Ref No. EOL/CBM-RG(E)/E&F/2017/3331

Date: 31st May, 2017

Essar Oil Limited
Exploration & Production Division
Village/ PO Gopalpur
Near Rajendra Nath Polytechnic College
Gopalpur Sarenga Road
PS Kanksha
Durgapur-713 212
Dist. Burdwan.
West Bengal
India

Corporate Identity Number :
U11100GJ1989PLC032116

E eol-enp.durgapur@essar.com
www.essaroil.co.in

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

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

Ref: Environmental Clearance of Phase-II granted by MoEF vide letter no. J-11011/351/2009- IA II (I) dated 23.09.2011; letter no.J-11011/351/2009-IA II(I) dated 18th June, 2012

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-II and II A CBM project activities for the period of October, 2016- March, 2017.

Thanking you.

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

31/05/2017
Authorized Signatory

Encl: Phase-II and II A 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

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

(October'16- March'17)

Ref: Environment Clearance no. F. No. J-11011/351/2009- IA II (I) dated 23.09.2011

Sr. No.	EC Conditions	Compliance Status
	A. Specific Conditions	
I.	As proposed, Only 58 pilot-cum-production wells shall be drilled upto a depth of 1000 m. No additional wells shall be drilled without prior permission from this Ministry.	Number of pilot-cum-production wells has been drilled as per the permission. Amendment in Environmental Clearance has been granted by MoEF for drilling 4 additional supporting wells at each pilot cum production site to augment the production.
Ii	As proposed, no drilling of well and any construction work shall be carried out in forest land. No forest land shall be used for installation of Group Gathering Stations (GGSs) and pipeline laying in the proposed location	All the facilities including well sites & Gas Gathering Stations are located outside the forest area.
Iii	Recommendations of the State Forest Department shall be obtained regarding likely impact of the proposed plant on the surrounding protected forests viz. Durgapur PF & Ukhra PF and implemented.	The Conservator of Forests (South East Circle), Forest Department, West Bengal made site inspection on 19th Dec'12 to assess the probable impacts & suggest suitable recommendations. The Addl. PCCF, West Bengal with his recommendations forwarded to the Addl. PCCF, MoEF (Eastern Regional Office). (A copy of the letter is attached with previous compliance report).
iv	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,	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.

Sr. No.	EC Conditions	Compliance Status
	A. Specific Conditions	
	2007.	
V	Prior permission from the Ministry of Defence shall be obtained regarding impact of proposed plant on Panagarh air base, if any.	NOC obtained from MoD for the proposed project The compliance of the conditions prescribed by MoD are being satisfactorily complied. (A copy of the letter is attached with previous compliance report)
Vi	The surface facilities shall be installed as per the applicable codes and standards, international practices and applicable local regulations.	Surface facilities have been designed as per OISD, DGMS and international standards viz. API.
Vii	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 16th November, 2009 for PM_{10}, $PM_{2.5}$, S02, 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 16th November, 2009 for PM10, PM2.5, SO2, NOX, CO, CH4, VOCs, HC, Non-methane HC. The monitoring results have been attached in ***Annexure I*.**
Viii	The company shall monitor data on methane and non-methane hydrocarbon at the drilling site, GGS, CGS and at the SV station from where the gas is supplied to the customers.	Methane hydrocarbons are monitored as part of Ambient Air Quality Monitoring Plan at Major facilities (GGS) and villages. The monitoring results are provided in ***Annexure I***.
Ix	Mercury shall also be analyzed in air, water and drill cuttings twice during drilling period.	Mercury has been analyzed in produced water and ambient air. Mercury levels in ambient air quality are within the Below Detection Limits (<1ng/m3). The analysis reports for Air & Water are attached in ***Annexure I & II***.
X	The flare system shall be designed as per good oil field practices and Oil Industry Safety Directorate (OISD) guidelines. The company	Elevated flare system has been designed as per OISD guidelines. Measures delineated in the EIA/EMP have been taken to prevent fire hazards. The overhead

Sr. No.	EC Conditions	Compliance Status
	A. Specific Conditions	
	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 emissions from stacks shall meet the MOEF/CPCB guidelines.	flaring has been installed with height of 30 m. The following measures have been implemented to prevent fire hazard. • Installation of electrical equipment as per approved hazardous zone classification as communicated to DGMS • Provided dry chemical fire extinguishers • Online methane gas analyzers (CH4) • Use of flame proof type lighting fixtures, push buttons and switches in the drill site facilities
Xi	The company shall make the arrangement for control of noise from the drilling activity 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.	CPCB approved models of Silent DG sets have been installed with acoustic enclosures. Noise monitoring has been carried out in the activity area. The results are attached in **Annexure III**.
Xii	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'August, 2005.	Drill cuttings are stored in HDPE lined pits. We comply with the guidelines for disposal of solid waste, drill cuttings and drilling fluids for onshore drilling operation notified vide GSR.546 (E) dated 30th August, 2005.
Xiii	Total fresh water requirement from local approved water suppliers shall not exceed 75 m3/day/well and prior permission shall be obtained from the concerned Authority and a copy submitted to the Ministry's Regional Office at Bhubaneswar. No ground water shall be used without permission of CGWA.	Maximum water requirement for drilling operations has been restricted to 75m3/well and for GGS is 1m3/day. However, The RO treat water is supply the water demand to new drilling operation and other utilities. No ground water is withdrawal for water consumption.

Sr. No.	EC Conditions	Compliance Status
	A. Specific Conditions	
Xiv	The produced water during drilling operations shall be collected in HDPE lined waste pit to prevent ground water contamination. Effluent shall be properly treated and treated effluent shall conform to CPCB standards. As proposed, produced water may also be used in operational coal mines of Eastern Coal Fields for dust suppression, slurry activities and post-mining restoration efforts etc. Domestic effluent shall be disposed through septic tank followed by soak pit. No effluent shall be discharged outside the premises and 'zero' discharge shall be adopted	Produced water is collected & stored in HDPE lined pits & the water is treated by Reverse Osmosis Treatment System. Currently RO treatment plants of total capacity 5100 m3/day have been installed. The treated water is used for our own operations (drilling & site preparation activities). Excess treated water will be discharged to nearby streams only after meeting discharge standards. Domestic effluent is treated septic tank followed by soak pits.
Xv	Water produced during drilling shall be reused in drilling of other core/test wells.	Produced water has been collected & stored in HDPE lined pits and water if not meeting the standards will be passed through suitable treatment system. Water meeting the standards set by CPCB will be reused in the construction activities & drilling of adjoining wells. Excess water is discharged only after meeting the discharge standards.
Xvi	Reverse Osmosis plant shall be installed for further treatment of the wastewater in case the TDS is > 2000 mg/l and treated wastewater shall be reused or discharge on the land after meeting the norms.	Currently, Reverse Osmosis plants with total capacity of 5100m3/day are installed to treat the produced water generated from production wells. The analysis reports of water treated through Reverse Osmosis plant are attached in ***Annexure IV***. The treated water is reused in drilling and other construction activities. Excess water is discharged to nearby streams only after meeting the discharges standards. Analysis reports of Surface water are attached in ***Annexure IV (a)***.
Xvii	Ground water quality monitoring shall be	The ground water monitoring has been carried out by

Sr. No.	EC Conditions	Compliance Status
	A. Specific Conditions	
	done to assess if produced water storage or disposal has any effect.	collecting samples from nearby bore holes & water bodies in the project area and the analysis results are attached in ***Annexure V.***
Xviii	Drilling wastewater including drill cuttings wash water shall be collected in disposal pit lined with HDPE lining and evaporated or treated and shall comply with the notified standards for on-shore disposal. The treated waste water should be reused in other wells during drilling operations. 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 the design of the secured shall be approved by the CPCB and obtain the authorization of the WBPCB. Copy of authorization or membership of TSDF shall be submitted to Ministry's Regional Office at Bhubaneswer.	Drilling wastewater including drill cuttings wash water has been collected and stored in HDPE lined pit and solar evaporated. Membership Certificate has been obtained from West Bengal Waste Management Limited, Haldia, for using TSDF facility for hazardous waste disposal. (A copy of the membership certificate is attached with previous compliance report). The drill cuttings analysis revealed the absence of any hazardous content. Drill cutting is disposed at onsite disposal facilities. The onsite disposal process is communicated to WBPCB. (A copy of the letter is attached with previous compliance report). The analysis report of drill cuttings is attached as **Annexure VI**.
Xix	Only water based drilling mud shall be used. The drilling mud shall be recycled. Hazardous waste shall be disposed of as per Hazardous Waste (Management, Handling and Transboudary Movement) Rules, 2008. The recyclable waste (oily sludge) and spent oil shall be disposed of to the authorized recyclers/re-processors.	Water based mud drilling is being carried. Drilling mud is recycled and reused for further drilling. We will comply with the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008. Oil contaminated waste & waste filters have been sent to TSDF facility, Haldia. WBPCB approve storage time extension used filter upto 270 days. Used oil has been sent to authorised recycler. The copies of Form 13 for Used oil are attached as ***Annexure-VII***.
Xx	The Company shall carry out long term subsidence study by collecting base line data before initiating drilling operation till the project lasts. The data so collected shall be	Half yearly subsidence monitoring was performed at all Monitoring Stations established by The National Institute of Technology (NIT), Durgapur in March'2017. We are awaiting the Subsidence Study report and will submit it immediately after receiving

Sr. No.	EC Conditions	Compliance Status
	A. Specific Conditions	
	submitted six monthly to the Ministry and its Regional Office at Bhubaneswar.	it.
Xxi	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.	The necessary measures have been taken to prevent fire hazards and for soil remediation as follows. • Installation of electrical equipment as per approved hazardous zone classification as communicated to DGMS • Dry chemical fire extinguishers • Portable methane gas analyzers (CH4) • Use of flame proof type lighting fixtures, push buttons and switches in the drill site facilities • Impervious surface, secondary containment and spill kit are provided whenever there is possibility of soil contamination
xxii	The project authorities shall install SCADA system with dedicated optical fiber based telecommunication link for safe operation of pipeline and Leak Detection System. Additional sectionalizing valves in the residential area and sensitive installations shall be provided to prevent the amount of gas going to the atmosphere in the event of pipeline failure. Intelligent pigging facility shall be provided for the entire pipeline system for internal corrosion monitoring. Coating and impressed current cathodic protection system shall be provided to prevent external corrosion.	Installation of SCADA system with dedicated optical fiber based telecommunication link for safe operation of pipeline and Leak Detection System is under process. Cathodic Ray Protection system has been installed along the length of pipeline to prevent the corrosion. The design and laying of surface facilities have been confirmed to the standards of OISD 141.
xxiii	All the surface facilities including GGS, CGS and SV station shall be as per applicable codes and standards, international practices and applicable local regulations.	All the surface facilities including GGS, CGS and SV stations have been laid as per OISD & API standards.

Sr. No.	EC Conditions	Compliance Status
	A. Specific Conditions	
xxiv	The design, material of construction, assembly, inspection, testing and safety recommendations of operation 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 surface facilities have been installed as per the ASME/ANSI B 31.8 standards. Pipelines design and laying is also confirms to the ANSI/ASME standards.
xxv	Annual safety audit should be carried out for the initial three years by an independent agency and report submitted to this Ministry for ensuring the strict compliance of safety regulations on operations and maintenance.	Safety audits are conducted by third party to maintain the safety standards.
xxvi	The project authorities shall petrol and inspect the pipeline regularly for detection of faults as per OISD guidelines and continuous monitoring of pipeline operation by adopting non-destructive method (s) of testing as envisaged in the EMP. Pearson survey and continuous potential survey should be carried out at regular intervals to ensure the adequacy of cathodic protection system.	Regular patrolling and inspection of laid pipeline has been carried out for detection of faults as per OISD guidelines. Pipeline operations shall be continuously monitored by adopting non-destructive methods of testing as envisaged in the EIA/EMP. Pearson survey and continuous potential survey shall be carried out at regular intervals to ensure the adequacy of cathodic protection system.
xxvii	The company shall develop a contingency plan for H2S release including all necessary recommendations from evacuation to resumption of normal operations. The workers shall be provided with personal H2S detectors in locations of high risk of exposure along with self containing breathing	H2S is not present as per the analysis of gas tapped from the test wells. However all the necessary safety measures shall be 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 have been provided with standard PPEs according to job

Sr. No.	EC Conditions	Compliance Status
	A. Specific Conditions	
	apparatus.	requirement.
xxviii	Adequate well protection system shall be provided like BoP or diverter systems as required based on the geological formation of the blocks.	Adequate well control measures along with BOP have been adopted to ensure necessary level of safety.
xxix	Blow Out Preventor (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.	CBM well hydrostatic pressures are normally less than 2psi. However considering the hydrostatic pressures and sensitivity of well, Blow Out Preventers or diverter systems have been 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.
xxx	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.
xxxi	Emergency Response Plan shall be based on the guidelines prepared by OISO, DGMS and Govt. of India. Recommendations mentioned in the Risk Assessment & Consequence Analysis and Disaster Management Plan shall be strictly followed.	Emergency Response plan has been prepared as per the OISD & DGMS guidelines. Recommendations mentioned in risk assessment and consequence analysis are being duly implemented.
xxxii	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 have been implemented.

Sr. No.	EC Conditions	Compliance Status
	A. Specific Conditions	
xxxiii	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 plan 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 unsuitable 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.
xxxiv	Occupational health surveillance of the workers shall be carried out as per the prevailing Acts and Rules.	All employees have undergone Pre-employment Medical Examination. Periodical Occupational Health Surveillance will be conducted and records maintained.
xxxv	In case the commercial viability of the project is established, the Company shall prepare a detailed plan for development of gas fields and obtain fresh environmental clearance from the Ministry.	MoEF granted amendment in phase II EC for drilling 4 nos. of additional supporting wells at each well site to meet the production capacity over and above 5 lakh m3 per day.
xxxvi	All the commitments made to the public during the Public Hearing / Public Consultation meeting held on 26th March, 2010 shall be satisfactorily implemented.	Commitments made during the Public Hearing are under implementation.
xxxvii	Company shall adopt Corporate Environment Policy as per the Ministry's O.M. No. J-11 013/41/2006-1A.II(1) dated 26th April, 2011 and implemented.	Corporate Environmental Policy is in place and being implemented. (A copy of the Policy is attached with previous compliance report)
xxxviii	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as	We do not intend to bring labor from outside; hence construction of colony is not envisaged. We have been hiring local labour for all construction work.

Sr. No.	EC Conditions	Compliance Status
	A. Specific Conditions	
	fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project	Nonetheless, we are providing all the necessary infrastructure and facilities like porta cabins, mobile toilets, soak pit & septic tank, safe drinking water, medical health care, creche, etc.

Sr. No.	EC Conditions	Compliance Status
General Condition		
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 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	For any further expansion and modification in project configuration, we would approach MoEF for the prior Environmental Clearance.
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 obtained for	We comply with the rules and regulations with regard to handling and disposal of Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008. Authorization from the West Bengal Pollution Control Board has been obtained with regard to storage,

Sr. No.	EC Conditions	Compliance Status
General Condition		
	collections/ treatment/ storage/disposal of hazardous wastes	treatment and disposal of hazardous waste.
V	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).	Acoustic hoods, silencers, enclosures will be provided to high noise generating equipment. Noise levels will be restricted to the standards prescribed under EPA Rules, 1989. Regular noise monitoring has been carried out.
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.	A dedicated environment management Cell consist of 14 persons (10 person for water and drill waste Management & 4 person for other environmental compliance) is currently in operation and functioning for implementation of environment management plan at large. 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. 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. The sampling and analysis of environmental parameters is been carried out by Scientific Research laboratory (MoEF recognized).
vii	As proposed, Rs. 7.80 Crores earmarked for environment protection and pollution control measures shall be used to implement the conditions stipulated by the Ministry of	The environment expenditure for the environment activities has been attached as ***Annexure VIII***.

Sr. No.	EC Conditions	Compliance Status
General Condition		
	Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided shall not be diverted for any other purposes.	
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 has been and will be 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 of environmental clearances are regularly submitted to Regional office of MoEF.
ix	A copy of clearance letter shall be sent by the proponent to concerned Panchayat, ZilaParishad / 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 Environmental Clearance (EC) has been circulated to the local administration and was uploaded on the Company's website.
x	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 WBPCB. The criteria pollutant levels namely; SPM, RSPM, S02, 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 has been carried out as per revised NAAQM criteria. The criteria pollutant levels namely; SPM, RSPM, S02, NOx, HC (Methane & Non-methane), VOCs has been monitored periodically and displayed at the main entrance of the Gas Gathering Station.

Sr. No.	EC Conditions	Compliance Status
General Condition		
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.
xii	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 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 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 advertisement was published in The Telegraph Calcutta and Anand Bazaar Pathrika on 30th September, 2011. A copy of the same has been submitted in the compliance report during the period Apr'11-Sep'11.

Sr. No.	EC Conditions	Compliance Status
General Condition		
	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	
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	Financial closure has been prepared in the year of 2010. The development work was commenced on 7th Dec, 2011 after obtaining consent to establish from WBPCB.

Essar Oil Limited

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

(October'16- March'17)

Ref: Environment Clearance no. F. No. J-11011/351/2009- IA II (I) dated 18.06.2012

Sr. No.	EC Conditions	Compliance Status
4(I)	As proposed, supporting wells (4 nos.) on each pilot-cum-production wells (58 nos.) shall be drilled upto a depth of 1000m. No additional wells/support well shall be drilled without prior permission of this Ministry.	4 supporting wells will be drilled at each pilot-cum-production wells (58x4=232 wells). No additional wells will be drilled without prior approval from MoEF.
4(ii)	Unit shall monitor ground water table within one Km radius of each well during pre-monsoon (i.e. May) and winter season (November). Trend analysis shall be carried out and report shall be submitted to the Ministry's regional office at Bhubaneswar	Monitoring of ground water table has been carried out in the month of November'2016 (post-monsoon). The ground water table data and the analysis of ground water report is attached as ***Annexure*- IX.**
4(iii)	Permission from CGWA for dewatering shall be obtained and submitted to the Ministry's Regional Office at Bhubaneswar.	Dewatering is an inherent process of CBM extraction & carried at much deeper depths (>500m) which does not disturb the usable drinking water aquifers located at the shallow depths. "No Objections Certificate" regarding the same has been obtained from State Water Investigation Directorate, Water Resources Investigation & Development Department, Govt. of West Bengal. (A copy of the letter is attached with previous compliance report).
4(iv)	Smokeless flare shall be installed	Smokeless flares will be installed for complete combustion of CBM. Flaring will be carried out only during process upsets.

Sr. No.	EC Conditions	Compliance Status
4(v)	All measures shall be taken to control noise pollution during drilling process. Acoustic enclosure/barrier shall be installed	Only silent DG sets meeting the specifications of CPCB are used. Acoustic enclosures have been provided to major noise generating equipment (Diesel Generators Sets). Earplugs have been provided to the working personnel at the site.
4(vi)	Any produced water shall be treated and recycled/reused within the project area. Any excess water shall be discharged after treatment and meeting the standards prescribed by the CPCB/SPCB. Regular water quality monitoring shall be carried out and monitoring report shall be submitted to the respective Regional Office of the MoEF.	Produced water is treated by Reverse Osmosis System. Treated water is being used for drilling & construction activities of other wells. Excess water will be discharged to the streams only after meeting the discharge standards. Treated Water quality monitoring reports are attached as ***Annexure-IV*** and discharged water quality monitoring reports are attached as ***Annexure IV (a).***
4(vii)	Approach road shall be constructed prior to the drilling	Approach roads are being constructed wherever the access is not available.
4(viii)	Land subsidence shall be monitored regularly and monitoring report shall be submitted to CPCB, SPCB and respective Ministry's regional office	Half yearly subsidence monitoring was performed at all Monitoring Stations established by National Institute of Technology (NIT), Durgapur in March'2017. The Subsidence study report is awaited from NIT, Durgapur.
5	All the specific conditions and general conditions specified in the environmental clearance accorded vide Ministry's letter no.J-11011/351/2009-IA II (I) dated 23rd September, 2011 shall be implemented	All the specific and general conditions of the Phase-II Environmental Clearance are being implemented.
6	Consent to Establish & Operate for the revised proposal shall be obtained from the W.B. Pollution Control Board	Regular CTE & CTO will be obtained from Pollution Control Board and will be submitted to MoEF.
7	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests. In case of deviations or alterations in the project proposal from	No further expansion or modification will be done in the project configuration without prior approval from the MoEF.

Sr. No.	EC Conditions	Compliance Status
	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 if required, if any.	

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	29.1	54.5	58.9	58.3	62.7	35.8
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	77.19	156.84	145.98	108.60	173.26	64.73
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	32.19	32.78	37.32	31.80	5.72	6.06
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	6.21	6.14	6.8261007	5.84	36.47	33.18
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.4	0.4	0.4	0.4	0.3	0.4
6	THC as Methane	mg/m3	-	1.96	1.17	1.88	1.33	1.52	1.83
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	3.1	-	-	3.9	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.61	-	-	0.56	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	26.46	-	-	21.6	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	36	-	-	35.02	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.11	-	-	0.18	-	-
14	Nickel (Ni)	ng/m^3	20	8.52	-	-	14.96	-	-
15	Arsenic	ng/m^3	6	1.12	-	-	1.32	-	-
16	Benzene	$\mu g/m^3$	5	2.03	-	-	2.76	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	25.42	70.63	46.18	57.36	59.93	34.42
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	68.35	176.88	88.92	146.32	155.35	75.33
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	31.4	34.9	37.67	37.1	5.6	6.4
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	6.1	6.8	6.90	7.3	35.7	32.7
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.40	0.35	0.354	0.36	0.37	0.40
6	THC as Methane	mg/m3	-	1.62	1.59	1.47	1.76	1.38	1.56
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	2.9	-	-	4.6	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.5	-	-	0.9	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	20.83	-	-	20.24	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	34.54	-	-	29.26	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.09	-	-	0.17	-	-
14	Nickel (Ni)	ng/m^3	20	8.56	-	-	15.65	-	-
15	Arsenic	ng/m^3	6	1.26	-	-	1.3	-	-
16	Benzene	$\mu g/m^3$	5	1.92	-	-	3.39	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	42.21	51.7	51.33	50.3	28.28	48.85
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	99.24	122.56	90.21	135.22	67.29	129.36
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	34.94	28.95	30.80829	32.62	6.44	6.2
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	6.22	6.18	6.212357	5.9	34.84	34.5
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.434	0.462	0.462	0.398	0.422	0.34
6	THC as Methane	mg/m3	-	1.48	1.48	1.31	1.45	1.56	1.32
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	3.04	-	-	4.22	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.69	-	-	0.82	-	-
11	Ammonia (NH_3)	µg/m^3	400	22.52	-	-	21.37	-	-
12	Ozone (O_3)	µg/m^3	100	44.68	-	-	40.37	-	-
13	Lead (Pb)	µg/m^3	1	0.15	-	-	0.14	-	-
14	Nickel (Ni)	ng/m^3	20	12.36	-	-	10.42	-	-
15	Arsenic	ng/m^3	6	1.32	-	-	1.28	-	-
16	Benzene	µg/m^3	5	2.12	-	-	3.04	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	51.79	57.6	47.38	55.07	68.74	48.5
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	122.53	134.16	82.27	135.89	168.76	104.61
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	36.5	32.1	33.05	35.58	6.38	6.19
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	7.52	6.6	6.71	6.29	35.36	34.28
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.356	0.284	0.284	0.368	0.402	0.38
6	THC as Methane	mg/m3	-	1.3	1.39	1.24	1.58	1.54	1.66
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	4.02	-	-	4.13	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.95	-	-	0.68	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	26.49	-	-	20.97	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	47.16	-	-	34.26	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.17	-	-	0.22	-	-
14	Nickel (Ni)	ng/m^3	20	11.51	-	-	15.6	-	-
15	Arsenic	ng/m^3	6	1.39	-	-	1.2	-	-
16	Benzene	$\mu g/m^3$	5	3.17	-	-	3.25	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	32.13	68.2	68.29	42.66	41.70	45.43
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	83.38	187.91	173.52	93.25	116.78	113.94
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	32.12	34.89	32.26562	31.8	5.6	5.8
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	5.5	6.17	6.188845	5.1	36.6	38.1
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.426	0.398	0.398	0.40	0.41	0.34
6	THC as Methane	mg/m3	-	1.64	1.88	1.96	1.24	1.56	1.49
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	2.39	-	-	2.73	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.82	-	-	0.37	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	24.27	-	-	17.64	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	42.63	-	-	36.26	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.15	-	-	0.15	-	-
14	Nickel (Ni)	ng/m^3	20	11.29	-	-	9.78	-	-
15	Arsenic	ng/m^3	6	1.1	-	-	1.2	-	-
16	Benzene	$\mu g/m^3$	5	1.75	-	-	1.89	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	43.24	55.64	64.75	57.52	50.95541	55.51
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	101.47	153.64	143.33	152.3	142.8296	145.03
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	34.25	30.26	31.8623	39.73	6.01	5.47
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	6.3	6.4	6.796678	6.22	32.91	31.56
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.472	0.418	0.418	0.466	0.478	0.419
6	THC as Methane	mg/m3	-	1.52	1.32	1.75	1.75	1.64	1.78
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	3.57	-	-	4.76	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.74	-	-	0.89	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	27.84	-	-	26.13	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	36.46	-	-	37.26	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.16	-	-	0.18	-	-
14	Nickel (Ni)	ng/m^3	20	14.43	-	-	12.87	-	-
15	Arsenic	ng/m^3	6	1.2	-	-	1.21	-	-
16	Benzene	$\mu g/m^3$	5	2.39	-	-	3.89	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	30.4	69.46	77.60	41.12	45.75	51.99
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	75.29	169.58	169.50	99.58	84.55	143.78
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	35.32	30.02	37.66	39.68	6.07	5.73
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	5.94	5.55	6.58	6.52	34.15	32.24
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.416	0.392	0.392	0.384	0.398	0.408
6	THC as Methane	mg/m3	-	1.44	1.36	1.71	1.39	1.62	1.74
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	2.57	-	-	3.68	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.71	-	-	0.45	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	24.21	-	-	18.43	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	42.1	-	-	40.36	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.14	-	-	0.16	-	-
14	Nickel (Ni)	ng/m^3	20	10.48	-	-	13.17	-	-
15	Arsenic	ng/m^3	6	1.11	-	-	1.3	-	-
16	Benzene	$\mu g/m^3$	5	1.64	-	-	2.37	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	55.39	69.68	67.68	57.05	56.20	81.13
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	122.13	167.51	169.04	148.89	161.51	177.15
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	40.11	36.63	33.53133998	41.42	6.18	5.84
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	6.9	6.63	6.018432322	5.14	34.24	34.41
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.464	0.388	0.388	0.432	0.455	0.284
6	THC as Methane	mg/m3	-	1.53	1.55	1.89	1.98	1.62	1.43
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	4.05	-	-	4.74	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.94	-	-	0.93	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	23.65	-	-	18.26	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	33.76	-	-	39.82	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.16	-	-	0.19	-	-
14	Nickel (Ni)	ng/m^3	20	12.37	-	-	11.72	-	-
15	Arsenic	ng/m^3	6	1.41	-	-	1.42	-	-
16	Benzene	$\mu g/m^3$	5	3.14	-	-	3.77	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	43.55	44.71	53.28	68.54	46.72	37.61
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	119.13	96.25	116.25	148.57	129.94	80.29
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	38.58	31.8	41.25519593	36.62	6.43	6.59
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	6.62	6.98	7.642543358	6.87	35.24	36.55
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.506	0.464	0.464	0.484	0.432	0.398
6	THC as Methane	mg/m3	-	1.42	1.69	1.63	1.64	1.78	1.53
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	4.04	-	-	4.91	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.87	-	-	0.79	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	16.89	-	-	15.73	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	36.14	-	-	38.26	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.15	-	-	0.24	-	-
14	Nickel (Ni)	ng/m^3	20	12.47	-	-	14.15	-	-
15	Arsenic	ng/m^3	6	1.16	-	-	1.13	-	-
16	Benzene	$\mu g/m^3$	5	3.05	-	-	4.02	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	40.47	59.52	67.22	62.16	42.68	42.19
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	99.37	144.47	132.89	155.51	103.85	100.51
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	33.4	34.26	33.30400542	35.55	6.11	6.87
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	5.56	6.64	6.4973073	6.21	36.41	42.53
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.348	0.308	0.308	0.322	0.356	0.324
6	THC as Methane	mg/m3	-	1.24	1.66	1.85	1.91	1.88	2.02
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	3.13	-	-	4.88	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.76	-	-	0.91	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	18.02	-	-	17.13	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	37.73	-	-	36.28	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.14	-	-	0.2	-	-
14	Nickel (Ni)	ng/m^3	20	9.24	-	-	16.72	-	-
15	Arsenic	ng/m^3	6	1.1	-	-	1.31	-	-
16	Benzene	$\mu g/m^3$	5	2.24	-	-	4.06	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	53.57	67.07	51.06	50.12	61.67	30.49
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	113.93	195.14	107.85	136.55	152.44	66.64
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	38.76	36.54	39.826258	32.76	5.76	6.29
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	7.11	6.92	6.9760563	6.85	37.73	42.91
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.584	0.476	0.476	0.488	0.426	0.392
6	THC as Methane	mg/m3	-	1.38	1.84	1.57	1.51	1.84	1.97
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	3.97	-	-	4.48	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.82	-	-	0.71	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	21.96	-	-	27.42	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	33.53	-	-	37.36	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.15	-	-	0.2	-	-
14	Nickel (Ni)	ng/m^3	20	12.5	-	-	16.1	-	-
15	Arsenic	ng/m^3	6	1.21	-	-	1.11	-	-
16	Benzene	$\mu g/m^3$	5	2.84	-	-	3.64	-	-

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

Compliance Period: Oct'16 to Mar'17

ANNEXURE I

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/m3	60 (24 hrs)	32.26	47.57	57.05	67.82	36.53	49.34
2	Particulate Matter 10 (PM10)	µg/m3	100 (24 hrs)	82.92	119.39	120.45	161.74	60.09	87.62
3	Nitrogen Dioxide (NO2)	µg/m3	80 (24 hrs)	34.69	28.6	35.537967	36.39	6.06	6.82
4	Sulphur Dioxide (SO2)	µg/m3	80 (24 hrs)	6.18	5.35	6.8004601	6.78	34.98	41.47
5	Carbon Monoxide (CO)	mg/m3	2 (8 hrs)	0.418	0.386	0.386	0.386	0.386	0.358
6	THC as Methane	mg/m3	-	1.3	1.24	1.66	1.67	1.74	1.67
7	Mercury	µg/m3	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m3	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m3	-	2.82	-	-	4.58	-	-
10	Benzo(a)Pyrene	ng/m^3	1	0.64	-	-	0.98	-	-
11	Ammonia (NH_3)	$\mu g/m^3$	400	20.83	-	-	23.36	-	-
12	Ozone (O_3)	$\mu g/m^3$	100	36.14	-	-	40.37	-	-
13	Lead (Pb)	$\mu g/m^3$	1	0.16	-	-	0.19	-	-
14	Nickel (Ni)	ng/m^3	20	10.37	-	-	14.54	-	-
15	Arsenic	ng/m^3	6	1.22	-	-	1.27	-	-
16	Benzene	$\mu g/m^3$	5	1.97	-	-	3.52	-	-

Produced Water Analysis Report of CBM Raniganj Project E1 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDN-172 V1	EDN-169 V1	EDN-103 D1	EDIE-115 V1	EDI-042 V1
Date				03.10.2016	03.10.2016	03.10.2016	03.10.2016	03.10.2016
1	pH		5.5 to 9.0	6.72	6.81	7.13	7.98	7.53
2	Total Suspended Solids	mg/l	100	70	88	21	8	4
3	Total Dissolved Solids	mg/l	---	11120	10722	10242	2648	9422
4	Turbidity	NTU	---	621	922	130.6	32.9	12.5
5	Acidity as $CaCO_3$	mg/l	---	33.3	29.4	25.5	27.4	24
6	Total Alkalinity as Calcium Carbonate	mg/l	---	1634.9	1406.1	1227.2	432.6	1069.2
7	Chloride	mg/l	---	7561.5	6939.3	4163.6	1005	3110.7
8	Total Hardness	mg/l	---	1497.7	1148.5	356.9	54.3	322
9	Sulphate	mg/l	---	14.8	12.7	10.8	<2.5	11.8
10	Calcium	mg/l		432.3	381	105.7	15.6	99.5
11	Magnesium	mg/l	---	101.8	48.1	22.6	3.8	17.9
12	Dissolved Oxygen	mg/l	---	5.9	6.2	6	5.7	5.6
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	5	4	3	2	<2
14	Chemical Oxygen Demand	mg/l	250	25	22.6	18	10	<8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	9.5	8.6	7.3	2.4	3.8
19	Ammoniacal Nitrogen	mg/l	---	6.07	4.93	4.3	1.48	4.48
20	Iron	mg/l	---	63.2	71.7	42.2	3.1	0.93
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.017	0.018	0.025	0.019	0.027
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDN-172 V1	EDN-169 V1	EDN-103 D1	EDIE-115 V1	EDI-042 V1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	68.7	69.6	112.4	102.6	91.4
30	Phosphorus	mg/l	---	0.29	0.23	0.22	0.17	0.15
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.247	0.311	0.215	0.063	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	1944	1715.4	1497.2	527.8	13061.4
41	Electrical Conductivity	µmhos/cm	---	17920	15950	13110	4285	1260
42	Sodium	mg/l	---	6120	5430	4870	1750	3760
	Potassium	mg/l	---	11.7	10.6	10.2	6.7	8.8

Produced Water Analysis Report of CBM Raniganj Project E3 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDH-035 D1	EDH-033 D5	EDH-031 V1	EDH-56 D1	EDH-11 V1
Date				03.10.2016	03.10.2016	03.10.2016	03.10.2016	03.10.2016
1	pH		5.5 to 9.0	8.07	7.95	7.32	7.54	8.75
2	Total Suspended Solids	mg/l	100	9	7	8	6	<2
3	Total Dissolved Solids	mg/l	---	4954	3948	12028	3852	1476
4	Turbidity	NTU	---	37.8	28.4	173.4	118.4	6.8
5	Acidity as $CaCO_3$	mg/l	---	11.8	19.6	23.5	25.5	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	740.5	278.7	1185.6	241.3	128.9
7	Chloride	mg/l	---	622.1	526.4	7752.9	765.7	382.8
8	Total Hardness	mg/l	---	50.4	38.8	985.5	58.2	31
9	Sulphate	mg/l	---	6.9	6	16.7	6.4	<2.5
10	Calcium	mg/l		15.6	12.4	321.9	17.1	7.8
11	Magnesium	mg/l	---	2.8	1.9	44.3	3.8	2.8
12	Dissolved Oxygen	mg/l	---	6.3	6	6.5	5.8	6
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	6	2	<2	3	<2
14	Chemical Oxygen Demand	mg/l	250	37	14	<8	22.6	<8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	2.9	2.6	10.1	1.05	0.91
19	Ammoniacal Nitrogen	mg/l	---	3.29	2.89	5.88	2.5	2.21
20	Iron	mg/l	---	5.3	2.6	48	31	0.81
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.015	0.016	0.036	0.038	0.044
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

Produced Water Analysis Report of CBM Raniganj Project E4 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDH-035 D1	EDH-033 D5	EDH-031 V1	EDH-56 D1	EDH-11 V1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	165.8	137.9	86.9	60.9	28.2
30	Phosphorus	mg/l	---	0.2	0.29	0.28	0.12	0.24
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.076	<0.05	0.143	0.108	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	903.4	340	1446.4	294.4	157.2
41	Electrical Conductivity	µmhos/cm	---	7983	6252	17980	5889	2356
42	Sodium	mg/l	---	2710	1980	6270	1068	362
	Potassium	mg/l	---	7.5	6.9	12.5	5.3	3.6

Produced Water Analysis Report of CBM Raniganj Project E5 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-009 V1	EDE-025 V1	EDI-037 D1	EDH-035 D1	EDE-048 D1
Date				03.10.2016	03.10.2016	04.10.2016	04.10.2016	04.10.2016
1	pH		5.5 to 9.0	8.63	8.22	7.34	8.15	8.2
2	Total Suspended Solids	mg/l	100	<2	<2	36	14	7
3	Total Dissolved Solids	mg/l	---	1746	2072	138	3980	1908
4	Turbidity	NTU	---	3.8	3.9	595	118	19.5
5	Acidity as $CaCO_3$	mg/l	---	Nil	6	23.5	6.8	5.8
6	Total Alkalinity as Calcium Carbonate	mg/l	---	183	162.2	87.4	698.9	428.5
7	Chloride	mg/l	---	4078.6	717.9	51.7	1081.5	727.4
8	Total Hardness	mg/l	---	93.1	31	23.3	54.3	42.7
9	Sulphate	mg/l	---	<2.5	<2.5	<2.5	8.9	7.5
10	Calcium	mg/l		29.5	6.2	6.2	15.6	12.4
11	Magnesium	mg/l	---	4.7	3.8	1.9	3.8	2.8
12	Dissolved Oxygen	mg/l	---	6.3	6	5.8	6.1	6
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	2	<2	<2	3	<2
14	Chemical Oxygen Demand	mg/l	250	13	<8	4.7	14	10
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	0.86	0.96	0.32	4.8	3.1
19	Ammoniacal Nitrogen	mg/l	---	2.14	2.32	1.3	4.84	3.99
20	Iron	mg/l	---	0.39	0.51	32.2	8.2	1.8
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.021	0.037	0.022	0.038	0.051
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-009 V1	EDE-025 V1	EDI-037 D1	EDH-035 D1	EDE-048 D1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	13.9	29.6	3.49	83.6	67.5
30	Phosphorus	mg/l	---	0.19	0.19	0.23	0.15	0.2
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		<0.05	<0.05	0.087	0.063	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	223.2	197.9	106.6	852.6	522.8
41	Electrical Conductivity	µmhos/cm	---	2960	3513	236	6420	3078
42	Sodium	mg/l	---	309	382	38.8	1420.5	1013
	Potassium	mg/l	---	2.9	4.1	1.9	11.4	10.8

Produced Water Analysis Report of CBM Raniganj Project E7 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDN-174 V1	EDN-170 V1	EDD-53 V-1	EDID-50 D-2	EDD-52 D-1
Date				03.11.2016	03.11.2016	03.11.2016	03.11.2016	03.11.2016
1	pH		5.5 to 9.0	7.68	7.79	8.11	7.92	8.46
2	Total Suspended Solids	mg/l	100	<2	83	11	4	<2
3	Total Dissolved Solids	mg/l	---	2852	7982	2964	2662	978
4	Turbidity	NTU	---	6.5	865	35.9	12.4	5.3
5	Acidity as $CaCO_3$	mg/l	---	8.82	7.84	6.86	9.8	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	457.6	249.6	2475.2	931.2	999.1
7	Chloride	mg/l	---	972.8	2963.6	882.7	110.7	432.5
8	Total Hardness	mg/l	---	257.4	1643.4	178	237.6	396
9	Sulphate	mg/l	---	7.2	21.7	6.8	10.3	12.9
10	Calcium	mg/l		63.5	555.5	39.6	71.4	87.2
11	Magnesium	mg/l	---	24	62.5	19.2	14.4	43.3
12	Dissolved Oxygen	mg/l	---	5.1	4.7	4.6	5.5	4.8
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	2.8	8	7	2.3	2.1
14	Chemical Oxygen Demand	mg/l	250	14	40	38	12	10
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	6.5	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	0.84	2.25	0.92	0.76	0.8
19	Ammoniacal Nitrogen	mg/l	---	2.48	5.51	4.39	3.17	1.36
20	Iron	mg/l	---	0.96	25.27	3.68	1.11	6.57
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.048	0.083	0.104	0.048	0.033
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDN-174 V1	EDN-170 V1	EDD-53 V-1	EDID-50 D-2	EDD-52 D-1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	29.5	48.7	31.5	29.7	36.8
30	Phosphorus	mg/l	---	0.28	0.31	0.23	0.25	0.29
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		<0.05	0.163	0.082	<0.05	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	558.3	304.5	3019.7	1136.1	1218.9
41	Electrical Conductivity	µmhos/cm	---	4192	11383	4532	4369	6117
42	Sodium	mg/l	---	1083	4548	968	1053	1686
	Potassium	mg/l	---	10.8	16.6	9.6	10.1	11.2

Produced Water Analysis Report of CBM Raniganj Project E9 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-28 D-5	EDD-29 V-1	EDH-35 D-4	EDD-24 V-1	EDE-043 V1
Date				03.11.2016	03.11.2016	03.11.2016	03.11.2016	03.11.2016
1	pH		5.5 to 9.0	7.62	8.21	8.56	7.96	8.07
2	Total Suspended Solids	mg/l	100	21	3	16	12	8
3	Total Dissolved Solids	mg/l	---	1536	4782	1582	998	1392
4	Turbidity	NTU	---	91.4	12.1	83.2	47.2	26.9
5	Acidity as $CaCO_3$	mg/l	---	7.84	3.92	Nil	7.84	6.86
6	Total Alkalinity as Calcium Carbonate	mg/l	---	853.6	1086.4	1996.8	717.8	488.8
7	Chloride	mg/l	---	638.5	1528.2	622.7	387.6	352.5
8	Total Hardness	mg/l	---	455.4	495	316.8	297	59.4
9	Sulphate	mg/l	---	14.2	11.5	15.3	9.6	5.9
10	Calcium	mg/l		103.1	158.7	87.2	79.3	15.8
11	Magnesium	mg/l	---	48.1	24	24	24	4.8
12	Dissolved Oxygen	mg/l	---	4.4	4.8	4.7	4.5	4.2
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	4	3.5	19	3.5	3.3
14	Chemical Oxygen Demand	mg/l	250	21	18	65	17	17
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	1.04	0.94	0.91	0.72	0.58
19	Ammoniacal Nitrogen	mg/l	---	4.62	2.79	5.88	3.62	3.32
20	Iron	mg/l	---	9.57	1.44	8.41	4.97	4.13
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.138	0.045	0.246	0.121	0.098
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-28 D-5	EDD-29 V-1	EDH-35 D-4	EDD-24 V-1	EDE-043 V1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	52.5	35.9	65.7	43.6	22.9
30	Phosphorus	mg/l	---	0.33	0.35	0.28	0.26	0.23
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.092	<0.05	0.144	0.105	0.088
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	1041.4	1325.4	2436.1	875.7	596.3
41	Electrical Conductivity	µmhos/cm	---	7362	8104	7139	5174	2244
42	Sodium	mg/l	---	2577	1836	2681	1721	512.4
	Potassium	mg/l	---	14.3	12.1	13	11.7	5

Produced Water Analysis Report of CBM Raniganj Project E11 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDP-98 D-2	EDH-29 D-2	EDD-52 D-2	EDD-50 D-2	EDE-048 D-1
Date				03.11.2016	03.12.2016	03.12.2016	03.12.2016	03.12.2016
1	pH		5.5 to 9.0	7.52	7.46	7.81	8.09	8.42
2	Total Suspended Solids	mg/l	100	37	9	6	4	<2
3	Total Dissolved Solids	mg/l	---	11012	5242	2784	2318	2012
4	Turbidity	NTU	---	184	33.6	21.7	11.9	6.8
5	Acidity as $CaCO_3$	mg/l	---	9.8	17.6	12.7	8.8	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	821.6	327.40	126.3	99.7	186.2
7	Chloride	mg/l	---	3875.4	1026	437	397	511.4
8	Total Hardness	mg/l	---	772.2	237.60	201.9	198	190
9	Sulphate	mg/l	---	27.6	5.3	<2.5	<2.5	6.8
10	Calcium	mg/l		198.3	76.1	66.6	61.8	47.6
11	Magnesium	mg/l	---	67.3	11.5	8.6	10.5	17.3
12	Dissolved Oxygen	mg/l	---	5.1	5.8	6.1	6.3	5.4
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	5.7	3	<2	<2	3
14	Chemical Oxygen Demand	mg/l	250	28	10.0	<8	<8	8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	2.6	1.45	1.5	2.1	0.8
19	Ammoniacal Nitrogen	mg/l	---	4.23	3.26	2.11	2.48	1.9
20	Iron	mg/l	---	10.98	4.33	3.91	1.46	0.66
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.156	0.044	0.021	0.032	0.024
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDP-98 D-2	EDH-29 D-2	EDD-52 D-2	EDD-50 D-2	EDE-048 D-1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	100.3	18.8	9.6	8.6	8.5
30	Phosphorus	mg/l	---	0.26	0.29	0.16	0.17	0.19
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.216	0.107	0.082	<0.05	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	1002.4	399.4	154.1	121.6	227.2
41	Electrical Conductivity	µmhos/cm	---	14846	7943	4278	3622	3048
42	Sodium	mg/l	---	6398	670.0	312	280	268
	Potassium	mg/l	---	18.2	18.7	11.3	10.2	8.7

Produced Water Analysis Report of CBM Raniganj Project E13 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDI-70 D-1	EDI-120 V-1	EDI-36 V-1	EDH-64 D-1	EDN-171 V1
Date				03.12.2016	03.12.2016	03.12.2016	03.12.2016	03.12.2016
1	pH		5.5 to 9.0	7.74	7.39	7.95	8.31	8.04
2	Total Suspended Solids	mg/l	100	17	14	3	<2	<2
3	Total Dissolved Solids	mg/l	---	10918	11840	4382	3114	1692
4	Turbidity	NTU	---	92.6	80.4	10.2	7.6	5.8
5	Acidity as $CaCO_3$	mg/l	---	11.7	16.6	9.8	Nil	7.8
6	Total Alkalinity as Calcium Carbonate	mg/l	---	1143	1215.2	340.2	276	112.5
7	Chloride	mg/l	---	4271.5	4819.2	1262	732	317.9
8	Total Hardness	mg/l	---	1346.4	1326.6	225.7	194	150.4
9	Sulphate	mg/l	---	18.3	21	9.2	5.1	<2.5
10	Calcium	mg/l		341.2	380.9	66.6	55.5	34.9
11	Magnesium	mg/l	---	120.2	91.4	14.4	13.4	15.3
12	Dissolved Oxygen	mg/l	---	5.1	4.9	6.4	6.2	6.1
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	5	7	<2	<2	<2
14	Chemical Oxygen Demand	mg/l	250	16	22	<8	<8	<8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	8.9	5.3	2.4	1.1	0.75
19	Ammoniacal Nitrogen	mg/l	---	5.1	4.9	3.47	2.73	2.07
20	Iron	mg/l	---	12.4	9.65	1.15	0.91	0.62
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.087	0.096	0.044	0.026	0.017
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

Produced Water Analysis Report of CBM Raniganj Project E14 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDI-70 D-1	EDI-120 V-1	EDI-36 V-1	EDH-64 D-1	EDN-171 V1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	37.7	48	29.3	22.8	7.3
30	Phosphorus	mg/l	---	0.46	0.58	0.37	0.32	0.23
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.211	0.146	0.075	<0.05	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	1394.5	1482.5	415	336.7	136.9
41	Electrical Conductivity	µmhos/cm	---	16530	17940	674	4791	2644
42	Sodium	mg/l	---	3180	4022	1011	732	208
	Potassium	mg/l	---	22.4	20.4	12.2	11.3	7.6

Produced Water Analysis Report of CBM Raniganj Project E15 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-26 D-1	EDD-72 V-1	EDI-041 V-1	EDH-68 D-1	EDH-68 D-3
Date				08.12.2016	08.12.2016	08.12.2016	08.12.2016	08.12.2016
1	pH		5.5 to 9.0	7.64	8.11	7.81	8.06	8.16
2	Total Suspended Solids	mg/l	100	<2	2	3	11	7
3	Total Dissolved Solids	mg/l	---	2392	2314	5294	5704	5168
4	Turbidity	NTU	---	5.1	7.5	11.4	21.7	15.6
5	Acidity as $CaCO_3$	mg/l	---	12.7	4.9	9.8	10.7	12.7
6	Total Alkalinity as Calcium Carbonate	mg/l	---	209.3	191.5	298.6	412	327
7	Chloride	mg/l	---	518	485.3	2012.4	1143.5	1248
8	Total Hardness	mg/l	---	178.2	166.3	198	205.9	209.8
9	Sulphate	mg/l	---	6.3	4.8	11.7	10.2	9.6
10	Calcium	mg/l		44.4	49.2	60.3	76.1	65
11	Magnesium	mg/l	---	16.3	10.5	11.5	3.8	11.5
12	Dissolved Oxygen	mg/l	---	6.5	6.2	5.9	4.9	5.2
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	<2	<2	4	3
14	Chemical Oxygen Demand	mg/l	250	<8	<8	<8	14	11
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	1.2	0.8	2.4	3.2	2.8
19	Ammoniacal Nitrogen	mg/l	---	3.32	2.87	4.55	4.06	3.52
20	Iron	mg/l	---	1.8	2.46	3.11	5.62	4.3
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.037	0.029	0.052	0.048	0.033
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-26 D-1	EDD-72 V-1	EDI-041 V-1	EDH-68 D-1	EDH-68 D-3
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	13.9	13.9	18.8	21.4	21.7
30	Phosphorus	mg/l	---	0.28	0.24	0.39	0.41	0.35
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		<0.05	0.086	0.092	0.127	0.105
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	255.3	233.6	364.3	502.6	398.9
41	Electrical Conductivity	µmhos/cm	---	4511	3539	8146	8775	7952
42	Sodium	mg/l	---	431	412	612	704	722
	Potassium	mg/l	---	9.5	8.8	11.9	15.4	13.1

Produced Water Analysis Report of CBM Raniganj Project E17 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDN-184 D3	EDN-184 D-4	EDD-405 D-1	EDD-54 D-4	EDD-54 D-3
Date				10.01.2017	10.01.2017	10.01.2017	10.01.2017	10.01.2017
1	pH		5.5 to 9.0	8.22	7.73	8.47	7.24	7.86
2	Total Suspended Solids	mg/l	100	4	<2	<2	9	16
3	Total Dissolved Solids	mg/l	---	2148	1094	2092	4122	3488
4	Turbidity	NTU	---	11.2	1.8	1.5	36.7	81.9
5	Acidity as $CaCO_3$	mg/l	---	4.9	11.8	Nil	17.6	10.8
6	Total Alkalinity as Calcium Carbonate	mg/l	---	121.70	83.1	97.6	209.5	192.4
7	Chloride	mg/l	---	927.5	460.6	912.1	1435.7	1276.3
8	Total Hardness	mg/l	---	150.40	90.2	156.8	164.6	176.4
9	Sulphate	mg/l	---	9.5	7.3	12.7	12.6	10.5
10	Calcium	mg/l		47.1	28.3	34.6	34.6	36.1
11	Magnesium	mg/l	---	7.6	4.8	17.1	19.1	21
12	Dissolved Oxygen	mg/l	---	5.9	6.3	6.2	5.8	5.6
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	<2	<2	2	3
14	Chemical Oxygen Demand	mg/l	250	<8	<8	<8	10	11
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	0.88	0.71	1.1	2.1	1.98
19	Ammoniacal Nitrogen	mg/l	---	0.26	0.14	0.33	0.42	0.35
20	Iron	mg/l	---	2.65	0.59	0.48	3.6	8.9
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.084	0.121	0.147	0.091	0.133
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDN-184 D3	EDN-184 D-4	EDD-405 D-1	EDD-54 D-4	EDD-54 D-3
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	30.2	4.6	32.4	39.1	34.2
30	Phosphorus	mg/l	---	0.19	0.14	0.34	0.39	0.28
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.112	0.082	<0.05	0.207	0.256
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	148.5	101.4	119.1	255.6	234.7
41	Electrical Conductivity	µmhos/cm	---	2691	1442	3020	5782	4752
42	Sodium	mg/l	---	852.0	230	834	1152	1045
	Potassium	mg/l	---	10.3	8.8	14.5	16.5	15.2

Produced Water Analysis Report of CBM Raniganj Project E19 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-26 D-3	EDE-048 D-2	EDD-21 D-3	EDD-21 D-1	EDD-21 D-2
Date				10.01.2017	10.01.2017	10.01.2017	10.01.2017	10.01.2017
1	pH		5.5 to 9.0	7.61	8.3	8.41	7.92	8.17
2	Total Suspended Solids	mg/l	100	12	2	<2	9	<2
3	Total Dissolved Solids	mg/l	---	2772	2534	2492	4286	3858
4	Turbidity	NTU	---	55.2	2.5	1.7	12.2	2
5	Acidity as $CaCO_3$	mg/l	---	12.7	Nil	Nil	9.8	9.8
6	Total Alkalinity as Calcium Carbonate	mg/l	---	100.3	76.2	65.3	119.7	211
7	Chloride	mg/l	---	1120.1	832.4	930.5	1920.1	1831.5
8	Total Hardness	mg/l	---	150.4	164.6	168.6	109.8	150.4
9	Sulphate	mg/l	---	9.9	9.3	8.2	10.1	7.5
10	Calcium	mg/l		47.1	34.6	44	28.2	44
11	Magnesium	mg/l	---	7.6	19.1	14.3	9.5	9.5
12	Dissolved Oxygen	mg/l	---	5.3	6.1	6.8	6.2	6.2
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	4	<2	<2	<2	<2
14	Chemical Oxygen Demand	mg/l	250	21	<8	<8	<8	<8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	3.2	3.2	1.8	2.9	1.2
19	Ammoniacal Nitrogen	mg/l	---	0.29	2.27	3.19	4.3	2.11
20	Iron	mg/l	---	4.1	0.63	0.57	1.86	1.07
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.078	0.139	0.127	0.211	0.092
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-26 D-3	EDE-048 D-2	EDD-21 D-3	EDD-21 D-1	EDD-21 D-2
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	36.6	36.6	39.8	39.7	72.5
30	Phosphorus	mg/l	---	0.41	0.27	0.19	0.3	0.15
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.219	<0.05	<0.05	<0.05	0.085
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	122.4	93	79.7	146	257.4
41	Electrical Conductivity	µmhos/cm	---	3864	3591	3421	5826	5392
42	Sodium	mg/l	---	1032	1080	1190	2141	2046
	Potassium	mg/l	---	14.2	9.5	8.8	10.9	11.7

Produced Water Analysis Report of CBM Raniganj Project E21 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDH-44 D-2	EDH-44 D-3	EDH-64 D-2	EDI-38 D-1	EDI-39 V-1
Date				10.01.2017	10.01.2017	10.01.2017	10.01.2017	10.01.2017
1	pH		5.5 to 9.0	7.84	7.92	8.16	8.25	7.97
2	Total Suspended Solids	mg/l	100	2	5	2	<2	<2
3	Total Dissolved Solids	mg/l	---	6446	5422	4724	5432	4126
4	Turbidity	NTU	---	3.6	14.7	6.6	2.8	3.1
5	Acidity as $CaCO_3$	mg/l	---	11.8	10.8	9.8	4.9	10.8
6	Total Alkalinity as Calcium Carbonate	mg/l	---	120.5	250.4	311	280.5	214.9
7	Chloride	mg/l	---	1532	1920.3	1752.4	1832.9	1960.4
8	Total Hardness	mg/l	---	407.7	356.7	356.7	164.6	150.4
9	Sulphate	mg/l	---	10.9	13.5	11.5	9.9	16.1
10	Calcium	mg/l		127.3	127.3	122.5	50.3	34.6
11	Magnesium	mg/l	---	21.9	9.5	12.4	9.5	15.2
12	Dissolved Oxygen	mg/l	---	6.8	5.5	5.9	6.2	6.4
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	<2	<2	<2	<2
14	Chemical Oxygen Demand	mg/l	250	<8	11	<8	<8	<8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	1.95	2.25	1.5	1.65	1.8
19	Ammoniacal Nitrogen	mg/l	---	3.46	4.17	2.45	3.11	2.96
20	Iron	mg/l	---	2.45	2.92	0.98	0.7	0.65
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.043	0.097	0.102	0.133	0.121
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDH-44 D-2	EDH-44 D-3	EDH-64 D-2	EDI-38 D-1	EDI-39 V-1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	72.8	62.4	46.7	93	71.2
30	Phosphorus	mg/l	---	0.25	0.32	0.23	0.49	0.57
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.149	0.159	0.131	0.075	0.059
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	147	305.5	379.4	342.2	262.2
41	Electrical Conductivity	µmhos/cm	---	9161	7643	5642	7511	6195
42	Sodium	mg/l	---	3382	2710	2027	2745	2008
	Potassium	mg/l	---	18.3	12.5	17.2	12.1	10.5

Produced Water Analysis Report of CBM Raniganj Project E23 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDN-162 D3	EDI-71 D-1	EDD-70 D-3	EDI-41 D-2	EDI-39 D-3
Date				08.02.2017	08.02.2017	08.02.2017	08.02.2017	08.02.2017
1	pH		5.5 to 9.0	7.62	7.33	7.52	7.49	8.05
2	Total Suspended Solids	mg/l	100	<2	<2	<2	8	5
3	Total Dissolved Solids	mg/l	---	4122	10296	8504	3388	3822
4	Turbidity	NTU	---	4.5	6.8	3.3	21.8	15.3
5	Acidity as $CaCO_3$	mg/l	---	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	1024.00	1670	1521	912	826.1
7	Chloride	mg/l	---	1450.3	1927.5	1803.2	1832.2	1905.2
8	Total Hardness	mg/l	---	104.00	180	152	84	88
9	Sulphate	mg/l	---	10.3	16.7	15.2	8.4	9.2
10	Calcium	mg/l		32.1	56.1	8.1	28.9	25.7
11	Magnesium	mg/l	---	5.8	9.7	7.8	2.9	5.8
12	Dissolved Oxygen	mg/l	---	6.1	6.5	6	4.1	5.2
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	<2	<2	4	<2
14	Chemical Oxygen Demand	mg/l	250	<8	<8	<8	12	8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	2.41	5.11	4.55	1.47	2.26
19	Ammoniacal Nitrogen	mg/l	---	1.12	2.48	2.83	0.86	1.44
20	Iron	mg/l	---	0.49	0.73	0.37	4.86	3.29
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.029	0.037	0.042	0.115	0.281
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDN-162 D3	EDI-71 D-1	EDD-70 D-3	EDI-41 D-2	EDI-39 D-3
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	54.6	112.1	75.5	76.27	77.07
30	Phosphorus	mg/l	---	0.27	0.57	0.62	0.31	0.37
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		<0.05	<0.05	<0.05	0.182	0.119
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	1249.3	2037.4	1855.6	1112.6	1007.8
41	Electrical Conductivity	µmhos/cm	---	6244	14922	12324	5056	5622
42	Sodium	mg/l	---	1280.0	3460	2142	1608	1662
	Potassium	mg/l	---	15.0	17.5	10.5	8.8	10.2

Produced Water Analysis Report of CBM Raniganj Project E25 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDI-40 D-2	EDE-60 V-1	EDE-043 D-1	EDI-32 D-5	EDD-22 D-2
Date				08.02.2017	08.02.2017	08.02.2017	08.02.2017	08.02.2017
1	pH		5.5 to 9.0	8.22	8.36	8.15	7.82	7.91
2	Total Suspended Solids	mg/l	100	3	6	3	4	9
3	Total Dissolved Solids	mg/l	---	5404	1856	1976	3462	1782
4	Turbidity	NTU	---	16.2	31.5	17.2	19.4	41.2
5	Acidity as $CaCO_3$	mg/l	---	Nil	4.9	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	730.7	520	439.5	928.3	437.2
7	Chloride	mg/l	---	2005.4	580.2	680.1	1420.2	489
8	Total Hardness	mg/l	---	108	60	64	116	68
9	Sulphate	mg/l	---	10.2	6.8	7.3	10.9	11.2
10	Calcium	mg/l		30.5	14.7	14.7	25.7	16
11	Magnesium	mg/l	---	7.8	5.8	6.8	12.6	6.8
12	Dissolved Oxygen	mg/l	---	4.5	3.8	4	4.2	3.5
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	3	5	3	2	4
14	Chemical Oxygen Demand	mg/l	250	10	18	12	10	16
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	2.82	2.36	2.14	3.41	0.63
19	Ammoniacal Nitrogen	mg/l	---	1.02	1.18	1.49	2.32	1.25
20	Iron	mg/l	---	4.63	6.28	3.24	4.11	8.41
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.362	0.049	0.086	0.153	0.119
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDI-40 D-2	EDE-60 V-1	EDE-043 D-1	EDI-32 D-5	EDD-22 D-2
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	71.3	24.5	27.75	42.06	20.98
30	Phosphorus	mg/l	---	0.48	0.19	0.26	0.36	0.22
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.197	0.242	0.097	0.101	0.105
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	891.5	622.2	536.2	1132.5	533.4
41	Electrical Conductivity	µmhos/cm	---	7945	2811	2948	5243	2741
42	Sodium	mg/l	---	1704	437	510	1043	397
	Potassium	mg/l	---	12.5	5.9	2.8	8.6	1.9

Produced Water Analysis Report of CBM Raniganj Project E27 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-23 D-1	EDD 407 D-1	EDG-74 D-3	EDC-413 D1	EDG-77 D-1
Date				08.02.2017	08.02.2017	08.02.2017	08.02.2017	08.02.2017
1	pH		5.5 to 9.0	8.25	8.17	7.81	7.36	8.62
2	Total Suspended Solids	mg/l	100	11	5	9	14	6
3	Total Dissolved Solids	mg/l	---	1598	1460	2114	3728	2458
4	Turbidity	NTU	---	50.1	30.2	48.2	62.5	27.3
5	Acidity as $CaCO_3$	mg/l	---	Nil	Nil	Nil	Nil	7.8
6	Total Alkalinity as Calcium Carbonate	mg/l	---	387.5	352.4	622.5	701.2	590.3
7	Chloride	mg/l	---	470.5	392	747.5	920	712
8	Total Hardness	mg/l	---	36	48	100	92	72
9	Sulphate	mg/l	---	9.4	7.8	10.5	14.5	11.2
10	Calcium	mg/l		11.2	8	28.9	25.7	16
11	Magnesium	mg/l	---	6.8	6.8	6.8	6.8	7.8
12	Dissolved Oxygen	mg/l	---	4	4.4	5.9	4.3	4.1
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	3	2	<2	2	2
14	Chemical Oxygen Demand	mg/l	250	11	9	<8	12	11
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	1.15	0.82	1.42	2.36	3.29
19	Ammoniacal Nitrogen	mg/l	---	2.43	1.09	0.46	0.82	0.76
20	Iron	mg/l	---	9.63	7.42	8.76	10.24	7.11
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.089	0.076	0.232	0.182	0.117
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

Produced Water Analysis Report of CBM Raniganj Project E28 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-23 D-1	EDD 407 D-1	EDG-74 D-3	EDC-413 D1	EDG-77 D-1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	18.17	18.76	27.7	34.2	27.11
30	Phosphorus	mg/l	---	0.31	0.17	0.35	0.45	0.32
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.201	0.224	0.117	0.095	0.142
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	472.8	429.9	759.5	855.5	707.6
41	Electrical Conductivity	µmhos/cm	---	2496	2282	3247	5649	3782
42	Sodium	mg/l	---	312	298	638	755	530
	Potassium	mg/l	---	<1	<1	4.5	6.9	5.2

Produced Water Analysis Report of CBM Raniganj Project E29 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDN-162 D4	EDI-71 D-2	EDI-38 D-3	EDI-41 D-3	EDI-32 D-5
Date				06.03.2017	06.03.2017	06.03.2017	06.03.2017	06.03.2017
1	pH		5.5 to 9.0	7.71	7.32	8.09	7.98	8.32
2	Total Suspended Solids	mg/l	100	88	114	7	14	16
3	Total Dissolved Solids	mg/l	---	5152	9168	3988	4372	3628
4	Turbidity	NTU	---	150	260	20.1	40.7	43.9
5	Acidity as $CaCO_3$	mg/l	---	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	1128.00	1402	914	1220	892
7	Chloride	mg/l	---	2047	4211	1136	1937	1732
8	Total Hardness	mg/l	---	152.00	432	96	120	80
9	Sulphate	mg/l	---	4.6	10.2	<2.5	7.5	6.2
10	Calcium	mg/l		27.3	101	17.6	22.4	14.4
11	Magnesium	mg/l	---	20.4	43.7	12.6	15.6	10.4
12	Dissolved Oxygen	mg/l	---	4.7	4.1	6.1	5.1	4.8
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	3.6	6	<2	<2	2
14	Chemical Oxygen Demand	mg/l	250	18.0	24	<8	8	9
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	6	5.1	4.2	2.7	4
19	Ammoniacal Nitrogen	mg/l	---	3.10	3.6	2.3	4.3	3.9
20	Iron	mg/l	---	77.30	124.5	6.9	8.8	11.3
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.101	0.245	0.082	0.049	0.073
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDN-162 D4	EDI-71 D-2	EDI-38 D-3	EDI-41 D-3	EDI-32 D-5
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	40.5	61.6	45.8	43.2	54.7
30	Phosphorus	mg/l	---	0.11	0.16	0.31	0.41	0.33
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.363	0.228	0.141	0.086	0.049
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	1376.0	1710	1115	1488	1088
41	Electrical Conductivity	µmhos/cm	---	7924	12952	5763	6431	5244
42	Sodium	mg/l	---	1148.0	2943	1033	1089	1124
	Potassium	mg/l	---	10.6	14.7	9.1	7.8	8.6

Produced Water Analysis Report of CBM Raniganj Project E31 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-52 D-5	EDG-74 D-2	EDG-74 D-3	EDG-413 D2	EDG-77 D-5
Date				06.03.2017	06.03.2017	06.03.2017	06.03.2017	06.03.2017
1	pH		5.5 to 9.0	8.28	8.11	7.92	7.75	8.17
2	Total Suspended Solids	mg/l	100	15	3	6	22	7
3	Total Dissolved Solids	mg/l	---	3114	2544	2298	3818	2672
4	Turbidity	NTU	---	42.8	6.3	8.4	51.6	3.3
5	Acidity as $CaCO_3$	mg/l	---	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	817	724	712	941	698
7	Chloride	mg/l	---	1460	912	1026	1556	1107
8	Total Hardness	mg/l	---	60	52	32	48	68
9	Sulphate	mg/l	---	5	<2.5	<2.5	6.5	4.8
10	Calcium	mg/l		11.2	12.8	8	11.2	19.2
11	Magnesium	mg/l	---	7.8	4.9	2.9	4.9	4.9
12	Dissolved Oxygen	mg/l	---	4.3	5.2	5	2.4	5.9
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	<2	<2	31	<2
14	Chemical Oxygen Demand	mg/l	250	8	<8	<8	112	<8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	5.1	0.66	0.82	3.41	2.98
19	Ammoniacal Nitrogen	mg/l	---	4.8	2.66	2.82	2.45	4.11
20	Iron	mg/l	---	9.1	0.91	1.43	3.4	2.92
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.062	0.132	0.092	0.096	0.052
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-52 D-5	EDG-74 D-2	EDG-74 D-3	EDG-413 D2	EDG-77 D-5
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	53.2	38.4	44.2	54.1	37.6
30	Phosphorus	mg/l	---	0.46	0.19	0.25	0.33	0.36
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.062	<0.05	<0.05	0.112	0.071
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	997	883	869	1148	852
41	Electrical Conductivity	µmhos/cm	---	4298	3641	3288	5438	3718
42	Sodium	mg/l	---	947	637	575	863	712
	Potassium	mg/l	---	5.9	4.6	5.1	8.8	2.2

Produced Water Analysis Report of CBM Raniganj Project E33 Division
(Compliance Period: Oct'16 - Mar'17)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-22 D-2	EDD-23 D-2	EDD-007 D1	EDP-429 D1	EDP-406 D2
Date				06.03.2017	06.03.2017	06.03.2017	06.03.2017	06.03.2017
1	pH		5.5 to 9.0	8.22	8.27	8.44	7.62	7.78
2	Total Suspended Solids	mg/l	100	3	<2	<2	74	27
3	Total Dissolved Solids	mg/l	---	2108	1984	1362	1744	1248
4	Turbidity	NTU	---	7.6	5.3	2.9	125	58.6
5	Acidity as $CaCO_3$	mg/l	---	Nil	Nil	10.8	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	547	512	430	498	357
7	Chloride	mg/l	---	857	792	412	852	308
8	Total Hardness	mg/l	---	84	36	40	100	32
9	Sulphate	mg/l	---	<2.5	<2.5	<2.5	<2.5	<2.5
10	Calcium	mg/l		17.6	8	9.6	19.2	8
11	Magnesium	mg/l	---	9.7	3.9	3.9	12.6	2.9
12	Dissolved Oxygen	mg/l	---	6	6.3	6.5	2.9	2.5
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	<2	<2	26.7	12.3
14	Chemical Oxygen Demand	mg/l	250	<8	<8	<8	89	39
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	3.45	1.96	6.7	4.3	2.2
19	Ammoniacal Nitrogen	mg/l	---	3.96	2.4	1.19	2.4	3.1
20	Iron	mg/l	---	1.76	0.72	0.43	1.49	0.88
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.035	0.041	0.028	0.035	0.021
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
25	Total Arsenic	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1

ANNEXURE II

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDD-22 D-2	EDD-23 D-2	EDD-007 D1	EDP-429 D1	EDP-406 D2
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	12.8	17.2	10.8	10.8	9.9
30	Phosphorus	mg/l	---	0.45	0.28	0.11	0.59	0.37
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	667	625	525	608	436
41	Electrical Conductivity	µmhos/cm	---	2896	2786	1822	2357	1731
42	Sodium	mg/l	---	268	236	157	249	128
	Potassium	mg/l	---	4.3	4.7	2.6	3.4	1.9

Noise Analysis Report of CBM Raniganj Project (E P Division)

Compliance Period Oct'16 -Mar'17

ANNEXURE III

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

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

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	04.10.2016	04.10.2016	04.10.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
1	pH		5.5 to 9.0	5.5-9.0	7.95	8.52	9.02
2	Total Suspended Solids	mg/l	100	100	3	<2	18
3	Total Dissolved Solids	mg/l	---	2100	2468	774	3448
4	Turbidity	NTU	---	---	10.2	3.6	79.7
5	Acidity as $CaCO_3$	mg/l			19.6	Nil	15.6
6	Alkalinity as $CaCO_3$	mg/l	---	---	449.3	245.4	615.7
7	Chlorides	mg/l	---	600	813.6	149.3	1024.1
8	Total Hardness as $CaCO_3$	mg/l	---	---	31	54.3	46.5
9	Sulphates	mg/l	---	1000	6.8	<2.5	13.8
10	Calcium	mg/l	---	---	9.3	17.1	15.6
11	Magnesium	mg/l	---	---	1.9	2.8	1.9
12	BOD	mg/l	30	30	3.6	<2	4
13	COD	mg/l	250	100	18	3.8	21.7
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	3.7	1.55	8.2
18	Ammonia Nitrogen	mg/l			5.32	2.58	5.78
19	Iron	mg/l	---	---	0.97	0.18	5.18
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.017	0.024	0.022
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	04.10.2016	04.10.2016	04.10.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
27	**Boron**	**mg/l**	**---**	**---**	<1	<1	<1
28	**Sodium Absorption Ratio**		**---**	**---**	89.6	27.2	88.9
29	**Phosphorous**	**mg/l**			0.017	0.018	0.02
30	**Aluminum**	**mg/l**			<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**			<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**			<0.05	<0.05	0.071
33	**Molybednum**	**mg/l**			<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**			<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**			<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**			<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**			<0.01	<0.01	<0.01
38	**Cobalt**	**mg/l**			<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	**---**	**---**	548.2	299.4	751.2
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	**---**	**---**	4112	1260	5560

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	04.10.2016	04.10.2016	04.10.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
1	pH		5.5 to 9.0	5.5-9.0	8.32	7.95	8.23
2	Total Suspended Solids	mg/l	100	100	<2	<2	12
3	Total Dissolved Solids	mg/l	---	2100	1816	284	10992
4	Turbidity	NTU	---	---	5.8	2.4	24.7
5	Acidity as $CaCO_3$	mg/l			Nil	21.5	5.9
6	Alkalinity as $CaCO_3$	mg/l	---	---	407.7	149.8	1609.9
7	Chlorides	mg/l	---	600	603	130.2	7322.2
8	Total Hardness as $CaCO_3$	mg/l	---	---	15.5	62.1	1424
9	Sulphates	mg/l	---	1000	7.1	<2.5	17.4
10	Calcium	mg/l	---	---	3.1	18.7	438.5
11	Magnesium	mg/l	---	---	1.9	3.8	80.1
12	BOD	mg/l	30	30	2.4	<2	5
13	COD	mg/l	250	100	11	5.6	27
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	5.2	0.68	9.1
18	Ammonia Nitrogen	mg/l			2.46	1.23	6.6
19	Iron	mg/l	---	---	0.38	0.11	2.1
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.015	0.012	0.02
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	04.10.2016	04.10.2016	04.10.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
27	**Boron**	**mg/l**	**---**	**---**	<1	<1	<1
28	**Sodium Absorption Ratio**		**---**	**---**	100.3	4.31	81.9
29	**Phosphorous**	**mg/l**			0.24	0.14	0.19
30	**Aluminum**	**mg/l**			<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**			<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**			<0.05	<0.05	<0.05
33	**Molybednum**	**mg/l**			<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**			<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**			<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**			<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**			<0.01	<0.01	<0.01
38	**Cobalt**	**mg/l**			<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	**---**	**---**	497.4	182.7	1964.1
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	**---**	**---**	2945	490	17460

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	05.10.2016	05.10.2016	05.10.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
1	pH		5.5 to 9.0	5.5-9.0	8.69	8.03	8.35
2	Total Suspended Solids	mg/l	100	100	3	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	3562	382	5986
4	Turbidity	NTU	---	---	10.6	2.3	2.7
5	Acidity as $CaCO_3$	mg/l			Nil	19.6	Nil
6	Alkalinity as $CaCO_3$	mg/l	---	---	407.7	99.8	532.5
7	Chlorides	mg/l	---	600	938	53.6	1091.2
8	Total Hardness as $CaCO_3$	mg/l	---	---	50.4	27.1	65.9
9	Sulphates	mg/l	---	1000	11.8	<2.5	9.6
10	Calcium	mg/l	---	---	17.1	15.6	20.2
11	Magnesium	mg/l	---	---	1.9	3.8	3.8
12	BOD	mg/l	30	30	2.5	2	<2
13	COD	mg/l	250	100	10	8	<8
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	6.9	0.49	5.5
18	Ammonia Nitrogen	mg/l			5.67	2.94	5.88
19	Iron	mg/l	---	---	0.95	0.13	0.15
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.051	0.047	0.022
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	05.10.2016	05.10.2016	05.10.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
27	**Boron**	**mg/l**	**---**	**---**	<1	<1	<1
28	**Sodium Absorption Ratio**		**---**	**---**	125.8	19	118.2
29	**Phosphorous**	**mg/l**			0.26	0.25	0.27
30	**Aluminum**	**mg/l**			<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**			<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**			0.057	<0.05	<0.05
33	**Molybednum**	**mg/l**			<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**			<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**			<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**			<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**			<0.01	<0.01	<0.01
38	**Cobalt**	**mg/l**			<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	**---**	**---**	497.4	121.7	649.6
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	**---**	**---**	5583	625	9210

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	04.11.2016	04.11.2016	04.11.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
1	pH		5.5 to 9.0	5.5-9.0	8.42	8.31	8.12
2	Total Suspended Solids	mg/l	100	100	12	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	1986	212	7824
4	Turbidity	NTU	---	---	41.7	<1	2.1
5	Acidity as $CaCO_3$	mg/l			Nil	Nil	6.86
6	Alkalinity as $CaCO_3$	mg/l	---	---	189.2	36.5	2176.8
7	Chlorides	mg/l	---	600	648.5	54.7	2929.7
8	Total Hardness as $CaCO_3$	mg/l	---	---	158.4	71.2	1623.6
9	Sulphates	mg/l	---	1000	<2.5	7.5	<2.5
10	Calcium	mg/l	---	---	47.6	20.6	555.5
11	Magnesium	mg/l	---	---	9.6	4.8	57.7
12	BOD	mg/l	30	30	2.8	<2	<2
13	COD	mg/l	250	100	14	<8	<8
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	3.19	0.57	6.24
18	Ammonia Nitrogen	mg/l			3.38	1.27	5.46
19	Iron	mg/l	---	---	1.87	<0.1	<0.1
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.109	0.026	0.243
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	04.11.2016	04.11.2016	04.11.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
27	**Boron**	**mg/l**	---	---	<1	<1	<1
28	**Sodium Absorption Ratio**		---	---	8.25	2.39	44.6
29	**Phosphorous**	**mg/l**			0.21	0.18	0.46
30	**Aluminum**	**mg/l**			<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**			<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**			0.164	<0.05	<0.05
33	**Molybednum**	**mg/l**			<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**			<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**			<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**			<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**			<0.01	<0.01	<0.01
38	**Cobalt**	**mg/l**			<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	---	230.8	44.5	2655.7
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	---	2701	353	12171

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	04.11.2016	04.11.2016	04.11.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
1	pH		5.5 to 9.0	5.5-9.0	8.12	8.38	8.73
2	Total Suspended Solids	mg/l	100	100	8	<2	72
3	Total Dissolved Solids	mg/l	---	2100	2836	864	3732
4	Turbidity	NTU	---	---	17	1.0	140
5	Acidity as $CaCO_3$	mg/l			4.9	Nil	Nil
6	Alkalinity as $CaCO_3$	mg/l	---	---	267.7	147.9	298.5
7	Chlorides	mg/l	---	600	879.2	320.5	947.4
8	Total Hardness as $CaCO_3$	mg/l	---	---	237.6	178.2	297
9	Sulphates	mg/l	---	1000	11.6	<2.5	12.6
10	Calcium	mg/l	---	---	63.4	39.6	79.3
11	Magnesium	mg/l	---	---	19.2	19.2	24
12	BOD	mg/l	30	30	4.5	2	16
13	COD	mg/l	250	100	23	12	71
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	3.67	1.22	3.86
18	Ammonia Nitrogen	mg/l			3.86	2.14	8.78
19	Iron	mg/l	---	---	0.89	<0.1	3.87
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.082	0.022	0.243
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	04.11.2016	04.11.2016	04.11.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
27	**Boron**	**mg/l**	---	---	<1	<1	<1
28	**Sodium Absorption Ratio**		---	---	18.85	6.78	20.55
29	**Phosphorous**	**mg/l**			0.21	0.11	0.46
30	**Aluminum**	**mg/l**			<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**			<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**			<0.05	<0.05	0.057
33	**Molybednum**	**mg/l**			<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**			<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**			<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**			<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**			<0.01	<0.01	<0.01
38	**Cobalt**	**mg/l**			<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	---	326.6	180.4	364.2
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	---	4080	1320	5238

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	04.11.2016	04.11.2016	04.11.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
1	pH		5.5 to 9.0	5.5-9.0	8.11	8.4	8.35
2	Total Suspended Solids	mg/l	100	100	2	<2	2
3	Total Dissolved Solids	mg/l	---	2100	3846	468	5892
4	Turbidity	NTU	---	---	2.5	1.3	2.3
5	Acidity as $CaCO_3$	mg/l			4.9	Nil	Nil
6	Alkalinity as $CaCO_3$	mg/l	---	---	356.6	43.8	581.9
7	Chlorides	mg/l	---	600	798.2	38.7	1720.8
8	Total Hardness as $CaCO_3$	mg/l	---	---	316.8	83.1	772.2
9	Sulphates	mg/l	---	1000	6.5	<2.5	8.8
10	Calcium	mg/l	---	---	71.4	23.8	238
11	Magnesium	mg/l	---	---	33.6	5.7	43.3
12	BOD	mg/l	30	30	4.3	<2	3.1
13	COD	mg/l	250	100	18	<8	12
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	2.33	0.76	3.76
18	Ammonia Nitrogen	mg/l			3.12	1.27	2.36
19	Iron	mg/l	---	---	<0.1	<0.1	0.11
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.073	0.041	0.048
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

					Date	04.11.2016	04.11.2016	04.11.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**		**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
27	**Boron**	**mg/l**	---	**---**		<1	<1	<1
28	**Sodium Absorption Ratio**		---	**---**		13	2.17	19.53
29	**Phosphorous**	**mg/l**				0.42	0.16	0.25
30	**Aluminum**	**mg/l**				<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**				<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**				<0.05	<0.05	<0.05
33	**Molybednum**	**mg/l**				<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**				<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**				<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**				<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**				<0.01	<0.01	<0.01
38	**Cobalt**	**mg/l**				<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	**---**		435	53.4	709.9
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	**---**		553.1	469	9200

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	02.12.2016	02.12.2016	02.12.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
1	pH		5.5 to 9.0	5.5-9.0	8.31	7.58	7.62
2	Total Suspended Solids	mg/l	100	100	2	<2	5
3	Total Dissolved Solids	mg/l	---	2100	1426	184	11378
4	Turbidity	NTU	---	---	6	<1	12.5
5	Acidity as $CaCO_3$	mg/l			Nil	10.8	9.8
6	Alkalinity as $CaCO_3$	mg/l	---	---	345.4	85.2	1609.5
7	Chlorides	mg/l	---	600	430.2	22.5	7231.2
8	Total Hardness as $CaCO_3$	mg/l	---	---	150.4	19.8	1227.6
9	Sulphates	mg/l	---	1000	10.6	5.8	21.7
10	Calcium	mg/l	---	---	47.6	6.3	412.5
11	Magnesium	mg/l	---	---	7.6	<1	48.1
12	BOD	mg/l	30	30	<2	<2	<2
13	COD	mg/l	250	100	<8	<8	<8
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	0.87	0.48	2.44
18	Ammonia Nitrogen	mg/l			2.11	3.46	5.4
19	Iron	mg/l	---	---	0.86	0.18	3.11
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.033	0.059	0.078
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	02.12.2016	02.12.2016	02.12.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
27	**Boron**	**mg/l**	---	---	<1	<1	<1
28	**Sodium Absorption Ratio**		---	---	27.8	4.9	92.9
29	**Phosphorous**	**mg/l**			0.39	0.42	0.31
30	**Aluminum**	**mg/l**			<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**			<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**			<0.05	<0.05	0.188
33	**Molybednum**	**mg/l**			<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**			<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**			<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**			<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**			<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**			<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	---	421.4	103.9	1963.6
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	---	1978	292	16732

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	02.12.2016	02.12.2016	02.12.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
1	pH		5.5 to 9.0	5.5-9.0	8.32	8.19	8.61
2	Total Suspended Solids	mg/l	100	100	4	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	2228	788	3462
4	Turbidity	NTU	---	---	12.1	3.6	2.0
5	Acidity as $CaCO_3$	mg/l			Nil	5.8	Nil
6	Alkalinity as $CaCO_3$	mg/l	---	---	428.7	272.8	598.7
7	Chlorides	mg/l	---	600	552.3	385.6	812.5
8	Total Hardness as $CaCO_3$	mg/l	---	---	166.3	122.7	201.9
9	Sulphates	mg/l	---	1000	13.6	8.9	11.2
10	Calcium	mg/l	---	---	52.3	39.6	66.6
11	Magnesium	mg/l	---	---	8.6	5.7	8.6
12	BOD	mg/l	30	30	<2	<2	<2
13	COD	mg/l	250	100	<8	<8	<8
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	1.07	0.98	1.48
18	Ammonia Nitrogen	mg/l			4.21	2.26	3.69
19	Iron	mg/l	---	---	2.41	0.74	0.39
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.114	0.087	0.062
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

					Date	02.12.2016	02.12.2016	02.12.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**		**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
27	**Boron**	**mg/l**	---	**---**		<1	<1	<1
28	**Sodium Absorption Ratio**		---	**---**		40.9	13.8	47
29	**Phosphorous**	**mg/l**				0.26	0.43	0.51
30	**Aluminum**	**mg/l**				<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**				<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**				0.204	<0.05	<0.05
33	**Molybednum**	**mg/l**				<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**				<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**				<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**				<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**				<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**				<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	**---**		523	332.8	730.4
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	**---**		3382	1049	4651

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	02.12.2016	02.12.2016	02.12.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
1	pH		5.5 to 9.0	5.5-9.0	8.02	8.36	7.98
2	Total Suspended Solids	mg/l	100	100	18	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	3816	142	6248
4	Turbidity	NTU	---	---	89.2	3.1	<1
5	Acidity as $CaCO_3$	mg/l			6.2	Nil	9.8
6	Alkalinity as $CaCO_3$	mg/l	---	---	632.8	87.4	532.8
7	Chlorides	mg/l	---	600	877.1	18.8	1078.3
8	Total Hardness as $CaCO_3$	mg/l	---	---	229.6	15.8	241.5
9	Sulphates	mg/l	---	1000	14.3	6.2	16.7
10	Calcium	mg/l	---	---	60.3	4.7	82.5
11	Magnesium	mg/l	---	---	19.2	<1	8.6
12	BOD	mg/l	30	30	<2	<2	<2
13	COD	mg/l	250	100	<8	<8	<8
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	0.68	0.59	1.19
18	Ammonia Nitrogen	mg/l			4.07	3.12	4.82
19	Iron	mg/l	---	---	10.61	0.73	0.18
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.093	0.022	0.019
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	02.12.2016	02.12.2016	02.12.2016
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
27	**Boron**	**mg/l**	---	---	<1	<1	<1
28	**Sodium Absorption Ratio**		---	---	61.9	4.5	65.8
29	**Phosphorous**	**mg/l**			0.21	0.19	0.35
30	**Aluminum**	**mg/l**			<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**			<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**			0.249	<0.05	<0.05
33	**Molybednum**	**mg/l**			<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**			<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**			<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**			<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**			<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**			<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	---	772	106.6	650
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	---	5629	242	9844

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	09.01.2017	09.01.2017	09.01.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
1	pH		5.5 to 9.0	5.5-9.0	8.34	8.42	8.56
2	Total Suspended Solids	mg/l	100	100	8	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	2482	882	2824
4	Turbidity	NTU	---	---	18.6	<1	<1
5	Acidity as $CaCO_3$	mg/l			Nil	Nil	Nil
6	Alkalinity as $CaCO_3$	mg/l	---	---	124.6	28.7	135.9
7	Chlorides	mg/l	---	600	1032.5	320.4	1220.3
8	Total Hardness as $CaCO_3$	mg/l	---	---	164.6	90.2	117.6
9	Sulphates	mg/l	---	1000	11.7	5.1	12.5
10	Calcium	mg/l	---	---	47.1	18.8	18.8
11	Magnesium	mg/l	---	---	11.4	10.5	17.1
12	BOD	mg/l	30	30	8.4	<2	<2
13	COD	mg/l	250	100	39.5	<8	<8
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	2.42	0.82	1.76
18	Ammonia Nitrogen	mg/l			4.86	2.44	5.47
19	Iron	mg/l	---	---	0.71	0.18	0.12
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.143	0.101	0.172
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

					Date	09.01.2017	09.01.2017	09.01.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**		**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
27	**Boron**	**mg/l**	---	**---**		<1	<1	<1
28	**Sodium Absorption Ratio**		---	**---**		30.3	5.2	41.2
29	**Phosphorous**	**mg/l**				0.42	0.24	0.31
30	**Aluminum**	**mg/l**				<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**				<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**				<0.05	<0.05	0.188
33	**Molybednum**	**mg/l**				<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**				<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**				<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**				<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**				<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**				<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	**---**		152	35	165.8
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	**---**		3456	1304	3946

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	09.01.2017	09.01.2017	09.01.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
1	pH		5.5 to 9.0	5.5-9.0	8.47	7.92	7.64
2	Total Suspended Solids	mg/l	100	100	<2	2	<2
3	Total Dissolved Solids	mg/l	---	2100	3688	182	5432
4	Turbidity	NTU	---	---	7.9	12.7	8.2
5	Acidity as $CaCO_3$	mg/l			Nil	9.8	12.7
6	Alkalinity as $CaCO_3$	mg/l	---	---	220.5	11.4	180.6
7	Chlorides	mg/l	---	600	1228.6	65.3	2318
8	Total Hardness as $CaCO_3$	mg/l	---	---	266.6	23.5	309.7
9	Sulphates	mg/l	---	1000	14.3	<2.5	15.7
10	Calcium	mg/l	---	---	80.1	4.7	81.6
11	Magnesium	mg/l	---	---	16.1	2.8	25.7
12	BOD	mg/l	30	30	1.7	2.6	<2
13	COD	mg/l	250	100	8	9	<8
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	1.65	0.72	2.1
18	Ammonia Nitrogen	mg/l			6.21	2.02	3.42
19	Iron	mg/l	---	---	1.53	2.18	1.98
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.089	0.021	0.171
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

					Date	09.01.2017	09.01.2017	09.01.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**		**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
27	**Boron**	**mg/l**	---	**---**		<1	<1	<1
28	**Sodium Absorption Ratio**		---	**---**		30.2	3.9	55.1
29	**Phosphorous**	**mg/l**				0.39	0.15	0.47
30	**Aluminum**	**mg/l**				<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**				<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**				0.127	0.059	0.079
33	**Molybednum**	**mg/l**				<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**				<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**				<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**				<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**				<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**				<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	**---**		269	13.9	220.3
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	**---**		5208	256	8108

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	09.01.2017	09.01.2017	09.01.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
1	**pH**		**5.5 to 9.0**	**5.5-9.0**	8.27	8.39	8.15
2	**Total Suspended Solids**	**mg/l**	**100**	**100**	<2	<2	<2
3	**Total Dissolved Solids**	**mg/l**	**---**	**2100**	1812	158	11354
4	**Turbidity**	**NTU**	**---**	**---**	3.5	<1	2.2
5	**Acidity as $CaCO_3$**	**mg/l**			Nil	Nil	4.9
6	**Alkalinity as $CaCO_3$**	**mg/l**	**---**	**---**	108.3	21.5	256.5
7	**Chlorides**	**mg/l**	**---**	**600**	820.1	86.6	6432.4
8	**Total Hardness as $CaCO_3$**	**mg/l**	**---**	**---**	94.1	31.4	407.7
9	**Sulphates**	**mg/l**	**---**	**1000**	8.7	<2.5	18.6
10	**Calcium**	**mg/l**	**---**	**---**	18.8	9.4	128.8
11	**Magnesium**	**mg/l**	**---**	**---**	11.4	1.9	21
12	**BOD**	**mg/l**	**30**	**30**	<2	<2	<2
13	**COD**	**mg/l**	**250**	**100**	<8	<8	<8
14	**Oil & Grease**	**mg/l**	**10**	**10**	<5	<5	<5
15	**Phenolic Compounds**	**mg/l**	**1**	**1.2**	<0.001	<0.001	<0.001
16	**Sulphides**	**mg/l**	**2**	**2**	<0.5	<0.5	<0.5
17	**Fluorides**	**mg/l**	**2**	**1.5**	1.25	0.49	3.45
18	**Ammonia Nitrogen**	**mg/l**			3.2	1.7	5.3
19	**Iron**	**mg/l**	**---**	**---**	1.66	0.29	0.85
20	**Total Chromium**	**mg/l**	**2**	**1**	<0.05	<0.05	<0.05
21	**Zinc**	**mg/l**			0.051	0.026	0.039
22	**Copper**	**mg/l**			<0.05	<0.05	<0.05
23	**Nickel**	**mg/l**			<0.05	<0.05	<0.05
24	**Arsenic**	**mg/l**			<0.01	<0.01	<0.01
25	**Lead**	**mg/l**			<0.1	<0.1	<0.1
26	**Mercury**	**mg/l**	**0.01**	**0.01**	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	09.01.2017	09.01.2017	09.01.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
27	**Boron**	**mg/l**	---	---	<1	<1	<1
28	**Sodium Absorption Ratio**		---	---	27.8	3.9	110.7
29	**Phosphorous**	**mg/l**			0.24	0.11	0.61
30	**Aluminum**	**mg/l**			<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**			<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**			0.075	<0.05	<0.05
33	**Molybednum**	**mg/l**			<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**			<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**			<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**			<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**			<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**			<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	---	132.1	26.2	312.9
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	---	2442	208	16220

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	07.02.2017	07.02.2017	07.02.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
1	pH		5.5 to 9.0	5.5-9.0	8.48	8.37	8.25
2	Total Suspended Solids	mg/l	100	100	3	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	2506	122	8058
4	Turbidity	NTU	---	---	12.6	2.1	1.1
5	Acidity as $CaCO_3$	mg/l			7.8	4.9	Nil
6	Alkalinity as $CaCO_3$	mg/l	---	---	930.2	76.2	1234
7	Chlorides	mg/l	---	600	1126	45	2610
8	Total Hardness as $CaCO_3$	mg/l	---	---	44	20	156
9	Sulphates	mg/l	---	1000	7.5	<2.5	14.8
10	Calcium	mg/l	---	---	12.8	4.8	49.7
11	Magnesium	mg/l	---	---	2.9	1.9	7.8
12	BOD	mg/l	30	30	3	<2	<2
13	COD	mg/l	250	100	14	<8	<8
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	3.48	1.16	6.21
18	Ammonia Nitrogen	mg/l			2.11	1.07	5.43
19	Iron	mg/l	---	---	1.46	0.83	0.52
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.108	0.068	0.283
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

					Date	07.02.2017	07.02.2017	07.02.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**		**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
27	**Boron**	**mg/l**	---	**---**		<1	<1	<1
28	**Sodium Absorption Ratio**		---	**---**		60.3	3.02	76.8
29	**Phosphorous**	**mg/l**				0.28	0.18	0.52
30	**Aluminum**	**mg/l**				<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**				<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**				0.147	<0.05	0.188
33	**Molybednum**	**mg/l**				<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**				<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**				<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**				<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**				<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**				<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	**---**		1134.8	93	1505.5
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	**---**		3848	207	12027

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	07.02.2017	07.02.2017	07.02.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
1	pH		5.5 to 9.0	5.5-9.0	8.41	8.52	8.71
2	Total Suspended Solids	mg/l	100	100	5	2	<2
3	Total Dissolved Solids	mg/l	---	2100	2186	792	2782
4	Turbidity	NTU	---	---	18	5	7.0
5	Acidity as $CaCO_3$	mg/l			5.8	9.8	17.6
6	Alkalinity as $CaCO_3$	mg/l	---	---	616	220.3	681
7	Chlorides	mg/l	---	600	1426.3	382.5	1521.5
8	Total Hardness as $CaCO_3$	mg/l	---	---	72	32	60
9	Sulphates	mg/l	---	1000	5.8	<2.5	6.6
10	Calcium	mg/l	---	---	19.2	8	17.6
11	Magnesium	mg/l	---	---	5.8	2.9	3.9
12	BOD	mg/l	30	30	3	<2	<2
13	COD	mg/l	250	100	16	<8	<8
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	2.11	1.87	2.95
18	Ammonia Nitrogen	mg/l			1.96	3.92	2.45
19	Iron	mg/l	---	---	2.15	1.09	1.18
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.162	0.093	0.219
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

					Date	07.02.2017	07.02.2017	07.02.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**		**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
27	**Boron**	**mg/l**	---	**---**		<1	<1	<1
28	**Sodium Absorption Ratio**		---	**---**		56.7	21.7	68.8
29	**Phosphorous**	**mg/l**				0.24	0.15	0.31
30	**Aluminum**	**mg/l**				<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**				<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**				0.242	<0.05	<0.05
33	**Molybednum**	**mg/l**				<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**				<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**				<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**				<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**				<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**				<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	**---**		751.5	268.8	780.8
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	**---**		3148	1227	3942

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	07.02.2017	07.02.2017	07.02.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
1	**pH**		**5.5 to 9.0**	**5.5-9.0**	8.43	8.33	8.19
2	**Total Suspended Solids**	**mg/l**	**100**	**100**	<2	3	<2
3	**Total Dissolved Solids**	**mg/l**	**---**	**2100**	3648	148	5392
4	**Turbidity**	**NTU**	**---**	**---**	4	10.2	5.8
5	**Acidity as $CaCO_3$**	**mg/l**			5.8	3.9	Nil
6	**Alkalinity as $CaCO_3$**	**mg/l**	**---**	**---**	1128.1	81.1	1640.2
7	**Chlorides**	**mg/l**	**---**	**600**	1627	62	1726
8	**Total Hardness as $CaCO_3$**	**mg/l**	**---**	**---**	84	20	100
9	**Sulphates**	**mg/l**	**---**	**1000**	8.2	<2.5	12.5
10	**Calcium**	**mg/l**	**---**	**---**	25.7	4.8	32.1
11	**Magnesium**	**mg/l**	**---**	**---**	9.9	1.9	4.9
12	**BOD**	**mg/l**	**30**	**30**	3	<2	<2
13	**COD**	**mg/l**	**250**	**100**	10	<8	<8
14	**Oil & Grease**	**mg/l**	**10**	**10**	<5	<5	<5
15	**Phenolic Compounds**	**mg/l**	**1**	**1.2**	<0.001	<0.001	<0.001
16	**Sulphides**	**mg/l**	**2**	**2**	<0.5	<0.5	<0.5
17	**Fluorides**	**mg/l**	**2**	**1.5**	2.88	2.05	4.16
18	**Ammonia Nitrogen**	**mg/l**			2.49	1.21	3.76
19	**Iron**	**mg/l**	**---**	**---**	0.71	0.89	0.62
20	**Total Chromium**	**mg/l**	**2**	**1**	<0.05	<0.05	<0.05
21	**Zinc**	**mg/l**			0.017	0.011	0.024
22	**Copper**	**mg/l**			<0.05	<0.05	<0.05
23	**Nickel**	**mg/l**			<0.05	<0.05	<0.05
24	**Arsenic**	**mg/l**			<0.01	<0.01	<0.01
25	**Lead**	**mg/l**			<0.1	<0.1	<0.1
26	**Mercury**	**mg/l**	**0.01**	**0.01**	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

					Date	07.02.2017	07.02.2017	07.02.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**		**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
27	**Boron**	**mg/l**	**---**	**---**		<1	<1	<1
28	**Sodium Absorption Ratio**		**---**	**---**		66.56	3.98	65.5
29	**Phosphorous**	**mg/l**				0.25	0.11	0.39
30	**Aluminum**	**mg/l**				<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**				<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**				<0.05	<0.05	<0.05
33	**Molybednum**	**mg/l**				<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**				<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**				<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**				<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**				<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**				<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	**---**	**---**		1376.3	98.9	2001
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	**---**	**---**		5476	248	8106

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	07.03.2017	07.03.2017	07.03.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
1	**pH**		**5.5 to 9.0**	**5.5-9.0**	8.53	8.39	8.28
2	**Total Suspended Solids**	**mg/l**	**100**	**100**	<2	<2	4
3	**Total Dissolved Solids**	**mg/l**	**---**	**2100**	1782	228	7164
4	**Turbidity**	**NTU**	**---**	**---**	1.2	<1	9.4
5	**Acidity as $CaCO_3$**	**mg/l**			10.9	6.8	Nil
6	**Alkalinity as $CaCO_3$**	**mg/l**	**---**	**---**	468	72	1470
7	**Chlorides**	**mg/l**	**---**	**600**	747	49	3042
8	**Total Hardness as $CaCO_3$**	**mg/l**	**---**	**---**	64	28	352
9	**Sulphates**	**mg/l**	**---**	**1000**	<2.5	<2.5	9.8
10	**Calcium**	**mg/l**	**---**	**---**	14.4	8	78.6
11	**Magnesium**	**mg/l**	**---**	**---**	6.8	1.9	37.9
12	**BOD**	**mg/l**	**30**	**30**	<2	<2	8.9
13	**COD**	**mg/l**	**250**	**100**	<8	<8	29
14	**Oil & Grease**	**mg/l**	**10**	**10**	<5	<5	<5
15	**Phenolic Compounds**	**mg/l**	**1**	**1.2**	<0.001	<0.001	<0.001
16	**Sulphides**	**mg/l**	**2**	**2**	<0.5	<0.5	<0.5
17	**Fluorides**	**mg/l**	**2**	**1.5**	3.1	0.52	10.4
18	**Ammonia Nitrogen**	**mg/l**			0.86	0.59	1.88
19	**Iron**	**mg/l**	**---**	**---**	0.22	0.17	0.98
20	**Total Chromium**	**mg/l**	**2**	**1**	<0.05	<0.05	<0.05
21	**Zinc**	**mg/l**			0.062	<0.01	0.153
22	**Copper**	**mg/l**			<0.05	<0.05	<0.05
23	**Nickel**	**mg/l**			<0.05	<0.05	<0.05
24	**Arsenic**	**mg/l**			<0.01	<0.01	<0.01
25	**Lead**	**mg/l**			<0.1	<0.1	<0.1
26	**Mercury**	**mg/l**	**0.01**	**0.01**	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	07.03.2017	07.03.2017	07.03.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet GGS 1**	**Outlet GGS 1**	**Reject GGS 1**
27	**Boron**	**mg/l**	---	---	<1	<1	<1
28	**Sodium Absorption Ratio**		---	---	10.8	3.7	63.7
29	**Phosphorous**	**mg/l**			0.1	0.09	0.21
30	**Aluminum**	**mg/l**			<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**			<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**			<0.05	<0.05	0.188
33	**Molybednum**	**mg/l**			<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**			<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**			<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**			<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**			<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**			<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	---	561	88	1793
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	---	2298	307	11701

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	07.03.2017	07.03.2017	07.03.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
1	pH		5.5 to 9.0	5.5-9.0	8.21	8.65	8.84
2	Total Suspended Solids	mg/l	100	100	9	3	<2
3	Total Dissolved Solids	mg/l	---	2100	2118	812	2516
4	Turbidity	NTU	---	---	20.9	7.2	<1
5	Acidity as $CaCO_3$	mg/l			Nil	16.7	17.6
6	Alkalinity as $CaCO_3$	mg/l	---	---	722	470	784
7	Chlorides	mg/l	---	600	1086	218	949
8	Total Hardness as $CaCO_3$	mg/l	---	---	64	44	68
9	Sulphates	mg/l	---	1000	6.5	<2.5	8.2
10	Calcium	mg/l	---	---	16	11.2	48.1
11	Magnesium	mg/l	---	---	5.8	3.9	11.7
12	BOD	mg/l	30	30	2	5.6	<2
13	COD	mg/l	250	100	11	19	<8
14	Oil & Grease	mg/l	10	10	<5	<5	<5
15	Phenolic Compounds	mg/l	1	1.2	<0.001	<0.001	<0.001
16	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5
17	Fluorides	mg/l	2	1.5	1.86	0.77	3.4
18	Ammonia Nitrogen	mg/l			5.1	1.9	1.4
19	Iron	mg/l	---	---	2.29	1.22	0.27
20	Total Chromium	mg/l	2	1	<0.05	<0.05	<0.05
21	Zinc	mg/l			0.044	0.051	0.065
22	Copper	mg/l			<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05
24	Arsenic	mg/l			<0.01	<0.01	<0.01
25	Lead	mg/l			<0.1	<0.1	<0.1
26	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

					Date	07.03.2017	07.03.2017	07.03.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**		**Inlet EDD-050**	**Outlet EDD-050**	**Reject EDD-050**
27	**Boron**	**mg/l**	---	---		<1	<1	<1
28	**Sodium Absorption Ratio**		---	---		47.5	4.7	26.1
29	**Phosphorous**	**mg/l**				0.24	0.17	0.12
30	**Aluminum**	**mg/l**				<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**				<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**				0.091	<0.05	<0.05
33	**Molybednum**	**mg/l**				<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**				<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**				<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**				<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**				<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**				<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	---		881	478	801
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	---		3142	1176	3428

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	17.03.2017	17.03.2017	17.03.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
1	**pH**		**5.5 to 9.0**	**5.5-9.0**	8.44	8.79	7.66
2	**Total Suspended Solids**	**mg/l**	**100**	**100**	<2	<2	4
3	**Total Dissolved Solids**	**mg/l**	**---**	**2100**	3344	162	5516
4	**Turbidity**	**NTU**	**---**	**---**	6.8	2.1	12
5	**Acidity as $CaCO_3$**	**mg/l**			10.6	16.8	Nil
6	**Alkalinity as $CaCO_3$**	**mg/l**	**---**	**---**	126.8	42.1	282
7	**Chlorides**	**mg/l**	**---**	**600**	940	27	1092
8	**Total Hardness as $CaCO_3$**	**mg/l**	**---**	**---**	60	32	76
9	**Sulphates**	**mg/l**	**---**	**1000**	5.4	<2.5	12.5
10	**Calcium**	**mg/l**	**---**	**---**	17.6	6.4	19.2
11	**Magnesium**	**mg/l**	**---**	**---**	3.9	3.9	6.8
12	**BOD**	**mg/l**	**30**	**30**	2.1	<2	3
13	**COD**	**mg/l**	**250**	**100**	8	<8	10
14	**Oil & Grease**	**mg/l**	**10**	**10**	<5	<5	<5
15	**Phenolic Compounds**	**mg/l**	**1**	**1.2**	<0.001	<0.001	<0.001
16	**Sulphides**	**mg/l**	**2**	**2**	<0.5	<0.5	<0.5
17	**Fluorides**	**mg/l**	**2**	**1.5**	1.96	0.29	2.48
18	**Ammonia Nitrogen**	**mg/l**			3.32	1.98	3.96
19	**Iron**	**mg/l**	**---**	**---**	2.86	0.24	4.22
20	**Total Chromium**	**mg/l**	**2**	**1**	<0.05	<0.05	<0.05
21	**Zinc**	**mg/l**			0.082	0.041	0.117
22	**Copper**	**mg/l**			<0.05	<0.05	<0.05
23	**Nickel**	**mg/l**			<0.05	<0.05	<0.05
24	**Arsenic**	**mg/l**			<0.01	<0.01	<0.01
25	**Lead**	**mg/l**			<0.1	<0.1	<0.1
26	**Mercury**	**mg/l**	**0.01**	**0.01**	<0.001	<0.001	<0.001

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period: Oct'16 to Mar'17

ANNEXURE IV

				Date	17.03.2017	17.03.2017	17.03.2017
S. No.	**Parameter**	**Unit**	**CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)**	**Onshore Discharge Standards**	**Inlet EDH-044**	**Outlet EDH-044**	**Reject EDH-044**
27	**Boron**	**mg/l**	---	---	<1	<1	<1
28	**Sodium Absorption Ratio**		---	---	40	2.83	58.5
29	**Phosphorous**	**mg/l**			0.43	0.22	0.56
30	**Aluminum**	**mg/l**			<0.01	<0.01	<0.01
31	**Lithium**	**mg/l**			<0.5	<0.5	<0.5
32	**Manganese**	**mg/l**			0.092	<0.05	0.128
33	**Molybednum**	**mg/l**			<0.5	<0.5	<0.5
34	**Palladium**	**mg/l**			<0.5	<0.5	<0.5
35	**Selenium**	**mg/l**			<0.01	<0.01	<0.01
36	**Vanadium**	**mg/l**			<0.2	<0.2	<0.2
37	**Cadmium**	**mg/l**			<0.02	<0.02	<0.02
38	**Cobalt**	**mg/l**			<0.1	<0.1	<0.1
39	**Bicarbonate**	**mg/l**	---	---	138.2	52.4	344
40	**Electrical Conductivity at 25 degree Celsius**	**us/cm**	---	---	4626	247	7819

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	EDD-050 Discharge	GGS 1 Discharge	Kunur Nala Upstream Near GGS-1
			Date	04.10.2016	04.10.2016	04.10.2016
1	pH at 27 C		5.5 to 9.0	8.43	8.12	7.61
2	Colour in hazen			<5	<5	<5
3	Total Suspended Solids	mg/l	100	<2	<2	4
4	Total Dissolved Solids	mg/l	2100	838	632	124
5	Turbidity	NTU		3.1	5.8	17
6	Acidity as $CaCO_3$	mg/l		Nil	6.9	25.5
7	Total Alkalinity as $CaCO_3$	mg/l		141.4	129	116.5
8	Chloride as Chlorine	mg/l		67	59.3	28.7
9	Total Hardness	mg/l		31	21.3	11.6
10	Sulphate	mg/l		6.3	5.8	<2.5
11	Calcium	mg/l		9.3	12.4	4.6
12	Magnesium	mg/l		1.9	2.8	2.8
13	Dissolved Oxygen	mg/l		5.7	5.6	6.2
14	Biochemical Oxygen Demand	mg/l	30	6	4.2	6.4
15	Chemical Oxygen Demand	mg/l	250	24	18	26
16	Oil & Grease	mg/l	10	<5	<5	<5
17	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001
18	Sulphides (as S_2) in mg/l	mg/l	2	<0.5	<0.5	<0.5
19	Fluoride	mg/l	2	0.78	1.9	1.45
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1
21	Iron	mg/l	3	0.15	0.61	1.88
22	Sodium	mg/l		398.1	375.3	61.2

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	EDD-050 Discharge	GGS 1 Discharge	Kunur Nala Upstream Near GGS-1
			Date	04.10.2016	04.10.2016	04.10.2016
23	Total Chromium	mg/l	2	<0.05	<0.05	<0.05
24	Zinc	mg/l	5	0.024	0.039	0.031
25	Copper	mg/l	3	<0.05	<0.05	<0.05
26	Nickel	mg/l	3	<0.05	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<0.01
28	Lead	mg/l	0.1	<0.1	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1
31	SAR			31.1	35.2	7.8
32	Phosphate	mg/l		0.18	0.15	0.17
33	Potassium	mg/l		8.1	7.3	1.8
34	Aluminium	mg/l		<0.01	<0.01	<0.01
35	Electrical Conductivity at 25° C	µmhos/cm		1259	9.98	225
36	Cadmium	mg/l	2	<0.01	<0.01	<0.01
37	Cobalt	mg/l		<0.1	<0.1	<0.1
38	Vanadium	mg/l	0.2	<0.2	<0.2	<0.2
39	Palladium	mg/l		<0.5	<0.5	<0.5
40	Selenium	mg/l	0.05	<0.01	<0.01	<0.01
41	Manganese	mg/l	2	<0.05	<0.05	0.069
42	Molybednum	mg/l		<0.5	<0.5	<0.5
43	Lithium	mg/l		<0.5	<0.5	<0.5
44	Berylium	mg/l		<0.5	<0.5	<0.5

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	EDD-050 Discharge	GGS 1 Discharge	Kunur Nala Upstream Near GGS-1
			Date	04.10.2016	04.10.2016	04.10.2016
45	Cyanide	mg/l		<0.02	<0.02	<0.02
46	Bicarbonate (as HCO_3)	mg/l		172.5	157.4	142.1
47	Free Ammonia as Nitrogen	mg/l	5	0.33	0.16	<0.1
48	Total coliform bacteria	MPN/100 ml		92	69	51

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Downstream Between EDH-63 & 58	Kunur Nala Downstream Near Kuldiha Bridge	GGS 1 Discharge
			Date	04.10.2016	05.10.2016	04.11.2016
1	pH at 27 C		5.5 to 9.0	7.89	8.15	8.19
2	Colour in hazen			<5	<5	<5
3	Total Suspended Solids	mg/l	100	12	8	2
4	Total Dissolved Solids	mg/l	2100	488	288	252
5	Turbidity	NTU		57.2	33.4	1.5
6	Acidity as $CaCO_3$	mg/l		21.5	7.8	5.88
7	Total Alkalinity as $CaCO_3$	mg/l		66.6	104	81.6
8	Chloride as Chlorine	mg/l		78.5	38.3	22.5
9	Total Hardness	mg/l		15.5	13.5	71.2
10	Sulphate	mg/l		4.5	<2.5	<2.5
11	Calcium	mg/l		7.8	7.8	17.4
12	Magnesium	mg/l		2.8	1.9	6.73
13	Dissolved Oxygen	mg/l		6.3	6	4.21
14	Biochemical Oxygen Demand	mg/l	30	7.5	4	4.8
15	Chemical Oxygen Demand	mg/l	250	35	20	23
16	Oil & Grease	mg/l	10	<5	<5	<5
17	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001
18	Sulphides (as S_2) in mg/l	mg/l	2	<0.5	<0.5	<0.5
19	Fluoride	mg/l	2	0.53	0.75	0.37
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1
21	Iron	mg/l	3	3.8	2.1	0.42
22	Sodium	mg/l		128.6	337.1	14.78

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Downstream Between EDH-63 & 58	Kunur Nala Downstream Near Kuldiha Bridge	GGS 1 Discharge
			Date	04.10.2016	05.10.2016	04.11.2016
23	Total Chromium	mg/l	2	<0.05	<0.05	<0.05
24	Zinc	mg/l	5	0.019	0.044	0.036
25	Copper	mg/l	3	<0.05	<0.05	<0.05
26	Nickel	mg/l	3	<0.05	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<0.01
28	Lead	mg/l	0.1	<0.1	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1
31	SAR			14.2	15.8	0.76
32	Phosphate	mg/l		0.2	0.22	0.39
33	Potassium	mg/l		3.2	6.4	4.3
34	Aluminium	mg/l		<0.01	<0.01	<0.01
35	Electrical Conductivity at 25° C	µmhos/cm		734	485	431
36	Cadmium	mg/l	2	<0.01	<0.01	<0.01
37	Cobalt	mg/l		<0.1	<0.1	<0.1
38	Vanadium	mg/l	0.2	<0.2	<0.2	<0.2
39	Palladium	mg/l		<0.5	<0.5	<0.5
40	Selenium	mg/l	0.05	<0.01	<0.01	<0.01
41	Manganese	mg/l	2	0.075	0.068	<0.05
42	Molybednum	mg/l		<0.5	<0.5	<0.5
43	Lithium	mg/l		<0.5	<0.5	<0.5
44	Berylium	mg/l		<0.5	<0.5	<0.5

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Downstream Between EDH-63 & 58	Kunur Nala Downstream Near Kuldiha Bridge	GGS 1 Discharge
			Date	04.10.2016	05.10.2016	04.11.2016
45	Cyanide	mg/l		<0.02	<0.02	<0.02
46	Bicarbonate (as HCO_3)	mg/l		81.2	126.9	99.5
47	Free Ammonia as Nitrogen	mg/l	5	<0.1	0.1	0.31
48	Total coliform bacteria	MPN/100 ml		69	92	120

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Upstream Near GGS-1	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	04.11.2016	04.11.2016	04.11.2018
1	pH at 27 C		5.5 to 9.0	7.85	8.49	8.37
2	Colour in hazen			<5	<5	10
3	Total Suspended Solids	mg/l	100	4	8	7.5
4	Total Dissolved Solids	mg/l	2100	142	854	384
5	Turbidity	NTU		6.9	32.4	20.2
6	Acidity as $CaCO_3$	mg/l		10.78	Nil	Nil
7	Total Alkalinity as $CaCO_3$	mg/l		45.7	102.8	215.7
8	Chloride as Chlorine	mg/l		18.7	251.6	60.5
9	Total Hardness	mg/l		51.4	138.6	91.1
10	Sulphate	mg/l		3.5	12.5	8.8
11	Calcium	mg/l		14.2	31.7	23.8
12	Magnesium	mg/l		3.84	14.4	7.6
13	Dissolved Oxygen	mg/l		3.45	5.2	3.92
14	Biochemical Oxygen Demand	mg/l	30	3.6	6.6	3.6
15	Chemical Oxygen Demand	mg/l	250	21	32	18
16	Oil & Grease	mg/l	10	<5	<5	<5
17	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001
18	Sulphides (as S_2) in mg/l	mg/l	2	<0.5	<0.5	<0.5
19	Fluoride	mg/l	2	0.21	0.82	0.86
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1
21	Iron	mg/l	3	0.31	0.83	0.23
22	Sodium	mg/l		12.3	165.3	36.7

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Upstream Near GGS-1	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	04.11.2016	04.11.2016	04.11.2018
23	Total Chromium	mg/l	2	<0.05	<0.05	<0.05
24	Zinc	mg/l	5	0.041	0.056	0.079
25	Copper	mg/l	3	<0.05	<0.05	<0.05
26	Nickel	mg/l	3	<0.05	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<0.01
28	Lead	mg/l	0.1	<0.1	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1
31	SAR			0.88	3.8	1.69
32	Phosphate	mg/l		0.31	0.55	0.27
33	Potassium	mg/l		4.8	12.4	4.3
34	Aluminium	mg/l		<0.01	<0.01	<0.01
35	Electrical Conductivity at 25° C	µmhos/cm		250	1398	618
36	Cadmium	mg/l	2	<0.01	<0.01	<0.01
37	Cobalt	mg/l		<0.1	<0.1	<0.1
38	Vanadium	mg/l	0.2	<0.2	<0.2	<0.2
39	Palladium	mg/l		<0.5	<0.5	<0.5
40	Selenium	mg/l	0.05	<0.01	<0.01	<0.01
41	Manganese	mg/l	2	0.069	0.075	0.068
42	Molybednum	mg/l		<0.5	<0.5	<0.5
43	Lithium	mg/l		<0.5	<0.5	<0.5
44	Berylium	mg/l		<0.5	<0.5	<0.5

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Upstream Near GGS-1	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	04.11.2016	04.11.2016	04.11.2018
45	Cyanide	mg/l		<0.02	<0.02	<0.02
46	Bicarbonate (as HCO_3)	mg/l		55.7	125.4	263.1
47	Free Ammonia as Nitrogen	mg/l	5	0.11	0.58	0.46
48	Total coliform bacteria	MPN/100 ml		110	170	120

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGS-1 Discharge	Kunur Nala Upstream Near GGS-1	EDD-050 Dischrage	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	02.12.2016	02.12.2016	02.12.2016	02.12.2016	02.12.2016
1	pH at 27 C		5.5 to 9.0	7.11	8.06	8.52	8.37	8.26
2	Colour in hazen			<5	<5	<5	<5	<5
3	Total Suspended Solids	mg/l	100	<2	2	<2	<2	3
4	Total Dissolved Solids	mg/l	2100	498	116	878	1108	368
5	Turbidity	NTU		1.4	6.2	3.3	2.3	6.3
6	Acidity as $CaCO_3$	mg/l		17.6	7.8	Nil	Nil	3.9
7	Total Alkalinity as $CaCO_3$	mg/l		108.7	77.9	298.5	357	96.3
8	Chloride as Chlorine	mg/l		98	20.8	409.5	468.1	35.6
9	Total Hardness	mg/l		39.6	43.5	150.4	166.3	31.6
10	Sulphate	mg/l		3.8	<2.5	6.6	12.5	8.9
11	Calcium	mg/l		11.1	11.1	42.8	49.2	7.9
12	Magnesium	mg/l		2.8	3.8	10.5	10.5	2.8
13	Dissolved Oxygen	mg/l		6.8	6.2	5.9	6.2	6.5
14	Biochemical Oxygen Demand	mg/l	30	3	<2	2	<2	<2
15	Chemical Oxygen Demand	mg/l	250	10	9	11	8	<8
16	Oil & Grease	mg/l	10	<5	<5	<5	<5	<5
17	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
18	Sulphides (as S_2) in mg/l	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
19	Fluoride	mg/l	2	0.72	0.32	0.82	1.02	0.73
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
21	Iron	mg/l	3	0.33	1.06	0.92	0.28	1.14
22	Sodium	mg/l		140	32.6	418.6	538	86

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGS-1 Discharge	Kunur Nala Upstream Near GGS-1	EDD-050 Dischrage	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	02.12.2016	02.12.2016	02.12.2016	02.12.2016	02.12.2016
23	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
24	Zinc	mg/l	5	0.036	0.071	0.048	0.044	0.059
25	Copper	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05
26	Nickel	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<0.01	<0.01	<0.01
28	Lead	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1	<1	<1
31	SAR			9.7	2.1	14.9	18.2	6.6
32	Phosphate	mg/l		0.54	0.47	0.38	0.44	0.37
33	Potassium	mg/l		5.1	2.4	6.2	7.3	4.8
34	Aluminium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
35	Electrical Conductivity at 25° C	µmhos/cm		775	208	1462	1972	592
36	Cadmium	mg/l	2	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
38	Vanadium	mg/l	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
39	Palladium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
40	Selenium	mg/l	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
41	Manganese	mg/l	2	<0.05	0.086	<0.05	0.068	0.063
42	Molybednum	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
43	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
44	Berylium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

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ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGS-1 Discharge	Kunur Nala Upstream Near GGS-1	EDD-050 Dischrage	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	02.12.2016	02.12.2016	02.12.2016	02.12.2016	02.12.2016
45	Cyanide	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02
46	Bicarbonate (as HCO_3)	mg/l		132.6	95	364.2	435.5	117.5
47	Free Ammonia as Nitrogen	mg/l	5	0.31	0.52	0.61	0.48	0.81
48	Total coliform bacteria	MPN/100 ml		120	220	430	170	110

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

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ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Upstream Near GGS-1	EDD-050 Discharge	Kunur Nala Downstream Between EDH-58 & 63	GGS 1 Discharge	Kunur Nala Downstream Near Kuldiha Bridge
			Date	09.01.2017	09.01.2017	09.01.2017	09.01.2017	09.01.2017
1	pH at 27 C		5.5 to 9.0	8.11	8.5	7.72	8.24	7.41
2	Colour in hazen			<5	<5	<5	<5	<5
3	Total Suspended Solids	mg/l	100	<2	<2	<2	4	2
4	Total Dissolved Solids	mg/l	2100	72	952	1948	734	468
5	Turbidity	NTU		4	2.8	1.1	10.6	5.1
6	Acidity as $CaCO_3$	mg/l		9.8	Nil	10.8	4.9	16.7
7	Total Alkalinity as $CaCO_3$	mg/l		8.3	32.1	108.7	52.2	23.4
8	Chloride as Chlorine	mg/l		14.5	540	980.5	310.8	240.5
9	Total Hardness	mg/l		31.4	121.5	149	121.5	70.6
10	Sulphate	mg/l		<2.5	5.9	7.9	6.1	<2.5
11	Calcium	mg/l		9.4	42.4	42.4	31.4	14.1
12	Magnesium	mg/l		1.9	3.8	10.5	10.5	8.6
13	Dissolved Oxygen	mg/l		6.9	6.5	6.1	4.9	6.5
14	Biochemical Oxygen Demand	mg/l	30	<2	<2	<2	3.8	<2
15	Chemical Oxygen Demand	mg/l	250	<8	<8	<8	19.3	<8
16	Oil & Grease	mg/l	10	<5	<5	<5	<5	<5
17	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
18	Sulphides (as S_2) in mg/l	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
19	Fluoride	mg/l	2	0.82	0.97	1.08	0.56	0.72
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
21	Iron	mg/l	3	0.56	0.41	0.27	1.88	0.65
22	Sodium	mg/l		18.1	327	724	140	112

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ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Upstream Near GGS-1	EDD-050 Discharge	Kunur Nala Downstream Between EDH-58 & 63	GGS 1 Discharge	Kunur Nala Downstream Near Kuldiha Bridge
			Date	09.01.2017	09.01.2017	09.01.2017	09.01.2017	09.01.2017
23	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
24	Zinc	mg/l	5	0.014	0.082	0.089	0.127	0.042
25	Copper	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05
26	Nickel	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<0.01	<0.01	<0.01
28	Lead	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1	<1	<1
31	SAR			1.41	12.9	25.8	5.5	5.8
32	Phosphate	mg/l		0.071	0.14	0.27	0.15	0.092
33	Potassium	mg/l		<1	4.9	9.7	6.8	5.9
34	Aluminium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
35	Electrical Conductivity at 25° C	µmhos/cm		104	1420	2842	1024	624
36	Cadmium	mg/l	2	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
38	Vanadium	mg/l	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
39	Palladium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
40	Selenium	mg/l	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
41	Manganese	mg/l	2	<0.05	0.086	<0.05	0.068	0.063
42	Molybednum	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
43	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
44	Berylium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Upstream Near GGS-1	EDD-050 Discharge	Kunur Nala Downstream Between EDH-58 & 63	GGS 1 Discharge	Kunur Nala Downstream Near Kuldiha Bridge
			Date	09.01.2017	09.01.2017	09.01.2017	09.01.2017	09.01.2017
45	Cyanide	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02
46	Bicarbonate (as HCO_3)	mg/l		10.1	39.2	132.6	63.7	28.5
47	Free Ammonia as Nitrogen	mg/l	5	<0.1	<0.1	0.15	0.11	<0.1
48	Total coliform bacteria	MPN/100 ml		430	220	240	350	430

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGS 1 Discharge	Kunur Nala Upstream Near GGS-2	EDD-050 Discharge	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	07.02.2017	07.02.2017	07.02.2017	07.02.2017	07.02.2017
1	pH at 27 C		5.5 to 9.0	8.16	9.21	8.59	8.76	8.51
2	Colour in hazen			<5	<5	<5	<5	<5
3	Total Suspended Solids	mg/l	100	<2	<2	<2	3	7
4	Total Dissolved Solids	mg/l	2100	272	92	944	1598	566
5	Turbidity	NTU		3.9	2.6	6.2	11.4	18.2
6	Acidity as $CaCO_3$	mg/l		Nil	20	7.8	17.6	9.8
7	Total Alkalinity as $CaCO_3$	mg/l		101.5	30.2	221.5	410.2	126
8	Chloride as Chlorine	mg/l		71.1	25.3	212.4	812.8	301.5
9	Total Hardness	mg/l		28	16	36	40	52
10	Sulphate	mg/l		8.6	<2.5	10.5	5.7	4.9
11	Calcium	mg/l		8	3.2	11.2	11.2	14.4
12	Magnesium	mg/l		1.9	1.9	1.9	2.9	3.9
13	Dissolved Oxygen	mg/l		6.5	6.2	5	4.3	5.7
14	Biochemical Oxygen Demand	mg/l	30	<2	<2	2	3	<2
15	Chemical Oxygen Demand	mg/l	250	<8	<8	11	13	8
16	Oil & Grease	mg/l	10	<5	<5	<5	<5	<5
17	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
18	Sulphides (as S_2) in mg/l	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
19	Fluoride	mg/l	2	1.52	0.68	1.85	2.52	1.82
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
21	Iron	mg/l	3	0.59	0.62	0.75	1.62	1.93
22	Sodium	mg/l		52	14	102	622	205

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGS 1 Discharge	Kunur Nala Upstream Near GGS-2	EDD-050 Discharge	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	07.02.2017	07.02.2017	07.02.2017	07.02.2017	07.02.2017
23	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
24	Zinc	mg/l	5	0.059	0.063	0.072	0.047	0.103
25	Copper	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05
26	Nickel	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<0.01	<0.01	<0.01
28	Lead	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1	<1	<1
31	SAR			4.27	1.53	7.38	42.7	12.34
32	Phosphate	mg/l		0.52	0.26	0.38	0.28	0.24
33	Potassium	mg/l		3	<1	11.2	14	5.2
34	Aluminium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
35	Electrical Conductivity at 25° C	µmhos/cm		450	142	1427	2397	912
36	Cadmium	mg/l	2	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
38	Vanadium	mg/l	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
39	Palladium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
40	Selenium	mg/l	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
41	Manganese	mg/l	2	<0.05	<0.05	<0.05	0.082	0.042
42	Molybednum	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
43	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
44	Berylium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGS 1 Discharge	Kunur Nala Upstream Near GGS-2	EDD-050 Discharge	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	07.02.2017	07.02.2017	07.02.2017	07.02.2017	07.02.2017
45	Cyanide	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02
46	Bicarbonate (as HCO_3)	mg/l		123.8	Nil	270.2	488	140.3
47	Free Ammonia as Nitrogen	mg/l	5	0.42	0.69	0.39	0.54	0.33
48	Total coliform bacteria	MPN/100 ml		58	33	84	70	48

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGS 1 Discharge	EDD-050 Discharge	Kunur Nala Upstream Near GGS-1	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	07.03.2017	07.03.2017	07.03.2017	07.03.2017	07.03.2017
1	pH at 27 C		5.5 to 9.0	8.88	8.81	9.12	8.65	8.17
2	Colour in hazen			5	15	<5	<5	<5
3	Total Suspended Solids	mg/l	100	8	11	<2	3	<2
4	Total Dissolved Solids	mg/l	2100	402	1142	92	1984	778
5	Turbidity	NTU		18.8	20.3	2.8	8	4.4
6	Acidity as $CaCO_3$	mg/l		19.6	17.6	21.6	16.8	Nil
7	Total Alkalinity as $CaCO_3$	mg/l		320	512	27	826	448
8	Chloride as Chlorine	mg/l		88	276	22	864	226
9	Total Hardness	mg/l		52	72	20	36	32
10	Sulphate	mg/l		<2.5	<2.5	<2.5	4.9	<2.5
11	Calcium	mg/l		14.4	17.6	4.9	8	8
12	Magnesium	mg/l		3.9	6.8	1.9	3.9	2.9
13	Dissolved Oxygen	mg/l		4.5	4	6	6.7	6.2
14	Biochemical Oxygen Demand	mg/l	30	3	4.8	<2	<2	<2
15	Chemical Oxygen Demand	mg/l	250	10	16	<8	<8	<8
16	Oil & Grease	mg/l	10	<5	<5	<5	<5	<5
17	Phenolic Compounds (as C_6H_5OH)	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001
18	Sulphides (as S_2) in mg/l	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
19	Fluoride	mg/l	2	0.54	1.35	1.45	0.62	0.84
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
21	Iron	mg/l	3	2.52	4.61	1.6	1.11	0.82
22	Sodium	mg/l		57	69	21	912	103

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGS 1 Discharge	EDD-050 Discharge	Kunur Nala Upstream Near GGS-1	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	07.03.2017	07.03.2017	07.03.2017	07.03.2017	07.03.2017
23	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05
24	Zinc	mg/l	5	0.093	0.077	0.069	0.059	0.021
25	Copper	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05
26	Nickel	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<0.01	<0.01	<0.01
28	Lead	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1	<1	<1
31	SAR			3.5	3.5	2	66.2	8
32	Phosphate	mg/l		0.34	0.48	0.53	0.37	0.43
33	Potassium	mg/l		7.1	11.2	3.9	14.7	8.2
34	Aluminium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
35	Electrical Conductivity at 25° C	µmhos/cm		612	1622	142	2886	1148
36	Cadmium	mg/l	2	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
38	Vanadium	mg/l	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
39	Palladium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
40	Selenium	mg/l	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
41	Manganese	mg/l	2	0.063	0.142	0.101	<0.05	<0.05
42	Molybednum	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
43	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
44	Berylium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil Limited (E P Division)

Compliance Period:Oct'16 to Mar'17

ANNEXURE IV a

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGS 1 Discharge	EDD-050 Discharge	Kunur Nala Upstream Near GGS-1	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge
			Date	07.03.2017	07.03.2017	07.03.2017	07.03.2017	07.03.2017
45	Cyanide	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02
46	Bicarbonate (as HCO_3)	mg/l		345	536	48	838	547
47	Free Ammonia as Nitrogen	mg/l	5	0.061	0.043	0.088	0.044	0.036
48	Total coliform bacteria	MPN/100 ml		58	33	84	70	94

Ground water analysis of surrounding areas off CBM Raniganj Project by Essar Oil Limited

Compliance Period: Oct'16 to Mar'17

ANNEXURE V

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 $CaCO_3$)	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 $CaCO_3$)	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_6H_5OH)	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

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Compliance Period: Oct'16 to Mar'17

ANNEXURE V

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 **ANNEXURE V**

Compliance Period: Oct'16 to Mar'17

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 $CaCO_3$)	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 $CaCO_3$)	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_6H_5OH)	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 V

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
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 **ANNEXURE V**

Compliance Period: Oct'16 to Mar'17

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 $CaCO_3$)	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 $CaCO_3$)	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_6H_5OH)	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 V

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
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

ANNEXURE V

Compliance Period: Oct'16 to Mar'17

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 $CaCO_3$)	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 $CaCO_3$)	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_6H_5OH)	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 **ANNEXURE V**

Compliance Period: Oct'16 to Mar'17

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
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	:	

Note : The submitted sample is Drawn by the Laboratory

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Report Reviewer

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Laboratory:
TÜV SÜD 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

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

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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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TÜV SÜD 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:.291016.005

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

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

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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	:	

Note : The submitted sample is Drawn by the Laboratory

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TÜV SÜD 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:.281116.005

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

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

Authorised By

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- END OF TEST REPORT-

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

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Laboratory:
TÜV SÜD 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:.281116.004

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

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

()

- END OF TEST REPORT-

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	:	

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 .

Laboratory:
TÜV SÜD 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:271216.016

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

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

()

- END OF TEST REPORT-

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	:	

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 .

Laboratory:
TÜV SÜD 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

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

()

- END OF TEST REPORT-

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 ful without the written approval of the laboratory

Laboratory:
TÜV SÜD 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

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

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

()

- END OF TEST REPORT-

FORM 13

[See Rule 21 (1)]

HAZARDOUS WASTE MANIFEST

1.	Occupier's Name & Mailing Address (including Phone No.)	Essar Oil Limited (E&P Division) Ware House, Near Samsan Ghat, Gopalpur, Durgapur
2.	Occupier's Registration No.	178/25(HW)-2449/2008
3.	Manifest Document No.	
4.	Transporter's Name & Address (including Phone No.)	Self Arranged, N.K. Company, J.R. Industrial Estate, Haran Molla Road, Vill-Banogram, P.O.-Rasapunja, P.S.-Bishnupura, Dist-South 24 Pgs (W.B) Phone-033-24780674
5.	Type of Vehicle	(Truck / Tanker / Special Vehicle)
6.	Transporter's Registration No.	
7.	Vehicle Registration No.	WB-19G-8765
8.	Designated Facility Name & Site Address :	M/S N.K. Company J.R. Industrial Estate, Haran Molla Road. Vill-Banogram, P.O-Rasapunja P.S-Bishnupura Dist-South 24 Prgs (W.B.)
9.	Facility's Registration No.	194/25(HW)-2004/2006 dt. 16.12.2015
10.	Facility's Phone No.	033-24780674
11.	Waste Description	Waste Oil
12.	Total Quantity	1,890 ltrs ..... m3 or MT
13.	Consistency	(Solid / Semi-Solid / Sludge / Oily / Tarry / Slurry)
14.	Transport description of Wastes	
15.	Containers	Number: 9 — Type: Drums
16.	Total Quantity	1·890 ltrs ..... m3 or MT
17.	Unit Wt. / Vol.	1·890 ltrs ..... m3 or MT
18.	Waste Category Number	5·2
19.	Special Handling Instruction & Additional information	
20.	OCCUPIER'S CERTIFICATE	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labeled, and are in all respects in proper condition for transport by road according to applicable national Government Regulations.
	Typed Name & Stamp :	Signature : Month 12 Day 08 Year 2016
21.	Transporter Acknowledgment of Receipt of Wastes	
	Typed Name & Stamp :	Signature : Jayanta Kr Dhali Month 12 Day 08 Year 2016
22.	Discrepancy Note Space	
23.	Facility Owner or Operator's Certification of Receipt of Hazardous Waste	
	Typed Name & Stamp :	Signature : Month 12 Day 08 Year 2016

1. White Colour forwarded to WBPCB by Generator
2. Yellow Colour retained by Generator
3. Pink Colour retained by facilitor
4. Orange Colour retained by transporter
5. Green Colour forwarded to WBPCB after disposal
6. Blue Colour returned to Generator after disposal

2nd Copy

FORM 10

WEST BENGAL WASTE MANAGEMENT LIMITED

J.L No. 103, Mouza Purba Srikrishnapur, P.O. & P.S. Sutahata, Haldia 721635, Dist. Purba Medinipur, West Bengal

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's name and mailing address (including Phone No. and e-mail) :	ESSAR OIL LTD. (E&P Division) Webel IT Park, 3rd Floor, Surya Sen Sarani, Near Gandhi More. Durgapur-713208. Ph. No-0343-6603008
2	Sender's authorization No. :	220/25 (HW)- 2449/2008
3	Manifest Document No. :	378
4	Transporter's name and address (including Phone No. and e-mail) :	**West Bengal Waste Management Limited** J.L No. 103, Mouza Purba Srikrishnapur, P.O. & P.S. Sutahata, Haldia 721635 Dist. Purba Medinipur, West Bengal, Ph. No.- 03224-278238 / 39 E-mail : wbwml_haldia@ramky.com
5	Type of vehicle :	(Truck/Tanker/Special Vehicle)
6	Transporter's registration No. :	1-MD(E)/X/06
7	Vehicle registration No. :	WB-29/8073
8	Receiver' s name and mailing address (including Phone No. and e-mail) :	**West Bengal Waste Management Limited** J.L No. 103, Mouza Purba Srikrishnapur, P.O. & P.S. Sutahata, Haldia 721635 Dist. Purba Medinipur, West Bengal, Ph. No.- 03224-278238 / 39 E-mail : wbwml_haldia@ramky.com
9	Receiver's authorization No. :	
10	Waste description :	Oil contaminated materials, Filter, Lithenium Battery (15 Nos)
11	Total quantity No. of Containers :	2.475 m3 or MT .....Nos.
12	Physical form :	(Solid/Semi-Solid/Sludge/Oily/Tarry/Slurry/Liquid)
13	Special handling instructions and additional information :	use gloves, Helmet, safety goggles, cover the truck before transport.
14	Sender's Certificate Name and stamp: ESSAR OIL LIMITED DURGAPUR CBM PROJECTS	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping categorized, packed, marked, and name and are labeled, and are in all respects in proper conditions for transport by road according to applicable national government regulations. Signature: (S. RAY) 9/12/16 Day Month Year: 0 9 1 2 2 0 1 6
15	Transporter acknowledgement of receipt of Wastes : Name and stamp: Signature:	Day Month Year: 0 9 1 2 2 0 1 6
16	Receiver' s certification for receipt of hazardous and other waste: Name and stamp: Signature:	Day Month Year: 0 9 1 2 2 0 1 6

1. White Colour forwarded to WBPCB by HzW Sender.
2. Yellow Colour retained by HzW Sender.
3. Pink Colour retained by HzW Receiver.
4. Orange Colour retained by Transporter.
5. Green Colour forwarded to WBPCP after disposal by HzW Receiver.
6. Blue Colour returned to Sender after disposal by HzW Receiver.
7. Grey Colour returned to SPCB of the HzW Sender (in case the Sender is in another State) by HzW Receiver.

FORM 13
[See Rule 21 (1)]
HAZARDOUS WASTE MANIFEST

1.	Occupier's Name & Mailing Address (including Phone No.)	Essarail Limited (EPD Division) WARE House Near Shamshanghat, Gopalpur Durgapur.
2.	Occupier's Registration No.	15/25(HW)2449/2008 dated 13/2/2015 of WBPCB
3.	Manifest Document No.	
4.	Transporter's Name & Address (including Phone No.)	Self arrange. Jayanta kr Dhali M-9903454297
5.	Type of Vehicle	(Truck / Tanker / Special Vehicle)
6.	Transporter's Registration No.	
7.	Vehicle Registration No.	WB-11D 0466
8.	Designated Facility Name & Site Address :	N.K. Company. J.L. Industrial Estate, Haran Molla Road. Vill-Banagaram P.O Rsapanja PS. Bishn W.B. 24Pgs(S)
9.	Facility's Registration No.	194/25(HW)-2054/2006 dt 16-12-2015
10.	Facility's Phone No.	033-24980674
11.	Waste Description	Waste oil oily sludge
12.	Total Quantity	6.300 kiltres m3 or MT
13.	Consistency	(Solid / Semi-Solid / Sludge / Oily / Tarry / Slurry)
14.	Transport description of Wastes	oily.
15.	Containers	Number: 30 drums; Type: MS/P.V.C. Number: 6300; Type: litres
16.	Total Quantity	..... m3 or MT
17.	Unit Wt. / Vol.	6.300 kiltres m3 or MT
18.	Waste Category Number	
19.	Special Handling Instruction & Additional information	
20.	OCCUPIER'S CERTIFICATE	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labeled, and are in all respects in proper condition for transport by road according to applicable national Government Regulations.
	Typed Name & Stamp :	Signature : Jayanta kr Dhali Month 10 Day 07 Year 2016
21.	Transporter Acknowledgment of Receipt of Wastes	Jayanta kr Dhali
	Typed Name & Stamp :	Signature : Month 10 Day 07 Year 2016
22.	Discrepancy Note Space	
23.	Facility Owner or Operator's Certification of Receipt of Hazardous Waste	
	Typed Name & Stamp :	Signature : Month 10 Day 07 Year 2016

1. White Colour forwarded to WBPCB by Generator
2. Yellow Colour retained by Generator
3. Pink Colour retained by facilitor
4. Orange Colour retained by transporter
5. Green Colour forwarded to WBPCB after disposal
6. Blue Colour returned to Generator after disposal

FORM 13

[See Rule 21 (1)]

HAZARDOUS WASTE MANIFEST

1.	Occupier's Name & Mailing Address (including Phone No.)	Essar Oil Limited (E & P Division) Warehouse, Near Bamleshwar Ghat, Bopalpur, Durgapur
2.	Occupier's Registration No.	WB78/25(HW)-2449/2008
3.	Manifest Document No.	
4.	Transporter's Name & Address (including Phone No.)	Self Arranged, N. K. Company, J. R. Industrial Estate, Haren Mollah Road, Vill.- Banogram, P.O. Rasapunja, P.S.- Bishnupura, Dist. South 24 Pgs. Phone: 033-24980674 (LO:B)
5.	Type of Vehicle	(Truck / Tanker / Special Vehicle)
6.	Transporter's Registration No.	
7.	Vehicle Registration No.	WB 19G 8765
8.	Designated Facility Name & Site Address :	M/S. N.K. Company, J. R. Industrial Estate, Haren Mollah Road, Village, Banogram, P.O. Rasapunja, P.S. Bishnupura, Dist. South 24 Pgs. (LO:B)
9.	Facility's Registration No.	194/25(HW)-2004/2006 dt 16.12.2015
10.	Facility's Phone No.	033-2449.80674
11.	Waste Description	Waste oil
12.	Total Quantity	1.680 m3 or MT
13.	Consistency	(Solid / Semi-Solid / Sludge / Oily / Tarry / Slurry)
14.	Transport description of Wastes	
15.	Containers	Number: 8 — Type: Drums
16.	Total Quantity	..... m3 or MT
17.	Unit Wt. / Vol.	1.680 m3 or MT
18.	Waste Category Number	5.2
19.	Special Handling Instruction & Additional information	
20.	OCCUPIER'S CERTIFICATE	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labeled, and are in all respects in proper condition for transport by road according to applicable national Government Regulations.
	Typed Name & Stamp : S. RAY	Signature : Month 1 1 Day 2 5 Year 2 0 1 6
21.	Transporter Acknowledgment of Receipt of Wastes	
	Typed Name & Stamp :	Signature : Jayantaka Dhali Month 1 1 Day 2 5 Year 2 0 1 6
22.	Discrepancy Note Space	
23.	Facility Owner or Operator's Certification of Receipt of Hazardous Waste	
	Typed Name & Stamp :	Signature : Month 1 1 Day 2 5 Year 2 0 1 6

ESSAR OIL LIMITED DURGAPUR CBM PROJECTS

N. K. COMPANY KOLKATA

1. White Colour forwarded to WBPCB by Generator
2. Yellow Colour retained by Generator
3. Pink Colour retained by facilitor
4. Orange Colour retained by transporter
5. Green Colour forwarded to WBPCB after disposal
6. Blue Colour returned to Generator after disposal

ANNEXURE VIII

Expenditure towards Environmental Protection Measures at Raniganj CBM Project (Period October, 2016 - March, 2017)		
Sl No	**Particular**	**Expenses (in Rs)**
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
TOTAL		**43,172,425.00**

SCIENTIFIC RESEARCH LABORATORY
(Analytical & Environmental Engineering Laboratory)
Laboratory Recognised By West Bengal Pollution Control Board
An ISO 14001 : 2004, ISO 9001 : 2008 & OHSAS 18001 : 2007 Certified
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

Shirsendu Dey

(Senior Chemist)

SCIENTIFIC RESEARCH LABORATORY

(Analytical & Environmental Engineering Laboratory)

Laboratory Recognised By West Bengal Pollution Control Board
An ISO 14001 : 2004, ISO 9001 : 2008 & OHSAS 18001 : 2007 Certified
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-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 Mosjid	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

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