

EOGEP L/CBM-RG(E)/E&F/2018/490

Date: 29th May, 2018



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

Essar Oil and Gas Exploration and Production Limited
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Sub: Submission Half-yearly Compliance Report of the Environmental Clearance (Phase-I) by Essar Oil and Gas Exploration and Production Limited 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, 2017- March, 2018.

Thanking you.

Yours faithfully
For Essar Oil and Gas Exploration and Production Limited

Authorized Signatory
(Ashutosh Dash
Vice President & Head – Production)



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 and Gas Exploration and Production Limited

**RG (East)-CBM-2001/1 (Phase-I) Half Yearly Environment Clearance Compliance Report –
October'17- March'18**

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

Sr. No.	EC Conditions	Compliance Status
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. AAQM 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 restoration process.	The top soil is spread in the designated Green Belt area of the major facility.

Sr. No.	EC Conditions	Compliance Status
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 (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 water are attached as Annexure III A.</p>
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	<p>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.</p> <p>Multi-gas detectors (for CH₄, CO, O₂ & H₂S) are used to detect the concentrations of the gases at the well head. The gas composition analysis, which</p>

Sr. No.	EC Conditions	Compliance Status
		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. 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	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.

Sr. No.	EC Conditions	Compliance Status
	focus on maintaining well bore hydrostatic pressure by proper pre-well planning and drill rig fluid	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 fresh clearance from Ministry.	We have prepared the detailed plan for the development of CBM block. EC has been obtained for phase II on 29th Sep, 2011 and environmental clearance for Phase III for 650 Development cum Production wells is also granted by MoEF on 28th February, 2013.
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.

Sr. No.	EC Conditions	Compliance Status
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. Hazardous Wastes (Management and Handling) Rules, 2008 are complied.
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 is currently in operation and functioning for implementation of environment management plan at large. 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	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.

Sr. No.	EC Conditions	Compliance Status
	Government along with the implementation schedule for all the conditions stipulated herein. The fund so provided shall not be diverted for any other purposes.	Details are given in Annexure V.
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 and Gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE I

S. NO.	Parameter	Unit	NAAQS Limit	GGs 1					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	33.04	37.35	43.18	36.42	37.28	41.08
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	64.73	74.04	75.68	72.64	69.38	74.65
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	44.35	41.72	41.19	42.65	42.84	43.58
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	6.35	6.94	6.41	6.04	6.76	6.22
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.398	0.386	0.429	0.416	0.412	0.463
6	THC as Methane	mg/m ³	-	2.09	1.78	1.78	2.09	2.18	2.42
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	3.02			2.92		
10	Benzo(a)Pyrene	ng/m ³	1	0.75			0.63		
11	Ammonia (NH ₃)	mg/m ³	400	22.47			26.14		
12	Ozone (O ₃)	mg/m ³	100	46.12			39.86		
13	Lead (Pb)	mg/m ³	1	0.15			0.18		
14	Nickel (Ni)	ng/m ³	20	14.84			15.02		
15	Arsenic	ng/m ³	6	1.62			1.31		
16	Benzene	mg/m ³	5	1.84			1.75		

S. NO.	Parameter	Unit	NAAQS Limit	JATGORIA					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	34.94	35.98	46.62	30.22	40.34	33.46
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	69.08	75.42	82.50	58.64	68.22	72.64
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	36.93	45.47	42.00	39.62	46.24	44.58
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	5.66	7.08	6.75	5.84	6.18	6.70
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.348	0.364	0.464	0.40	0.438	0.446
6	THC as Methane	mg/m ³	-	2.64	1.8	1.72	1.80	2.230	2.36
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	5.38	< 0.002	< 0.002
8	Hydrocarbon as Non Methane	mg/m ³	-	< 0.003	< 0.003	< 0.003	0.362	1.56	1.56
9	VOCs	µg/m ³	-	4.25			3.02		
10	Benzo(a)Pyrene	ng/m ³	1	0.95			0.39		
11	Ammonia (NH ₃)	mg/m ³	400	30.14			19.04		
12	Ozone (O ₃)	mg/m ³	100	49.71			31.97		
13	Lead (Pb)	mg/m ³	1	0.25			0.14		
14	Nickel (Ni)	ng/m ³	20	16.84			13.67		
15	Arsenic	ng/m ³	6	1.95			1.53		
16	Benzene	mg/m ³	5	2.49			1.46		

S. NO.	Parameter	Unit	NAAQS Limit	MCS (MALANDIGHI)					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	34.76	36.80	46.83	39.42	36.28	39.66
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	68.18	68.31	76.20	74.58	64.33	75.22
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	42.29	44.20	41.34	43.21	43.52	47.28
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	6.06	6.93	6.73	5.82	7.04	7.46
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.344	0.364	0.422	0.368	0.402	0.438
6	THC as Methane	mg/m ³	-	2.41	1.39	1.46	2.41	2.01	1.98
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	3.89			2.96		
10	Benzo(a)Pyrene	ng/m ³	1	0.82			0.76		
11	Ammonia (NH ₃)	mg/m ³	400	25.12			27.53		
12	Ozone (O ₃)	mg/m ³	100	48.23			44.51		
13	Lead (Pb)	mg/m ³	1	0.19			0.24		
14	Nickel (Ni)	ng/m ³	20	15.63			16.05		
15	Arsenic	ng/m ³	6	1.79			1.78		
16	Benzene	mg/m ³	5	2.21			1.95		

S. NO.	Parameter	Unit	NAAQS Limit	KULDIHA					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	34.78	41.41	42.98	35.22	41.68	34.28
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	65.31	70.57	82.55	68.42	77.28	68.54
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	37.46	40.34	40.90	40.28	42.36	46.28
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	5.80	6.85	6.39	6.22	3.78	5.84
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.408	0.382	0.438	0.402	0.456	0.524
6	THC as Methane	mg/m ³	-	2.18	1.64	0.17	2.09	2.51	2.32
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	3.73			2.68		
10	Benzo(a)Pyrene	ng/m ³	1	0.79			0.54		
11	Ammonia (NH ₃)	mg/m ³	400	24.57			21.42		
12	Ozone (O ₃)	mg/m ³	100	44.18			35.83		
13	Lead (Pb)	mg/m ³	1	0.21			0.17		
14	Nickel (Ni)	ng/m ³	20	13.39			11.59		
15	Arsenic	ng/m ³	6	1.54			1.81		
16	Benzene	mg/m ³	5	2.12			1.62		

S. NO.	Parameter	Unit	NAAQS Limit	GOPALPUR					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	24.39	41.97	44.06	35.24	36.08	47.54
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	58.71	83.29	76.16	76.32	72.04	84.36
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	38.60	44.34	39.86	40.35	43.84	46.28
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	5.38	7.05	6.53	6.02	5.38	6.64
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.362	0.398	0.438	0.368	0.386	0.402
6	THC as Methane	mg/m ³	-	1.83	1.95	1.88	1.83	2.58	2.32
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	2.94			3.02		
10	Benzo(a)Pyrene	ng/m ³	1	0.64			0.77		
11	Ammonia (NH ₃)	mg/m ³	400	20.39			24.89		
12	Ozone (O ₃)	mg/m ³	100	40.24			45.64		
13	Lead (Pb)	mg/m ³	1	0.15			0.20		
14	Nickel (Ni)	ng/m ³	20	13.68			13.41		
15	Arsenic	ng/m ³	6	1.56			1.47		
16	Benzene	mg/m ³	5	1.62			1.81		

S. NO.	Parameter	Unit	NAAQS Limit	GGs 2 (AKANDARA)					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	31.17	45.41	36.66	34.60	37.62	36.44
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	59.10	87.04	67.35	66.84	71.08	78.34
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	40.13	42.04	40.03	42.82	44.25	46.82
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	6.11	6.26	6.37	6.24	6.24	6.58
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.346	0.402	0.426	0.388	0.386	0.408
6	THC as Methane	mg/m ³	-	1.98	1.93	1.81	1.98	2.07	2.21
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	3.24			2.98		
10	Benzo(a)Pyrene	ng/m ³	1	0.71			0.47		
11	Ammonia (NH ₃)	mg/m ³	400	21.83			22.16		
12	Ozone (O ₃)	mg/m ³	100	42.92			37.46		
13	Lead (Pb)	mg/m ³	1	0.14			0.16		
14	Nickel (Ni)	ng/m ³	20	9.79			12.55		
15	Arsenic	ng/m ³	6	1.41			1.44		
16	Benzene	mg/m ³	5	1.91			1.73		

S. NO.	Parameter	Unit	NAAQS Limit	SARENGA					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	30.79	42.79	46.62	32.22	44.58	35.84
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	56.72	88.78	79.76	67.54	83.24	72.54
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	37.68	43.97	45.46	41.62	40.06	45.28
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	5.49	6.97	7.22	5.88	6.04	7.18
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.354	0.402	0.422	0.384	0.428	0.454
6	THC as Methane	mg/m ³	-	1.75	1.97	1.68	1.75	2.74	2.54
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	2.65			3.34		
10	Benzo(a)Pyrene	ng/m ³	1	0.58			0.75		
11	Ammonia (NH ₃)	mg/m ³	400	19.75			25.14		
12	Ozone (O ₃)	mg/m ³	100	37.26			47.59		
13	Lead (Pb)	mg/m ³	1	0.11			0.21		
14	Nickel (Ni)	ng/m ³	20	11.89			14.74		
15	Arsenic	ng/m ³	6	1.43			1.89		
16	Benzene	mg/m ³	5	1.58			1.88		

S. NO.	Parameter	Unit	NAAQS Limit	DHABANI		BANSIA			
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	32.09	34.33	42.62	33.87	32.58	34.20
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	65.74	64.28	71.55	66.78	66.29	64.56
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	37.69	41.46	39.98	40.38	42.68	40.38
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	5.77	6.13	6.55	5.94	6.12	6.70
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.336	0.394	0.463	0.407	0.432	0.502
6	THC as Methane	mg/m ³	-	2.37	1.58	1.82	1.57	1.79	1.98
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	4.11			2.86		
10	Benzo(a)Pyrene	ng/m ³	1	0.92			0.58		
11	Ammonia (NH ₃)	mg/m ³	400	25.27			25.95		
12	Ozone (O ₃)	mg/m ³	100	48.55			33.18		
13	Lead (Pb)	mg/m ³	1	0.22			0.16		
14	Nickel (Ni)	ng/m ³	20	16.12			12.21		
15	Arsenic	ng/m ³	6	1.72			1.45		
16	Benzene	mg/m ³	5	20.50			1.69		

S. NO.	Parameter	Unit	NAAQS Limit	NACHAN					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	27.62	40.60	44.17	38.29	33.58	37.52
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	61.88	76.43	78.37	78.64	67.24	70.48
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	39.11	40.73	48.37	35.22	42.64	42.64
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	5.73	6.17	7.04	6.28	6.54	6.58
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.354	0.402	0.428	0.368	0.422	0.462
6	THC as Methane	mg/m ³	-	1.88	1.91	1.84	1.88	1.97	2.32
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	3.07			3.12		
10	Benzo(a)Pyrene	ng/m ³	1	0.61			0.84		
11	Ammonia (NH ₃)	mg/m ³	400	22.17			28.36		
12	Ozone (O ₃)	mg/m ³	100	39.72			46.17		
13	Lead (Pb)	mg/m ³	1	0.20			0.23		
14	Nickel (Ni)	ng/m ³	20	14.07			16.41		
15	Arsenic	ng/m ³	6	1.67			1.92		
16	Benzene	mg/m ³	5	1.75			2.14		

S. NO.	Parameter	Unit	NAAQS Limit	GHATAKDANGA					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	24.88	37.65	41.18	36.82	31.42	41.84
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	55.95	68.19	70.49	60.78	60.08	76.24
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	36.78	41.60	46.43	43.54	40.58	46.50
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	5.87	6.41	6.82	5.98	6.32	7.12
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.372	0.355	0.378	0.394	0.398	0.438
6	THC as Methane	mg/m ³	-	1.64	1.54	1.39	1.64	1.71	2.12
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	2.63			2.42		
10	Benzo(a)Pyrene	ng/m ³	1	0.44			0.37		
11	Ammonia (NH ₃)	mg/m ³	400	17.78			19.92		
12	Ozone (O ₃)	mg/m ³	100	46.17			32.54		
13	Lead (Pb)	mg/m ³	1	0.10			0.13		
14	Nickel (Ni)	ng/m ³	20	13.54			10.68		
15	Arsenic	ng/m ³	6	1.38			1.36		
16	Benzene	mg/m ³	5	1.48			1.55		

S. NO.	Parameter	Unit	NAAQS Limit	KANTABERIA					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	36.34	38.39	44.40	32.66	47.81	34.28
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	68.24	67.70	70.07	70.46	74.62	68.38
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	43.04	46.89	41.66	46.30	44.12	48.25
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	5.85	7.26	6.92	6.32	6.06	7.84
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.378	0.384	0.384	0.384	0.464	0.476
6	THC as Methane	mg/m ³	-	2.56	1.44	1.65	2.41	2.38	2.56
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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			3.04		
10	Benzo(a)Pyrene	ng/m ³	1	0.59			0.71		
11	Ammonia (NH ₃)	mg/m ³	400	28.11			24.13		
12	Ozone (O ₃)	mg/m ³	100	45.91			39.88		
13	Lead (Pb)	mg/m ³	1	0.24			0.19		
14	Nickel (Ni)	ng/m ³	20	15.78			15.22		
15	Arsenic	ng/m ³	6	1.83			1.75		
16	Benzene	mg/m ³	5	2.26			1.87		

S. NO.	Parameter	Unit	NAAQS Limit	PRATAPPUR					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	27.16	43.61	46.94	36.21	34.57	39.72
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	51.08	79.65	75.11	66.82	70.11	74.52
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	39.56	40.42	40.22	40.65	41.64	44.24
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	5.79	6.42	6.15	6.33	5.98	6.12
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.356	0.374	0.418	0.402	0.436	0.498
6	THC as Methane	mg/m ³	-	1.57	1.85	1.64	1.57	2.34	2.34
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	2.92			2.82		
10	Benzo(a)Pyrene	ng/m ³	1	0.55			0.49		
11	Ammonia (NH ₃)	mg/m ³	400	19.84			26.07		
12	Ozone (O ₃)	mg/m ³	100	32.75			38.56		
13	Lead (Pb)	mg/m ³	1	0.12			0.15		
14	Nickel (Ni)	ng/m ³	20	12.75			12.96		
15	Arsenic	ng/m ³	6	1.33			1.24		
16	Benzene	mg/m ³	5	1.65			1.59		

S. NO.	Parameter	Unit	NAAQS Limit	PARULIA					
				Oct'17	Nov'18	Dec'19	Jan'18	Feb'18	Mar'18
1	Particulate Matter (PM2.5)	µg/m ³	60 (24 hrs)	26.89	38.64	43.46	40.10	36.27	45.28
2	Particulate Matter 10 (PM10)	µg/m ³	100 (24 hrs)	57.97	74.61	87.34	76.22	67.24	81.44
3	Nitrogen Dioxide (NO ₂)	µg/m ³	80 (24 hrs)	37.62	43.08	40.25	40.28	44.62	42.36
4	Sulphur Dioxide (SO ₂)	µg/m ³	80 (24 hrs)	5.60	7.44	6.59	5.64	6.22	6.38
5	Carbon Monoxide (CO)	mg/m ³	2 (8 hrs)	0.364	0.362	0.428	0.398	0.420	0.458
6	THC as Methane	mg/m ³	-	1.84	1.81	0.16	1.84	1.85	2.28
7	Mercury	µg/m ³	-	< 0.002	< 0.002	< 0.002	< 0.002	< 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	-	2.79			3.04		
10	Benzo(a)Pyrene	ng/m ³	1	0.47			0.66		
11	Ammonia (NH ₃)	mg/m ³	400	23.39			23.41		
12	Ozone (O ₃)	mg/m ³	100	39.29			43.78		
13	Lead (Pb)	mg/m ³	1	0.16			0.11		
14	Nickel (Ni)	ng/m ³	20	14.88			15.81		
15	Arsenic	ng/m ³	6	1.61			1.69		
16	Benzene	mg/m ³	5	1.81			1.76		

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ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDN-171 D-1	EDN-170 V-1	EDN-169 V-1	EDN-162 V-1	EDI-123 D-6	EDI-42 V-1	EDI-41 D-3	EDD-008 D-2	EDD-20 V-1	EDD-21 D-2
Date				11.10.2017	11.10.2017	11.10.2017	11.10.2017	11.10.2017	11.10.2017	11.10.2017	11.10.2017	11.10.2017	11.10.2017
1	pH		5.5 to 9.0	9.17	7.45	7.82	8.11	7.91	8.3	8.72	8.93	9.32	9.22
2	Total Suspended Solids	mg/l	100	<2	117	89	107	115	26	<2	<2	<2	<2
3	Total Dissolved Solids	mg/l	---	452	5982	7846	4892	7012	7165	5428	3044	2962	3292
4	Turbidity	NTU	---	3.4	592.5	265	324.5	452	68	75.5	<1	5.9	5
5	Acidity as CaCO ₃	mg/l	---	Nil	8.8	6.5	4.3	5.5	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	217.80	190.1	241.6	267.3	297	544.5	1078.1	1633.5	1643.4	1366.2
7	Chloride	mg/l	---	127.3	3184.8	4244.3	2628.4	4003.2	4042.5	2567.7	771.4	674.9	1241.1
8	Total Hardness	mg/l	---	98.00	2802.8	1085.8	733	737	62.7	105.8	47	345	78.4
9	Sulphate	mg/l	---	<2.5	5.5	8.9	4.5	8.9	10.3	6.5	4.3	5.8	9.5
10	Calcium	mg/l		23.6	432.1	262.4	177.5	174.4	15.7	22	11	102.1	23.6
11	Magnesium	mg/l	---	9.5	261.9	104.8	70.5	73.3	5.7	12.4	4.8	21.9	4.8
12	Dissolved Oxygen	mg/l	---	5.9	5.5	4.7	4.9	5.1	5.3	5.8	5.5	5.7	4.9
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	<2	2	2.8	<2	<2	<2	<2	<2	2
14	Chemical Oxygen Demand	mg/l	250	<8	8	11	10	9	10	<8	<8	<8	8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5	<5.0	<5	<5	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	2.18	3.11	3.46	1.9	2.15	2	0.88	0.93	0.56	2.3
19	Ammoniacal Nitrogen	mg/l	---	1.49	4.3	5.11	2.96	2.4	2.17	1.45	2.11	2.35	3.94
20	Iron	mg/l	---	0.67	50.1	22.1	16.7	41.5	1.11	22.1	0.11	11.5	1.01
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.017	0.024	0.033	0.025	0.031	0.037	0.041	0.011	0.013	0.019
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDN-171 D-1	EDN-170 V-1	EDN-169 V-1	EDN-162 V-1	EDI-123 D-6	EDI-42 V-1	EDI-41 D-3	EDD-008 D-2	EDD-20 V-1	EDD-21 D-2
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05	<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	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	3.6	16.2	38.2	28.8	42.2	146.2	93.2	79.8	27.3	49.5
30	Phosphorus	mg/l	---	0.22	0.27	0.24	0.1	0.13	0.19	0.12	0.19	0.11	0.19
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		<0.05	0.167	0.082	0.069	0.091	<0.05	<0.05	<0.05	0.065	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	126.9	231.9	294.8	326.1	362.3	664.3	732	1015	976	1171.1
41	Electrical Conductivity	µmhos/cm	---	790	8246	11200	6845	9422	9562	6872	3911	3649	5321
42	Sodium	mg/l	---	85.3	1972	2896	1793	2628	2712	2196	1258	1165	1020
43	Potassium	mg/l	---	5.3	9.2	11	10.5	11.9	12.3	8.8	6.9	7.2	7.5

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ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDI-34 V-1	EDH-44 D-4	EDD-53 V-1	EDG-75 V-1	EDC-72 V-1	EDG-77 D-5	EDG-75 D-5	EDC-72 D-5	EDD-411 D-2	EDD-53 D-1
Date				11.10.2017	11.10.2017	11.10.2017	11.10.2017	11.10.2017	05.11.2017	05.11.2017	05.11.2017	05.11.2017	06.11.2017
1	pH		5.5 to 9.0	8.35	8.43	9.05	9.11	9.38	8.17	9.24	8.62	9.32	9.22
2	Total Suspended Solids	mg/l	100	35	62	7	<2	<2	<2	<2	<2	20	12
3	Total Dissolved Solids	mg/l	---	7248	3652	4098	1308	2536	2890	1820	2880	1814	2894
4	Turbidity	NTU	---	87.7	196	13.7	1.4	<1	6	6.3	9.9	64.1	39.3
5	Acidity as CaCO ₃	mg/l	---	Nil	Nil	11.3	12.1	13.2	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	356.4	1021.6	2286.9	841.5	1234.5	1306.0	1009.8	861.3	1168.2	1080
7	Chloride	mg/l	---	4017.6	1832.1	1060.7	289.3	549.6	626.8	433.9	530.3	337.5	771.4
8	Total Hardness	mg/l	---	364.6	90.2	54.9	51	51	38.40	49.9	38.4	38.4	49.9
9	Sulphate	mg/l	---	11	10.3	6.2	<2.5	5.7	6.5	8.2	10.2	8.5	10.5
10	Calcium	mg/l		113.1	20.4	12.6	12.6	11	9.2	10.8	7.7	9.2	9.2
11	Magnesium	mg/l	---	20	9.5	5.7	4.8	5.7	3.7	5.6	4.7	3.7	6.5
12	Dissolved Oxygen	mg/l	---	4.5	5.7	6	6.2	5.9	5.2	4.8	5	5.4	4.7
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	3	<2	<2	<2	<2	2	3	2	4.6	4
14	Chemical Oxygen Demand	mg/l	250	10	<8	<8	<8	<8	12.0	14	14	22	18
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5	<5.0	<5
16	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	2.8	2.1	1.55	1.05	1.49	2.11	1.98	3.5	3.4	3.5
19	Ammoniacal Nitrogen	mg/l	---	4.96	4.11	2.89	2.25	3.1	6.30	3.9	4.8	5.2	4.5
20	Iron	mg/l	---	18.4	30.3	0.42	0.16	0.26	1.74	1.07	0.35	15.1	1.43
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.023	0.015	<0.01	<0.01	<0.01	0.025	0.019	0.043	0.082	0.041
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDI-34 V-1	EDH-44 D-4	EDD-53 V-1	EDG-75 V-1	EDC-72 V-1	EDG-77 D-5	EDG-75 D-5	EDC-72 D-5	EDD-411 D-2	EDD-53 D-1
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05	<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	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	60.1	51.7	90.7	27	62.9	64.9	32.8	49.8	52.7	86.9
30	Phosphorus	mg/l	---	0.31	0.25	0.15	0.09	0.17	0.24	0.17	0.29	0.33	0.34
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		<0.05	0.059	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.079	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	434.8	1120.4	1805.6	536.8	1073.6	1690.0	1232	1050.4	1060	742
41	Electrical Conductivity	µmhos/cm	---	10204	5398	5649	1997	3592	3892	2749	4011	2356	4286
42	Sodium	mg/l	---	2642	1128	1548	445	1032	928.0	534	710	753	1412
43	Potassium	mg/l	---	12.3	8.2	8.7	2.9	6.2	8.0	4	10	12	8

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Compliance Period: Oct'17 - Mar'18)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDD-54 D-4	EDH-29 D-6	EDH-33 V-1	EDH-44 D-1	EDI-36 D-1	EDI-34 V-1	EDI-32 D-2	EDI-115 V-1	EDN-172 V-1	EDH-33 D-8
Date				06.11.2017	06.11.2017	06.11.2017	06.11.2017	06.11.2017	06.11.2017	06.11.2017	06.11.2017	16.12.2017	16.12.2017
1	pH		5.5 to 9.0	9.16	8.3	8.98	9.23	8.56	7.82	7.76	8.72	7.41	9.12
2	Total Suspended Solids	mg/l	100	<2	10	9	24	62	21	<2	10	31	<2
3	Total Dissolved Solids	mg/l	---	2840	5986	5782	712	7037	8462	5482	2260	6482	4128
4	Turbidity	NTU	---	50	29	20.8	62.5	108.5	48.5	4.2	19.6	76.9	4
5	Acidity as CaCO ₃	mg/l	---	Nil	Nil	Nil	Nil	Nil	4.9	5.8	Nil	9.6	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	1100.8	910.8	1831.5	178.2	1633.5	1188	1881	623.7	342.00	1691
7	Chloride	mg/l	---	530.3	3014	2458.8	115.7	483.7	4219.3	2092.7	771.4	2047	1022
8	Total Hardness	mg/l	---	38.4	149.8	61.4	53.8	126.7	180.5	92.2	61.4	1607.80	91.2
9	Sulphate	mg/l	---	8.9	14.3	10.9	<2.5	12.5	9.5	8.3	<2.5	10.5	5.9
10	Calcium	mg/l		9.2	38.5	13.8	12.3	33.8	50.8	29.2	12.3	364	30.5
11	Magnesium	mg/l	---	3.7	13.1	6.5	5.6	10.3	13.1	4.7	7.5	169.9	3.7
12	Dissolved Oxygen	mg/l	---	5.1	5.4	4.5	5.1	4.8	4.4	5.2	5.4	3.7	4.6
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	2.6	2.3	2.6	3	2.5	<2	<2	4	<2
14	Chemical Oxygen Demand	mg/l	250	<8	12	14	17	22	15	<8	11	18.0	8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	2.4	4.5	4.11	2.55	5.8	3.85	2.9	1.96	3.45	2.15
19	Ammoniacal Nitrogen	mg/l	---	5.3	6.9	3.2	1.9	7.3	5.9	4.2	3.1	6.20	3.1
20	Iron	mg/l	---	2.37	5.56	1.33	3.26	74.9	6.4	1.25	4.72	17.25	0.82
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	<0.01	0.062	0.028	<0.01	0.077	0.081	0.062	0.023	0.027	0.015
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Compliance Period: Oct'17 - Mar'18)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDD-54 D-4	EDH-29 D-6	EDH-33 V-1	EDH-44 D-1	EDI-36 D-1	EDI-34 V-1	EDI-32 D-2	EDI-115 V-1	EDN-172 V-1	EDH-33 D-8
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05	<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	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	56.7	83.8	106.5	8.2	95.9	95.5	97.9	42.3	14	46.7
30	Phosphorus	mg/l	---	0.28	0.39	0.25	0.14	0.36	0.37	0.27	0.17	0.33	0.25
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		<0.05	0.088	<0.05	0.075	0.108	<0.05	<0.05	<0.05	0.063	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	786	1111.4	1614	162	1680	1449.4	2294.8	760.9	417.2	1282
41	Electrical Conductivity	µmhos/cm	---	3911	8762	7492	1032	9433	12482	7533	3106	9246	6511
42	Sodium	mg/l	---	810	2360	1920	110	2482	2950	2160	763	1287.0	1019
43	Potassium	mg/l	---	7	14	12	5	14	8	11	6	7.0	6

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Compliance Period: Oct'17 - Mar'18)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDI-120 D-3	EDI-40 D-4	EDI-70 D-3	EDI-38 D-1	EDI-41 V-1	EDI-39 D-2	EDI-123 D-5	EDD-25 V-1	EDD-405 D-1	EDN-162V-1
Date				16.12.2017	16.12.2017	16.12.2017	16.12.2017	16.12.2017	16.12.2017	16.12.2017	16.12.2017	16.12.2017	08.01.2018
1	pH		5.5 to 9.0	8.85	8.61	7.61	8.72	8.96	9.02	8.55	9.32	9.61	7.81
2	Total Suspended Solids	mg/l	100	21	42	12	10	12	23	25	<2	3	98
3	Total Dissolved Solids	mg/l	---	9328	4712	7360	4068	5172	4596	7678	2036	2462	5076
4	Turbidity	NTU	---	58.2	86.4	43.6	34.7	35.5	46.1	57.2	5.7	9	222
5	Acidity as CaCO ₃	mg/l	---	Nil	Nil	8.3	Nil	Nil	Nil	Nil	Nil	Nil	9.2
6	Total Alkalinity as Calcium Carbonate	mg/l	---	380	627	560.5	907	741	684	399	1691	1653	408.0
7	Chloride	mg/l	---	3822.5	2462	4011	1976	2312	2046	4261	304	512	3012
8	Total Hardness	mg/l	---	972.8	285	463.6	144.4	228	201.4	124	45.6	642.2	764.20
9	Sulphate	mg/l	---	11.8	6.8	12.3	5.9	11.5	10.2	14.5	6.2	7.3	11.5
10	Calcium	mg/l		246.7	86.8	152.3	41.1	79.2	68.5	32.1	12.2	193.4	187.8
11	Magnesium	mg/l	---	86.8	16.6	20.3	10.1	7.4	7.4	10.7	3.7	38.8	71.8
12	Dissolved Oxygen	mg/l	---	3.9	4.1	3.7	4.6	3.9	4	3.4	5.2	4.9	3.7
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	5	3	4	2	3	2	5	<2	<2	4
14	Chemical Oxygen Demand	mg/l	250	21	10	16	9	11	9	17	<8	8	12.0
15	Oil & Grease(Hexane Extract)	mg/l	10	<5	<5.0	<5	<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	4.1	2.85	3.65	2.5	2.1	1.85	3.25	2.3	2.95	2.86
19	Ammoniacal Nitrogen	mg/l	---	5.2	4.15	6.2	3.15	4.12	3.3	5.2	4.15	4.62	5.30
20	Iron	mg/l	---	8.3	6.25	2.8	4.35	2.4	3.24	8.21	0.92	1.07	37.50
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.037	0.047	0.039	0.31	0.033	0.021	0.037	0.014	0.024	0.029
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
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ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDI-120 D-3	EDI-40 D-4	EDI-70 D-3	EDI-38 D-1	EDI-41 V-1	EDI-39 D-2	EDI-123 D-5	EDD-25 V-1	EDD-405 D-1	EDN-162V-1
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05	<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	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	35	42.5	54.7	46.8	44.2	45	109.1	44.9	10.8	23.8
30	Phosphorus	mg/l	---	0.41	0.27	0.43	0.22	0.31	0.26	0.39	0.23	0.29	0.32
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.077	0.082	0.061	0.052	0.067	0.058	0.071	<0.05	<0.05	0.186
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	436.6	765	683.8	1106.5	652	482	306	1024	982	497.8
41	Electrical Conductivity	µmhos/cm	---	13826	7114	11022	5982	7528	6692	10122	2531	2984	6812
42	Sodium	mg/l	---	2511	1648	2714	1298	1542	1462	2806	692	627	1512.0
43	Potassium	mg/l	---	9	8	14	10	11	7	13	4	6	14.0

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ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDN-184 V-1	EDI-123 D-6	EDI-042 V-1	EDI-070 V-1	EDH-03 D-6	EDI-041D-3	EDE-019 D-2	EDE-043 D-1	EDC-072 D-1	EDD-054 D-4
Date				08.01.2018	08.01.2018	08.01.2018	08.01.2018	08.01.2018	08.01.2018	08.01.2018	08.01.2018	10.01.2018	10.01.2018
1	pH		5.5 to 9.0	8.22	8.11	8.3	8.41	9.33	9.33	9.49	9.16	9.45	9.33
2	Total Suspended Solids	mg/l	100	212	4.6	37	41	5	29	5	8	<2	4
3	Total Dissolved Solids	mg/l	---	2142	5284	6042	6694	4152	3942	1618	1280	2764	2886
4	Turbidity	NTU	---	552	93.1	78.6	82.1	11.5	64.2	9	16	4.1	11.3
5	Acidity as CaCO ₃	mg/l	---	2.8	3.6	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	244.8	244.8	510	612	693.2	1122	1032	572.2	1876.8	1856.4
7	Chloride	mg/l	---	1144	3261	3522	3918	2013.6	2172	402.7	386.2	503.4	503.4
8	Total Hardness	mg/l	---	249.6	829.4	384	349.4	38.4	188.2	46.1	65.3	42.2	38.4
9	Sulphate	mg/l	---	7.5	12.2	9.6	11.5	10.2	8.5	6.2	5.8	5.9	6.3
10	Calcium	mg/l		81.6	249.3	120	100	10.8	46.2	12.3	13.8	12.3	9.2
11	Magnesium	mg/l	---	11.2	50.4	20.5	24.3	2.8	17.7	3.7	7.5	2.8	3.7
12	Dissolved Oxygen	mg/l	---	4.1	3.2	3.3	3.2	3.9	4.1	4.9	5.3	5.1	4.9
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	3	4	2	2	<2	2	<2	<2	<2	<2
14	Chemical Oxygen Demand	mg/l	250	10	14	9	11	8	8	<8	<8	<8	<8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5	<5.0	<5	<5	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	1.95	3.12	3.1	3.6	4.15	2.86	1.8	1.55	1.5	1.75
19	Ammoniacal Nitrogen	mg/l	---	3.8	4.9	4.95	6.2	5.15	3.82	2.95	2.5	3.3	4.1
20	Iron	mg/l	---	51.8	11.6	21.5	23.3	2.17	9.6	2.4	3.55	0.96	1.11
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.019	0.037	0.019	0.025	0.015	0.024	0.021	0.017	0.019	0.024
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Compliance Period: Oct'17 - Mar'18)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDN-184 V-1	EDI-123 D-6	EDI-042 V-1	EDI-070 V-1	EDH-03 D-6	EDI-041D-3	EDE-019 D-2	EDE-043 D-1	EDC-072 D-1	EDD-054 D-4
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05	<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	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	14.4	24.5	44.6	52.1	119.7	31.9	17.3	16.2	75.3	87.2
30	Phosphorus	mg/l	---	0.27	0.31	0.3	0.36	0.27	0.25	0.19	0.14	0.13	0.17
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.208	0.078	0.092	0.084	<0.05	0.063	0.058	0.052	<0.05	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	298.7	298.7	622.2	446.6	520.2	986.2	882.4	351	1422.2	1530.5
41	Electrical Conductivity	µmhos/cm	---	2984	6988	6892	8044	6211	4925	2782	2062	3248	3588
42	Sodium	mg/l	---	522	1622	2014	2243	1710	1012	270	301	1122	1244
43	Potassium	mg/l	---	10	11	10	12	8	8	6	4	8	7

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Compliance Period: Oct'17 - Mar'18)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDH-04 D-1	EDH-044 D-3	EDD-017 D-1	EDD-007 V-1	EDD-011 V-1	EDE-061 D-1	EDE-001 V-1	EDH-033 D-6	EDI-036 D-3	EDI-032 D-4
Date				10.01.2018	10.01.2018	12.02.2018	12.02.2018	12.02.2018	12.02.2018	12.02.2018	12.02.2018	12.02.2018	12.02.2018
1	pH		5.5 to 9.0	9.53	8.41	9.51	9.55	9.68	9.5	9.25	9.2	8.44	9.19
2	Total Suspended Solids	mg/l	100	9	182	16	<2	<2	<2	<2	<2	26	48
3	Total Dissolved Solids	mg/l	---	786	4332	2882	1822	1378	1870	2572	3768	6248	3712
4	Turbidity	NTU	---	23.6	458	35.9	1.3	1.8	3.9	1.2	3	59.1	102.1
5	Acidity as CaCO ₃	mg/l	---	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	408	428.4	124.00	978	712	824	1082	1262	502	380.2
7	Chloride	mg/l	---	254	2718.3	1085	603	412	728	1104	1826	2962	1932
8	Total Hardness	mg/l	---	38.4	153.6	34.60	23	19.2	34.6	19.2	30.7	245.8	169
9	Sulphate	mg/l	---	<2.5	10.2	8.7	7.3	6.2	5.9	7.5	10.2	15.3	8.2
10	Calcium	mg/l		9.2	46.2	7.7	6.2	4.6	7.7	6.2	7.7	80	58.5
11	Magnesium	mg/l	---	3.7	9.3	3.7	1.9	1.9	3.7	1	2.8	11.2	5.6
12	Dissolved Oxygen	mg/l	---	5.4	3.9	4.3	5.1	5.3	5.4	5.6	5.5	4.1	4.7
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	3	<2	<2	<2	<2	<2	<2	2	<2
14	Chemical Oxygen Demand	mg/l	250	<8	11	10.0	<8	<8	<8	<8	<8	13	<8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	0.86	1.55	1.9	1.65	0.72	2.42	3.35	4.12	3.62	2.45
19	Ammoniacal Nitrogen	mg/l	---	2.8	3.8	3.50	2.6	1.6	3.5	3.75	4.2	6.1	4.15
20	Iron	mg/l	---	2.45	63.2	1.25	0.33	0.41	0.39	0.21	0.33	10.6	24.2
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	<0.01	0.033	0.023	0.015	0.011	0.014	0.022	0.031	0.041	0.029
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Compliance Period: Oct'17 - Mar'18)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDH-04 D-1	EDH-044 D-3	EDD-017 D-1	EDD-007 V-1	EDD-011 V-1	EDE-061 D-1	EDE-001 V-1	EDH-033 D-6	EDI-036 D-3	EDI-032 D-4
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05	<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	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	7.9	44.7	76.4	55.5	34.3	45.8	80.1	86.9	50.2	49.2
30	Phosphorus	mg/l	---	0.11	0.27	0.22	0.17	0.15	0.17	0.21	0.25	0.35	0.26
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		<0.05	0.134	0.065	<0.05	<0.05	<0.05	<0.05	<0.05	0.072	0.081
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	273	2472	761.0	548	380.6	698	892	972	612.4	296
41	Electrical Conductivity	µmhos/cm	---	1320	4966	3745	2246	1988	2648	3432	5421	8992	4733
42	Sodium	mg/l	---	112	1282	1032.0	612	508	618	802	1105	1810	1470
43	Potassium	mg/l	---	3	14	10.0	6	5	4	7	11	8	6

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Compliance Period: Oct'17 - Mar'18)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDI-032 V-1	EDI-123 D-1	EDN-162 D-7	EDN-172 V-1	EDN-184 D-2	EDN-184 D-1	EDT-038 V-1	EDI-40 D-3	EDI-32 D-3	EDH-044 D-4
Date				12.02.2018	12.02.2018	12.02.2018	12.02.2018	12.02.2018	12.03.2018	12.03.2018	12.03.2018	12.03.2018	12.03.2018
1	pH		5.5 to 9.0	8.32	8.36	7.81	7.97	8.81	7.61	8.5	8.72	7.98	8.82
2	Total Suspended Solids	mg/l	100	<2	108	32	98	3	21	27	37	11	53
3	Total Dissolved Solids	mg/l	---	3830	5844	3218	4186	842	2562	3766	2648	1926	1882
4	Turbidity	NTU	---	1.3	395	77.5	317.5	9.6	38.2	43.6	84	21.9	107.3
5	Acidity as CaCO ₃	mg/l	---	Nil	Nil	10.2	8.6	Nil	8.8	Nil	Nil	6.2	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	407	427	382	396.2	183.4	285.60	1295.4	663	903.6	734
7	Chloride	mg/l	---	2030	3162	1648	2066	407.2	1232	1813.6	1010	912	920
8	Total Hardness	mg/l	---	42.2	802.6	725.8	1405.4	88.3	216.60	114	193.8	95	83.6
9	Sulphate	mg/l	---	9.1	14.3	7.5	9.2	6.9	6.8	7.3	8.1	5.5	4.9
10	Calcium	mg/l		13.8	264.7	187.5	458.6	29.2	68.5	41.1	70	28.9	27.4
11	Magnesium	mg/l	---	1.9	34.5	62.5	63.4	3.7	11.1	2.8	4.6	5.5	3.7
12	Dissolved Oxygen	mg/l	---	4.3	3.9	4.7	4.5	5.1	5.4	5.3	4.7	5.7	5.8
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	3	<2	<2	<2	<2	<2	3	<2	<2
14	Chemical Oxygen Demand	mg/l	250	8	12	<8	<8	<8	<8.0	<8	10	<8	<8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5	<5.0	<5.0
16	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	2.9	3.45	2.11	2.35	1.5	1.96	1.73	2.1	1.55	1.1
19	Ammoniacal Nitrogen	mg/l	---	4.55	5.15	2.95	3.25	2.9	3.70	4.2	3.9	3.1	2.85
20	Iron	mg/l	---	0.33	39.6	12.4	32.1	2.15	10.60	13.2	21.4	4.8	23.5
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	0.037	0.042	0.019	0.015	0.017	0.017	0.023	0.021	0.015	0.012
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Compliance Period: Oct'17 - Mar'18)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDI-032 V-1	EDI-123 D-1	EDN-162 D-7	EDN-172 V-1	EDN-184 D-2	EDN-184 D-1	EDT-038 V-1	EDI-40 D-3	EDI-32 D-3	EDH-044 D-4
24	Nickel	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05	<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	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	101.5	32.3	17.3	15.6	12.4	31	46.1	34.2	27.8	24.8
30	Phosphorus	mg/l	---	0.31	0.36	0.29	0.31	0.23	0.31	0.34	0.29	0.19	0.15
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		<0.05	0.089	0.062	0.083	<0.05	0.076	0.084	0.101	0.065	0.092
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	496.5	520.9	466	483.4	170.8	348.4	1579.9	808.6	1102.4	895
41	Electrical Conductivity	µmhos/cm	---	4961	7692	3992	5082	1220	3242	4063	3488	2648	2593
42	Sodium	mg/l	---	1514	2107	1070	1340	270	1048.0	1132	1095	624	522
43	Potassium	mg/l	---	10	11	6	8	4	6.0	8	4	11	8

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Compliance Period: Oct'17 - Mar'18)

ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDH-044 D-1	EDH-033 D-8	EDD-008 D-4	EDE-024 D-3	EDD-003 V-1	EDD-003 D-1	EDD-010 V-1	EDD-406 D-2
Date				12.03.2018	12.03.2018	12.03.2018	12.03.2018	12.03.2018	12.03.2018	12.03.2018	12.03.2018
1	pH		5.5 to 9.0	9.21	8.55	9.32	8.75	9.5	9.2	9.73	9.61
2	Total Suspended Solids	mg/l	100	<2	<2	<2	<2	4	<2	2	<2
3	Total Dissolved Solids	mg/l	---	636	2562	1956	1662	1820	1686	1336	624
4	Turbidity	NTU	---	3.5	2.5	1.4	1.6	10.3	1.5	5.1	2.1
5	Acidity as CaCO ₃	mg/l	---	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	402	1434	1207	1095.2	1078	1014	908	310
7	Chloride	mg/l	---	107	618	402.7	255.8	230.5	222.7	197	190
8	Total Hardness	mg/l	---	72.5	53.2	38	41.8	34.2	38	34.2	41.8
9	Sulphate	mg/l	---	<2.5	5.9	4.5	4	3.5	<2.5	<2.5	<2.5
10	Calcium	mg/l		18.3	16.7	10.7	13.7	7.6	12.2	9.1	9.1
11	Magnesium	mg/l	---	6.5	2.8	2.8	1.8	3.7	1.8	2.8	4.6
12	Dissolved Oxygen	mg/l	---	46	4.7	4.9	5.1	5.3	5.5	5.7	5.7
13	Biological Oxygen Demand, 3 Days at 27°C	mg/l	30	<2	<2	<2	<2	<2	<2	<2	<2
14	Chemical Oxygen Demand	mg/l	250	<8	<8	<8	8	<8	<8	<8	<8
15	Oil & Grease(Hexane Extract)	mg/l	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
16	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
17	Sulphide	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
18	Fluoride	mg/l	2	0.95	2.1	1.75	1.55	1.85	1.6	1.1	0.75
19	Ammoniacal Nitrogen	mg/l	---	1.6	4.25	3.6	2.95	2.19	1.96	1.7	1.8
20	Iron	mg/l	---	0.84	0.48	0.33	0.39	1.55	0.62	0.81	0.56
21	Total Chromium	mg/l	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Zinc	mg/l	---	<0.01	0.019	0.022	0.011	0.015	0.012	<0.01	0.22
23	Copper	mg/l	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

**Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Compliance Period: Oct'17 - Mar'18)**

ANNEXURE II

S. No.	Parameter	Unit	CPCB Standard	EDH-044 D-1	EDH-033 D-8	EDD-008 D-4	EDE-024 D-3	EDD-003 V-1	EDD-003 D-1	EDD-010 V-1	EDD-406 D-2
24	Nickel	mg/l		<0.05	<0.05	<0.05	<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	<0.01	<0.01	<0.01
26	Lead	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
27	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Boron	mg/l		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	SAR		---	13.1	62	56.9	42.4	67.9	58.9	42.4	14.2
30	Phosphorus	mg/l	---	0.12	0.21	0.17	0.13	0.25	0.19	0.09	0.11
31	Aluminium	mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Manganese	mg/l		0.055	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
34	Molybdenum	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
35	Palladium	mg/l	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
36	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
37	Vanadium	mg/l	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
39	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
40	Bicarbonate	mg/l	---	376	1749.5	1026.4	1122.4	634.4	712.3	572	148
41	Electrical Conductivity	µmhos/cm	---	910	2872	2346	2185	2146	2098	1921	870
42	Sodium	mg/l	---	255	1039	807	630	912	835	570.4	212
43	Potassium	mg/l	---	5	9	7	5	11	9	8	7

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	GGS-1(R.O-Inlet)	GGS-1(R.O-Outlet)	GGS-1(R.O-Reject)	EDD-50(R.O-Inlet)	EDD-50(R.O-outlet)	EDD-50(R.O-Reject)	EDH-44(R.O Inlet)
Date					12.10.2017	12.10.2017	12.10.2017	12.10.2017	12.10.2017	12.10.2017	12.10.2017
1	pH		5.5 to 9.0	5.5-9.0	9.33	9.45	9.51	9.25	9.37	9.17	8.82
2	Total Suspended Solids	mg/l	100	100	<2	<2	3	<2	<2	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	2196	224	5712	2248	1264	2294	3028
4	Turbidity	NTU	---	---	1.8	1.1	10.8	4.2	<1	6.7	4.8
5	Acidity as CaCO ₃	mg/l	---	---	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	---	1514.8	115.8	4078.8	1247.4	772.2	1376.1	871.2
7	Chloride	mg/l	---	600	202.5	19.3	655.7	376.1	231.4	395.3	1301.7
8	Total Hardness	mg/l	---	---	54.9	23.5	78.4	58.8	31.4	58.8	94.1
9	Sulphate	mg/l	---	1000	<2.5	<2.5	5.9	6.3	5.1	7.3	8.9
10	Calcium	mg/l			12.6	6.3	26.8	14.1	7.9	12.6	20.4
11	Magnesium	mg/l	---	---	5.7	1.9	2.9	5.7	2.9	6.7	10.5
12	Biological Oxygen Demand, 3 Days at 27°C	mg/l	250	100	<2	<2	<2	<2	<2	<2	3
13	Chemical Oxygen Demand	mg/l	10	10	<8	<8	<8	<8	<8	<8	10
14	Oil & Grease (Hexane Extract)	mg/l	1	1.2	<5	<5	<5	<5	<5	<5	<5
15	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	2	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
16	Sulphide (as H ₂ S)	mg/l	2	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
17	Fluoride	mg/l	---	---	0.92	0.5	1.19	1.11	0.85	1.15	0.65
18	Ammoniacal Nitrogen	mg/l	---	---	1.96	1.55	2.45	2.55	2.1	2.75	2.49
19	Iron	mg/l	2	1	0.29	<0.1	0.59	0.51	0.26	1.39	0.66
20	Total Chromium	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Zinc	mg/l	---	---	<0.01	<0.01	0.011	0.012	0.016	0.24	<0.01

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	GGs-1(R.O-Inlet)	GGs-1(R.O-Outlet)	GGs-1(R.O-Reject)	EDD-50(R.O-Inlet)	EDD-50(R.O-outlet)	EDD-50(R.O-Reject)	EDH-44(R.O Inlet)
Date					12.10.2017	12.10.2017	12.10.2017	12.10.2017	12.10.2017	12.10.2017	12.10.2017
22	Copper	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Total Arsenic	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Mercury	mg/l			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
27	Boron	mg/l	---	---	<1	<1	<1	<1	<1	<1	<1
28	Phosphorus	mg/l	---	---	0.16	0.1	0.27	0.21	0.15	0.26	0.22
29	Aluminium	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lithium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
31	Manganese	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
32	Molybdenum	mg/l	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Palladium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
34	Selenium	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
35	Vanadium	mg/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
36	Cadmium	mg/l			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
38	Bicarbonate	mg/l	---	---	1122.4	43.9	2976.8	780.8	502.6	927.2	502.6
39	Conductivity	µmhos/cm	---	---	3126	330	7988	3422	1697	3394	4210
40	Sodium	mg/l	---	---	830	52	2507	824	532	927	1152

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDH-44(R.O Outlet)	EDH-44(R.O Reject)	EDN-99(R.O Inlet)	EDN-99(R.O Outlet)	GGG-1(R.O-Inlet)	GGG-1(R.O-Outlet)	GGG-1(R.O-Reject)
Date					12.10.2017	12.10.2017	12.10.2017	12.10.2017	13.11.2017	13.11.2017	13.11.2017
1	pH		5.5 to 9.0	5.5-9.0	9.15	8.65	8.25	8.98	9.17	9.23	9.58
2	Total Suspended Solids	mg/l	100	100	<2	<2	<2	<2	3	<2	72
3	Total Dissolved Solids	mg/l	---	2100	152	4896	5274	826	2186	248	4358
4	Turbidity	NTU	---	---	2.4	1.4	<1	<1	14.9	2.2	146
5	Acidity as CaCO ₃	mg/l	---	---	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	---	128.7	1405.8	663.3	188.1	1584	176.2	3425.4
7	Chloride	mg/l	---	600	25.1	2159.9	2606.3	395.3	219.8	28.9	520.7
8	Total Hardness	mg/l	---	---	27.4	129.4	458.6	62.7	57.6	34.6	69.1
9	Sulphate	mg/l	---	1000	<2.5	9.2	11.3	<2.5	5.3	<2.5	7.1
10	Calcium	mg/l			7.9	29.8	70.7	12.6	12.3	7.7	15.4
11	Magnesium	mg/l	---	---	1.9	13.3	42.9	7.6	6.5	3.7	7.5
12	Biological Oxygen Demand, 3 Days at 27°C	mg/l	250	100	<2	2	<2	<2	<2	<2	4.4
13	Chemical Oxygen Demand	mg/l	10	10	<8	8	<8	<8	9	<8	22
14	Oil & Grease (Hexane Extract)	mg/l	1	1.2	<5	<5	<5	<5	<5	<5	<5
15	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	2	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
16	Sulphide (as H ₂ S)	mg/l	2	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
17	Fluoride	mg/l	---	---	0.33	0.85	0.47	0.75	0.97	0.55	2.17
18	Ammoniacal Nitrogen	mg/l	---	---	1.05	3.1	1.85	1.25	4.2	2.3	6.05
19	Iron	mg/l	2	1	<0.1	<0.1	<0.1	<0.1	0.8	0.11	1.17
20	Total Chromium	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Zinc	mg/l	---	---	<0.01	0.023	0.019	<0.01	0.033	<0.01	0.042

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDH-44(R.O Outlet)	EDH-44(R.O Reject)	EDN-99(R.O Inlet)	EDN-99(R.O Outlet)	GGG-1(R.O-Inlet)	GGG-1(R.O-Outlet)	GGG-1(R.O-Reject)
					Date	12.10.2017	12.10.2017	12.10.2017	12.10.2017	13.11.2017	13.11.2017
22	Copper	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Total Arsenic	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Mercury	mg/l			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
27	Boron	mg/l	---	---	<1	<1	<1	<1	<1	<1	<1
28	Phosphorus	mg/l	---	---	0.14	0.19	0.27	0.17	0.12	0.07	0.42
29	Aluminium	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lithium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
31	Manganese	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
32	Molybdenum	mg/l	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Palladium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
34	Selenium	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
35	Vanadium	mg/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
36	Cadmium	mg/l			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
38	Bicarbonate	mg/l	---	---	58.5	976	809.2	131.8	956	78	2196
39	Conductivity	µmhos/cm	---	---	240	6920	7590	1170	3260	362	5812
40	Sodium	mg/l	---	---	39	1792	2107	285	940	86	340

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDD-50(R.O-Inlet)	EDD-50(R.O-outlet)	EDD-50(R.O-Reject)	EDH-44(R.O Inlet)	EDH-44(R.O Outlet)	EDH-44(R.O Reject)	EDN-99(R.O Inlet)
Date					13.11.2017	13.11.2017	13.11.2017	13.11.2017	13.11.2017	13.11.2017	13.11.2017
1	pH		5.5 to 9.0	5.5-9.0	9.24	9.41	8.86	9.17	9.63	9.28	8.66
2	Total Suspended Solids	mg/l	100	100	4	<2	3	2	<2	2	5
3	Total Dissolved Solids	mg/l	---	2100	2286	1022	2672	4594	258	5848	4618
4	Turbidity	NTU	---	---	8.1	1.8	11.0	6.6	1.2	5.3	16.4
5	Acidity as CaCO ₃	mg/l	---	---	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	---	1465.2	594	1663.2	1445.4	178.2	1881	435.6
7	Chloride	mg/l	---	600	371.2	241.1	482.1	1976.7	44.4	2037.4	2664.1
8	Total Hardness	mg/l	---	---	119	34.6	69.1	126.7	46.1	157.4	430.1
9	Sulphate	mg/l	---	1000	17	<2.5	7.5	11	<2.5	17.5	8.2
10	Calcium	mg/l			26.2	77	16.9	29.2	13.8	32.3	109.3
11	Magnesium	mg/l	---	---	13.1	3.7	6.5	13.1	2.8	18.7	38.3
12	Biological Oxygen Demand, 3 Days at 27°C	mg/l	250	100	2.5	<2	2	2.5	<2	3	3.8
13	Chemical Oxygen Demand	mg/l	10	10	14	<8	10	14	<8	17	22
14	Oil & Grease (Hexane Extract)	mg/l	1	1.2	<5	<5	<5	<5	<5	<5	<5
15	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	2	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
16	Sulphide (as H ₂ S)	mg/l	2	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
17	Fluoride	mg/l	---	---	1.86	0.67	1.9	2.75	0.48	3.3	3.1
18	Ammoniacal Nitrogen	mg/l	---	---	3.4	1.8	4.2	4.66	1.1	5.2	5.2
19	Iron	mg/l	2	1	0.93	<0.1	0.27	0.97	<0.1	0.57	1.79
20	Total Chromium	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Zinc	mg/l	---	---	0.019	<0.01	0.025	0.019	<0.01	0.026	0.033

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDD-50(R.O-Inlet)	EDD-50(R.O-outlet)	EDD-50(R.O-Reject)	EDH-44(R.O Inlet)	EDH-44(R.O Outlet)	EDH-44(R.O Reject)	EDN-99(R.O Inlet)
Date				13.11.2017	13.11.2017	13.11.2017	13.11.2017	13.11.2017	13.11.2017	13.11.2017	13.11.2017
22	Copper	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Total Arsenic	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Mercury	mg/l			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
27	Boron	mg/l	---	---	<1	<1	<1	<1	<1	<1	<1
28	Phosphorus	mg/l	---	---	0.24	0.18	0.39	0.22	0.07	0.29	0.39
29	Aluminium	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lithium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
31	Manganese	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
32	Molybdenum	mg/l	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Palladium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
34	Selenium	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
35	Vanadium	mg/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
36	Cadmium	mg/l			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
38	Bicarbonate	mg/l	---	---	887	390	1087	812	86	1040	531
39	Conductivity	µmhos/cm	---	---	3248	1428	3752	5849	303	7912	5586
40	Sodium	mg/l	---	---	842	418	1082	1712	91	1970	1632

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDN-99(R.O Outlet)	GGs-1(R.O-Inlet)	GGs-1(R.O-Outlet)	GGs-1(R.O-Reject)	EDD-50(R.O-Inlet)	EDD-50(R.O-outlet)	EDD-50(R.O-Reject)
Date					13.11.2017	14.12.2017	14.12.2017	14.12.2017	14.12.2017	14.12.2017	14.12.2017
1	pH		5.5 to 9.0	5.5-9.0	9.14	9.75	10.11	9.31	9.09	9.11	9.51
2	Total Suspended Solids	mg/l	100	100	<2	5	<2	<2	6	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	842	2188	194	4248	2634	896	2562
4	Turbidity	NTU	---	---	3.2	16.7	4.4	3.6	14.1	2.1	3.5
5	Acidity as CaCO ₃	mg/l	---	---	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	---	99	1729	152	2831	1463	551	1463
7	Chloride	mg/l	---	600	400.2	326	40.1	812	622	248	572
8	Total Hardness	mg/l	---	---	30.7	30.4	11.4	49.4	38	22.8	53.2
9	Sulphate	mg/l	---	1000	<2.5	9.5	3.5	10.3	7.8	<2.5	6.8
10	Calcium	mg/l			7.7	7.6	3.1	10.7	10.7	6.1	12.2
11	Magnesium	mg/l	---	---	2.8	2.8	1	5.5	2.8	1.9	5.5
12	Biological Oxygen Demand, 3 Days at 27°C	mg/l	250	100	<2	2	<2	<2	3	<2	<2
13	Chemical Oxygen Demand	mg/l	10	10	<8	10	<8	9	12	<8	8
14	Oil & Grease (Hexane Extract)	mg/l	1	1.2	<5	<5	<5	<5	<5	<5	<5
15	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	2	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
16	Sulphide (as H ₂ S)	mg/l	2	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
17	Fluoride	mg/l	---	---	0.86	2.55	0.79	2.65	1.95	0.82	2.15
18	Ammoniacal Nitrogen	mg/l	---	---	2.9	4.9	2.2	5.1	3.45	2.6	4.11
19	Iron	mg/l	2	1	<0.1	1.62	0.41	0.77	1.2	0.92	1.85
20	Total Chromium	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Zinc	mg/l	---	---	<0.01	0.012	<0.01	0.022	0.017	0.021	0.015

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDN-99(R.O Outlet)	GGs-1(R.O-Inlet)	GGs-1(R.O-Outlet)	GGs-1(R.O-Reject)	EDD-50(R.O-Inlet)	EDD-50(R.O-outlet)	EDD-50(R.O-Reject)
Date				13.11.2017	14.12.2017	14.12.2017	14.12.2017	14.12.2017	14.12.2017	14.12.2017	14.12.2017
22	Copper	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Total Arsenic	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Mercury	mg/l			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
27	Boron	mg/l	---	---	<1	<1	<1	<1	<1	<1	<1
28	Phosphorus	mg/l	---	---	0.1	0.32	0.12	0.27	0.12	0.08	0.18
29	Aluminium	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lithium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
31	Manganese	mg/l	---	---	<0.05	0.058	<0.05	<0.05	<0.05	<0.05	<0.05
32	Molybdenum	mg/l	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Palladium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
34	Selenium	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
35	Vanadium	mg/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
36	Cadmium	mg/l			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
38	Bicarbonate	mg/l	---	---	19.5	1122	87.8	1970	927	321	1012
39	Conductivity	µmhos/cm	---	---	1240	3210	294	5102	3472	1270	3341
40	Sodium	mg/l	---	---	248	712	37	1712	1102	308	1050

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	GGs-1(R.O-Inlet)	GGs-1(R.O-Reject)	GGs-1(R.O-Outlet)	EDD-50(R.O-outlet)	EDD-50(R.O-Reject)	EDH-44(R.O Outlet)	EDH-44(R.O Inlet)
				Date	09.01.2018	09.01.2018	09.01.2018	09.01.2018	09.01.2018	09.01.2018	09.01.2018
1	pH		5.5 to 9.0	5.5-9.0	9.21	8.82	9.71	9.18	9.71	9.52	8.63
2	Total Suspended Solids	mg/l	100	100	3	<2	<2	<2	<2	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	1574	2482	198	922	2994	108	2942
4	Turbidity	NTU	---	---	6.4	3.8	1.5	2.4	1.3	<1	2.1
5	Acidity as CaCO ₃	mg/l	---	---	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	---	1074.8	1744.2	122.4	489.6	1778.8	48.9	1407.6
7	Chloride	mg/l	---	600	201.4	352.4	57	196.3	704.7	40.2	1057.8
8	Total Hardness	mg/l	---	---	38.4	38.4	7.7	30.7	30.7	11.5	73
9	Sulphate	mg/l	---	1000	4.5	5.2	<2.5	<2.5	7.8	<2.5	6.5
10	Calcium	mg/l			10.8	9.2	1.5	9.2	10.8	3.1	18.5
11	Magnesium	mg/l	---	---	2.8	3.7	1	1.9	1.9	1	6.5
12	Biological Oxygen Demand, 3 Days at 27°C	mg/l	250	100	<2	<2	<2	<2	3	<2	<2
13	Chemical Oxygen Demand	mg/l	10	10	<8	<8	<8	<8	11	<8	<8
14	Oil & Grease (Hexane Extract)	mg/l	1	1.2	<5	<5	<5	<5	<5	<5	<5
15	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	2	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
16	Sulphide (as H ₂ S)	mg/l	2	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
17	Fluoride	mg/l	---	---	0.95	1.25	0.33	0.65	1.35	0.25	2.85
18	Ammoniacal Nitrogen	mg/l	---	---	3.75	4.2	1.45	2.18	3.45	1.85	3.29
19	Iron	mg/l	2	1	0.81	0.73	0.42	0.36	0.24	0.22	0.39
20	Total Chromium	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Zinc	mg/l	---	---	0.012	0.019	<0.01	<0.01	0.037	<0.01	<0.01

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	GGs-1(R.O-Inlet)	GGs-1(R.O-Reject)	GGs-1(R.O-Outlet)	EDD-50(R.O-outlet)	EDD-50(R.O-Reject)	EDH-44(R.O Outlet)	EDH-44(R.O Inlet)
				Date	09.01.2018	09.01.2018	09.01.2018	09.01.2018	09.01.2018	09.01.2018	09.01.2018
22	Copper	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Total Arsenic	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Mercury	mg/l			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
27	Boron	mg/l	---	---	<1	<1	<1	<1	<1	<1	<1
28	Phosphorus	mg/l	---	---	0.12	0.16	0.08	0.11	<0.01	0.08	0.19
29	Aluminium	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lithium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
31	Manganese	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
32	Molybdenum	mg/l	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Palladium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
34	Selenium	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
35	Vanadium	mg/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
36	Cadmium	mg/l			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
38	Bicarbonate	mg/l	---	---	976.4	1322.3	89.3	392.4	1571.5	31.1	1280
39	Conductivity	µmhos/cm	---	---	2462	3711	295	1780	3511	202	3342
40	Sodium	mg/l	---	---	610	920	64	303	1210	32	1006

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	Date			Date			Date		
					EDH-44(R.O Reject)	EDN-99(R.O Outlet)	EDN-99(R.O Inlet)	EDN-99(R.O Reject)	GGG-1(R.O-Inlet)	GGG-1(R.O-Reject)	GGG-1(R.O-Outlet)	09.01.2018	09.01.2018
1	pH		5.5 to 9.0	5.5-9.0	9.16	9.58	8.51	9.05	9.36	9.22	9.72		
2	Total Suspended Solids	mg/l	100	100	<2	<2	2	<2	<2	<2	<2		
3	Total Dissolved Solids	mg/l	---	2100	4212	696	3782	4018	1286	2244	214		
4	Turbidity	NTU	---	---	<1	<1	5.2	2.1	3.3	2.5	3.5		
5	Acidity as CaCO ₃	mg/l	---	---	Nil	Nil	Nil	Nil	Nil	Nil	Nil		
6	Total Alkalinity as Calcium Carbonate	mg/l	---	---	2003.2	183.6	652.8	673.2	662	1070	172		
7	Chloride	mg/l	---	600	1260.5	251.7	2074.4	2162.2	286	544	40.2		
8	Total Hardness	mg/l	---	---	92.2	23	337.9	376.3	34.6	38.4	7.7		
9	Sulphate	mg/l	---	1000	7.5	<2.5	7.5	8.2	5.6	6.1	<2.5		
10	Calcium	mg/l			32.3	6.2	123.1	137	12.3	10.8	1.5		
11	Magnesium	mg/l	---	---	2.8	1.9	7.5	8.4	1	2.8	1		
12	Biological Oxygen Demand, 3 Days at 27°C	mg/l	250	100	<2	<2	<2	<2	<2	<2	<2		
13	Chemical Oxygen Demand	mg/l	10	10	<8	<8	<8	<8	<8	<8	<8		
14	Oil & Grease (Hexane Extract)	mg/l	1	1.2	<5	<5	<5	<5	<5	<5	<5		
15	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	2	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		
16	Sulphide (as H ₂ S)	mg/l	2	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
17	Fluoride	mg/l	---	---	2.35	0.81	1.45	1.85	2.1	2.35	1.1		
18	Ammoniacal Nitrogen	mg/l	---	---	4.6	1.06	2.43	3.85	2.85	3.15	1.9		
19	Iron	mg/l	2	1	0.31	0.18	0.45	0.38	0.27	0.2	0.26		
20	Total Chromium	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
21	Zinc	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	0.026	0.039	<0.01		

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDH-44(R.O Reject)	EDN-99(R.O Outlet)	EDN-99(R.O Inlet)	EDN-99(R.O Reject)	GGG-1(R.O-Inlet)	GGG-1(R.O-Reject)	GGG-1(R.O-Outlet)
Date					09.01.2018	09.01.2018	09.01.2018	09.01.2018	13.02.2018	13.02.2018	13.02.2018
22	Copper	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Total Arsenic	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Mercury	mg/l			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
27	Boron	mg/l	---	---	<1	<1	<1	<1	<1	<1	<1
28	Phosphorus	mg/l	---	---	0.21	0.22	0.28	0.31	0.15	0.22	0.1
29	Aluminium	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lithium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
31	Manganese	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.188
32	Molybdenum	mg/l	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Palladium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
34	Selenium	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
35	Vanadium	mg/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
36	Cadmium	mg/l			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
38	Bicarbonate	mg/l	---	---	1870.3	162	583	612	488	927	63.4
39	Conductivity	µmhos/cm	---	---	4736	1162	4298	4832	2246	3812	378
40	Sodium	mg/l	---	---	1712	257	1070	1219	304	780	31

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDD-50(R.O-Inlet)	EDD-50(R.O-outlet)	EDD-50(R.O-Reject)	EDH-44(R.O Inlet)	EDH-44(R.O Outlet)	EDH-44(R.O Reject)	EDN-99(R.O Inlet)
Date					13.02.2018	13.02.2018	13.02.2018	13.02.2018	13.02.2018	13.02.2018	13.02.2018
1	pH		5.5 to 9.0	5.5-9.0	8.92	9.43	9.53	8.81	10.3	8.9	8.45
2	Total Suspended Solids	mg/l	100	100	<2	3	<2	<2	<2	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	1688	1036	2498	2410	174	3692	2088
4	Turbidity	NTU	---	---	2.6	7.8	2.0	<1	1.9	<1	4.3
5	Acidity as CaCO ₃	mg/l	---	---	Nil	Nil	Nil	Nil	Nil	10.6	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	---	712	503	1024	286	94	572	317
7	Chloride	mg/l	---	600	522	302	814	1241	30.2	2248	1062
8	Total Hardness	mg/l	---	---	30.7	19.2	42.2	53.8	11.5	92.2	238.1
9	Sulphate	mg/l	---	1000	6.3	5.8	7.1	8.3	3.5	8.8	5.2
10	Calcium	mg/l			9.2	4.6	12.3	15.4	3.1	29.2	89.3
11	Magnesium	mg/l	---	---	1.9	1.9	2.8	3.7	1	4.7	3.7
12	Biological Oxygen Demand, 3 Days at 27°C	mg/l	250	100	2	<2	2	<2	<2	<2	<2
13	Chemical Oxygen Demand	mg/l	10	10	10	<8	11	<8	<8	<8	<8
14	Oil & Grease (Hexane Extract)	mg/l	1	1.2	<5	<5	<5	<5	<5	<5	<5
15	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	2	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
16	Sulphide (as H ₂ S)	mg/l	2	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
17	Fluoride	mg/l	---	---	1.86	1.5	2.1	1.95	0.76	2.3	2.05
18	Ammoniacal Nitrogen	mg/l	---	---	3.5	2.81	4.1	2.85	1.75	3.3	3.25
19	Iron	mg/l	2	1	0.39	0.87	0.26	0.15	0.19	0.11	0.55
20	Total Chromium	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Zinc	mg/l	---	---	0.019	0.012	0.024	0.023	0.017	0.036	0.022

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDD-50(R.O-Inlet)	EDD-50(R.O-outlet)	EDD-50(R.O-Reject)	EDH-44(R.O Inlet)	EDH-44(R.O Outlet)	EDH-44(R.O Reject)	EDN-99(R.O Inlet)
					Date	13.02.2018	13.02.2018	13.02.2018	13.02.2018	13.02.2018	13.02.2018
22	Copper	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Total Arsenic	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Mercury	mg/l			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
27	Boron	mg/l	---	---	<1	<1	<1	<1	<1	<1	<1
28	Phosphorus	mg/l	---	---	0.24	0.18	0.29	0.26	0.19	0.3	0.24
29	Aluminium	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lithium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
31	Manganese	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	0.128	<0.05
32	Molybdenum	mg/l	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Palladium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
34	Selenium	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
35	Vanadium	mg/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
36	Cadmium	mg/l			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
38	Bicarbonate	mg/l	---	---	624	370	946	197	48.8	488	386.7
39	Conductivity	µmhos/cm	---	---	2550	1180	3280	3010	272	4620	2480
40	Sodium	mg/l	---	---	717	412	1040	982	31	1080	740

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDN-99(R.O Reject)	EDN-99(R.O Outlet)	GGs-1(R.O-Inlet)	GGs-1(R.O-Outlet)	GGs-1(R.O-Reject)	EDD-50(R.O-Inlet)	EDD-50(R.O-outlet)
				Date	13.02.2018	13.02.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018
1	pH		5.5 to 9.0	5.5-9.0	7.92	9.41	9.28	10.16	9.55	9.22	9.45
2	Total Suspended Solids	mg/l	100	100	<2	<2	2	<2	2	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	2478	342	1436	478	1744	1470	724
4	Turbidity	NTU	---	---	1.5	4.7	5.1	1.2	4.1	3.9	1.4
5	Acidity as CaCO ₃	mg/l	---	---	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	---	428	202	1032	302.1	1280	928	463
7	Chloride	mg/l	---	600	1170	106	55.3	112	96.3	251	94
8	Total Hardness	mg/l	---	---	391.7	26.9	34.2	22.8	41.8	45.6	38
9	Sulphate	mg/l	---	1000	5.9	4.2	5.7	<2.5	6.3	3.5	<2.5
10	Calcium	mg/l			137	7.7	7.6	6.1	12.2	10.7	12.2
11	Magnesium	mg/l	---	---	12.1	1.9	3.7	1.8	2.8	4.6	1.8
12	Biological Oxygen Demand, 3 Days at 27°C	mg/l	250	100	<2	<2	2	<2	3	<2	<2
13	Chemical Oxygen Demand	mg/l	10	10	<8	<8	8	<8	9	<8	<8
14	Oil & Grease (Hexane Extract)	mg/l	1	1.2	<5	<5	<5	<5	<5	<5	<5
15	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	2	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
16	Sulphide (as H ₂ S)	mg/l	2	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
17	Fluoride	mg/l	---	---	2.6	0.81	2.35	1.8	2.6	1.95	1.2
18	Ammoniacal Nitrogen	mg/l	---	---	3.65	1.98	4.3	2.45	4.75	3.95	3.15
19	Iron	mg/l	2	1	0.25	0.42	0.89	0.37	0.72	1.62	0.61
20	Total Chromium	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Zinc	mg/l	---	---	0.031	0.015	0.029	0.017	0.036	0.019	0.013

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDN-99(R.O Reject)	EDN-99(R.O Outlet)	GGs-1(R.O-Inlet)	GGs-1(R.O-Outlet)	GGs-1(R.O-Reject)	EDD-50(R.O-Inlet)	EDD-50(R.O-outlet)
Date				13.02.2018	13.02.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018
22	Copper	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Total Arsenic	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Mercury	mg/l			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
27	Boron	mg/l	---	---	<1	<1	<1	<1	<1	<1	<1
28	Phosphorus	mg/l	---	---	0.17	0.08	0.21	0.17	0.26	0.14	0.11
29	Aluminium	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lithium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
31	Manganese	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	0.188	<0.05	<0.05
32	Molybdenum	mg/l	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Palladium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
34	Selenium	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
35	Vanadium	mg/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
36	Cadmium	mg/l			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
38	Bicarbonate	mg/l	---	---	522.2	122	771	Nil	341.6	402.6	195.2
39	Conductivity	µmhos/cm	---	---	3510	612	2044	610	2862	1626	960
40	Sodium	mg/l	---	---	882	92	540	165	810	643	352

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDD-50(R.O- Reject)	EDH-44(R.O Inlet)	EDH-44(R.O Reject)	EDH-44(R.O Outlet)	EDN-99(R.O Inlet)	EDN-99(R.O Outlet)	EDN-99(R.O Reject)
Date					13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018
1	pH		5.5 to 9.0	5.5-9.0	9.6	9.42	9.05	9.75	9.36	9.15	8.33
2	Total Suspended Solids	mg/l	100	100	<2	<2	<2	<2	<2	<2	<2
3	Total Dissolved Solids	mg/l	---	2100	1374	1162	1942	132	1836	616	1318
4	Turbidity	NTU	---	---	2.1	<1	<1	<1	4.2	1.6	1.4
5	Acidity as CaCO ₃	mg/l	---	---	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6	Total Alkalinity as Calcium Carbonate	mg/l	---	---	927	818	1108	93	927	301	422.2
7	Chloride	mg/l	---	600	380	251.7	507	24	503.4	197	554.4
8	Total Hardness	mg/l	---	---	53.2	53.2	102.6	26.6	250.8	38	235.6
9	Sulphate	mg/l	---	1000	4.5	3.2	5.2	<2.5	7.3	4.9	5.7
10	Calcium	mg/l			16.7	13.7	32	7.6	88.3	10.7	89.8
11	Magnesium	mg/l	---	---	2.8	4.6	5.5	1.8	7.4	2.8	2.8
12	Biological Oxygen Demand, 3 Days at 27°C	mg/l	250	100	<2	<2	<2	<2	<2	<2	<2
13	Chemical Oxygen Demand	mg/l	10	10	8	<8	8	<8	8	<8	<8
14	Oil & Grease (Hexane Extract)	mg/l	1	1.2	<5	<5	<5	<5	<5	<5	<5
15	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	2	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
16	Sulphide (as H ₂ S)	mg/l	2	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
17	Fluoride	mg/l	---	---	1.95	1.5	2.05	0.31	1.25	0.79	0.89
18	Ammoniacal Nitrogen	mg/l	---	---	3.1	2.85	4.3	1.1	3.9	1.82	2.9
19	Iron	mg/l	2	1	0.39	<0.1	<0.1	0.11	0.48	0.21	0.31
20	Total Chromium	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Zinc	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	0.019	<0.01	0.025

Analysis of R.O. Water of CBM Raniganj Project by Essar Oil and gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

ANNEXURE III

S. No.	Parameter	Unit	General Discharge Standards	O & G Discharge Standards	EDD-50(R.O-Reject)	EDH-44(R.O Inlet)	EDH-44(R.O Reject)	EDH-44(R.O Outlet)	EDN-99(R.O Inlet)	EDN-99(R.O Outlet)	EDN-99(R.O Reject)
Date					13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018
22	Copper	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Nickel	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Total Arsenic	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Mercury	mg/l			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
27	Boron	mg/l	---	---	<1	<1	<1	<1	<1	<1	<1
28	Phosphorus	mg/l	---	---	0.23	0.19	0.27	0.07	0.29	0.17	0.28
29	Aluminium	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lithium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
31	Manganese	mg/l	---	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
32	Molybdenum	mg/l	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
33	Palladium	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
34	Selenium	mg/l	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
35	Vanadium	mg/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
36	Cadmium	mg/l			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
37	Cobalt	mg/l	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
38	Bicarbonate	mg/l	---	---	585.6	496	690.4	24.4	488	123.2	515.1
39	Conductivity	µmhos/cm	---	---	1980	1780	2432	196	2160	770	1690
40	Sodium	mg/l	---	---	409	375	512	37	670	214	407

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited **ANNEXURE III A**
Compliance Period: Oct'17 to Mar'18

S. No.	Parameter	Unit	O & G Discharge Standards	GGs-1(R.O Discharge)	Kunur Nala Upstream Near GGS-1	EDD-50 (R.O-Discharge)	Kunur Nala Downstream Between EDH-58 & 63	EDH-44(R.O Discharge)	Kunur Nala Downstream Near Kuldiha Bridge	GGs-1(R.O Discharge)
			Date	12.10.2017	12.10.2017	12.10.2017	12.10.2017	12.10.2017	12.10.2017	13.11.2017
1	pH at 27°C		5.5-9.0	9.14	7.42	9.28	9.86	9.07	8.95	9.31
2	Colour in hazen			<5	<5	<5	<5	<5	<5	<5
3	Total Suspended Solids	mg/l	100	<2	19	<2	21	<2	43	3
4	Total Dissolved Solids	mg/l	2100	768	142	844	144	1594	192	846
5	Turbidity	NTU		<1	47.9	2.4	61.1	5.5	112	5.6
6	Acidity as CaCO ₃	mg/l		Nil	14.7	Nil	Nil	Nil	Nil	Nil
7	Total Alkalinity as CaCO ₃	mg/l		495	107.9	445.5	89.1	495	69.3	574.2
8	Chloride as Chlorine	mg/l	600	106.1	11.6	144.6	17.4	636.4	57.9	125.4
9	Total Hardness	mg/l		43.1	70.6	39.2	74.5	129.4	90.2	42.2
10	Sulphate	mg/l	1000	3.9	<2.5	4.5	<2.5	<2.5	<2.5	5.7
11	Calcium	mg/l		9.4	15.7	9.4	20.4	18.8	14.1	9.2
12	Magnesium	mg/l		4.8	7.6	3.8	5.7	4.8	8.6	4.7
13	Dissolved Oxygen	mg/l		4.7	5.8	4.9	6.1	4.1	5.9	3.2
14	Biochemical Oxygen Demand	mg/l	30	<2	<2	<2	<2	2.9	<2	4
15	Chemical Oxygen Demand	mg/l	100	<8	<8	<8	<8	10	<8	22
16	Oil & Grease	mg/l	10	<5	<5	<5	<5	<5	<5	<5
17	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
18	Sulphides (as S ₂)	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
19	Fluoride	mg/l	1.5	0.45	0.29	0.51	0.25	0.38	0.31	0.82
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
21	Iron	mg/l	3	0.19	1.85	0.39	3.29	0.72	4.89	0.09
22	Sodium	mg/l		242	38	277	41	512	58	327
23	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Zinc	mg/l	2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited **ANNEXURE III A**
Compliance Period: Oct'17 to Mar'18

S. No.	Parameter	Unit	O & G Discharge Standards	GGs-1(R.O Discharge)	Kunur Nala Upstream Near GGS-1	EDD-50 (R.O-Discharge)	Kunur Nala Downstream Between EDH-58 & 63	EDH-44(R.O Discharge)	Kunur Nala Downstream Near Kuldiha Bridge	GGs-1(R.O Discharge)
			Date	12.10.2017	12.10.2017	12.10.2017	12.10.2017	12.10.2017	12.10.2017	13.11.2017
25	Copper	mg/l	0.2	<0.05	<0.05	<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	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<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	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1	<1	<1	<1	<1
31	Phosphate	mg/l		0.11	0.1	0.14	0.17	0.24	0.2	0.19
32	Potassium	mg/l		3.2	2.1	3.9	1.9	2.8	2.3	7
33	Aluminium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
34	EC at 25° C	µmhos/cm		1220	270	1430	189	2240	280	1210
35	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
36	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
37	Vanadium	mg/l		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Palladium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
39	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
40	Manganese	mg/l		<0.05	<0.05	<0.05	0.092	<0.05	0.105	0.091
41	Molybednum	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
42	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
43	Beryllium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
44	Cyanide	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
45	Bicarbonate (as HCO ₃)	mg/l		307	131.6	336	73.2	414.8	48.8	293
46	Free Ammonia as Nitrogen	mg/l	5	1.8	0.46	2.5	2.98	2.3	1.75	0.42
47	Total coliform bacteria	MPN/100ml		60	54	42	65	52	48	58

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited **ANNEXURE III A**
Compliance Period: Oct'17 to Mar'18

S. No.	Parameter	Unit	O & G Discharge Standards	Kunur Nala Upstream Near GGS-1	GGGS-1 Surface Runoff Drain	EDD-50 (R.O-Discharge)	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge	GGGS-1(R.O Discharge)	Kunur Nala Upstream Near GGS-1
Date				13.11.2017	13.11.2017	13.11.2017	13.11.2017	13.11.2017	14.12.2017	14.12.2017
1	pH at 27°C		5.5-9.0	8.29	7.34	8.41	9.16	9.11	9.74	8.71
2	Colour in hazen			<5	<5	<5	<5	<5	<5	<5
3	Total Suspended Solids	mg/l	100	7	32	<2	9	<2	<2	7
4	Total Dissolved Solids	mg/l	2100	278	412	914	498	412	914	312
5	Turbidity	NTU		17.8	72.8	4.9	18.5	6.1	5.7	14.2
6	Acidity as CaCO ₃	mg/l		Nil	9.5	Nil	Nil	Nil	Nil	Nil
7	Total Alkalinity as CaCO ₃	mg/l		178.2	165.9	425.7	297	217.8	665	185
8	Chloride as Chlorine	mg/l	600	25.1	144.6	231.4	73.3	55.9	122	83
9	Total Hardness	mg/l		88.3	69.1	42.2	96	111.4	34.2	72.2
10	Sulphate	mg/l	1000	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
11	Calcium	mg/l		26.2	16.9	12.3	29.2	29.2	7.6	18.3
12	Magnesium	mg/l		5.6	6.5	2.8	5.6	9.3	3.7	6.5
13	Dissolved Oxygen	mg/l		3.4	2.9	5.3	5.1	4.8	4.7	5.2
14	Biochemical Oxygen Demand	mg/l	30	5	8	<2	<2	<2	<2	<2
15	Chemical Oxygen Demand	mg/l	100	28	34	<8	<8	<8	<8	<8
16	Oil & Grease	mg/l	10	<5	<5	<5	<5	<5	<5	<5
17	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
18	Sulphides (as S ₂)	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
19	Fluoride	mg/l	1.5	0.56	0.62	0.75	0.59	0.73	0.75	0.42
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
21	Iron	mg/l	3	0.92	4.53	0.12	1.17	1.08	1.4	1.55
22	Sodium	mg/l		96	142	392	185	132	374	89
23	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Zinc	mg/l	2	<0.01	<0.01	0.017	<0.01	<0.01	0.011	<0.01

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited **ANNEXURE III A**
Compliance Period: Oct'17 to Mar'18

S. No.	Parameter	Unit	O & G Discharge Standards	Kunur Nala Upstream Near GGS-1	GGG-1 Surface Runoff Drain	EDD-50 (R.O-Discharge)	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge	GGG-1(R.O Discharge)	Kunur Nala Upstream Near GGS-1
Date				13.11.2017	13.11.2017	13.11.2017	13.11.2017	13.11.2017	14.12.2017	14.12.2017
25	Copper	mg/l	0.2	<0.05	<0.05	<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	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<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	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1	<1	<1	<1	<1
31	Phosphate	mg/l		0.12	0.15	0.19	0.15	0.14	0.32	0.19
32	Potassium	mg/l		3	4	10	8	4	7	4.2
33	Aluminium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
34	EC at 25° C	µmhos/cm		410	502	1462	714	472	1482	496
35	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
36	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
37	Vanadium	mg/l		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Palladium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
39	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
40	Manganese	mg/l		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
41	Molybednum	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
42	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
43	Beryllium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
44	Cyanide	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
45	Bicarbonate (as HCO ₃)	mg/l		207	203	519	202	152	423	157
46	Free Ammonia as Nitrogen	mg/l	5	0.29	0.36	0.19	0.15	0.17	0.56	0.82
47	Total coliform bacteria	MPN/100ml		56	65	40	63	47	51	53

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited **ANNEXURE III A**

Compliance Period: Oct'17 to Mar'18

S. No.	Parameter	Unit	O & G Discharge Standards	EDD-50 (R.O-Discharge)	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldiha Bridge	GGs-1(R.O Discharge)	Kunur Nala Upstream Near GGS-1	EDD-50 (R.O-Discharge)	Kunur Nala Downstream Between EDH-58 & 63
			Date	14.12.2017	14.12.2017	14.12.2017	09.01.2018	09.01.2018	09.01.2018	09.01.2018
1	pH at 27°C		5.5-9.0	9.7	9.02	8.89	9.28	9.21	9.82	9.41
2	Colour in hazen			<5	<5	<5	<5	<5	<5	<5
3	Total Suspended Solids	mg/l	100	2	14	11	<2	8	<2	11
4	Total Dissolved Solids	mg/l	2100	992	672	398	1052	418	1036	1072
5	Turbidity	NTU		4.7	34.5	29.2	2.9	17.5	2.4	23.1
6	Acidity as CaCO ₃	mg/l		Nil	Nil	Nil	Nil	Nil	Nil	Nil
7	Total Alkalinity as CaCO ₃	mg/l		665	551	223	677.3	277.4	652.8	627.6
8	Chloride as Chlorine	mg/l	600	142	103	109	130.9	55.4	302	251.7
9	Total Hardness	mg/l		26.6	76	129.2	30.7	92.2	30.7	65.3
10	Sulphate	mg/l	1000	<2.5	<2.5	<2.5	5.5	<2.5	4.5	3.5
11	Calcium	mg/l		7.6	22.8	27.4	10.8	21.5	9.2	15.4
12	Magnesium	mg/l		1.9	4.6	14.8	1	9.3	1.9	6.5
13	Dissolved Oxygen	mg/l		4.9	4.9	4.8	4.2	5.1	4.7	4.9
14	Biochemical Oxygen Demand	mg/l	30	<2	<2	<2	<2	<2	<2	<2
15	Chemical Oxygen Demand	mg/l	100	<8	8	<8	<8	<8	<8	<8
16	Oil & Grease	mg/l	10	<5	<5	<5	<5	<5	<5	<5
17	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
18	Sulphides (as S ₂)	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
19	Fluoride	mg/l	1.5	0.89	2.15	1.05	0.95	0.62	0.75	1.05
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
21	Iron	mg/l	3	1.3	3.15	2.95	0.18	0.25	0.21	3.85
22	Sodium	mg/l		328	228	102	490	162	318	414
23	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Zinc	mg/l	2	0.14	0.025	0.02	<0.01	<0.01	<0.01	0.017

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited **ANNEXURE III A**
Compliance Period: Oct'17 to Mar'18

S. No.	Parameter	Unit	O & G Discharge Standards	EDD-50 (R.O-Discharge)	Kunur Nala Downstream Between EDH-58 & 63	Kunur Nala Downstream Near Kuldaha Bridge	GGs-1(R.O Discharge)	Kunur Nala Upstream Near GGS-1	EDD-50 (R.O-Discharge)	Kunur Nala Downstream Between EDH-58 & 63
			Date	14.12.2017	14.12.2017	14.12.2017	09.01.2018	09.01.2018	09.01.2018	09.01.2018
25	Copper	mg/l	0.2	<0.05	<0.05	<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	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<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	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1	<1	<1	<1	<1
31	Phosphate	mg/l		0.34	0.18	0.21	0.41	0.33	0.39	0.29
32	Potassium	mg/l		6.8	5	4.3	38.6	7.3	25	7
33	Aluminium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
34	EC at 25° C	µmhos/cm		1612	912	547	2330	558	1562	1430
35	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
36	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
37	Vanadium	mg/l		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Palladium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
39	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
40	Manganese	mg/l		<0.05	0.082	<0.05	<0.05	<0.05	<0.05	<0.05
41	Molybednum	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
42	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
43	Beryllium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
44	Cyanide	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
45	Bicarbonate (as HCO ₃)	mg/l		451	472	197	428.5	194.3	478.3	417.2
46	Free Ammonia as Nitrogen	mg/l	5	0.55	0.32	0.28	0.35	0.29	0.4	0.4
47	Total coliform bacteria	MPN/100ml		45	59	41	49	52	42	54

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited **ANNEXURE III A**
Compliance Period: Oct'17 to Mar'18

S. No.	Parameter	Unit	O & G Discharge Standards	Kunur Nala Downstream Near Kuldihha Bridge	GGs-1(R.O Discharge)	Kunur Nala Upstream Near GGS-1	EDD-50 (R.O- Discharge)	Kunur Nala Downstream Between EDH-59 & 63	Kunur Nala Downstream Near Kuldihha Bridge	GGs-1(R.O Discharge)
Date				09.01.2018	13.02.2018	13.02.2018	13.02.2018	13.02.2018	13.02.2018	13.03.2018
1	pH at 27°C		5.5-9.0	9.3	8.41	9.5	9.11	9.45	8.91	9.65
2	Colour in hazen			<5	<5	<5	<5	<5	<5	<5
3	Total Suspended Solids	mg/l	100	2	<2	2	<2	12	4	<2
4	Total Dissolved Solids	mg/l	2100	392	284	172	826	1228	332	592
5	Turbidity	NTU		5.7	1.6	6.2	1.1	24.2	8.3	1.8
6	Acidity as CaCO ₃	mg/l		Nil	Nil	Nil	Nil	Nil	Nil	Nil
7	Total Alkalinity as CaCO ₃	mg/l		306	56	147	304	642	107	340.6
8	Chloride as Chlorine	mg/l	600	40.3	136	20.2	412	314	148	79.6
9	Total Hardness	mg/l		119	42.2	46.1	23	53.8	123	30.4
10	Sulphate	mg/l	1000	<2.5	<2.5	<2.5	4.7	6.9	3.1	<2.5
11	Calcium	mg/l		43.1	12.3	15.4	6.2	15.4	43.1	6.1
12	Magnesium	mg/l		2.8	2.8	1.9	1.9	3.7	3.7	3.7
13	Dissolved Oxygen	mg/l		4.7	5	5.3	4.9	4.2	5.1	5.1
14	Biochemical Oxygen Demand	mg/l	30	<2	<2	<2	<2	2	<2	<2
15	Chemical Oxygen Demand	mg/l	100	8	<8	<8	<8	11	<8	<8
16	Oil & Grease	mg/l	10	<5	<5	<5	<5	<5	<5	<5
17	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
18	Sulphides (as S ₂)	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
19	Fluoride	mg/l	1.5	0.73	0.93	0.62	1.5	1.75	1.05	1.05
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
21	Iron	mg/l	3	0.48	0.3	0.72	0.28	1.35	0.85	0.75
22	Sodium	mg/l		151	74	41	232	510	63	192
23	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Zinc	mg/l	2	<0.01	0.018	0.012	0.024	0.018	0.015	<0.01

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited **ANNEXURE III A**
Compliance Period: Oct'17 to Mar'18

S. No.	Parameter	Unit	O & G Discharge Standards	Kunur Nala Downstream Near Kuldihha Bridge	GGs-1(R.O Discharge)	Kunur Nala Upstream Near GGS-1	EDD-50 (R.O- Discharge)	Kunur Nala Downstream Between EDH-59 & 63	Kunur Nala Downstream Near Kuldihha Bridge	GGs-1(R.O Discharge)
			Date	09.01.2018	13.02.2018	13.02.2018	13.02.2018	13.02.2018	13.02.2018	13.03.2018
25	Copper	mg/l	0.2	<0.05	<0.05	<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	<0.05	<0.05
27	Arsenic	mg/l	0.2	<0.01	<0.01	<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	<0.1	<0.1
29	Mercury	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
30	Boron	mg/l		<1	<1	<1	<1	<1	<1	<1
31	Phosphate	mg/l		0.21	0.37	0.29	0.41	0.27	0.22	0.08
32	Potassium	mg/l		4	6	3	9	7	4	8
33	Aluminium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
34	EC at 25° C	µmhos/cm		542	468	201	1340	1680	510	865
35	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
36	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
37	Vanadium	mg/l		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
38	Palladium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
39	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
40	Manganese	mg/l		<0.05	<0.05	<0.05	<0.05	0.068	<0.05	<0.05
41	Molybednum	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
42	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
43	Beryllium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
44	Cyanide	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
45	Bicarbonate (as HCO ₃)	mg/l		278.3	68.3	106	214.7	567.5	82	73.2
46	Free Ammonia as Nitrogen	mg/l	5	0.38	0.24	0.46	0.32	0.39	0.27	0.63
47	Total coliform bacteria	MPN/100ml		41	51	45	49	53	41	52

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited **ANNEXURE III A**
Compliance Period: Oct'17 to Mar'18

S. No.	Parameter	Unit	O & G Discharge Standards	Kunur Nala Upstream Near GGS-1	EDD-50 (R.O-Discharge)	Kunur Nala Downstream Between EDH-59 & 63	EDH-44(R.O Discharge)	Kunur Nala Downstream Near Kuldiha Bridge
Date				13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018
1	pH at 27°C		5.5-9.0	9.49	9.57	9.41	9.28	8.71
2	Colour in hazen			<5	<5	<5	<5	<5
3	Total Suspended Solids	mg/l	100	4	<2	19	<2	<2
4	Total Dissolved Solids	mg/l	2100	274	842	998	1260	450
5	Turbidity	NTU		8.6	<1	42.7	<1	5.6
6	Acidity as CaCO ₃	mg/l		Nil	Nil	Nil	Nil	Nil
7	Total Alkalinity as CaCO ₃	mg/l		134.6	463	412	842	182
8	Chloride as Chlorine	mg/l	600	82	240.2	360	302.2	104.3
9	Total Hardness	mg/l		91.2	34.2	45.6	60.8	114
10	Sulphate	mg/l	1000	<2.5	6.1	7.5	6.9	<2.5
11	Calcium	mg/l		25.9	9.1	13.7	18.3	33.5
12	Magnesium	mg/l		6.5	2.8	2.8	3.7	7.4
13	Dissolved Oxygen	mg/l		5.1	4.9	4.7	4.3	5.8
14	Biochemical Oxygen Demand	mg/l	30	<2	<2	<2	2	<2
15	Chemical Oxygen Demand	mg/l	100	<8	<8	<8	10	<8
16	Oil & Grease	mg/l	10	<5	<5	<5	<5	<5
17	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002
18	Sulphides (as S ₂)	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5
19	Fluoride	mg/l	1.5	0.65	0.91	1.15	1.3	0.9
20	Residual free chlorine	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
21	Iron	mg/l	3	0.9	0.21	10.6	0.24	0.61
22	Sodium	mg/l		69	310	394	415	176
23	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05
24	Zinc	mg/l	2	<0.01	0.023	0.034	0.021	0.017

Surface water quality analysis of surrounding areas of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited **ANNEXURE III A**
Compliance Period: Oct'17 to Mar'18

S. No.	Parameter	Unit	O & G Discharge Standards	Kunur Nala Upstream Near GGS-1	EDD-50 (R.O-Discharge)	Kunur Nala Downstream Between EDH-59 & 63	EDH-44(R.O Discharge)	Kunur Nala Downstream Near Kuldiha Bridge
			Date	13.03.2018	13.03.2018	13.03.2018	13.03.2018	13.03.2018
25	Copper	mg/l	0.2	<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	Phosphate	mg/l		0.21	0.33	0.37	0.29	0.27
32	Potassium	mg/l		4	7	11	7	5
33	Aluminium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
34	EC at 25° C	µmhos/cm		395	1145	1240	1655	572
35	Cadmium	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02
36	Cobalt	mg/l		<0.1	<0.1	<0.1	<0.1	<0.1
37	Vanadium	mg/l		<0.2	<0.2	<0.2	<0.2	<0.2
38	Palladium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
39	Selenium	mg/l		<0.01	<0.01	<0.01	<0.01	<0.01
40	Manganese	mg/l		<0.05	<0.05	0.068	<0.05	<0.05
41	Molybednum	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
42	Lithium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
43	Beryllium	mg/l		<0.5	<0.5	<0.5	<0.5	<0.5
44	Cyanide	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02
45	Bicarbonate (as HCO ₃)	mg/l		29.3	174.5	122	536.8	184
46	Free Ammonia as Nitrogen	mg/l	5	0.62	0.71	0.55	0.48	0.31
47	Total coliform bacteria	MPN/100ml		41	46	49	55	48

Noise in Surrounding Villages (Leq dB (A))							
Permissible Limit as per CPCB	Location	Bansia	Kantabaria Crossing	Saraswatigunj	Kuldiha	Nachan	Pratappur
	Sampling Date	11.01.2018	09.01.2018	13.12.2017	04.01.2018	12.12.2017	16.12.2017
75	Day time	62.37	67.03	53.60	65.26	52.27	47.31
70	Night Time	56.15	58.36	53.01	61.25	52.22	59.32

Noise in Surrounding Villages (Leq dB (A))				
Permissible Limit as per CPCB	Location	Jatgoria	Saranga	Parulia
	Sampling Date	05.01.2018	15.12.2017	15.01.2018
75	Day time	61.36	50.88	66.38
70	Night Time	59.95	50.27	67.80

Noise in Operational Areas (Leq dB (A))					
Permissible Limit as per CPCB	Location	GGs-1 at Khatgoria	GGs-2 at Akandara	MCS at Malandighi	Warehous at Gopalpur
	Sampling Date	20.12.2017	10.01.2018	16.01.2018	14.12.2017
75	Day time	53.75	57.46	57.09	52.58
70	Night Time	52.24	55.35	57.73	50.08

Annexure V

Environmental Expenditure of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Limited
Compliance Period: Oct'17 to Mar'18

Expenditure towards Environmental Protection Measures at Raniganj CBM Project (Period October,2017 - March, 2018)		
SI No	Particular	Expenses (in Rs)
1	Installation of Reverse Osmosis Treatment System for Produced Water Treatment and METP unit for liquid waste treatment at Drill Site (Capital & Recurring)	1,67,11,000.00
2	Environmental Monitoring Activities (Recurring)	8,13,594.00
3	HDPE liners for drill cuttings storage & disposal (Capital)	1,33,570.00
4	Non Hazardous Waste Disposal (Recurring)	6,37,200.00
5	Hazardous Waste Disposal (Recurring)	1,95,427.00
6	CSR Activities (Recurring)	22,53,549.00
7	Third Party HSE inspection	27,000.00
TOTAL		2,07,71,340.00