

Ref No. EOL/CBM-RG(E)/E&F/2017/3330



Date: 31st May, 2017

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

Essar Oil Limited
Exploration & Production Division
Village/ PO Gopalpur
Near Rajendra Nath Polytechnic College
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Corporate Identity Number :
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Sub: Submission Half-yearly Compliance Report of the Environmental Clearance (Phase-I) by
Essar Oil Limited (E&P Division) reg.


Ref: Environmental Clearance of Phase-I granted by MoEF vide letter no.J-11011/660/2007-IA II
(I) dated 06th May, 2008

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-I 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-I 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-I) Half Yearly Environment Clearance Compliance Report – October'16- March'17

**Ref: Environment Clearance no. F. No. J-11011/660/2007- IA II (I) dated
06.05.2008**

Sr. No.	EC Conditions	Compliance Status
A. Specific Conditions		
1.	The Company shall 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.	Drill cuttings have been collected and stored in HDPE lined pits. Drilling of Phase-I activities (15 test wells and 12 core holes) has been completed.
2.	The Company shall pay Compensation for acquisition of private land as per the Central Government/State Govt Norms. The compensation to be paid to the land losers shall not be less than the norms/package as per the policy on National resettlement and rehabilitation Rules, 2007.	The acquisition has been done directly with the concerned land owners and the compensation is paid to the above as per the prevailing market rate. There is no involvement of Rehabilitation and Resettlement.
3.	The Company shall monitor data on methane and non-methane hydrocarbon and data submitted to ministry.	Methane hydrocarbon data is being monitored as a part of ambient air quality monitoring. AAQ report is attached as Annexure I .
4.	The drilling shall be restricted to the mines free area. The company shall use (Water Based Mud) WBM.	Drilling has been carried out in mine free area within the block area granted by the Ministry of Petroleum and Natural Gas (MoPNG). Water based mud has been used for drilling
5.	The surface facilities shall be installed as per applicable codes and standards, international practices and applicable local regulations.	All the surface facilities have been installed as per OISD and API guidelines
6.	The Top soil removed wherever suitable shall be stacked separately for reuse during	The top soil is spread in the designated Green Belt area of the major facility. In future it has been planned that the top soil

Sr. No.	EC Conditions	Compliance Status
A. Specific Conditions		
	restoration process.	will be spread along the periphery of the new facilities to develop greenbelt and the practice will be continued.
7.	Drilling waste water including drill cutting wash water shall be collected in disposal pit lined with HDPE lining evaporated or treated and shall comply with the notified standards for on-shore disposal.	Drilling wastewater including drill cutting and wash water has been collected and stored in HDPE lined pit for solar evaporation.
8.	The company shall take necessary measures to prevent fire hazards and soil remediation as needed. At place of ground flaring the flare pit shall be lined with refractory bricks and efficient burning systems shall be provided. In case of overhead flare stacks the stack height shall be provided as per the norms to minimize the gaseous emissions and heating load during flaring.	<p>We do not have any ground flaring on our project. Proper stack is provided with as per the norms at central GGS for overhead flaring.</p> <p>The following facilities have been provided for fire prevention & control.</p> <ul style="list-style-type: none"> ▪ Installation of electrical equipment as per approved hazardous zone classification as communicated to DGMS ▪ Provided dry chemical fire extinguishers
9.	The produced water during drilling operations shall be collected in the lined waste pits to prevent ground water contamination. The water shall be treated to the prescribed standards before disposal. The treated produced water shall be used for irrigation, pisci-culture and ground water recharge etc.	<p>The produced water has been collected in HDPE lined pits to prevent any ground water contamination. Analysis reports of produced water are attached as Annexure II.</p> <p>Centralized Reverse Osmosis Treatment Plant with total capacity of 5100 m³/day has been installed at Gas Gathering Station-1 and three well pads (EDD-050, EDH-044 & EDN-099) to cater the produced water generated from Ph-I, II & III wells. The treated produced water is reused in our own operations (drilling, HF, green belt development, Domestic purpose). Analysis reports of water treated through Reverse Osmosis plant are attached as Annexure III. Excess water is discharged to the nearby stream after confirming to the discharge standards. Analysis reports of Surface</p>

Sr. No.	EC Conditions	Compliance Status
A. Specific Conditions		
		water are attached as Annexure III (a) .
10.	To prevent underground coal fire, preventive measures shall be taken for ingress of ambient air during water withdrawal inside the coal seams by adopting technologies including vacuum suction. Gas detectors for detection of CH ₄ and H ₂ S shall be installed	As the CBM well is a closed system and do not have any contact with underground environment, there will not be any possibility of ingress of ambient air during water withdrawal. Multi-gas detectors (for CH ₄ , CO, O ₂ & H ₂ S) are used to detect the concentrations of the gases at the well head. The gas composition analysis, which is being done periodically, does not show any presence of H ₂ S. Gas presence is tested every time before work permit is issued for all hot works at the site.
11.	The company shall take necessary measures to reduce noise levels at the drill site by providing mitigation measures such as proper acoustic enclosures to the DG Set and meet the norms notified by the MoEF. Height of all stacks/vents shall be provided as per the CPCB guidelines.	The company has taken following measures to reduce noise levels; <ul style="list-style-type: none"> ▪ DG sets with acoustic enclosures ▪ provision of silencers, rubber claddings & noise isolators ▪ regular maintenance & inspection of machinery & equipment Adequate stack height is provided for all the DG sets.
12.	Proper Infrastructure and sanitation facilities shall be provided for the construction workers during construction. All the construction waste shall be managed so that there is no impact on the surrounding environment	The sanitation facilities are provided at all drill sites. Construction, Inert & domestic waste e.g., food wastes, papers etc., generated during the activities have been collected in bins and disposed through the Durgapur Municipal Corporation.
13.	The company shall take necessary measures to prevent fire hazards, containing oil spill and soil remediation as needed	Adequate nos. and type of fire extinguishers have been provided and maintained at each well site. Emergency Response Plan is in place and third party audit has been carried out to ensure its appropriateness and efficiency.

Sr. No.	EC Conditions	Compliance Status
A. Specific Conditions		
		Impervious surfaces, Secondary containment and proper spill kits are provided whenever there is possibility of land contamination.
14.	The project proponent shall also comply with the Environmental protection measures and safeguards recommended in the EIA/EMP/risk analysis report as well as the recommendations of public hearing	All the recommendations of the public hearing & the environmental protection measures & safeguards as mentioned in the EIA report have been implemented.
15.	To prevent well blowouts during drilling operations, Blow Out Preventer (BOP) system shall be installed. Blow out prevention measures during drilling shall focus on maintaining well bore hydrostatic pressure by proper pre-well planning and drill rig fluid	CBM well hydrostatic pressures are normally less than 2psi. However depending upon the hydrostatic pressures and sensitivity of well, Blow Out Preventer was installed wherever required. Drilling has been completed & no further drilling was carried out in the compliance period.
16.	Occupational health surveillance of workers shall be carried out as per the prevailing acts and rules	All employees have undergone Pre-employment Medical Examination.
17.	The Company shall take measures after completion of drilling process by well plugging and secured enclosures, decommissioning of rig upon abandonment of the well and drilling site shall be restored to near 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.	Commercially viable test wells have been converted to production wells. Coreholes have been abandoned and restored as per the well closure plan.
18.	In case the commercial viability of the project is established, the company will prepare a detailed plan for the development of CBM block to obtain a	We have prepared the detailed plan for the development of CBM block. EC has been obtained for phase II on 29 th Sep, 2011 and environmental clearance for Phase III for 650

Sr. No.	EC Conditions	Compliance Status
A. Specific Conditions		
	fresh clearance from Ministry.	Development cum Production wells is also granted by MoEF on 28 th February, 2013.

Sr. No.	EC Conditions	Compliance Status
B. General Condition		
1.	No further expansion or modification in the project 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 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.
2.	The Project authorities must strictly comply with the rules and regulations under Manufacture, storage and import of hazardous chemical rules, 1989 as amended in 2000. Prior approval from chief inspector of factories, Chief controller of explosives, Fire Safety Inspectorate etc must be obtained, wherever applicable.	Hazardous chemicals are not used in CBM Raniganj Project. However prior approvals have been obtained from DGMS, Chief Controller of Explosives, Fire Safety Inspectorate & West Bengal Pollution Control Board.
3.	The Project authorities must strictly comply with the rules and regulations with regarding to handling and disposal of Hazardous Wastes (Management and Handling) Rules, 1989/2003 wherever applicable. Authorization from the state pollution control board must be obtained for collection/treatment/storage/disposal of hazardous wastes.	Obtained Extension of Authorization for handling, storage, and disposal of HW from West Bengal Pollution Control Board for on 8 th November 2016. The authorization is valid till 31 th Oct 2018. (The copy of the Authorization letter is attached as Annexure VI) Hazardous Wastes (Management and Handling) Rules, 2008 are complied.

Sr. No.	EC Conditions	Compliance Status
B. General Condition		
4.	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, enclosure 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(Night).	Noise control measures are taken by providing acoustic enclosures & silencer for DG sets. Regular noise monitoring is being carried out in the Plant area and report is attached as Annexure- IV.
5.	A separate Environmental Management Cell equipped with full fledged laboratory facilities must be set up to carry out the environmental management and monitoring function	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 carried out by Scientific Research laboratory (MoEF recognized).
6.	The Project Authorities will provide adequate funds both recurring and non-recurring to implement the conditions stipulated by the MoEF as well as state Government along with the	Adequate funds have been provided for the CBM project as a whole (All phases together) to meet recurring and non-recurring expenses for pollution control as per stipulation of MoEF and WBPCB. Details are given in Annexure V.

Sr. No.	EC Conditions	Compliance Status
B. General Condition		
	implementation schedule for all the conditions stipulated herein. The fund so provided shall not be diverted for any other purposes	
7.	The Regional Office of the Ministry of Bhubaneswar/CPCB/SPCB will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation shall be submitted to them regularly.	All the required supports have been extended and will be continued to extend the support to the Regional office of this Ministry/Central Pollution Control Board/West Bengal Pollution Control Board. Half Yearly Environmental Compliance Report is being submitted with Environment Monitoring Data.
8.	The Project proponent shall inform the public that the project has been accorded environmental clearance by the ministry and copies of letter are available with the SPCB/Committee and may also be seen at website of the Ministry and Forest at http://www.envfor.nic.in . This shall be advertised within seven days of issue of this letter in at least two local news papers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned.	The notice has been published news papers (vernacular & English languages) regarding the grant environmental clearance. The supporting documents have been submitted in the first compliance report (submitted on 31/12/2008).
9.	The Project Authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	The project was funded internally without any external funding. Project was commenced on 20 th June, 2008 after obtaining consent to establish from WBPCB.

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

S. NO.	Parameter	Unit	NAAQS Limit	MCS					
				Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	42.21	51.7	51.33	50.3	28.28	48.85
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	99.24	122.56	90.21	135.22	67.29	129.36
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	34.94	28.95	30.80829	32.62	6.44	6.2
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	6.22	6.18	6.212357	5.9	34.84	34.5
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.434	0.462	0.462	0.398	0.422	0.34
6	THC as Methane	mg/m ³	-	1.48	1.48	1.31	1.45	1.56	1.32
7	Mercury	µg/m ³	-	< 0.002	-	-	< 0.002	-	-
8	Hydrocarbon as Non Methane	mg/m ³	-	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
9	VOCs	µg/m ³	-	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)

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE I

Compliance Period: Oct'16 to Mar'17

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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E2 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
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

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 ₆ H ₅ OH)	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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E6 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
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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E8 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
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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E10 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
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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E12 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
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

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 ₆ H ₅ OH)	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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E16 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
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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E18 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
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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E20 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
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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E22 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
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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E24 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
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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E26 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
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

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 ₆ H ₅ OH)	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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E30 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
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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E32 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
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

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 ₆ H ₅ OH)	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

Produced Water Analysis Report of CBM Raniganj Project E34 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
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

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

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	04.10.2016	04.10.2016	04.10.2016
					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 III

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

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

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	04.10.2016	04.10.2016	04.10.2016
					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 III

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

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

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	05.10.2016	05.10.2016	05.10.2016
					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 III

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

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

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	04.11.2016	04.11.2016	04.11.2016
					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 III

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					04.11.2016	04.11.2016	04.11.2016
					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)

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	04.11.2016	04.11.2016	04.11.2016
					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 III

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

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

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	04.11.2016	04.11.2016	04.11.2016
					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	

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					04.11.2016	04.11.2016	04.11.2016
					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)

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					02.12.2016	02.12.2016	02.12.2016
					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

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					02.12.2016	02.12.2016	02.12.2016
					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)

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					02.12.2016	02.12.2016	02.12.2016
					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 III

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					02.12.2016	02.12.2016	02.12.2016
					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)

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	02.12.2016	02.12.2016	02.12.2016
					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	

Compliance Period: Oct'16 to Mar'17

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

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					09.01.2017	09.01.2017	09.01.2017
					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)

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	09.01.2017	09.01.2017	09.01.2017
					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 III

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					09.01.2017	09.01.2017	09.01.2017
					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)

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					09.01.2017	09.01.2017	09.01.2017
					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

Compliance Period: Oct'16 to Mar'17

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

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

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					07.02.2017	07.02.2017	07.02.2017
					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 III

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					07.02.2017	07.02.2017	07.02.2017
					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)

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					07.02.2017	07.02.2017	07.02.2017
					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 III

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

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

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	07.02.2017	07.02.2017	07.02.2017
					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 III

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

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

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	07.03.2017	07.03.2017	07.03.2017
					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 III

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					07.03.2017	07.03.2017	07.03.2017
					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)

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	07.03.2017	07.03.2017	07.03.2017
					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 III

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

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

ANNEXURE III

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date	17.03.2017	17.03.2017	17.03.2017
					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	

Compliance Period: Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	Onshore Discharge Standards	Date		
					17.03.2017	17.03.2017	17.03.2017
					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

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ANNEXURE III a

Compliance Period:Oct'16 to Mar'17

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
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 ₆ H ₅ OH)	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)

ANNEXURE III a

Compliance Period:Oct'16 to Mar'17

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
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	Beryllium	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 III 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 III 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
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 ₆ H ₅ OH)	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)

ANNEXURE III a

Compliance Period:Oct'16 to Mar'17

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
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	Beryllium	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 III 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)

ANNEXURE III a

Compliance Period:Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Upstream	Kunur Nala Downstream	Kunur Nala Downstream
				Near GGS-1	Between EDH-58 & 63	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 ₆ H ₅ OH)	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)

ANNEXURE III a

Compliance Period:Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	Kunur Nala Upstream	Kunur Nala Downstream	Kunur Nala Downstream
				Near GGS-1	Between EDH-58 & 63	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

Compliance Period:Oct'16 to Mar'17

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

Compliance Period:Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGs-1 Discharge	Kunur Nala Upstream Near GGS-1	EDD-050 Discharge	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 ₆ H ₅ OH)	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

Compliance Period:Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGs-1 Discharge	Kunur Nala Upstream Near GGS-1	EDD-050 Discharge	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
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	Molybdenum	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	Beryllium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5

Compliance Period:Oct'16 to Mar'17

S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants	GGs-1 Discharge	Kunur Nala Upstream Near GGS-1	EDD-050 Discharge	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

Compliance Period:Oct'16 to Mar'17

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 Kuldih 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 ₆ H ₅ OH)	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

Compliance Period:Oct'16 to Mar'17

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	Beryllium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5

Compliance Period:Oct'16 to Mar'17

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

Compliance Period:Oct'16 to Mar'17

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 ₆ H ₅ OH)	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

Compliance Period:Oct'16 to Mar'17

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	Beryllium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5

Compliance Period:Oct'16 to Mar'17

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

Compliance Period:Oct'16 to Mar'17

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 ₆ H ₅ OH)	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

Compliance Period:Oct'16 to Mar'17

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	Beryllium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5

Compliance Period:Oct'16 to Mar'17

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

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

ANNEXURE IV

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

Expenditure towards Environmental Protection Measures at Raniganj CBM Project		(Period
October, 2016 - March, 2017)		
SI 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



WEST BENGAL POLLUTION CONTROL BOARD

(Department of Environment, Govt. of West Bengal)

Paribesh Bhawan

Bldg. No. 10 A, Block-LA, Sector-III, Bidhan Nagar,

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Website : www.wbpcb.gov.in, e-mail : wbpcbnet@wbpcb.gov.in

Memo No. **178** /2S(HW) –2449/2008

Date: **08.11** .2016

Form – II

Grant of Authorization under the provisions of the Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 & amendments made thereafter.

Ref.: Application for renewal of authorization dated 16.09.2016 for management & handling of hazardous waste.

Authorization for Operating a facility for generation, handling, collection, reception, storage, transport, recycling, reprocessing, reuse and disposal of hazardous wastes under Rules 5(4) of the Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 & amendments made thereafter.

1. **Memo No. and date of previous Authorizations issued by the Board 15/2S(HW)-2449/2008 dt. 13.02.2014.**

2. **M/s. Essar Oil Limited (E & P) Division**

WEBEL IT Park, Surya Sen Sarani, Near Gandhi More, Durgapur, District: Burdwan, Pin – 713 208. West Bengal is hereby granted an authorization to operate a facility for generation, handling, collection, reception, transport, storage and disposal of hazardous waste of category (s) **“5.1, 5.2 & 35.1”** on the premises situated in WEBEL IT Park, Surya Sen Sarani, Near Gandhi More, Durgapur, District: Burdwan, Pin – 713 208. West Bengal

3. The authorization shall be in force for a period upto **31.10.2018.**

4. The authorization is subject to the condition stated below and such conditions are as may be specified in the rules for the time being in force under the Environment (Protection) Act, 1986.

[Chief Engineer]

Waste Management Cell

on behalf of

Member Secretary

West Bengal Pollution Control Board

Encl.: *Terms & conditions for authorization.*


Terms and conditions of authorization

1. The authorization shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made thereunder.
2. The unit shall not store hazardous waste for more than 90 Days under any circumstances.
3. The authorisation or its renewal shall be produced during inspection at the request of an officer authorised by the State Pollution Control Board.
4. The person authorized shall not rent, lend, sell, transfer or otherwise transport the hazardous wastes without obtaining prior permission of the State Pollution Control Board.
5. Any unauthorized change in personnel, equipment or working conditions as mentioned in the application by the person authorized shall constitute a breach of his authorization.
6. It is the duty of the authorized person to take prior permission of the State Pollution Control Board to close down the facility.
7. An application for the renewal of authorization shall be made as laid down in Rule 5 (7) of the Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 & amendments made thereafter.
8. Without Board's permission the authorized person cannot dispose off any category of hazardous waste of the unit outside the factory premises.
9. The person authorized is allowed to store the hazardous wastes inside the factory with all precautionary measures to avoid any leaching. Moreover direct land filling of any hazardous wastes is not permitted.
10. The occupier will not be allowed to dispose / recycle / reuse or reprocess any of their hazardous wastes by any unauthorized external agency / or without the consent of State Board.
11. The occupier / generator will not be allowed to transport any types of hazardous wastes through any unauthorized transporters as per Motor Vehicles Act, 1988 and Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 & amendments made thereafter.
12. Hazardous waste storing drums / pits should be properly covered.
13. Proper display arrangement showing characteristic / category / quantity per month etc. to be made at the storing site.
14. The occupier should maintain all other formalities viz. Form – 3, 4, 6, 11,12 & 13 as per Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 & amendments made thereafter.
15. Any off-specification product and containers of hazardous chemicals should not be disposed of outside or sold to any unauthorized agency without the knowledge of the Board.
16. All safety precautions and procedures to be adopted during handling of hazardous wastes.
17. Good housekeeping to be maintained in the factory.
18. Authorization may be withdrawn any time if hazardous wastes storage facilities are not found satisfactory and in case of non-compliance of any statutory provisions under the said rules.

Terms and conditions of authorization

19. The unit shall store the Hazardous Wastes (category wise separately) under shade in an environment friendly safe manner within the premises at designated places.
20. The unit shall not store hazardous wastes on site for more than 90 days.
21. Used oil (5.1) shall be sold through manifest system to the authorized recyclers having valid Pass-Book of the State Pollution Control Board (SPCB). During each sale, the original Pass-book issued by the SPCB to the recyclers shall be endorsed mentioning the quantity and copy of the same should be kept as record.
22. Waste/ residue containing oil (5.2) and damaged & discarded oil filters (35.1) shall be disposed of to the Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF) at Haldia, Purba Medinipur through Manifest system.
23. The unit shall submit Annual return in (Form 4) on a regular basis.
24. Records of hazardous waste generation, storage and disposal shall be maintained properly and shall be available to the inspecting officials of the State Board during inspection.
25. The unit shall update regularly the environmental information in Display Boards as per the order of the Hon'ble Supreme Court dated. 14.10.2003 in W.P.(C) NO.657 of 1995.
26. Authorisation will be revoked in case of non-compliances with any of the above mentioned conditions.
27. The unit shall apply for renewal of hazardous waste authorisation at least 60 (sixty) days before the expiry of this authorisation.

M/s. Essar Oil Limited (E & P) Division
WEBEL IT Park, Surya Sen Sarani, Near
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Pin - 713 208. West Bengal


[Chief Engineer]
Waste Management Cell
on behalf of
Member Secretary
West Bengal Pollution Control Board