8260
19	1,4-Dichlorobenzene,	mg/kg	<1.0	USEPA 8260
20	Hexachlorobutadiene,	mg/kg	<1.0	USEPA 8260
21	Hexachloroethane,	mg/kg	<1.0	USEPA 8270D
22	Heptachlor,	mg/kg	<1.0	USEPA 8270D
23	Pyrene,	mg/kg	<1.0	USEPA 8270D
24	Chlorobenzilate,	mg/kg	<1.0	USEPA 8270D
25	Tetrachloroethene,	mg/kg	<1.0	USEPA 8270D
26	Lindane,	mg/kg	<1.0	USEPA 8270D

**Test Report No. DEL/E(S)/17/000532**  
**Dated**

Authorised By

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- END OF TEST REPORT-

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<b>CSR Expenditure from October 2016 to March 2017</b>			
<b>Thematic Area</b>	<b>Projects</b>	<b>Beneficiaries</b>	<b>Expenditure (INR)</b>
<b>HEALTH</b>	Community Health Care Services through Mobile Medical Van	14118	1739768
<b>LIVELIHOOD</b>	Agriculture Development Project	10	458045
<b>EDUCATION</b>	Support to local schools	1034	99963
<b>SPORTS</b>	Support to sports	2598	124035
<b>COMMUNITY INFRASTRUCTURE DEVELOPMENT AND CULTURAL EVENT</b>	Support to community	2726	1454517
<b>NEED BASE ASSECEMENT</b>		Company	600000
		<b>20486</b>	<b>4476328</b>

<b>Expenditure towards Environmental Protection Measures at Raniganj CBM Project (Period October, 2016 - March, 2017)</b>		
<b>SI No</b>	<b>Particular</b>	<b>Expenses (in Rs)</b>
1	Installation of Reverse Osmosis Treatment System for Produced Water Treatment (Capital & Recurring)	23,680,278.00
2	METP unit for liquid waste treatment at Drill Site (O & M)	10,369,320.00
3	Environmental Monitoring Activities (Recurring)	859,837.00
4	HDPE liners for drill cuttings storage & disposal (Capital)	2,580,565.00
5	Non Hazardous Waste Disposal (Recurring)	828,000.00
6	Subsidence Study by third party	231,000.00
7	CSR Activities (Recurring)	4,476,328.00
8	Third Party HSE Audit	147,097.00
<b>TOTAL</b>		<b>43,172,425.00</b>