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EOGEPL/ CBM-RG (E)/ HSE/2024/5799

18th May, 2024

The Regional Director
Ministry of Environment, Forest and Climate Change,
Integrated Regional Office, Kolkata
IB – 198, Sector-III, Salt Lake City, Kolkata – 700106.

Sub: Submission of the Six-monthly Compliance Report of Environment Clearance, Phase-II and its amendments by Essar Oil Gas Exploration and Production Limited (EOGEPL) reg.

Ref: Environmental Clearance, Phase-II vide F. No. J-11011/351/2009- IA II (I) dated 23.09.2011 and its; amendments dated 18.06.2012 and 06.11.2017.

Respected Sir/Madam,

We submit herewith the six-monthly compliance report w.r.t. the stipulated conditions of prior Environment Clearance, Phase II vide F. No. J-11011/351/2009- IA II (I), dated 23rd September 2011 and it's amendments dated 18th June 2012 & 6th November 2017.

The six-monthly compliance report is considered for the period of October'23 to March'24.

Thanking you for your continued support.

For Essar Oil and Gas Exploration and Production Limited

Warm Regards,

Vikram Goday
Vice President & Head- Facilities
Raniganj East, CBM Project-Durgapur

Enclosed: Annexure I, II, III, IV, V, VI, VII, VIII, IX, X, XI

Copy to:

1. The Environmental Engineer, Durgapur Regional Office, WBPCB, Durgapur-713216

S. No.	Conditions	Compliance Status
2.0	The Ministry of Environment & Forests has examined your application. It is noted that the proposal is for pilot-cum-production wells at Raniganj East Coal Bed Methane (CBM) Block RG (E)-CBM-2001/1 in Durgapur, West Bengal by Essar Oil Limited (E&P Division). The block is located in the coal ferrous zone (Raniganj Coal Field) of Burdwan, Birbhum and Bankura Districts in West Bengal. Durgapur Town is located at 2.6 km from project boundary and 3.7 km from the nearest proposed drilling well. Essar Oil Ltd. (EOL) has 100% ownership in the CBM Block and as Operator has signed a Production Sharing Contract (PSC) with the Government of India on 26th July, 2002 for block RG (EAST)-CBM-2001/1. Petroleum Exploration License (PEL) for carrying out exploratory operation within the block has been granted by the Govt. of West Bengal on 29th March, 2005 vide letter no. 185-CI/O/Coal/028.02/M1. Total area of CBM block is 500 km^2. The coordinates of the block are 23°22'10" – 23°41'12"N Latitude and 87°14'15" – 87°28'46" E Longitudes. Protected Forests (Durgapur PF & Ukhra PF) fall within the block. River Ajay and Damodar flow through the block area. No national park/wildlife sanctuary is located within the 10 km. Panagarh air base is located at 15 km from the block. Total cost of the project is Rs. 260.00 Crores. Following are the details of existing and proposed activities: Phase- 1: (Completed; Environmental Clearance for the existing phase-1 has been accorded by the Ministry vide letter no. J-11011/660/2007-IA (II)-I dated 6th May, 2008.) - 120 LKM of HRSS Seismic Survey (2D) - 12 Nos. of Core hole drilling - 15 Nos. of test well drilling. Phase- II: (Proposed wells will be drilled in the area of 45 km^2 out of total block area 500 km^2) - 90 Nos. of Pilot cum Production well drilling were proposed. Out of which, 32 wells are falling in the forest land of 14.24 ha. Essar Oil Ltd. vide letter no. EOI/CBM/ENV/07-11/01 dated 30th July, 2011 informed that 32 wells falling under forest land be kept out of purview of the EC. Thus only 58 nos. of Pilot cum Production well will be drilled. - 3 Nos. of Group Gathering Station (GGS) - 40 km length of pipeline from GGS to Durgapur. - Drilling well will not be carried out in the forest area.	Noted/Complied with.

3.0	58 pilot-cum-production wells will be drilled up to a depth of 1000 m. Plot area for each pilot well will be 1.5-2.0 acres. Drilling will be done by truck mounted RD-20 Rig using water based mud up to 500 m depth and air mist drilling beyond 500 m. One cluster will have 40-50 wells and one Group Gathering Stations (GGSs) in area of 4-5 acres. Each well site will have a separator for initial separation of gas and water. Coal Bed Methane (CBM) will be transported by underground pipelines. Emergency gas flaring facilities will be provided at well site and GGSs. Expected total gas production from pilot wells will be about 5 Lakh m^3/day. The compressed gas will be transported through underground pipeline & filled into cascade system cylinders for supply to final customers.	Complied with. Only 53 pilot-cum-production wells drilled up to target depth. Emergency gas flaring facilities have been provided at GGSs and MCS. The compressed gas is transported through underground pipeline and filled into cascade system cylinders also for supply to final customer.
4.0	Air emissions from DG sets will be controlled by providing adequate stack height. Air emissions will be reduced by installing CBM gas based power generator sets. Flaring will be done during emergency as per the guidelines for flaring vide GSR (E) dt. April, 1996. Air drilling technique will be used to reduce water consumption. Water requirement for each pilot well will be 75 m^3/well and sourced from local approved water suppliers. Produced water will be stored in pit for recycling/reuse (process, irrigation etc.) after treatment and solar evaporation. No effluent will be discharged outside the premises and 'Zero' discharge will be adopted. Drill cuttings will be stored in HDPE lined pits, treated and disposed in accordance with CPCB guidelines. Waste oil/used oil will be sent to authorized re-processors. Site closure and decommissioning will be initiated for wells not indicative of any commercially viable gas production. Wells will be plugged and abandoned by investing reluctant plugs (slurry of cements and water) at strategic location. Wells providing positive gas productions results will be converted to production wells.	Complied with. All wells are in production wells.
5.0	The proposal was considered by the Expert Appraisal Committee (Industry-2) in its 1st, 14th and 25th Meeting held during 24th-25th July, 2009, 16th-17th September, 2010 and 28th-30th July, 2011 respectively.	Noted.
6.0	Public hearing/public consultation meeting was held on 26th March, 2010.	Noted.
7.0	The Ministry of Environment and Forests hereby accords environmental clearance to the above project under the provision of EIA Notification dated 14th September, 2006 subject to strict compliance of the following specific and general conditions.	Noted.

A.	**Specific Conditions:**	
i.	As proposed, Only 58 pilot-cum-production wells shall be drilled up to a depth of 1000 m. No additional wells shall be drilled without prior permission from this Ministry.	Only 53 pilot-cum-production wells has been drilled up to a depth of 1000 m.
ii	As proposed, no drilling of well and any construction work shall be carried out in forest land. No forest land shall be used for installation of Group Gathering Stations (GGSs) and pipeline laying in the proposed location.	All the facilities including well sites & Group/Gas Gathering Stations (GGSs) are located outside the forest area.
iii	Recommendations of the State Forest Department shall be obtained regarding likely impact of the proposed plant on the surrounding protected forests viz. Durgapur PF & Ukhra PF and implemented.	Complied with.
iv	Compensation for the land acquisition to the land oustees, if any, and also for standing crop shall be paid as per the National Resettlement and Rehabilitation Policy (NRRP) 2007 or State Government norms. It may be ensured that compensation provided shall not be less than the norms of the NRRP, 2007.	Land acquisition has been conducted directly with the land owners and the compensation is paid as per the prevailing market rate. There is no involvement of Rehabilitation and Resettlement.
v	Prior permission from the Ministry of Defense shall be obtained regarding impact of proposed plant on Panagarh air base, if any.	Group/Gas Gathering Station (GGS) and Main Compressor Station (MCS) have been installed as per the condition of the NOC sanctioned by Ministry of Defense (MoD).
vi	The surface facilities shall be installed as per the applicable codes and standards, international practices and applicable local regulations.	Surface facilities have been designed and installed as per applicable Code and Standard, i.e. OISD guidelines.
vii	Ambient air quality shall be monitored near the closest human settlements as per the National Ambient Air Quality Emission Standards (NAAQES) issued by the Ministry vide G.S.R. No. 826(E) dated 16th November, 2009 for PM_{10}, $PM_{2.5}$, $S0_2$, NOx, CO, CH_4, VOCs, HC, Non-methane HC etc. Efforts shall be made to improve the ambient air quality of the area.	Ambient Air Quality (AAQ) Monitoring being carried out by the NABL accredited laboratory at well sites near to the closest human settlements as per the National Ambient Air Quality Standards (NAAQS) issued by CPCB vide G.S.R No. 826(E) dated 16th November, 2009 for PM_{10}, $PM_{2.5}$, $S0_2$, NOx, CO, CH_4, VOCs, HC, Non-methane HC. The AAQ monitoring results of last six months, i.e. Octoberl'^{23} to March'^{24} refer to ***Annexure I.***
viii	The company shall monitor data on methane and non-methane hydrocarbon at the drilling site, GGS, CGS and at the SV station from where the gas is supplied to the customers.	Methane and non-methane hydrocarbons are monitored. It is a part of the Ambient Air Quality Monitoring plan at major facilities (GGS, MCS) and villages (refer to ***Annexure I)***.
ix	Mercury shall also be analyzed in air, water and drill cuttings twice during drilling period.	Mercury is being analyzed in ambient air, produced water, where the concentration level is lower than the specified limit. The analysis results of ambient air **(**refer to **Annexure I**) and produced water (refer to **Annexure *II).***

		Toxicology analysis of drill cutting reveals that the mercury concentration observed below the detection limit (refer to ***Annexure III***).
x	The flare system shall be designed as per good oil field practices and Oil Industry Safety Directorate (OISD) guidelines. The company shall take necessary measures to prevent fire hazards and soil remediation as needed. At the place of ground flaring, the flare pit shall be lined with refractory bricks and efficient burning system. In case of overhead flare stacks, the stack height shall be provided as per the regulatory requirements and emissions from stacks shall meet the MOEF/CPCB guidelines.	The overhead flaring system has been installed as per OISD guidelines. The flare stack height is 30 m. for GGS and 50 m. for MCS. The measures delineated in the EIA/EMP are being maintained to prevent fire hazards. The following measures have been implemented. • Installation of electrical equipment has been done as per the approved hazardous zone classification of DGMS. • Major facilities like GGS, MCS, Warehouse etc. are well equipped with Fire hydrant system. • DCP type fire extinguishers are available at site. • Online methane gas analyzers (CH_4) are available. • Flame proof type lighting fixtures, push buttons and switches are used at well pads and surface facilities.
xi	The company shall make the arrangement for control of noise from the drilling activity and DG sets by providing necessary mitigation measures such as proper acoustic enclosures to DG sets and meet the norms notified by the MoEF. Height of all the stacks/vents shall be as per the CPCB guidelines.	DG sets are in used confirming to CPCB guidelines of acoustic enclosure and providing adequate stack height. Schedule noise monitoring is carried out at nearby localities. The results of noise monitoring refer to ***Annexure IV***.
xii	The company shall comply with the guidelines for disposal of solid waste, drill cutting and drilling fluids for onshore drilling operation notified vide GSR. 546(E) dated 30'August, 2005.	Complied with.
xiii	Total fresh water requirement from local approved water suppliers shall not exceed 75 m^3/day/well and prior permission shall be obtained from the concerned Authority and a copy submitted to the Ministry's Regional Office at Bhubaneswar. No ground water shall be used without permission of CGWA.	Complied with, Ground water extraction is made with the permission of SWID for potable purposes.
xiv	The produced water during drilling operations shall be collected in HDPE lined waste pit to prevent ground water contamination. Effluent shall be properly treated and treated effluent shall conform to CPCB standards. As proposed, produced water may also be used in operational coal mines of Eastern Coal Fields for dust suppression, slurry activities and post-mining restoration efforts etc. Domestic effluent shall be disposed through	Produced water is collected & stored in adequate designed over surface Zn-Al tanks installed at all sites. In case of excess volume of water is stored HDPE lined pits. The produced water is transported through pipelines to Reverse Osmosis (RO) plant for further

	septic tank followed by soak pit. No effluent shall be discharged outside the premises and 'zero' discharge shall be adopted	treatment. Presently, RO plants having the capacity 8100 m^3/ day. The treated water is used in project and other activities and the balance treated water is discharged to nearby stream. The discharge water is conforming to the specified discharge limit. Domestic effluent is treated in septic tank followed by soak pits.
xv	Water produced during drilling shall be reused in drilling of other core/test wells.	Complied with.
xvi	Reverse Osmosis plant shall be installed for further treatment of the wastewater in case the TDS is > 2000 mg/l and treated wastewater shall be reused or discharge on the land after meeting the norms.	Reverse Osmosis (RO) plants, total capacity of 8100 m^3/ day for treating the produced water generated from production wells. Produced water quality analysis result refer to ***Annexure II***. RO Plant water quality monitoring results refer to ***Annexure V*****.** The treated water is used in project and other activities and the excess treated water is discharged to nearby stream. The discharge water is conforming to the specified discharge limit. Surface water quality monitoring results refer to ***Annexure VI****.*
xvii	Ground water quality monitoring shall be done to assess if produced water storage or disposal has any effect.	The ground water quality monitoring has been carried out in post-monsoon (November'23). The ground water analysis results refer to ***Annexure VII***.
xviii	Drilling waste water including drill cuttings wash water shall be collected in disposal pit lined with HDPE lining and evaporated or treated and shall comply with the notified standards for on-shore disposal. The treated waste water should be reused in other wells during drilling operations. The membership of common TSDF shall be obtained for the disposal of drill cuttings and hazardous waste. Otherwise secured land fill shall be created at the site as per the design of the secured shall be approved by the CPCB and obtain the authorization of the WBPCB. Copy of authorization or membership of TSDF shall be submitted to Ministry's Regional Office at Bhubaneswar.	Drilling wastewater including drill cuttings, wash water is collected onsite impervious HDPE lined pit at site. After that at treatment site, it is stored in RCC pit for further treatment through Drilling Waste Processing Plant. Treated effluent is conforming to the notified standards for onshore disposal. Dry cuttings are used for well pad development. Toxicological analysis for drill cutting refer to ***Annexure III*** reveals that all tested parameters are within the permissible limit. Membership Certificate has been obtained from West Bengal Waste Management Limited, Saltora, to use TSDF facility for disposing of hazardous waste. A copy of the membership certificate refer to ***Annexure VIII***.
xix	Only water based drilling mud shall be used. The drilling mud shall be recycled. Hazardous waste shall be disposed of as per Hazardous Waste (Management,	Complied with.

	Handling and Trans-boundary Movement) Rules, 2008. The recyclable waste (oily sludge) and spent oil shall be disposed of to the authorized recyclers/re-processors.	Hazardous wastes are being disposed as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. Oil contaminated waste, waste filters and silica gel for purification of gas are being disposed through the authorized CHWTSDF, Saltora, operated by the authorized agency M/s West Bengal Waste Management Ltd. through the Manifest Form 10 Used oil is being sent to the authorized recycler, through the Manifest Form 10. The Manifest Form 10 copy for the period of October'23 to March'24 refer to ***Annexure IX*.**
xx	The Company shall carry out long term subsidence study by collecting base line data before initiating drilling operation till the project lasts. The data so collected shall be submitted six monthly to the Ministry and its Regional Office at Bhubaneswar.	Land Subsidence Study conducted in the month of March'24 by the National Institute of Technology, Durgapur. The report refers to ***Annexure X*.**
xxi	The Company shall take necessary measures to prevent fire hazards, containing oil spill and soil remediation as needed. At place of ground flaring, the overhead flaring stack with knockout drums shall be installed to minimize gaseous emissions during operation.	The necessary preventive measures have taken in place to prevent fire hazards, oil spill and soil remediation as follows. • Installation of electrical equipment has been done as per the approved hazardous zone classification of DGMS. • Major facilities like GGS, MCS, Ware House etc. are well equipped with fire hydrant system • DCP type fire extinguishers are available at all well sites. • Fixed and Portable type multi gas detectors are in used for work zone monitoring. Detectable gases are, CH_4, O_2, CO, H_2S. • Flame proof type lighting fixtures, push buttons and switches are used at drill site and facilities. • Impervious lining, secondary containment and spill kits are ensured, whenever there is a possibility of soil contamination. The overhead flaring stack with knockout drums have been installed to minimize gaseous emissions during operation.
xxii	The project authorities shall install SCADA system with dedicated optical fiber based telecommunication link for safe operation of pipeline and Leak Detection System. Additional sectionalizing valves in the residential area and sensitive installations shall be provided to prevent the amount of gas going to the atmosphere in the event of	SCADA System has been installed and operational for monitoring of wells and Group/Gas Gathering Station. Safe operation of the pipeline is ensured through the continuous motoring of parameter at the Control Room and regular patrolling.

	pipeline failure. Intelligent pigging facility shall be provided for the entire pipeline system for internal corrosion monitoring. Coating and impressed current cathodic protection system shall be provided to prevent external corrosion.	Sectionalizing valves are in place, intelligent pigging facility has been provided, coating and impressed current cathodic protection system has also been provided along the length of pipeline to prevent the external corrosion. Third party T4S audit is conducted by DNV as per the schedule practices. The design and laying of surface facilities have been confirmed to the standards of OISD.
xxiii	All the surface facilities including GGS, CGS and SV station shall be as per applicable codes and standards, international practices and applicable local regulations.	All the surface facilities including GGS, CGS and SV stations have been established as per applicable codes and standards of OISD.
xxiv	The design, material of construction, assembly, inspection, testing and safety aspects of operation and maintenance of pipeline and transporting the natural gas/oil shall be governed by ASME/ANSI B 31.8/B31.4 and OISD standard 141. Pipeline wall thickness and minimum depth of burial at river crossing and casings at rails, major road crossings should be in conformity with ANSI/ASME requirements.	All the surface facilities and pipelines have been installed as per the ASME/ANSI B 31.8 and OISD standards 141/226.
xxv	Annual safety audit should be carried out for the initial three years by an independent agency and report submitted to this Ministry for ensuring the strict compliance of safety regulations on operations and maintenance.	Safety audit is conducted annually by the independent competent agency every year and achieved certificates for the compliance of ISO 45001 : 2018 and ISO 14001 : 2015 and ISO 50001 : 2018.
xxvi	The project authorities shall patrol and inspect the pipeline regularly for detection of faults as per OISD guidelines and continuous monitoring of pipeline operation by adopting non-destructive method (s) of testing as envisaged in the EMP. Pearson survey and continuous potential survey should be carried out at regular intervals to ensure the adequacy of cathodic protection system.	Regular patrolling and inspection of laid pipeline are being carried out for detection of faults as per OISD guidelines. Pipeline operations shall be continuously monitored by adopting non-destructive methods of testing as envisaged in the EIA/EMP. Pearson survey and continuous potential survey being carried out at regular intervals as per OISD Standard to ensure the adequacy of cathodic protection system. Pearson survey and continuous potential survey last conducted in the year 2019.
xxvii	The company shall develop a contingency plan for H_2S release including all necessary aspects from evacuation to resumption of normal operations. The workers shall be provided with personal H_2S detectors in locations of high risk of exposure along with self-containing breathing apparatus.	H_2S is not present as per the analysis of gas tapped from the wells. However, all the necessary safety measures have been delineated as per the Emergency Response Plan. Gas detectors are ensured to check the presence of gases in the work zone. All workforce are ensured with the standard PPEs according to the job requirement. Self-contained breathing apparatus are provided as per the requirement.

xxviii	Adequate well protection system shall be provided like BOP or diverter systems as required based on the geological formation of the blocks.	Complied with.
xxix	Blow Out Preventer (BOP) system shall be installed to prevent well blowouts during drilling operations. BOP measures during drilling shall focus on maintaining well bore hydrostatic pressure by proper pre-well planning and drilling fluid logging etc.	Complied with.
xxx	The top soil removed shall be stacked separately for reuse during restoration process	The top soil has been used for developing the green belt development field in the project facilities.
xxxi	Emergency Response Plan shall be based on the guidelines prepared by OISO, DGMS and Govt. of India. Recommendations mentioned in the Risk Assessment & Consequence Analysis and Disaster Management Plan shall be strictly followed.	Petroleum & Natural Gas Regulatory Board (PNGRB) approved Emergency Response & Disaster Management Plan (ERDMP) is operational.
xxxii	Project proponent shall comply with the environment protection measures and safeguards recommended in the EIA/EMP/risk analysis report/disaster management plan.	Environmental protection measures and safeguards recommended in EMP / Risk Analysis / Disaster Management Plan have been implemented and being maintained.
xxxiii	The company shall take measures after completion of drilling process by well plugging and secured enclosures, decommissioning of rig upon abandonment of the well and drilling site shall be restored in original condition. In the event that no economic quantity of hydrocarbon is found a full abandonment plan shall be implemented for the drilling site in accordance with the applicable Indian Petroleum Regulations.	Complied with the measures by well plugging and secured enclosures. Well will be abandoned and restoration of site to original condition shall be implemented, if found unsuitability of hydrocarbon extraction. Well will be fully abandoned in compliance with Indian Petroleum Regulations in the event of no economic quantity of hydrocarbon is found. At present all wells are in production wells.
xxxiv	Occupational health surveillance of the workers shall be carried out as per the prevailing Acts and Rules.	All employees have undergone pre-employment medical examination. Periodical occupational health surveillance is conducted as per the approved schedule of Directorate General of Mine Safety (DGMS).
xxxv	In case the commercial viability of the project is established, the Company shall prepare a detailed plan for development of gas fields and obtain fresh environmental clearance from the Ministry.	Complied with another EC vide F. No. J-11011/1491/2011-IA II (I), dated- 26th February, 2013
xxxvi	All the commitments made to the public during the Public Hearing / Public Consultation meeting held on 26th March, 2010 shall be satisfactorily implemented.	Complied with.

xxxvii	Company shall adopt Corporate Environment Policy as per the Ministry's O.M. No. J-11 013/41/2006-1A.II (1) dated 26th April, 2011 and implemented.	Corporate Environment Policy has been framed and is being implemented and maintained.
xxxviii	Provision shall be made for the housing of construction labor within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project	Complied with by engaging local labor for project activities, where all the necessary infrastructure and facilities like porta- cabins, mobile toilets, septic tank & soak pit, safe drinking water, medical health care etc. were ensured with.
B.	**General Condition**	
i	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board (SPCB), State Government and any other statutory authority.	EOGEPL strictly adhere to the stipulations made by the State Pollution Control Board (SPCB), State Government and Statutory Authority..
ii	No further expansion or modification in the project shall be carried out without prior approval of the Ministry of Environment & Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any	Noted.
iii	The project authorities must strictly comply with the rules and regulations under Manufacture, Storage and Import of Hazardous Chemicals Rules, 2000 as amended subsequently. Prior approvals from Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. must be obtained, wherever applicable.	EOGEPL is in compliance with OMR- 2017 and OISD guidelines and PESO approval obtained wherever applicable.
iv	The project authorities must strictly comply with the rules and regulation with regarding to handling and disposal of Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 wherever applicable. Authorization from the State Pollution Control Board must be obtained for collections/ treatment/ storage/disposal of hazardous wastes.	EOGEPL is in compliance with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. EOGEPL obtained Hazardous Waste Authorization vide Memo No. – 190/2S(HW)-2449/2008, Date- 28/12/2023.
v	The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).	DG sets, Gas Generator Sets are in used confirming to CPCB guidelines of acoustic enclosure and providing adequate stack height. Schedule noise monitoring is carried out at nearby localities. The results of noise monitoring refer to ***Annexure IV***.
vi	A separate Environmental Management Cell equipped with full-fledged laboratory facilities must be set up to	A dedicated Environment Management Cell is functional for implementing the environment management plan at large.

	carry out the environmental management and monitoring functions.	Environmental monitoring is conducted by M/s Scientific Research laboratory, Kolkata (MoEF&CC recognized and NABL accredited).
vii	As proposed, Rs. 7.80 Crores earmarked for environment protection and pollution control measures shall be used to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided shall not be diverted for any other purposes.	Complied with.
viii	The Regional Office of this Ministry/Central Pollution Control Board/State Pollution Control Board will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation shall be submitted to them regularly.	Six-monthly compliance report with supporting annexure is submitted schedule wise. Last submitted on 06/12/2023.
ix	A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad / Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent	Complied with.
x	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MOEF, the respective Zonal Office of CPCB and the WBPCB. The criteria pollutant levels namely; SPM, RSPM, SO_2, NOx, HC (Methane & Non-methane), VOCs (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	The compliance report of environment clearance conditions including results of monitoring data is being uploaded on company's website and it is sent to the Regional Office of MOEF&CC and WBPCB at six-monthly basis The ambient air quality monitoring is carried out as per the NAAQS, Date- 18th November 2009. The criteria pollutant levels namely; SPM, RSPM, SO_2, NOx, HC (Methane & Non-methane), VOCs (ambient levels as well as stack emissions) are monitored schedule wise and displayed at the main gate of warehouse.
xi	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEF, the respective Zonal Office of CPCB and the WBPCB. The Regional Office of this Ministry /CPCB / WBPCB shall monitor the stipulated conditions.	The six-monthly report on the status of the compliance of the stipulated environmental conditions including results of environmental monitored data is submitted through e-mail to the Regional Office of MoEF&CC and in hard copy to Durgapur Regional Office of WBPCB schedule wise.
xii	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of	The Environmental Statement in Form-V is submitted to the Durgapur Regional Office, West Bengal Pollution Control Board in hard copy and Integrated Regional Office (IRO), MoEF&CC, Kolkata by e-mailing of the soft copy within the schedule time frame every year.

	environmental conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail.	The same is also uploaded on the company's website.
xiii	The Project Proponent shall inform the public that. The project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the WBPCB and may also be seen at Website of the Ministry of Environment and Forests at http:/envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the Regional office.	Complied with.
xiv	Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work	Complied with.
Ref: Amendment of Environment Clearance vide F. No. J-11011/351/2009- IA II (I) dated 18th June, 2012.		
S. No.	**Conditions**	**Compliance Status**
2.0	It is noted that existing environmental clearance was accorded for 58 pilot-cum-production wells. Now, project proposal is to drill supporting wells (4 Nos.) on each of the existing/planned well pads to enable dewatering to achieve target gas production capacity of 500,000 m^3/day. The depth of supporting wells will be 1000 m. All wells (main and support) will be connected to a single manifold at surface to provide a common line for extraction of water and gas. The common gas line will be connected to the nearest Gas Gathering Station and for further transportation to the customers. Since the dewatering load is distributed among these supporting wells will be operated with the same footprint, i.e. without the requirement for additional land or any significant additional environmental impact. This will also enable to minimize the environmental impact by reducing the number of movements of rigs etc., land required for construction of access roads, impact on water courses and better monitoring of ambient air quality & its impact.	Complied with.
3.0	The proposal was considered by the Expert Appraisal Committee (Industry-2) in its 31st and 33rd meetings held during 12th – 13th January, 2012 and 21st – 22nd March, 2012 respectively and committee recommended the project proposal for amendment in the existing environmental clearance in respect of addition of four support wells in each well pad to enable dewatering to achieve target production of 500,000 m^3/day.	Complied with.

4.0	Since additional four support wells are to be drilled in the same well pad and no additional land is required, the Ministry has no objection for inclusion of 4 supporting wells of the support wells on each of the well pad in the existing project. However, compliance to the following conditions shall be ensured.	Noted/complied with.
I	As proposed, supporting wells (4 nos.) on each pilot-cum-production wells (58 nos.) shall be drilled up to a depth of 1000m. No additional wells/support well shall be drilled without prior permission of this Ministry.	Complied with.
ii	Unit shall monitor ground water table within one Km radius of each well during pre-monsoon (i.e. May) and winter season (November). Trend analysis shall be carried out and report shall be submitted to the Ministry's regional office at Bhubaneswar.	Monitoring of ground water table has been carried out in November'23. The monitoring results refer to ***Annexure XI***.
iii	Permission from CGWA for dewatering shall be obtained and submitted to the Ministry's Regional Office at Bhubaneswar.	Permission obtained from State Water Investigation Directorate (SWID) and Water Resources Investigation & Development Department, Govt. of West Bengal. Permission copy was submitted to Ministry's R.O at Bhubaneswar.
iv	Smokeless flare shall be installed	Smokeless flair stack has been installed.
v	All the measures shall be taken to control noise pollution during drilling process. Acoustic enclosure/barrier shall be installed.	Complied with.
vi	Any produced water shall be treated and recycled/reused within the project area. Any excess water shall be discharged after treatment and meeting the standards prescribed by the CPCB/SPCB. Regular water quality monitoring shall be carried out and monitoring report shall be submitted to the respective Regional Office of the MoEF.	Produced water is treated with Reverse Osmosis (RO) system. Treated water is being recycled/ reused in project & other activities. Excess treated water is discharged to the nearby stream. The discharge water is conforming to the specified discharge limit. RO plant water quality monitoring results refer to ***Annexure V***. Surface water quality monitoring results refer to ***Annexure V***I.
vi	Any produced water shall be treated and recycled/reused within the project area. Any excess water shall be discharged after treatment and meeting the standards prescribed by the CPCB/SPCB. Regular water quality monitoring shall be carried out and monitoring report shall be submitted to the respective Regional Office of the MoEF.	Produced water is treated with Reverse Osmosis (RO) system. Treated water is being recycled/ reused in project & other activities. Excess treated water is discharged to the nearby stream. The discharge water is conforming to the specified discharge limit. RO plant water quality monitoring results refer to ***Annexure V***. Surface water quality monitoring results refer to ***Annexure V***I.

vii	Approach road shall be constructed prior to the drilling	Approach road has been constructed wherever the access road is not available.
viii	Land subsidence shall be monitored regularly and monitoring report shall be submitted to CPCB, SPCB and respective Ministry's regional office	Land Subsidence Study conducted in the month of March'24 by the National Institute of Technology, Durgapur. The report refers to **Annexure XI.**
5.0	All the specific conditions and general conditions specified in the environmental clearance accorded vide Ministry's letter no.J-11011/351/2009-IA II (I) dated 23rd September, 2011 shall be implemented	Complied with.
6.0	Consent to Establish and Operate for the revised proposal shall be obtained from the W.B. Pollution Control Board	Complied with.
7.0	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures if required, if any.	Noted.
8.0	All other conditions also remain same.	Noted.
9.0	This issues with prior approval from the competent authority.	Noted.
10.0	You are requested to keep this letter with the Environmental Clearance accorded vide letter No.- J-11011/351/2009-IA II (i) dated 23rd September, 2011.	Noted.
Ref: Amendment of Environment Clearance vide F. No. J-11011/351/2009- IA II (I) dated 6th November, 2017.		
2.	The Ministry had earlier issued environmental clearance for Pilot-cum-Production wells at Raniganj East Coal Bed Methane (CBM) Block RG (E)-CBM-2001/1 in Durgapur (West Bengal) in favor of M/s Essar Oil Limited (E&P Division) vide letter dated 23rd September, 2011, followed by amendment therein vide letter dated 18th June, 2012.	Noted.
3	M/s Essar Oil Limited has demerged its Exploration and Production (E&P) Division, which has now been transferred to a newly created wholly owned subsidiary namely M/s Essar Oil and Gas Exploration and Production Ltd., and thus necessitating transfer of all requisite approvals in the name of new company.	Complied with.
4	M/s Essar Oil Limited has given No Objection Certificate for transfer of environmental clearance granted vide letter	Noted.

	dated 23rd September, 2011 and the amendment dated 18th June, 2012 in the name of M/s Essar Oil and Gas Exploration and Production Limited.	
5	M/s Essar Oil and Gas Exploration and Production Limited has submitted an affidavit to abide by the terms and conditions stipulated in the environment clearance dated 23rd September, 2011 and the amendment dated 18th June, 2012 issued in the name of M/s Essar Oil Limited.	Noted.
6	As per the relevant provisions of the EIA Notifications, 2006, the environmental clearance to the project 'Pilot-cum-Production Wells' at Raniganj East Coal Bed Methane (CBM) Block RG (E)-CBM-2001/1 in Durgapur (WB) granted by the Ministry vide letter No. J-11011/351/2009-IA-II(I) dated 23rd September, 2011 read with amendment dated 18th June, 2012 is hereby transferred from M/s Essar Oil Limited (E&P Division) to M/s Essar Oil and Gas Exploration and Production Limited, on the same terms and conditions under which prior environmental clearance was initially granted and for the same validity period.	Noted.
7	This issues with approval of the competent authority.	Noted.

ANNEXURE I

Ambient Air Quality Monitoring Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd. **ANNEXURE I**

(Period: October'23 - March'24)

Name of Location			MCS						GGS- 01					
Month			Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
Parameter	UoM	NAAQS LIMIT												
$PM_{2.5}$	$\mu g/m^3$	60	27.34	31.52	35.15	46.65	52.61	56.98	32.77	41.40	46.25	47.82	49.62	49.17
PM_{10}	$\mu g/m^3$	100	59.30	69.19	77.80	88.03	96.77	95.43	76.80	75.37	85.63	96.64	87.92	94.57
Nitrogen Dioxide	$\mu g/m^3$	80	24.71	24.82	29.30	29.74	31.55	33.36	24.54	25.54	28.58	29.30	31.20	33.12
Sulphur Dioxide	$\mu g/m^3$	80	4.61	4.28	4.65	4.92	4.59	4.95	4.84	4.26	4.94	4.77	4.82	4.71
Carbon Monoxide	mg/m^3	2	0.42	0.44	0.45	0.46	0.46	0.47	0.44	0.44	0.45	0.46	0.45	0.47
Hydrocarbon	mg/m^3	NIL	1.12	1.59	1.84	1.92	1.96	2.04	1.54	1.80	2.07	2.08	1.73	2.08
Mercury	mg/m^3			< 0.002			< 0.002			< 0.002			< 0.002	
Hydrocarbon as Non Methane	mg/m^3	NIL	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
VOC's	$\mu g/m^3$			2.85			3.53			3.17			3.20	
Benzo(a)Pyrene	ng/m^3	1		0.30			0.45			0.44			0.36	
Ammonia	$\mu g/m^3$	400		29.08			30.04			32.03			28.13	
Ozone	$\mu g/m^3$	180		33.13			34.97			36.28			32.17	
Lead	$\mu g/m^3$	1		0.08			0.12			0.13			0.08	
Nickel	ng/m^3	20		9.63			10.45			11.04			8.19	
Arsenic	ng/m^3	6		1.38			1.93			1.62			1.62	
Benzene	$\mu g/m^3$	5		1.57			2.02			1.83			1.74	

Ambient Air Quality Monitoring Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd. **ANNEXURE I**

(Period: October'23 - March'24)

Name of Location			GGS- 02						PARULIA					
Month			Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
Parameter	UoM	NAAQS LIMIT												
$PM_{2.5}$	$\mu g/m^3$	60	27.12	41.39	42.55	49.96	44.64	52.47	41.45	33.88	34.92	42.92	47.82	50.83
PM_{10}	$\mu g/m^3$	100	50.78	72.32	79.13	92.33	84.97	97.17	80.47	70.87	79.03	90.64	94.33	94.72
Nitrogen Dioxide	$\mu g/m^3$	80	24.76	24.06	29.29	31.68	32.49	32.50	26.93	25.48	28.11	29.86	30.75	31.33
Sulphur Dioxide	$\mu g/m^3$	80	4.46	4.23	4.68	4.61	4.54	4.46	4.47	4.22	4.67	4.86	4.87	4.84
Carbon Monoxide	mg/m^3	2	0.40	0.43	0.44	0.46	0.46	0.46	0.44	0.44	0.45	0.44	0.44	0.47
Hydrocarbon	mg/m^3	NIL	1.04	1.70	1.91	1.94	1.69	1.92	1.54	1.68	1.88	1.82	1.82	2.24
Mercury	mg/m^3			< 0.002			< 0.002			< 0.002			< 0.002	
Hydrocarbon as Non Methane	mg/m^3	NIL	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
VOC's	$\mu g/m^3$			2.97			2.98			2.93			3.29	
Benzo(a)Pyrene	ng/m^3	1		0.37			0.34			0.31			0.41	
Ammonia	$\mu g/m^3$	400		30.73			27.51			29.85			28.95	
Ozone	$\mu g/m^3$	180		34.91			31.12			34.07			33.34	
Lead	$\mu g/m^3$	1		0.11			0.07			0.09			0.10	
Nickel	ng/m^3	20		10.08			7.83			10.03			9.58	
Arsenic	ng/m^3	6		1.54			1.59			1.42			1.71	
Benzene	$\mu g/m^3$	5		1.71			1.67			1.60			1.86	

Ambient Air Quality Monitoring Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd. **ANNEXURE I**

(Period: October'23 - March'24)

Name of Location			SARASWATIGUNJ						PRATPPUR					
Month			Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
Parameter	UoM	NAAQS LIMIT												
$PM_{2.5}$	$\mu g/m^3$	60	35.29	33.70	38.59	42.14	47.72	56.40	32.14	47.72	37.08	47.86	51.26	56.17
PM_{10}	$\mu g/m^3$	100	78.33	73.78	73.47	73.32	88.90	89.65	74.71	87.08	76.78	95.53	95.69	97.25
Nitrogen Dioxide	$\mu g/m^3$	80	24.64	25.68	27.35	27.82	30.62	32.22	25.26	25.89	28.08	30.79	31.96	32.33
Sulphur Dioxide	$\mu g/m^3$	80	4.63	4.52	4.66	4.43	4.57	4.77	4.44	4.16	4.82	4.68	4.37	4.42
Carbon Monoxide	mg/m^3	2	0.46	0.43	0.45	0.43	0.46	0.48	0.44	0.45	0.45	0.44	0.44	0.47
Hydrocarbon	mg/m^3	NIL	1.42	1.74	1.64	1.72	1.86	1.96	1.60	2.04	1.81	1.96	2.18	2.16
Mercury	mg/m^3			< 0.002			< 0.002			< 0.002			< 0.002	
Hydrocarbon as Non Methane	mg/m^3	NIL	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
VOC's	$\mu g/m^3$			3.04			3.35			3.46			3.87	
Benzo(a)Pyrene	ng/m^3	1		0.40			0.42			0.54			0.56	
Ammonia	$\mu g/m^3$	400		31.57			29.11			34.12			34.49	
Ozone	$\mu g/m^3$	180		35.81			33.68			38.39			38.87	
Lead	$\mu g/m^3$	1		0.12			0.10			0.17			0.16	
Nickel	ng/m^3	20		10.51			9.87			12.52			13.43	
Arsenic	ng/m^3	6		1.59			1.76			1.94			2.19	
Benzene	$\mu g/m^3$	5		1.77			1.89			2.12			2.33	

Ambient Air Quality Monitoring Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd. **ANNEXURE I**

(Period: October'23 - March'24)

Name of Location			BANSIA						JAMGORA					
Month			Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
Parameter	UoM	NAAQS LIMIT												
$PM_{2.5}$	$\mu g/m^3$	60	34.72	36.88	38.75	47.08	52.54	46.85	47.15	43.61	39.28	49.40	55.60	51.83
PM_{10}	$\mu g/m^3$	100	75.44	79.96	81.70	97.84	95.11	89.39	83.74	80.02	76.17	92.98	96.30	93.27
Nitrogen Dioxide	$\mu g/m^3$	80	27.23	25.23	26.81	29.39	31.31	31.16	26.96	25.26	27.88	29.80	32.65	32.48
Sulphur Dioxide	$\mu g/m^3$	80	4.82	4.33	4.66	4.66	4.60	4.58	4.26	4.30	4.79	4.69	4.14	4.42
Carbon Monoxide	mg/m^3	2	0.43	0.44	0.45	0.45	0.44	0.46	0.46	0.46	0.45	0.45	0.45	0.46
Hydrocarbon	mg/m^3	NIL	1.48	1.91	1.98	1.86	1.99	2.16	1.56	1.93	1.75	1.96	2.09	2.04
Mercury	mg/m^3			< 0.002			< 0.002			< 0.002			< 0.002	
Hydrocarbon as Non Methane	mg/m^3	NIL	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
VOC's	$\mu g/m^3$			3.28			3.59			3.32			3.69	
Benzo(a)Pyrene	ng/m^3	1		0.45			0.46			0.48			0.51	
Ammonia	$\mu g/m^3$	400		32.76			30.57			33.07			32.37	
Ozone	$\mu g/m^3$	180		36.93			35.18			37.11			36.94	
Lead	$\mu g/m^3$	1		0.14			0.12			0.15			0.14	
Nickel	ng/m^3	20		11.48			10.71			11.81			12.17	
Arsenic	ng/m^3	6		1.70			1.97			1.78			2.10	
Benzene	$\mu g/m^3$	5		1.93			2.05			1.97			2.21	

Ambient Air Quality Monitoring Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd. **ANNEXURE I**

(Period: October'23 - March'24)

Name of Location			KULDIHA						JATGORIA					
Month			Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
Parameter	UoM	NAAQS LIMIT												
$PM_{2.5}$	$\mu g/m^3$	60	29.74	42.39	42.41	49.34	48.95	44.27	34.24	34.74	39.98	50.92	49.27	55.42
PM_{10}	$\mu g/m^3$	100	55.94	84.19	81.67	97.43	92.44	90.37	71.69	73.90	70.66	96.45	93.38	92.52
Nitrogen Dioxide	$\mu g/m^3$	80	23.71	25.80	28.59	30.93	32.39	32.44	26.26	25.60	26.84	30.34	32.52	31.17
Sulphur Dioxide	$\mu g/m^3$	80	4.02	4.76	4.91	4.74	4.84	4.54	4.44	4.16	4.67	4.45	4.82	4.46
Carbon Monoxide	mg/m^3	2	0.41	0.44	0.46	0.45	0.46	0.46	0.45	0.42	0.44	0.45	0.45	0.47
Hydrocarbon	mg/m^3	NIL	0.98	1.98	1.96	1.88	2.07	2.12	1.54	1.77	1.52	1.92	2.27	2.18
Mercury	mg/m^3			< 0.002			< 0.002			< 0.002			< 0.002	
Hydrocarbon as Non Methane	mg/m^3	NIL	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
VOC's	$\mu g/m^3$			3.38			3.67			3.09			4.03	
Benzo(a)Pyrene	ng/m^3	1		0.51			0.50			0.42			0.59	
Ammonia	$\mu g/m^3$	400		33.58			31.56			31.68			36.14	
Ozone	$\mu g/m^3$	180		37.69			36.19			35.89			39.71	
Lead	$\mu g/m^3$	1		0.16			0.13			0.12			0.18	
Nickel	ng/m^3	20		12.07			11.39			10.42			14.89	
Arsenic	ng/m^3	6		1.86			2.05			1.62			2.32	
Benzene	$\mu g/m^3$	5		2.03			2.16			1.80			2.49	

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(Period: October'23 - March'24)

Name of Location			Gopalpur Warehouse						KANTABERIA					
Month			Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
Parameter	UoM	NAAQS LIMIT												
$PM_{2.5}$	$\mu g/m^3$	60	24.37	27.39	35.18	42.88	49.57	50.32	36.34	35.51	37.15	49.96	52.98	56.25
PM_{10}	$\mu g/m^3$	100	57.69	66.56	73.84	82.13	93.14	96.36	74.22	77.34	71.20	98.89	94.67	97.28
Nitrogen Dioxide	$\mu g/m^3$	80	23.95	23.75	27.96	29.36	31.11	31.58	25.96	24.53	28.79	31.73	31.21	31.58
Sulphur Dioxide	$\mu g/m^3$	80	4.41	4.31	4.52	4.66	4.69	4.68	4.69	4.15	4.57	4.70	4.46	4.57
Carbon Monoxide	mg/m^3	2	0.40	0.43	0.44	0.45	0.45	0.47	0.46	0.44	0.45	0.46	0.46	0.46
Hydrocarbon	mg/m^3	NIL	1.04	1.48	1.70	1.80	1.90	1.98	1.46	1.85	1.59	1.96	2.12	2.12
Mercury	mg/m^3			< 0.002			< 0.002			< 0.002			< 0.002	
Hydrocarbon as Non Methane	mg/m^3	NIL	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
VOC's	$\mu g/m^3$			2.80			3.46			3.21			3.81	
Benzo(a)Pyrene	ng/m^3	1		0.29			0.43			0.46			0.53	
Ammonia	$\mu g/m^3$	400		28.17			29.57			32.29			33.15	
Ozone	$\mu g/m^3$	180		32.24			34.06			36.51			37.44	
Lead	$\mu g/m^3$	1		0.08			0.11			0.14			0.15	
Nickel	ng/m^3	20		9.17			10.16			11.26			12.96	
Arsenic	ng/m^3	6		1.33			1.82			1.67			2.13	
Benzene	$\mu g/m^3$	5		1.52			1.93			1.88			2.28	

Ambient Air Quality Monitoring Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd. **ANNEXURE I**

(Period: October'23 - March'24)

Name of Location			NACHAN						SARENGA					
Month			Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
Parameter	UoM	NAAQS LIMIT												
$PM_{2.5}$	$\mu g/m^3$	60	33.93	34.36	38.43	47.90	52.43	52.12	38.96	27.92	43.94	46.50	49.17	50.83
PM_{10}	$\mu g/m^3$	100	79.98	73.37	76.90	94.58	92.20	95.25	76.17	66.48	80.36	86.48	90.96	97.63
Nitrogen Dioxide	$\mu g/m^3$	80	27.56	26.33	29.23	32.01	32.69	31.05	25.59	24.86	27.71	28.47	32.21	32.24
Sulphur Dioxide	$\mu g/m^3$	80	4.49	4.15	4.80	4.58	4.64	4.92	4.59	4.37	4.73	4.12	4.34	4.46
Carbon Monoxide	mg/m^3	2	0.45	0.45	0.44	0.45	0.44	0.46	0.43	0.44	0.44	0.43	0.45	0.48
Hydrocarbon	mg/m^3	NIL	1.58	1.71	1.78	1.94	1.91	2.10	1.48	1.44	1.94	1.74	2.04	2.06
Mercury	mg/m^3			< 0.002			< 0.002			< 0.002			< 0.002	
Hydrocarbon as Non Methane	mg/m^3	NIL	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
VOC's	$\mu g/m^3$			3.11			3.51			2.76			3.64	
Benzo(a)Pyrene	ng/m^3	1		0.41			0.44			0.28			0.48	
Ammonia	$\mu g/m^3$	400		31.24			29.77			27.34			30.81	
Ozone	$\mu g/m^3$	180		35.69			34.28			31.83			35.73	
Lead	$\mu g/m^3$	1		0.12			0.11			0.08			0.13	
Nickel	ng/m^3	20		10.84			10.29			3.74			11.08	
Arsenic	ng/m^3	6		1.56			1.87			1.30			2.01	
Benzene	$\mu g/m^3$	5		1.79			1.98			1.48			2.09	

Ambient Air Quality Monitoring Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd. **ANNEXURE I**

(Period: October'23 - March'24)

Name of Location			LABNAPARA					
Month								
Parameter	UoM	NAAQS LIMIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
$PM_{2.5}$	$\mu g/m^3$	60	38.45	39.06	40.22	46.25	45.42	47.92
PM_{10}	$\mu g/m^3$	100	82.57	70.25	78.11	70.80	90.87	91.40
Nitrogen Dioxide	$\mu g/m^3$	80	27.03	24.73	28.22	28.78	30.02	32.30
Sulphur Dioxide	$\mu g/m^3$	80	4.92	4.10	4.56	4.32	4.56	4.56
Carbon Monoxide	mg/m^3	2	0.46	0.43	0.45	0.43	0.45	0.46
Hydrocarbon	mg/m^3	NIL	1.54	1.64	1.86	1.68	1.78	2.02
Mercury	mg/m^3			< 0.002			< 0.002	
Hydrocarbon as Non Methane	mg/m^3	NIL	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
VOC's	$\mu g/m^3$			2.92			3.27	
Benzo(a)Pyrene	ng/m^3	1		0.33			0.38	
Ammonia	$\mu g/m^3$	400		30.19			28.58	
Ozone	$\mu g/m^3$	180		34.05			32.78	
Lead	$\mu g/m^3$	1		0.10			0.09	
Nickel	ng/m^3	20		10.24			8.96	
Arsenic	ng/m^3	6		1.47			1.67	
Benzene	$\mu g/m^3$	5		1.65			1.79	

ANNEXURE II

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Period: October'23 - March'24)

ANNEXURE II

MONTH				Oct.'23											
S. No.	Parameter	Unit	Onshore Discharge Standard (Not to exceed)	EDD-50-D2 (NACHAN)	EDD-06-D1 (BANGORIA)	EDN-179-D3 (GOPALPUR)	EDN-172-V1 (SARENGA)	`EDN-099-D1 (KULDIHA)	EDI-123-D5 (LOHAGURI)	EDI-120-D1 (HARKI)	EDI-40-D4 (SARASWATIGUNJ)	EDI-71-D3 (MALANDIGHI)	EDH-065-D2 (AKANDARA)	EDH-058-D2 (LABNAPARA)
1	pH		5.5-9.0	8.51	8.66	7.97	7.70	7.83	7.62	8.10	8.34	7.91	8.39	8.43
2	Temperature	deg. C	40 deg. C	29.9°C	35.1°C	35.2°C	32.2°C	31.7°C	34.9°C	34.1°C	33.2°C	34.7°C	33.7°C	30.9°C
3	Suspended Solids	mg/l	100	16	<2	3	41	56	12	<2	<2	3	14	4
4	Total Dissolved Solids	mg/l	2100	2836	1992	2470	11174	12960	12108	12208	9658	10622	4120	4468
5	Chlorides	mg/l	600	685	98	1240	6325	7225	6954	7015	5375	5820	1035	1680
6	Sulphates	mg/l	1000	8.2	7.0	5.9	15.7	24.1	18.3	21.1	11.5	19.0	8.2	9.4
7	BOD	mg/l	30	<2	<2	<2	<2	<2	<2	<2	<2	<2	3	<2
8	COD	mg/l	100	<8	<8	<8	8.0	<8	<8	<8	<8	<8	12.0	8.0
9	Oil & Grease	mg/l	10	<5.0	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	<5
10	Phenolic Compounds	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	0.79	0.53	0.62	1.78	2.24	1.88	1.39	0.76	1.73	0.64	0.39
13	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	0.014	0.018	0.022	0.021	0.024	0.031	0.018	0.014	0.012	0.013	0.019
15	Copper	mg/l	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	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	<0.001
19	Cyanide	mg/l	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	96.2	97.0	96.3	86.5	93.6	93.9	94.6	96.9	95	98.8	98.6

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ANNEXURE II

MONTH				Nov.'23											
S. No.	Parameter	Unit	Onshore Discharge Standard (Not to exceed)	EDI-071-D6 (MALANDIGHI)	EDD-046-D2 (AKANDARA)	EDI-037-D9 (AKANDARA)	EDI-70-D7 (MALANDIGHI)	`EDP-300-D1 (JATGORIA)	EDP-364-D3 (GOPEDANGA)	EDP-364-V1 (GOPEDANGA)	EDI-41-D4 (SARASWATIGUNJ)	EDN-162-D2 (VALUKANDA)	EDN-163-D1 (VALUKANDA)	EDN-169-D1 (KESHABPUR)	EDN-169-D2 (KESHABPUR)
1	pH		5.5-9.0	7.87	8.41	8.35	7.93	8.53	8.60	8.47	7.72	7.88	7.81	7.95	7.66
2	Temperature	deg. C	40 deg. C	30.7°C	34.7°C	33.7°C	32.7°C	29.8°C	30.4°C	32.9°C	28.1°C	32.8°C	31.4°C	28.5°C	29.9°C
3	Suspended Solids	mg/l	100	17	6	10	14	<2	<2	<2	4	11	22	26	18
4	Total Dissolved Solids	mg/l	2100	17268	5754	7824	7158	2698	1814	2286	6180	8138	9224	9860	8718
5	Chlorides	mg/l	600	9840	2155	3875	3215	450	112	185	3525	4380	4920	5460	4255
6	Sulphates	mg/l	1000	8.3	6.9	7.6	8.9	5.8	4.9	6.2	5.0	9.2	4.2	7.9	6.7
7	BOD	mg/l	30	3	<2	<2	2	<2	<2	<2	<2	2	2	<2	4
8	COD	mg/l	100	10.0	<8	8.0	9.0	<8	<8	<8	8.0	10.0	9.0	8.0	16.0
9	Oil & Grease	mg/l	10	<5.0	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
10	Phenolic Compounds	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	0.98	1.35	1.82	0.81	0.52	0.43	0.73	0.96	1.48	0.019	0.015	0.012
13	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	0.019	0.015	0.013	0.017	0.011	0.021	0.016	0.022	0.011	0.029	0.022	0.018
15	Copper	mg/l	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	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	<0.001	<0.001
19	Cyanide	mg/l	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	95.1	98.5	96.7	96.6	98.1	97.5	98.5	94.8	89.1	91	82.8	86.9

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ANNEXURE II

MONTH				Dec.'23									
S. No.	Parameter	Unit	Onshore Discharge Standard (Not to exceed)	EDE-301-V1 (FULJURI)	EDE-300-D1 (FULJURI)	EDD-256-D1 (GOPEDANGA)	EDD-07-D2 (GOPEDANGA)	`EDD-004-D5 (BANGORIA)	EDD-244-D1 (NACHAN)	EDC-409-D7 (PRATAPPUR)	EDC-072-D9 (PARULIA)	EDP-240-D1 (PARULIA)	EDP-240-D2 (PARULIA)
1	pH		5.5-9.0	8.46	8.50	8.53	8.49	8.42	8.53	8.41	8.52	8.37	8.45
2	Temperature	deg. C	40 deg. C	30.4°C	30.6°C	28.7°C	30.1°C	28.4°C	28.2°C	28.4°C	28.3°C	28°C	28.6°C
3	Suspended Solids	mg/l	100	7	<2	6	10	12	<2	9	4	19	3
4	Total Dissolved Solids	mg/l	2100	1998	2782	2758	2032	3514	3622	2992	3446	1680	1210
5	Chlorides	mg/l	600	325	530	470	280	1690	1075	355	755	355	211
6	Sulphates	mg/l	1000	5.7	6.4	7.1	6.4	7.9	8.5	7.8	6.1	4.8	5.1
7	BOD	mg/l	30	7	<2	4	<2	<2	<2	14	<2	2	<2
8	COD	mg/l	100	22.0	<8	16.0	8.0	8.0	<8	39.0	<8	9.0	<8
9	Oil & Grease	mg/l	10	<5.0	<5.0	<5	<5	<5	<5	<5	<5	<5	<5
10	Phenolic Compounds	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	1.89	2.04	1.47	0.81	0.98	1.05	1.62	0.88	0.92	0.68
13	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	0.016	0.019	0.012	0.012	0.01	0.019	0.021	0.024	0.014	0.011
15	Copper	mg/l	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	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
19	Cyanide	mg/l	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	92.3	96.6	97.3	96.5	96.1	96.1	93.3	96.6	93.5	93

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ANNEXURE II

MONTH				Jan.'24													
S. No.	Parameter	Unit	Onshore Discharge Standard (Not to exceed)	EDI-36-D4 (AKANDARA)	EDI-36-D5 (AKANDARA)	EDI-36-D6 (AKANDARA)	EDI-36-D5 (AKANDARA)	EDI-34-D6 (AKANDARA)	EDI-32-D6 (AKANDARA)	EDI-32-D7 (AKANDARA)	EDI-303-D2 (JATGORIA)	EDE-364-V1 (GOPEDANGA)	EDE-364-D1 (GOPEDANGA)	EDE-364-D2 (GOPEDANGA)	EDE-364-D3 (GOPEDANGA)	EDD-256-D2 (GOPEDANGA)
1	pH		5.5-9.0	8.46	8.39	7.95	8.37	8.40	8.60	8.45	8.63	8.58	8.62	8.55	8.51	8.42
2	Temperature	deg. C	40 deg. C	24.9°C	26.5°C	27.9°C	27.2°C	28.3°C	26.8°C	27.3°C	26.8°C	29.4°C	31.7°C	33.6°C	34.6°C	37.8°C
3	Suspended Solids	mg/l	100	9	6	2	5	12	7	3	<2	<2	7	4	<2	6
4	Total Dissolved Solids	mg/l	2100	8384	9280	10460	9018	8894	3784	6278	2340	2416	2182	2076	1812	2548
5	Chlorides	mg/l	600	4070	4365	5105	3982	3789	1210	2875	135	193	107	96	58	210
6	Sulphates	mg/l	1000	8.2	5.1	7.4	6.9	8.3	7.4	7.6	5.8	6.2	4.7	7.6	9.0	6.1
7	BOD	mg/l	30	2	<2	<2	<2	2	2	4	<2	<2	<2	<2	<2	2
8	COD	mg/l	100	10.0	<8	8.0	<8	11.0	9.0	16.0	<8	<8	<8	8.0	<8	11.0
9	Oil & Grease	mg/l	10	<5.0	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
10	Phenolic Compounds	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	1.10	1.45	0.8	0.68	1.02	0.89	1.33	0.93	1.52	0.48	1.24	0.71	0.79
13	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	0.021	0.013	0.018	0.016	0.02	0.013	0.019	0.015	0.012	0.018	0.014	0.023	0.012
15	Copper	mg/l	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	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	<0.001	<0.001	<0.001
19	Cyanide	mg/l	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	96.9	96.4	96.3	98.3	98.1	97.1	98.6	95.8	97.8	98.3	98.4	96.7	97.2

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ANNEXURE II

MONTH				Feb.'24											
S. No.	Parameter	Unit	Onshore Discharge Standard (Not to exceed)	EDI-042-D5 (SARASWATIGUNJ)	EDI-037-D7 (AKANDARA)	EDI-046-D1 (AKANDARA)	EDI-046-D2 (AKANDARA)	EDI-046-D3 (AKANDARA)	EDI-046-D4 (AKANDARA)	EDI-041-D4 (GHATAKDANGA)	EDI-041-D5 (GHATAKDANGA)	EDI-038-D4 (SARASWATIGUNJ)	EDI-038-D5 (SARASWATIGUNJ)	EDI-038-D6 (SARASWATIGUNJ)	EDI-039-D4 (SARASWATIGUNJ)
1	pH		5.5-9.0	8.44	8.49	8.55	8.61	8.40	8.57	8.46	8.39	8.66	8.70	8.58	8.74
2	Temperature	deg. C	40 deg. C	28.5°C	29.2°C	29.4°C	31.5°C	32.5°C	32.9°C	32.6°C	32.9°C	31.9°C	32.8°C	32.9°C	30.4°C
3	Suspended Solids	mg/l	100	11	17	7	3	9	<2	<2	12	4	<2	7	4
4	Total Dissolved Solids	mg/l	2100	8320	8294	7620	5974	5256	5144	7204	7040	5512	5520	5610	5098
5	Chlorides	mg/l	600	4160	4086	3570	2140	1815	1740	3975	3805	1810	1970	1692	1485
6	Sulphates	mg/l	1000	3.9	7.6	6.0	5.3	7.1	6.5	5.8	3.9	8.4	5.6	6.2	4.7
7	BOD	mg/l	30	<2	3	2	<2	2	<2	<2	<2	3	<2	<2	<2
8	COD	mg/l	100	8.0	18.0	10.0	<8	10.0	<8	8.0	<8	12.0	<8	9.0	<8
9	Oil & Grease	mg/l	10	<5.0	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
10	Phenolic Compounds	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	1.42	0.87	0.63	0.68	0.83	0.91	0.39	1.30	0.88	0.70	0.81	0.93
13	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	0.017	0.011	0.024	0.014	0.019	0.011	0.017	0.012	0.011	0.015	0.02	0.013
15	Copper	mg/l	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	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	<0.001	<0.001
19	Cyanide	mg/l	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	96	95.5	97.7	98.4	97.7	96.7	96.4	95.6	97.1	94.7	97.4	96.6

Produced Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Period: October'23 - March'24)

ANNEXURE II

MONTH				Mar.'24											
S. No.	Parameter	Unit	Onshore Discharge Standard (Not to exceed)	EDI-71-D6 (MALANDIGHI)	EDI-71-D (MALANDIGHI)	EDI-70-D4 (SARASWATIGUNJ)	EDI-70-D5 (SARASWATIGUNJ)	EDI-70-D6 (SARASWATIGUNJ)	EDI-70-D7 (SARASWATIGUNJ)	EDN-162-D2 (VALUKANDA)	EDN-163-D1 (VALUKANDA)	EDN-163-D4 (VALUKANDA)	EDN-169-D1 (SARENGA)	EDN-169-D2 (SARENGA)	EDD-242-D3 (NACHAN)
1	pH		5.5-9.0	8.41	8.37	8.34	8.49	8.38	8.45	8.43	8.51	8.35	8.47	8.50	8.47
2	Temperature	deg. C	40 deg. C	30.2°C	29.7°C	31.8°C	31.9°C	21.2°C	29.1°C	34.6°C	31.2°C	31.2°C	34.2°C	34.4°C	28.5°C
3	Suspended Solids	mg/l	100	12	8	10	4	2	11	21	15	48	10	17	24
4	Total Dissolved Solids	mg/l	2100	15720	14890	9088	9720	4970	7540	7896	10398	9140	11924	13084	1446
5	Chlorides	mg/l	600	8946	7885	5642	5645	2062	3795	4015	5475	4356	6815	7230	328
6	Sulphates	mg/l	1000	8	7.2	6.1	6.2	4.9	5.3	9.0	8.3	10.2	8.0	9.7	6.3
7	BOD	mg/l	30	3	2	<2	<2	<2	<2	<2	<2	3	<2	2	2
8	COD	mg/l	100	10.0	9.0	8.0	<8	<8	<8	9.0	8.0	14.0	8.0	10.0	11.0
9	Oil & Grease	mg/l	10	<5.0	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5.0
10	Phenolic Compounds	mg/l	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	0.98	1.4	0.73	0.82	0.69	1.30	0.87	1.25	1.05	1.45	1.60	0.82
13	Total Chromium	mg/l	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	0.024	0.027	0.019	0.012	0.02	0.022	0.013	0.020	0.027	0.019	0.024	0.023
15	Copper	mg/l	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	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	<0.001	<0.001
19	Cyanide	mg/l	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	95.5	93.7	93.6	95.9	95.9	94.6	90.1	95.1	92.8	87.2	89	93.5

ANNEXURE III

Drill Cutting Analysis Report of CBM Raniganj Project by Essar Oil and Gas Exploration and Production Ltd.

(Period: October'23 - March'24)

ANNEXURE III

Well Name				EDI-47-D2	EDI-71-D7	EDN-163-D4	EDC-409-D7	EDG-074-D7	EDN-166-D9	EDI-045-D2	EDN-166-D6
Location				Akandara	Malan Dighi	Gopalpur	Parulia	Pratappur	Keshabpur	Akandhara	Keshabpur
Date				31.10.2023	31.10.2023	31.10.2023	30.11.2023	31.11.2023	30.12.2023	30.12.2023	30.01.2024
Sl No.	Parameter	Unit	Limit as per G,S,R No. 395 E,dtd-4th Apr,2016 Schedule-II,Class-A	Result							
1	Barium (as Ba)	mg/l	100.0	0.22	0.32	0.19	0.20	0.25	BDL (DL:0,1)	BDL (DL:0,1)	0.8
2	Selenium (as Se)	mg/l	1.0	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
3	Cadmium (as Cd)	mg/l	1.0	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
4	Lead (as Pb)	mg/l	5.0	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
5	Mercury (as Hg)	mg/l	0.2	BDL (DL:0,05)	BDL (DL:0,05)	BDL (DL:0,05)	BDL (DL:0,05)	BDL (DL:0,05)	BDL (DL:0,05)	BDL (DL:0,05)	BDL (DL:0,05)
6	Chloroform	mg/l	6.0	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)
7	2,4-D	mg/l	10.0	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)
8	Ignitability	None		Non Flammable	Non Flammable	Non Flammable	Non Flammable	Non Flammable	Non Flammable	Non Flammable	Non Flammable
9	Benzene	mg/l	0.5	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)
10	Chlorobenzene	mg/l	100.0	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)
11	Trichloroethylene	mg/l	0.5	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)
12	Hexachlorobutadiene	mg/l	0.5	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)	BDL (DL:0,2)
13	Endrin	mg/l	0.02	BDL (DL:0,02)	BDL (DL:0,02)	BDL (DL:0,02)	BDL (DL:0,02)	BDL (DL:0,02)	BDL (DL:0,02)	BDL (DL:0,02)	BDL (DL:0,02)
14	Corrosivity	mg/l		Non Corrosive	Non Corrosive	Non Corrosive	Non Corrosive	Non Corrosive	Non Corrosive	Non Corrosive	Non Corrosive
15	Reactivity	None		Non Reactive	Non Reactive	Non Reactive	Non Reactive	Non Reactive	Non Reactive	Non Reactive	Non Reactive
16	Heptachlor	mg/l	0.008	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
17	Chlorodane	mg/l	0.03	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
18	1,2, Dichloroethane	mg/l	0.5	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)
19	1,1 Dichloroethylene	mg/l	0.7	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)
20	2,4, Dinitrotoluene	mg/l	0.13	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
21	Hexachlorobenzene	mg/l	0.13	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
22	Hexachloroethene	mg/l	3.0	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
23	Vinyl Chloride	mg/l	0.2	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)
24	2,4,5 TP(Silvex)	mg/l	1.0	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
25	2,4,6, Trichlorophenol	mg/l	2.0	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
26	Lindane	mg/l	0.4	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
27	Methoxychlor	mg/l	10	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)
28	Methyl Ethyl Ketone	mg/l	200.0	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
29	Nitrobenzene	mg/l	2.0	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)
30	Pentachlorophenol	mg/l	100.0	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)
31	Pyridine	mg/l	5.0	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)	BDL (DL:1,0)
32	Toxaphene	mg/l	0.5	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
33	Arsenic	mg/l	5.0	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
34	Total Chromium	mg/l	5.0	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
35	m-Cresol	mg/l	200.0	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
36	o-Cresol	mg/l		BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
37	p-Cresol	mg/l		BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
38	1,4 diclorobezene	mg/l	7.5	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
39	Carbon tetrachloride	mg/l	0.5	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)
40	Tetra chloro ethylene	mg/l	0.7	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)	BDL (DL:0.2)
41	Silver	mg/l	5.0	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
42	Cresols	mg/l	200.0	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
43	2,4,5 -Trichlorophenol	mg/l	400.0	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)

ANNEXURE IV

ANNEXURE IV

Ambient Noise Monitoring Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd.

(Period: October'23 to March'24)

Ambient Noise Monitoring Result				
Location	DAY TIME		NIGHT TIME	
	Limit as per the EC, dBA	Noise Level (Leq) dBA	Limit as per the EC, dBA	Noise Level (Leq) dBA
KULDIHA [EDN # 099]	75	59.14	70	53.41
MCS-MALANDIGHI	75	63.84	70	53.05
SARASWATIGUNJ [EDI # 039]	75	60.96	70	52.08
GOPALPUR WAREHOUSE	75	63.85	70	51.53
GGS#002 NEAR MAIN GATE SECURITY ROOM	75	64.01	70	54.97
JAMGORA [EDP # 406]	75	57.40	70	50.87
NACHAN [EDD – 053]	75	62.44	70	52.62
PRATAPPUR [EDD # 049]	75	56.83	70	50.72
JATGORIA [EDD – 005]	75	53.15	70	50.30
KANTABERIA [EDD-012]	75	60.87	70	54.31
PARULIA [EDC-413]	75	56.39	70	52.37
KHATGORIA [GGS # 001]	75	62.31	70	51.69
BANSIA [EDD – 411]	75	61.05	70	51.60
LABNAPARA [EDH # 064]	75	61.33	70	53.82
SARENGA	75	55.93	70	50.45

ANNEXURE V

ANNEXURE V

R.O. water analysis report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd.
(Period: October'23 - March'24)

Month					Oct.'23											
S. No.	Parameter	Unit	Onshore Discharge Standards	CPCB Limit for Discharge	GGS-01 RO			EDD-50 RO			EDH-64 RO			EDN-99 RO		
					Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject
1	pH		5.5-9.0	5.5 to 9.0	7.61	7.46	7.89	7.75	7.57	7.93	7.48	7.15	7.82	7.71	7.78	7.86
2	Temperature	deg. C	40 deg. C		33.9°C	33.5°C	31.9°C	31.8°C	31.8°C	29.9°C	29.3°C	32.8°C	29.7°C	33.1°C	30.2°C	33.4°C
3	Suspended Solids	mg/l	100	100	5	3	7	3	<2	6	4	<2	7	5	<2	8
4	Total Dissolved Solids	mg/l	2100	---	2762	1126	4430	3226	978	4438	7178	912	11160	6226	1562	8540
5	Chlorides	mg/l	600	---	875	388	1535	980	452	1386	2170	336	3675	1987	478	2645
6	Sulphates	mg/l	1000	---	4.9	3.0	5.6	5.9	44	7.00	9.8	38	11.4	7.3	36.0	10.2
7	BOD, 3 Days at 27ºC	mg/l	30	30	<2	<2	<2	<2	<2	<2	<2	<2	2	<2	<2	<2
8	COD	mg/l	100	250	<8	<8	<8	<8	<8	<8	8	<8	10	<8	<8	8
9	Oil & Grease	mg/l	10	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
10	Phenolic Compounds	mg/l	1.2	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	2	0.95	0.81	1.15	0.76	0.62	0.97	1.49	1.02	2.50	1.83	0.49	2.21
13	Total Chromium	mg/l	1	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	5	0.017	0.014	0.020	0.013	0.011	0.019	0.024	0.015	0.029	0.028	0.017	0.033
15	Copper	mg/l	0.2	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Cyanide	mg/l	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	.....	98.6	47.4	99.2	98.7	49.6	99.1	97.7	47.8	97.2	91.9	48.2	92.8

ANNEXURE V

R.O. water analysis report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd.
(Period: October'23 - March'24)

Month					Nov.'23											
S. No.	Parameter	Unit	Onshore Discharge Standards	CPCB Limit for Discharge	GGS-01 RO			EDD-50 RO			EDH-64 RO			EDN-99 RO		
					Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject
1	pH		5.5-9.0	5.5 to 9.0	7.48	7.15	7.60	7.84	7.56	7.97	7.47	7.60	7.88	7.96	7.76	8.01
2	Temperature	deg. C	40 deg. C		29.3°C	28.5°C	25.4°C	28.6°C	27.8°C	27.0°C	27.4°C	28.6°C	27.5°C	29.2°C	26.5°C	26.7°C
3	Suspended Solids	mg/l	100	100	4	<2	6	5	2	6	3	<2	6	7	<2	10
4	Total Dissolved Solids	mg/l	2100	---	2770	1186	4638	3196	1126	4322	5054	524	9692	7288	1574	9598
5	Chlorides	mg/l	600	---	1035	350	1570	948	326	1460	1750	206	3586	2445	431	3148
6	Sulphates	mg/l	1000	---	6.3	4.2	7.5	5.8	4.3	6.5	6.8	3.6	9	8.9	4.2	10.2
7	BOD, 3 Days at 27ºC	mg/l	30	30	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
8	COD	mg/l	100	250	<8	<8	<8	<8	<8	<8	<8	<8	<8	8	<8	9
9	Oil & Grease	mg/l	10	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
10	Phenolic Compounds	mg/l	1.2	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	2	1.35	0.58	1.30	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	2	<0.05	<0.05	<0.05	0.89	0.41	1.10	1.48	0.91	1.62	1.96	1.30	2.06
13	Total Chromium	mg/l	1	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	5	0.018	0.011	0.023	0.022	0.016	0.028	0.017	0.011	0.022	0.024	0.019	0.027
15	Copper	mg/l	0.2	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Cyanide	mg/l	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	.....	98.9	57.8	99.6	98.4	56.8	98.7	97.7	59.13	98	93.6	57.17	94.9

ANNEXURE V

R.O. water analysis report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd.
(Period: October'23 - March'24)

Month					Dec.'23											
S. No.	Parameter	Unit	Onshore Discharge Standards	CPCB Limit for Discharge	GGS-01 RO			EDD-50 RO			EDH-64 RO			EDN-99 RO		
					Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject
1	pH		5.5-9.0	5.5 to 9.0	7.6	7.35	7.66	7.75	7.57	7.14	7.78	7.61	7.72	8.51	7.80	7.47
2	Temperature	deg. C	40 deg. C		28.3°C	26.7°C	27.3°C	26.6°C	26.3°C	22.9°C	23.1°C	23.3°C	23.4°C	30.1°C	28.3°C	29.6°C
3	Suspended Solids	mg/l	100	100	4	<2	6	6	<2	8	4	<2	6	5	<2	7
4	Total Dissolved Solids	mg/l	2100	---	2620	1102	4122	3168	1280	4230	5292	910	7416	7176	1622	10352
5	Chlorides	mg/l	600	---	1010	373	1680	1240	362	1530	1518	454	2950	2275	456	4150
6	Sulphates	mg/l	1000	---	5.9	4.5	7.3	4.0	3.8	6.7	5.9	4.1	6.6	6.8	5.5	8.1
7	BOD, 3 Days at 27ºC	mg/l	30	30	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
8	COD	mg/l	100	250	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
9	Oil & Grease	mg/l	10	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
10	Phenolic Compounds	mg/l	1.2	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	2	0.83	0.41	0.96	0.61	0.33	0.88	0.79	0.36	0.88	0.94	0.52	1.45
13	Total Chromium	mg/l	1	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	5	0.018	0.012	0.019	0.016	0.014	0.018	0.017	0.013	0.020	0.023	0.017	0.021
15	Copper	mg/l	0.2	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Cyanide	mg/l	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	.....	60	57	62.2	90.8	57.6	93.8	92.8	52.4	95	87.6	56.3	91.8

ANNEXURE V

R.O. water analysis report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd.
(Period: October'23 - March'24)

Month					Jan.'24											
S. No.	Parameter	Unit	Onshore Discharge Standards	CPCB Limit for Discharge	GGS-01 RO			EDD-50 RO			EDH-64 RO			EDN-99 RO		
					Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject
1	pH		5.5-9.0	5.5 to 9.0	8.41	8.36	8.39	8.37	8.30	8.44	8.35	7.96	8.40	8.34	7.88	8.38
2	Temperature	deg. C	40 deg. C		26.5°C	23.3°C	24.6°C	25.2°C	24.3°C	20.9°C	21.1°C	22.8°C	19.6°C	26.1°C	19.2°C	25.9°C
3	Suspended Solids	mg/l	100	100	4	<2	6	3	<2	6	5	<2	8	5	2	7
4	Total Dissolved Solids	mg/l	2100	---	3108	1332	3692	3350	1220	4382	6622	916	9174	6944	1658	9456
5	Chlorides	mg/l	600	---	1012	188	1315	1148	422	1490	3035	518	4165	4210	596	4615
6	Sulphates	mg/l	1000	---	6.2	4.6	7.3	6.1	4.6	7.5	9.6	4.5	10.4	7.6	5	9.2
7	BOD, 3 Days at 27ºC	mg/l	30	30	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	2
8	COD	mg/l	100	250	<8	<8	<8	<8	<8	<8	<8	<8	8.0	8.0	<8	9.0
9	Oil & Grease	mg/l	10	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
10	Phenolic Compounds	mg/l	1.2	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	2	0.91	0.62	0.97	1.18	0.79	1.43	1.51	0.53	1.64	1.17	0.93	1.46
13	Total Chromium	mg/l	1	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	5	0.016	<0.01	0.012	0.019	0.012	0.023	0.012	<0.01	0.018	0.022	0.015	0.028
15	Copper	mg/l	0.2	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Cyanide	mg/l	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	.....	98.2	59	98.2	98.8	54.3	98.4	96.3	56.6	96.4	88.6	58.9	92.7

ANNEXURE V

R.O. water analysis report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd.
(Period: October'23 - March'24)

Month					Feb.'24											
S. No.	Parameter	Unit	Onshore Discharge Standards	CPCB Limit for Discharge	GGS-01 RO			EDD-50 RO			EDH-64 RO			EDN-99 RO		
					Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject
1	pH		5.5-9.0	5.5 to 9.0	7.64	7.81	7.95	7.11	7.38	7.72	7.68	7.42	7.91	6.93	7.50	7.88
2	Temperature	deg. C	40 deg. C		25.8°C	26.9°C	25.8°C	28.1°C	27.7°C	27.5°C	27.6°C	26.9°C	27.8°C	30.0°C	27.9°C	29.9°C
3	Suspended Solids	mg/l	100	100	<2	<2	6	2	<2	5	3	<2	4	5	<2	8
4	Total Dissolved Solids	mg/l	2100	---	3032	908	4540	3176	1128	4966	6940	1092	9476	6102	1214	8034
5	Chlorides	mg/l	600	---	1086	405	1840	1260	398	2074	1830	380	2570	1570	425	2160
6	Sulphates	mg/l	1000	---	6.8	5.1	7.7	4.1	<2.5	5.1	4.9	<2.5	5.6	6.9	<2.5	7.5
7	BOD, 3 Days at 27ºC	mg/l	30	30	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
8	COD	mg/l	100	250	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
9	Oil & Grease	mg/l	10	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
10	Phenolic Compounds	mg/l	1.2	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	2	0.89	0.38	0.97	0.55	0.38	0.63	0.59	0.38	0.64	0.61	0.43	0.72
13	Total Chromium	mg/l	1	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	5	0.011	<0.01	0.014	0.014	<0.01	0.016	0.018	0.014	0.020	0.015	<0.01	0.018
15	Copper	mg/l	0.2	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Cyanide	mg/l	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	.....	98	58.26	98.70	97.6	53.39	98.4	96	58.79	97	86.8	57.08	87.7

ANNEXURE V

R.O. water analysis report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Ltd.
(Period: October'23 - March'24)

Month					March'24											
S. No.	Parameter	Unit	Onshore Discharge Standards	CPCB Limit for Discharge	GGS-01 RO			EDD-50 RO			EDH-64 RO			EDN-99 RO		
					Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject	Inlet	Outlet	Reject
1	pH		5.5-9.0	5.5 to 9.0	7.93	7.76	7.98	7.45	7.82	7.91	7.62	7.50	7.82	7.95	7.62	7.40
2	Temperature	deg. C	40 deg. C		27.4°C	26.4°C	25.8°C	28.4°C	26.1°C	27.1	28.0°C	27°C	26.7°C	25.8°C	26.9°C	25.8°C
3	Suspended Solids	mg/l	100	100	<2	<2	<2	3	<2	6	<2	<2	5	3	<2	7
4	Total Dissolved Solids	mg/l	2100	---	3030	1432	3874	2340	1340	3126	5504	1146	9690	5162	1298	7858
5	Chlorides	mg/l	600	---	810	307	920	710	412	830	1950	380	2622	1380	382	2115
6	Sulphates	mg/l	1000	---	5.2	<2.5	6.1	6.0	3.8	7.1	4.3	3.0	5.7	6.9	4.2	7.8
7	BOD, 3 Days at 27ºC	mg/l	30	30	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
8	COD	mg/l	100	250	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
9	Oil & Grease	mg/l	10	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
10	Phenolic Compounds	mg/l	1.2	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
11	Sulphides	mg/l	2	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Fluorides	mg/l	1.5	2	0.69	0.41	0.73	0.6	0.38	0.69	0.50	0.37	0.59	0.73	0.50	0.83
13	Total Chromium	mg/l	1	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Zinc	mg/l	0.1	5	0.015	0.011	0.018	0.014	<0.01	0.019	0.016	0.011	0.02	0.014	<0.01	0.017
15	Copper	mg/l	0.2	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Nickel	mg/l	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Lead	mg/l	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	Mercury	mg/l	0.01	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Cyanide	mg/l	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20	Hexavalent Chromium	mg/l	0.1	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	% Sodium	mg/l	60	.....	94.3	53.4	94.5	91.4	55.4	92.4	92.8	59	98.1	97	54.1	97.10

ANNEXURE VI

Surface Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Period: October'23 - March'24)

Annexure VI

Month				Oct-23								Nov-23							
S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	GGS #001 (R,O- Discharge)	Kunur Nala Upstream Near GGS #001	EDD # 50 (R,O- Discharge)	Kunur Nala Downstream between EDH 58 & 64	EDH-64 (R,O Discharge)	RLI - AKANDARA	Kunur Nala Downstream Near Kajdiha Bridge	EDN #099(R,O Discharge)	GGS #001 (R,O- Discharge)	Kunur Nala Upstream Near GGS #001	EDD # 50 (R,O- Discharge)	Kunur Nala Downstream between EDH 58 & 64	EDH-64 (R,O Discharge)	RLI - AKANDARA	Kunur Nala Downstream Near Kajdiha Bridge	EDN #099(R,O Discharge)
1	pH	---	5.5 to 9.0	8,49	8,34	8,47	8,11	8,36	8,36	7,96	8,06	8,36	7,98	8,45	8,01	7,86	7,97	7,73	7,91
2	Temperature	°C	---	32,6°C	33,0°C	31,7°C	31,2°C	30,6°C	34,2°C	31,8°C	29,9°C	28,3°C	27,6°C	27,3°C	26,8°C	26,7°C	26,7°C	28,8°C	26,9°C
3	Total Suspended Solids	mg/l	100	<2 (BDL)	7	<2 (BDL)	4	9	14	<2 (BDL)	5	6	10	<2 (BDL)	5	<2 (BDL)	12	8	<2 (BDL)
4	Biochemical Oxygen Demand	mg/l	30	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	5,6	4,7	5	4,3	5,8	4,9	5,1	6
5	Chemical Oxygen Demand	mg/l	250	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	8	<8 (BDL)	<8 (BDL)	<8 (BDL)	8	<8 (BDL)	<8 (BDL)	<8 (BDL)	8	<8 (BDL)	<8 (BDL)
6	Oil & Grease	mg/l	10	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)
7	Phenolic Compounds (as C_6H_5OH)	mg/l	1.0	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)
8	Sulphides (as S_2)	mg/l	2.0	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)
9	Fluoride	mg/l	2.0	0,61	0,33	0,56	0,27	0,84	0,42	0,37	1,18	1,46	0,73	1,20	0,61	0,48	0,61	0,33	0,42
10	Total Chromium	mg/l	2.0	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
11	Zinc	mg/l	5.0	0,019	0,012	0,024	0,018	0,013	0,011	0,015	0,028	0,017	0,011	0,023	0,015	0,019	0,024	0,011	0,014
12	Copper	mg/l	3.0	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
13	Nickel	mg/l	3.0	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
14	Lead	mg/l	0.1	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)
15	Mercury	mg/l	0.01	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)
16	Cyanide	mg/l	0.2	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)
17	Hexavalent Chromium	mg/l	0.1	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)
18	Nitrate Nitrogen(as N)	mg/l	10	0,99	1,03	1,45	0,72	0,96	0,29	0,43	1,55	3,30	0,20	2,86	0,61	<0,05	7,47	7,29	<0,05
19	Vanadium	mg/l	0.2	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)
20	Iron	mg/l	3	0,18	0,94	0,26	0,55	0,81	1,24	0,33	0,70	0,42	0,53	0,16	0,62	0,23	0,84	0,32	0,15
21	Manganese	mg/l	2	<0,05 (BDL)	0,058	<0,05 (BDL)	<0,05 (BDL)	0,055	0,068	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	0,057	<0,05 (BDL)	<0,05 (BDL)
22	Dissolved Phosphate	mg/l	5.0	0,14	0,06	0,11	0,07	0,14	0,04	0,06	0,18	0,12	0,05	0,10	0,07	0,12	0,06	0,09	0,10
23	Selenium	mg/l	0.05	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)
24	Cadmium(as Cd)	mg/l	2	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)
25	Total Arsenic (as As)	mg/l	0.2	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)
26	Free Ammonia(as NH3)	mg/l	5.0	0,39	0,31	0,29	0,12	0,44	0,34	0,10	0,17	0,23	0,11	0,15	0,12	0,04	0,14	0,04	0,04
27	Total Kjeldahl Nitrogen (as N)	mg/l	100	3,9	4,5	2,8	3,4	4,9	5	3,3	4,0	2,8	3,1	1,6	3,7	2,0	4,1	2,9	2,4
28	Ammoniacal Nitrogen(as N)	mg/l	50	2,8	3,1	1,9	2	3,7	2,8	1,9	2,8	1,9	2,2	1	2,4	1,1	2,7	1,2	1,1
29	Total Residual Chlorine	mg/l	1.0	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)
30	Colour	Hazen Uni	Colourless	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)
31	Odour		Odourless	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable

Surface Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Period: October'23 - March'24)

Annexure VI

Month				Dec-23								Jan-24							
S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	GGS #001 (R,O- Discharge)	Kunur Nala Upstream Near GGS #001	EDD # 50 (R,O- Discharge)	Kunur Nala Downstream between EDH 58 & 64	EDH-64 (R,O Discharge)	RLI - AKANDARA	Kunur Nala Downstream Near Kuldiha Bridge	EDN #099(R,O Discharge)	GGS #001 (R,O- Discharge)	Kunur Nala Upstream Near GGS #001	EDD # 50 (R,O- Discharge)	Kunur Nala Downstream between EDH 58 & 64	EDH-64 (R,O Discharge)	RLI - AKANDARA	Kunur Nala Downstream Near Kuldiha Bridge	EDN #099(R,O Discharge)
1	pH	---	5.5 to 9.0	8,48	7,92	8,51	8,43	7,86	7,74	7,52	7,91	8,25	8,30	8,40	8,32	7,98	8,02	7,86	8,28
2	Temperature	°C	---	27,1°C	25,7°C	26,0°C	18,7°C	23,2°C	24,4°C	25,4°C	26,6°C	25,1°C	20,9°C	24,9°C	22,2°C	18,8°C	20,1°C	20,7°C	20,2°C
3	Total Suspended Solids	mg/l	100	<2 (BDL)	<2 (BDL)	<2 (BDL)	11	2	14	9	4	3	<2 (BDL)	<2 (BDL)	4	8	3	<2 (BDL)	6
4	Biochemical Oxygen Demand	mg/l	30	<2 (BDL)	<2 (BDL)	<2 (BDL)	2	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)
5	Chemical Oxygen Demand	mg/l	250	<8 (BDL)	<8 (BDL)	<8 (BDL)	9	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)
6	Oil & Grease	mg/l	10	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)
7	Phenolic Compounds (as C_6H_5OH)	mg/l	1.0	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)
8	Sulphides (as S_2)	mg/l	2.0	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)
9	Fluoride	mg/l	2.0	0,61	0,49	0,57	0,74	0,69	0,45	0,61	0,75	0,80	0,49	1,06	0,66	0,41	0,56	0,80	0,61
10	Total Chromium	mg/l	2.0	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
11	Zinc	mg/l	5.0	0,018	0,012	0,015	0,019	0,019	0,024	0,019	0,014	0,015	0,011	0,017	0,022	0,018	0,015	0,012	0,017
12	Copper	mg/l	3.0	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
13	Nickel	mg/l	3.0	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
14	Lead	mg/l	0.1	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)
15	Mercury	mg/l	0.01	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)
16	Cyanide	mg/l	0.2	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)
17	Hexavalent Chromium	mg/l	0.1	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)
18	Nitrate Nitrogen(as N)	mg/l	10	2,49	4,30	1,82	0,84	1,70	1,63	3,40	2,05	1,49	0,93	0,75	1,62	0,63	0,45	0,73	0,37
19	Vanadium	mg/l	0.2	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)
20	Iron	mg/l	3	0,39	0,50	0,42	0,88	0,24	1,05	0,65	0,71	0,33	0,21	0,26	0,47	0,68	0,55	0,38	0,47
21	Manganese	mg/l	2	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	0,058	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
22	Dissolved Phosphate	mg/l	5.0	0,08	0,11	0,15	0,19	0,10	0,18	0,14	0,08	0,07	0,10	0,09	0,05	0,11	0,07	0,06	0,013
23	Selenium	mg/l	0.05	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)
24	Cadmium(as Cd)	mg/l	2	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)
25	Total Arsenic (as As)	mg/l	0.2	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)
26	Free Ammonia(as NH3)	mg/l	5.0	0,17	0,10	0,43	0,42	0,08	0,09	0,04	0,08	0,23	0,16	0,24	0,11	0,10	0,05	0,06	0,22
27	Total Kjeldahl Nitrogen (as N)	mg/l	100	2,2	3,6	4,0	5,7	3,3	4,6	2,9	2,6	3,3	2,8	3,9	2,2	4,0	1,8	2,3	3,4
28	Ammoniacal Nitrogen(as N)	mg/l	50	1,2	2,4	3,1	3,8	2,1	3	1,8	1,9	2,3	1,6	2	1,1	1,9	1,0	1,4	2,2
29	Total Residual Chlorine	mg/l	1.0	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)
30	Colour	Hazen Uni	Colourless	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)
31	Odour		Odourless	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable

Surface Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Period: October'23 - March'24)

Annexure VI

Month				Feb-24								Mar-24							
S. No.	Parameter	Unit	CPCB Limit for Discharge of Environmental Pollutants (Inland surface water)	EDH-64 (R,O Discharge)	EDN #099(R,O Discharge)	Kunur Nala Downstream Near Kuldiha Bridge	EDD # 50 (R,O- Discharge)	Kunur Nala Upstream Near GGS #001	GGS #001 (R,O- Discharge)	RLI - AKANDARA	Kunur Nala Downstream between EDH 58 & 64	GGS #001 (R,O- Discharge)	Kunur Nala Upstream Near GGS #001	EDD # 50 (R,O- Discharge)	Kunur Nala Downstream between EDH 58 & 64	EDH-64 (R,O Discharge)	RLI - AKANDARA	Kunur Nala Downstream Near Kuldiha Bridge	EDN #099(R,O Discharge)
1	pH	---	5.5 to 9.0	8,31	8,22	8,02	7,91	8,34	8,29	8,40	8,25	8,15	8,30	8,39	8,19	8,34	8,09	8,22	8,11
2	Temperature	°C	---	26,3°C	27,9°C	26,4°C	27,8°C	25,2°C	27,8°C	27,5°C	27,2°C	27,3°C	26,1°C	25,9°C	29,2°C	26,4°C	26,2°C	30,3°C	25,5°C
3	Total Suspended Solids	mg/l	100	4	<2 (BDL)	3	<2 (BDL)	8	<2 (BDL)	6	<2 (BDL)	4	<2 (BDL)	3	6	9	<2 (BDL)	7	3
4	Biochemical Oxygen Demand	mg/l	30	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)
5	Chemical Oxygen Demand	mg/l	250	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)	<8 (BDL)
6	Oil & Grease	mg/l	10	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)
7	Phenolic Compounds (as C_6H_5OH)	mg/l	1.0	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)	<0,002 (BDL)
8	Sulphides (as S_2)	mg/l	2.0	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)	<0,5 (BDL)
9	Fluoride	mg/l	2.0	0,80	0,61	0,91	0,37	0,43	0,81	0,58	0,7	0,44	0,63	0,39	0,51	0,38	0,64	0,80	0,48
10	Total Chromium	mg/l	2.0	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
11	Zinc	mg/l	5.0	0,019	0,012	0,01	<0,01	0,017	0,014	<0,01	0,016	0,016	0,011	0,019	0,012	0,019	0,016	0,012	0,022
12	Copper	mg/l	3.0	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
13	Nickel	mg/l	3.0	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
14	Lead	mg/l	0.1	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)
15	Mercury	mg/l	0.01	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)	<0,001 (BDL)
16	Cyanide	mg/l	0.2	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)
17	Hexavalent Chromium	mg/l	0.1	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)
18	Nitrate Nitrogen(as N)	mg/l	10	1,32	0,48	1,04	0,96	2,1	1,64	1,83	1,22	1,40	2,68	2,15	1,02	0,85	1,25	1,89	0,62
19	Vanadium	mg/l	0.2	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)
20	Iron	mg/l	3	0,57	0,26	0,46	0,19	0,94	0,30	0,68	0,29	0,61	0,33	0,52	0,70	0,85	0,35	0,64	0,41
21	Manganese	mg/l	2	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)	<0,05 (BDL)
22	Dissolved Phosphate	mg/l	5.0	0,09	0,11	0,06	0,04	0,08	0,14	0,09	0,14	0,09	0,11	0,06	0,13	0,17	0,09	0,11	0,06
23	Selenium	mg/l	0.05	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)	<0,005 (BDL)
24	Cadmium(as Cd)	mg/l	2	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)	<0,02 (BDL)
25	Total Arsenic (as As)	mg/l	0.2	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)	<0,01 (BDL)
26	Free Ammonia(as NH3)	mg/l	5.0	0,21	0,10	0,05	0,10	0,18	0,15	0,23	0,23	0,17	0,19	0,14	0,16	0,24	0,17	0,23	0,16
27	Total Kjeldahl Nitrogen (as N)	mg/l	100	3,3	2,5	1,9	4,0	3,0	2,4	2,8	3,7	3,6	4,8	2,2	2,7	3,5	4,1	5,3	3,7
28	Ammoniacal Nitrogen(as N)	mg/l	50	2,1	1,2	1	2,4	1,8	1,5	1,9	2,3	2,1	1,9	1,2	2	2,4	2,9	3,2	21,6
29	Total Residual Chlorine	mg/l	1.0	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)	<0,1 (BDL)
30	Colour	Hazen Uni	Colourless	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)	<5 (BDL)
31	Odour		Odourless	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable

ANNEXURE VII

Ground Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Period: October'23 - March'24)

Annexure VII

Date of Sampling					22.11.2023	22.11.2023	22.11.2023	22.11.2023	22.11.2023	22.11.2023
Sample Identification Number					GW-338-2023	GW-339-2023	GW-340-2023	GW-341-2023	GW-342-2023	GW-343-2023
Latitude & Longitude					Lat:23°30'03.1"N, Long:87°23'56.1"E	Lat:23°31'31.4"N, Long:87°24'59.4"E	Lat:23°34'59.3"N, Long:87°24'27.0"E	Lat:23°35'12.3"N, Long:87°24'55.5"E	Lat:23°36'97.3"N, Long:87°23'43.2"E	Lat:23°36'49"N, Long:87°22'18"E
S. No.	Parameter	Drinking Water Specification(Second Revision)-IS:10500 -2012 and Amendment No. 4 November 2021		Method of Analysis	Gopalpur near House of Manik Mondal Tubewell	Sarenga Village near Sarenga Primary School Tubewell	Ghatakdanga Village near Atchala Tubewell	Saraswatiganj village near Hari Mandir Tubewell	Jatgoria Village (Near House of Sk Niashar) Tubewell	Kantaberia Village(Near Gopalpur Mandir) Tubewell
		Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source							
1	Colour, Hazen Units	5	15	APHA 23rd Edition, 2120 B	<5	<5	<5	<5	<5	<5
2	pH Value	6.5-8.5	No relaxation	APHA 23rd Edition, 4500-H+ B	6.81	6.75	6.6	6.92	6.69	6.94
3	Turbidity, NTU	1	5	APHA 23rd Edition, 2130B	4.8	3	3.5	<1	2.1	3.9
4	Total Dissolved Solids, mg/l	500	2000	APHA 23rd Edition, 2540 C	162	256	48	36	86	104
5	Total Suspended Solids, mg/l	---	---	APHA 23rd Edition, 2540 D	4	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	17
6	Aluminium (as Al), mg/l	0.03	0.2	APHA 23rd Edition, 3500 –Al B	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)
7	Ammonia (as total ammonia -N), mg/l	0.5	No relaxation	APHA 23rd Edition, 4500-NH_3 F	0.19	0.18	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)
8	Anionic Detergents (as MBAS), mg/l	0.2	1	APHA 23rd Edition, 5540 C	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)
9	Barium (as Ba), mg/l	0.7	No relaxation	APHA 23rd Edition, 3111 D	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)
10	Boron (as B), mg/l	0.5	1.0	APHA 23rd Edition, 4500-B C	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)
11	Calcium (as Ca), mg/l	75	200	APHA 23rd Edition, 3500-Ca B	26	58	11	5	22	19
12	Chloride (as Cl), mg/l	250	1000	APHA 23rd Edition, 4500 –Cl¯B	45	31	8	6	16	23
13	Copper (as Cu), mg/l	0.05	1.5	APHA 23rd Edition, 3111 B	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)
14	Fluoride (as F), mg/l	1	1.5	APHA 23rd Edition, 4500 –F¯D	0.08	0.15	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)
15	Free Residual Chlorine ,mg/l	0.2	1	IS 3025 (Part 26)-1986	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL))
16	Iron (as Fe), mg/l	1	No relaxation	APHA 23rd Edition, 3500-Fe B	1.55	0.37	0.41	0.19	0.36	2.68
17	Magnesium (as Mg), mg/l	30	100	APHA 23rd Edition, 3500-Mg B	2	15	<2 (BDL)	2	2	6
18	Manganese (as Mn), mg/l, Max.	0.1	0.3	APHA 23rd Edition, 3111 B	0.058	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	0.093
19	Mineral Oil, mg/l, Max	1	No relaxation	IS 3025 (Part 39):1991	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)
20	Nitrate (as NO_3), mg/l	45	No relaxation	APHA 23rd Edition, 4500-NO_3 -B	6.04	3.59	2.39	4.3	2.26	<0.5 (BDL)
21	Phenolic Compounds (as C_6H_5OH) ,mg/l	0.001	0.002	APHA 23rd Edition, 5530 C	<0.002 (BDL)	<0.002 (BDL)	<0.002 (BDL)	<0.002 (BDL)	<0.002 (BDL)	<0.002 (BDL)
22	Sulphate (as SO_4), mg/l, Max.	200	400	APHA 23rd Edition, 4500-SO_4^{2-}E	21.7	<2.5 (BDL)	<2.5 (BDL)	<2.5 (BDL)	<2.5 (BDL)	<2.5 (BDL)
23	Silver (as Ag), mg/l	0.1	No relaxation	APHA 23rd Edition, 3114 B	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)
24	Sodium (as Na), mg/l	---	---	APHA 23rd Edition, 3500 –Na B	48	32	5	4	11	15
25	Selenium (as Se), mg/l	0.01	No relaxation	APHA 23rd Edition, 3114 C	<0.005 (BDL)	<0.005 (BDL)	<0.005 (BDL)	<0.005 (BDL)	<0.005 (BDL)	<0.005 (BDL)
26	Cadmium (as Cd), mg/l	0.003	No relaxation	APHA 23rd Edition, 3111 B	<0.003 (BDL)	<0.003 (BDL)	<0.003 (BDL)	<0.003 (BDL)	<0.003 (BDL)	<0.003 (BDL)
27	Cyanide (as CN), mg/l	0.05	No relaxation	APHA 23rd Edition, 4500 –CN¯E	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)
28	Lead (as Pb), mg/l	0.01	No relaxation	APHA 23rd Edition, 3111 B	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)
29	Mercury (as Hg), mg/l	0.001	No relaxation	APHA 23rd Edition, 3112 B	<0.001 (BDL)	<0.001 (BDL)	<0.001 (BDL)	<0.001 (BDL)	<0.001 (BDL)	<0.001 (BDL)
30	Total Arsenic (as As), mg/l	0.01	No relaxation	APHA 23rd Edition, 3114 C	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)
31	Polynuclear aromatic hydrocarbons (as PAH), mg/l	0.0001	No relaxation	APHA 23rd Edition, 6440 B	<0.0001 (BDL)	<0.0001 (BDL)	<0.0001 (BDL)	<0.0001 (BDL)	<0.0001 (BDL)	<0.0001 (BDL)
32	Pesticide Residues,µg/l	0.01	No relaxation	APHA 23rd Edition, 6630 B&C	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)
33	Total Coliform Count, MPN/100 ml	Shall not be detectable in any 100 ml sample		IS 1622 : 1981 (Reaffirmed 2009)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)
34	Odour	Agreeable	Agreeable	IS: 3025 (Part 5) - 1983	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
35	Polychlorinated Biphenyls, mg/l	0.0005	No relaxation	APHA 23rd Edition, 6630	Not Detectable	Not Detectable	Not Detectable	Not Detectable	Not Detectable	Not Detectable
36	Chloramines,mg/l	4	No relaxation	APHA 23rd Edition, 4500 Cl G	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)
37	Molybdenum,mg/l	0.07	No relaxation	APHA 23rd Edition, 3111 D	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)
38	Sulphide,mg/l	0.05	No relaxation	APHA 23rd Edition, 4500-S^{2-} F	<0.5 (BDL)	<0.5 (BDL)	<0.5 (BDL)	<0.5 (BDL)	<0.5 (BDL)	<0.5 (BDL)
39	Electrical Conductivity at 25° C, µmhos/cm	---	---	APHA 23rd Edition, 2510 B	.	441	80	61	149	172
40	Phosphorus(as P), mgl	---	---	APHA 23rd Edition, 4500 P D	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)
41	Nickel, mg/l	0.02	No relaxation	APHA 23rd Edition, 3111 B	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)
42	Total Chromium,mg/l	0.05	No relaxation	APHA 23rd Edition, 3111 B	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)
43	Zinc,mg/l	5	15	APHA 23rd Edition, 3111 B	0.013	0.016	<0.01	<0.01	<0.01	0.015
44	Total Alkalinity as $CaCO_3$ mg/l	200	600	APHA 23rd Edition, 2320 B	40	176	36	16	52	60
45	Total Hardness,mg/l	200	600	APHA 23rd Edition, 2340 C	72	204	32	20	60	72

Ground Water Analysis Report of CBM Raniganj Project of Essar Oil and Gas Exploration and Production Limited
(Period: October'23 - March'24)

Annexure VII

Date of Sampling					22.11.2023	22.11.2023	22.11.2023	22.11.2023	22.11.2023	22.11.2023	22.11.2023
Sample Identification Number					GW-344-2023	GW-345-2023	GW-346-2023	GW-347-2023	GW-348-2023	GW-349-2023	GW-350-2023
Latitude & Longitude					Lat:23°37'15.4"N, Long:87°21'48.9"E	Lat:23°35'15.19"N, Long:87°22'08.5"E	Lat:23°36'97.3"N, Long:87°22'23.9"E	Lat:23°34'27.0"N, Long:87°23'00.1"E	Lat:23°37'46.6"N, Long:87°20'15.7"E	Lat:23°37'34.6"N, Long:87°19'00.1"E	Lat:23°36'38.4"N, Long:87°20'09.0"E
S. No.	Parameter	Drinking Water Specification(Second Revision)-IS:10500 -2012 and Amendment No. 4 November 2021		Method of Analysis	Bargoria Village near EDD-003 Bauri Para Tubewell	Dhabani Village near house of Sapan Bauri house Tubewell	Labnapara village near house of Sunil Kisku Tubewell	Akandara Village Near Adibasi Para (House of Kishor Soren)	Kalikapur Village near Durga Mandir Tubewell	Bansia Village near ICDS Washpara Tubewell	Nachan Village near House of Arup Ghatak Tubewell
		Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source								
1	Colour, Hazen Units	5	15	APHA 23rd Edition, 2120 B	<5	<5	<5	<5	<5	<5	<5
2	pH Value	6.5-8.5	No relaxation	APHA 23rd Edition, 4500-H+ B	6.58	7.02	6.61	6.78	6.9	7.03	6.84
3	Turbidity, NTU	1	5	APHA 23rd Edition, 2130B	4.6	3	2.8	4.1	4.8	3.9	4.4
4	Total Dissolved Solids, mg/l	500	2000	APHA 23rd Edition, 2540 C	30	42	284	62	354	336	544
5	Total Suspended Solids, mg/l	---	---	APHA 23rd Edition, 2540 D	2	<2 (BDL)	<2 (BDL)	3	11	<2 (BDL)	2
6	Aluminium (as Al), mg/l	0.03	0.2	APHA 23rd Edition, 3500 –Al B	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)
7	Ammonia (as total ammonia -N), mg/l	0.5	No relaxation	APHA 23rd Edition, 4500-NH_3 F	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	0.48	<0.01 (BDL)	<0.01 (BDL)
8	Anionic Detergents (as MBAS), mg/l	0.2	1	APHA 23rd Edition, 5540 C	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)
9	Barium (as Ba), mg/l	0.7	No relaxation	APHA 23rd Edition, 3111 D	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)
10	Boron (as B), mg/l	0.5	1.0	APHA 23rd Edition, 4500-B C	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)
11	Calcium (as Ca), mg/l	75	200	APHA 23rd Edition, 3500-Ca B	3	6	53	8	63	42	87
12	Chloride (as Cl), mg/l	250	1000	APHA 23rd Edition, 4500 –Cl^- B	4	6	41	10	139	133	72
13	Copper (as Cu), mg/l	0.05	1.5	APHA 23rd Edition, 3111 B	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)
14	Fluoride (as F), mg/l	1	1.5	APHA 23rd Edition, 4500 –F^- D	<0.05 (BDL)	<0.05 (BDL)	0.18	<0.05 (BDL)	<0.05 (BDL)	0.21	0.27
15	Free Residual Chlorine ,mg/l	0.2	1	IS 3025 (Part 26)-1986	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)
16	Iron (as Fe), mg/l	1	No relaxation	APHA 23rd Edition, 3500-Fe B	0.72	0.55	0.47	1.92	2.65	0.74	0.99
17	Magnesium (as Mg), mg/l	30	100	APHA 23rd Edition, 3500-Mg B	2	3	20	4	7	17	27
18	Manganese (as Mn), mg/l, Max.	0.1	0.3	APHA 23rd Edition, 3111 B	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	0.061	0.093	<0.05 (BDL)	<0.05 (BDL)
19	Mineral Oil, mg/l, Max	1	No relaxation	IS 3025 (Part 39):1991	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)	<1 (BDL)
20	Nitrate (as NO_3), mg/l	45	No relaxation	APHA 23rd Edition, 4500-NO_3 -B	4.65	4.87	19.5	2.08	12.5	<0.5	3.23
21	Phenolic Compounds (as C_6H_5OH) ,mg/l	0.001	0.002	APHA 23rd Edition, 5530 C	<0.002 (BDL)	<0.002 (BDL)	<0.002 (BDL)	<0.002 (BDL)	<0.002 (BDL)	<0.002 (BDL)	<0.002 (BDL)
22	Sulphate (as SO_4), mg/l, Max.	200	400	APHA 23rd Edition, 4500-SO_4^{2-} E	<2.5 (BDL)	<2.5 (BDL)	<2.5 (BDL)	<2.5 (BDL)	7	7.3	11.5
23	Silver (as Ag), mg/l	0.1	No relaxation	APHA 23rd Edition, 3114 B	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)
24	Sodium (as Na), mg/l	---	---	APHA 23rd Edition, 3500 –Na B	2	4	27	8	91	87	49
25	Selenium (as Se), mg/l	0.01	No relaxation	APHA 23rd Edition, 3114 C	<0.005 (BDL)	<0.005 (BDL)	<0.005 (BDL)	<0.005 (BDL)	<0.005 (BDL)	<0.005 (BDL)	<0.005 (BDL)
26	Cadmium (as Cd), mg/l	0.003	No relaxation	APHA 23rd Edition, 3111 B	<0.003 (BDL)	<0.003 (BDL)	<0.003 (BDL)	<0.003 (BDL)	<0.003 (BDL)	<0.003 (BDL)	<0.003 (BDL)
27	Cyanide (as CN), mg/l	0.05	No relaxation	APHA 23rd Edition, 4500 –CN^- E	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)
28	Lead (as Pb), mg/l	0.01	No relaxation	APHA 23rd Edition, 3111 B	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)
29	Mercury (as Hg), mg/l	0.001	No relaxation	APHA 23rd Edition, 3112 B	<0.001 (BDL)	<0.001 (BDL)	<0.001 (BDL)	<0.001 (BDL)	<0.001 (BDL)	<0.001 (BDL)	<0.001 (BDL)
30	Total Arsenic (as As), mg/l	0.01	No relaxation	APHA 23rd Edition, 3114 C	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)
31	Polynuclear aromatic hydrocarbons (as PAH), mg/l	0.0001	No relaxation	APHA 23rd Edition, 6440 B	<0.0001 (BDL)	<0.0001 (BDL)	<0.0001 (BDL)	<0.0001 (BDL)	<0.0001 (BDL)	<0.0001 (BDL)	<0.0001 (BDL)
32	Pesticide Residues,µg/l	0.01	No relaxation	APHA 23rd Edition, 6630 B&C	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)
33	Total Coliform Count, MPN/100 ml	Shall not be detectable in any 100 ml sample		IS 1622 : 1981 (Reaffirmed 2009)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)	<2 (BDL)
34	Odour	Agreeable	Agreeable	IS: 3025 (Part 5) - 1983	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
35	Polychlorinated Biphenyls, mg/l	0.0005	No relaxation	APHA 23rd Edition, 6630	Not Detectable	Not Detectable	Not Detectable	Not Detectable	Not Detectable	Not Detectable	Not Detectable
36	Chloramines,mg/l	4	No relaxation	APHA 23rd Edition, 4500 Cl G	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)	<0.1 (BDL)
37	Molybdenum,mg/l	0.07	No relaxation	APHA 23rd Edition, 3111 D	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)
38	Sulphide,mg/l	0.05	No relaxation	APHA 23rd Edition, 4500-S^{2-} F	<0.5 (BDL)	<0.5 (BDL)	<0.5 (BDL)	<0.5 (BDL)	<0.5 (BDL)	<0.5 (BDL)	<0.5 (BDL)
39	Electrical Conductivity at 25° C, µmhos/cm	---	---	APHA 23rd Edition, 2510 B	52	75	490	105	610	575	895
40	Phosphorus(as P), mgl	---	---	APHA 23rd Edition, 4500 P D	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)	<0.01 (BDL)
41	Nickel, mg/l	0.02	No relaxation	APHA 23rd Edition, 3111 B	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)	<0.02 (BDL)
42	Total Chromium,mg/l	0.05	No relaxation	APHA 23rd Edition, 3111 B	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)	<0.05 (BDL)
43	Zinc,mg/l	5	15	APHA 23rd Edition, 3111 B	<0.01	<0.01	0.017	0.012	0.02	0.014	0.024
44	Total Alkalinity as $CaCO_3$,mg/l	200	600	APHA 23rd Edition, 2320 B	16	24	184	36	48	44	328
45	Total Hardness,mg/l	200	600	APHA 23rd Edition, 2340 C	16	28	216	36	184	172	328

ANNEXURE VIII

MEMBERSHIP CERTIFICATE

THIS IS TO CERTIFY THAT **M/S. ESSAR OIL AND GAS EXPLORATION AND PRODUCTION LIMITED** HAVING ITS UNIT AT PLOT NO. **GOPALPUR, GOPALPUR SARENGA ROAD, PS- KANKSHA, DIST- BURDWAN, WEST BENGAL 713212** IS A REGISTERED LIFETIME MEMBER OF **INTEGRATED COMMON HAZARDOUS WASTE TREATMENT STORAGE AND DISPOSAL FACILITY (ICHW-TSDF)** AT JL. 80, VILL. PABAYAN, P.S. SALTORA, DIST.- BANKURA, WEST BENGAL- 722158. OPERATED BY WEST BENGAL WASTE MANAGEMENT LTD.

THE MEMBERSHIP IS WBWML/HzW/DGPR/E- 004 AND VALID TILL 31.03.2025.

WEST BENGAL WASTE MANAGEMENT LIMITED

PROJECT HEAD

West Bengal Waste Management Limited
(A Division of Re Sustainability Limited)

Site Address:
CHW-TSDF at: Plot No.- 80,
Vill.-Pabayan, P.S.: Saltora,
Dist.- Bankura, West Bengal 722 158, India

Registered Office:
Level 11, Aurobindo Galaxy,
Hyderabad Knowledge City,
Hitech City Road, Hyderabad-500 081. India.
CIN No. U74140TG1994PLC018833

T: +91 74777 96110
E: wbwml.saltora@resustainability.com
resustainability.com

ANNEXURE IX

2nd Copy

FROM 10

WEST BENGAL WASTE MANAGEMENT LIMITED

Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158, West Bengal.

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's name and mailing address (including Phone No. and e-mail) :	ESSAR OIL AND GAS EXPLORATION AND PRODUCTION LTD VILL AND POST → MOLANDIGHI DIST → PASCHIM BURDWAN, 713212
2	Sender's authorization No. :	205/25 (H/W) - 2449/2008
3	Manifest Document No. :	1 841
4	Transporter's name and address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
5	Type of vehicle :	(Truck/Tanker/Special Vehicle)
6	Transporter's registration No. :	1-MD(E)/X/06
7	Vehicle registration No. :	WB31N 0098
8	Receiver's name and mailing address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
9	Receiver's authorization No. :	34/25 (HW) - 4531/2022
10	Waste description :	Cotton waste
11	Total quantity No of Containers :	1.500 (TON) .....m3 or MT .....Nos.
12	Physical form :	(Solid/Semi-Solid/Sludge/Oily/Tarry/Slurry/Liquid)
13	Special handling instructions and additional information :	used Proper PPE. Chemical gloves, Safety shoe,
14	Sender's Certificate	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping categorized, packed, marked and name and are labeled and are in all respects in proper conditions for transport by road according to applicable National Government Regulations.
	Name and Stamp	Signature Day Month Year 20/11/2023
15	Transporter acknowledgement of receipt of Wastes :	
	Name and Stamp	Signature NAM Day Month Year 20/11/2023
16	Receiver's certificate for receipt hazardous and other wastes :	
	Name and Stamp	Signature Day Month Year

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

2nd Copy

FROM 10

WEST BENGAL WASTE MANAGEMENT LIMITED

Vill, : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158, West Bengal.

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's name and mailing address (including Phone No. and e-mail) :	ESSAR OIL AND GAS EXPLORATION AND PRODUCTION LTD VILL AND POST → MOLANDIHHI DIST → PASCHIM BURDWAN . 713212
2	Sender's authorization No. :	205 | 25 (HW) - 2449 | 2008
3	Manifest Document No. :	1 842
4	Transporter's name and address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
5	Type of vehicle :	(Truck/Tanker/Special Vehicle)
6	Transporter's registration No. :	1-MD(E)/X/06
7	Vehicle registration No. :	WB 31 N 0098
8	Receiver's name and mailing address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
9	Receiver's authorization No. :	34/25 (HW) - 4531 / 2022
10	Waste description :	Waste filter
11	Total quantity No of Containers :	1.500 (TON).....m3 or MT .....Nos.
12	Physical form :	(Solid/Semi-Solid/Sludge/Oily/Tarry/Slurry/Liquid)
13	Special handling instructions and additional information :	Use Proper PPE. Chemical Hand gloves, shoe, helmet
14	Sender's Certificate	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping categorized, packed, marked and name and are labeled and are in all respects in proper conditions for transport by road according to applicable National Government Regulations.
	Name and Stamp	Signature: A.M Day 20 Month 11 Year 2023
15	Transporter acknowledgement of receipt of Wastes :	
	Name and Stamp	Signature: Nkumar Day 20 Month 11 Year 2023
16	Receiver's certificate for receipt hazardous and other wastes :	
	Name and Stamp	Signature Day Month Year

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

FROM 10

2nd Copy

WEST BENGAL WASTE MANAGEMENT LIMITED

Vill, : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158, West Bengal.

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's name and mailing address (including Phone No. and e-mail) :	ESSAR OIL AND GAS EXPLORATION AND PRODUCTION LTD VILL AND POST → MOLANDIHHJ DIST → PASCHIM BURDWAN , 713212
2	Sender's authorization No. :	205 | 25 (HW) - 2449 | 2008
3	Manifest Document No. :	1 .843
4	Transporter's name and address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
5	Type of vehicle :	(Truck/Tanker/Special Vehicle)
6	Transporter's registration No. :	1-MD(E)/X/06
7	Vehicle registration No. :	WB 31N 0098
8	Receiver's name and mailing address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
9	Receiver's authorization No. :	34/25 (HW) - 4531/2022
10	Waste description :	Membrane filter
11	Total quantity No of Containers :	1.100 (TON) .....m3 or MT .....Nos.
12	Physical form :	(Solid/Semi-Solid/Sludge/Oily/Tarry/Slurry/Liquid)
13	Special handling instructions and additional information :	Used Proper PPE. Chemical Hand gloves, Helmet, Shoe
14	Sender's Certificate	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping categorized, packed, marked and name and are labeled and are in all respects in proper conditions for transport by road according to applicable National Government Regulations.
	Name and Stamp	Signature Day Month Year: 2 0 | 1 1 | 2 0 2 3
15	Transporter acknowledgement of receipt of Wastes :	
	Name and Stamp	Signature Day Month Year: 2 0 | 1 1 | 2 0 2 3
16	Receiver's certificate for receipt hazardous and other wastes :	
	Name and Stamp	Signature Day Month Year: | | | | | | | |

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

FORM 10

[See rule 19 (1)]

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1.	Sender's name and mailing address (including Phone No. and e-mail)		Essar oil and gas Exploration and production ltd Village and Post - Malandighi Pin-713212
2.	Sender's authorisation No.	:	205/25(HW)-2449/2008
3.	Manifest Document No.	:	
4.	Transporter's name and address: (including Phone No. and e-mail)		TEXSUS LUB Delhi Road, Rishra, P.O.-Mollarber, P.S. Dankuni Dist-Hughly. Pin-712250
5.	Type of vehicle	:	(Truck / Tanker / Special Vehicle)
6.	Transporter's registration No.	:	03/25(HW)-3591/2019
7.	Vehicle registration No.	:	WB19L 8202, WB11F 2813
8.	Receiver's name and mailing address (including Phone No. and e-mail)	:	TEXSUS LUB Delhi Road, Rishra, P.O. Mollarber P.S. Dankuni, Dist- Hughly Pin-712250
9.	Receiver's authorisation No.	:	03/25(HW)-3591/2019
10.	Waste description	:	used oil
11.	Total quantity No. of Containers	: :	12000 LTR .....m³ or MT 60 DRUMS .....Nos.
12.	Physical form	:	(Solid / Semi-Solid / Sludge / Oily / Tarry / Slurry / Liquid)
13.	Special handling instructions and additional information	:	Handle with care
14.	Sender's Certificate	:	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labelled, and are in all respects in proper conditions for transport by road according to applicable national government regulations.
	Name and stamp : ESSAR OIL AND GAS EXPLORATION AND PRODUCTION LIMITED CBM PROJECTS DURGAPUR	Signature :	Month: 12 Day: 26 Year: 2023
15.	Transporter acknowledgment of receipt of Wastes		
	Name and stamp : Jayanta Dhali	Signature : TEXSUS LUB P.O.-Mollarber Dist-Hooghly-712 250	Month: 12 Day: 26 Year: 2023
16.	Receiver's certification for receipt of hazardous and other waste		
	Name and stamp :	Signature :	Month: Day: Year:

FORM 10

[See rule 19 (1)]

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1.	Sender's name and mailing address (including Phone No. and e-mail)		Essar oil and gas Exploration and Production ltd Village Post - Mollarber, 713212
2.	Sender's authorisation No.	:	205/25 (H/W)-2449/2008
3.	Manifest Document No.	:	
4.	Transporter's name and address: (including Phone No. and e-mail)		TEXSUS LUB Delhi Road, Rishra, P.O. Mollarber, P.S. Dankuni Dist-Hooghly. Pin-712250
5.	Type of vehicle	:	(Truck / Tanker / Special Vehicle)
6.	Transporter's registration No.	:	03/25(HW)-3591/2019
7.	Vehicle registration No.	:	WB19L 8202
8.	Receiver's name and mailing address (including Phone No. and e-mail)	:	TEXSUS LUB Delhi Road, Rishra, P.O. Mollarber P.S. Dankuni, Dist-Hughly. Pin-712250
9.	Receiver's authorisation No.	:	03/25(HW)-3591/2019
10.	Waste description	:	used oil
11.	Total quantity No. of Containers	: :	3400 LTR ..... m^3 or MT 17 Drums ..... Nos.
12.	Physical form	:	(Solid / Semi-Solid / Sludge / Oily / Tarry / Slurry / Liquid) ✓
13.	Special handling instructions and additional information	:	Handle with care
14.	Sender's Certificate	:	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labelled, and are in all respects in proper conditions for transport by road according to applicable national government regulations.
	Name and stamp : ESSAR OIL AND GAS EXPLORATION AND PRODUCTION LIMITED DURGAPUR CBM PROJECTS	Signature :	Month 12 Day 28 Year 2023
15.	Transporter acknowledgment of receipt of Wastes		
	Name and stamp : Jayanta Dhali	Signature : P.O.-Mollarber Dist-Hooghly-712 250	Month Day Year
16.	Receiver's certification for receipt of hazardous and other waste		
	Name and stamp :	Signature :	Month Day Year

FORM 10

[See rule 19 (1)]

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1.	Sender's name and mailing address (including Phone No. and e-mail)		Essaraid and gas Exploration and production Ltd Village and Post :- Molandighi, 713212
2.	Sender's authorisation No.	:	190/25(HW)-2449/2008
3.	Manifest Document No.	:	
4.	Transporter's name and address: (including Phone No. and e-mail)		TEXSUS LUB Delhi Road, Rishra, P.O. Mallarbar, P.S Dankuni Dist- Hughly. Pin-712250
5.	Type of vehicle	:	(Truck / Tanker / Special Vehicle)
6.	Transporter's registration No.	:	03/25(HW)-3591/2019
7.	Vehicle registration No.	:	WB19H 4584, WB19L 8202
8.	Receiver's name and mailing address (including Phone No. and e-mail)	:	TEXSUS LUB Delhi Road, Rishra, P.O. Mallarbar P.S Dankuni, Dist- Hughly. Pin-712250
9.	Receiver's authorisation No.	:	03/25(HW)-3591/2019
10.	Waste description	:	used oil
11.	Total quantity No. of Containers	: :	10800 LTR ..... m³ or MT 54 Drums ..... Nos.
12.	Physical form	:	(Solid / Semi-Solid / Sludge / Oily / Tarry / Slurry / Liquid)
13.	Special handling instructions and additional information	:	Handle with care
14.	Sender's Certificate	:	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labelled, and are in all respects in proper conditions for transport by road according to applicable national government regulations.
	Name and stamp :	Signature :	Month: 01 Day: 04 Year: 2024
15.	Transporter acknowledgment of receipt of Wastes		
	Name and stamp : TEXSUS LUB P.O.-Mallarbar Dist-Hooghly-712 250	Signature :	Month Day Year
16.	Receiver's certification for receipt of hazardous and other waste		
	Name and stamp :	Signature :	Month Day Year

FROM 10

2nd Copy

WEST BENGAL WASTE MANAGEMENT LIMITED

Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158, West Bengal.

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's name and mailing address (including Phone No. and e-mail) :	Essar oil and gas Exploration and production ltd Vill and Post → Malandighi Dist → Paschim Burdwan, 713212
2	Sender's authorization No. :	190/25 (HW) - 2449/2008
3	Manifest Document No. :	1 1082
4	Transporter's name and address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
5	Type of vehicle :	(Truck/Tanker/Special Vehicle)
6	Transporter's registration No. :	1-MD(E)/X/06
7	Vehicle registration No. :	WB31N0062
8	Receiver's name and mailing address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
9	Receiver's authorization No. :	34/25(HW)-4531/2022
10	Waste description :	Membrane filter
11	Total quantity No of Containers :	1.470 TON .....m3 or MT .....Nos.
12	Physical form :	(Solid/Semi-Solid/Sludge/Oily/Tarry/Slurry/Liquid)
13	Special handling instructions and additional information :	Used proper PPE, Chemical gloves, Inhalat
14	Sender's Certificate	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping categorized, packed, marked and name and are labeled and are in all respects in proper conditions for transport by road according to applicable National Government Regulations.
	Name and Stamp	Signature Day 28 Month 02 Year 2024
15	Transporter acknowledgement of receipt of Wastes :	
	Name and Stamp	Signature 28/2/24 Day Month Year
16	Receiver's certificate for receipt hazardous and other wastes :	
	Name and Stamp	Signature Day Month Year

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

FROM 10

2nd Copy

WEST BENGAL WASTE MANAGEMENT LIMITED

Vill, : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158, West Bengal.

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's name and mailing address (including Phone No. and e-mail) :	Essar oil and gas exploration and production ltd Vill and post → Malandighi Dist → Paschim burdwan, 713212
2	Sender's authorization No. :	190/25(HW)-2449/2008
3	Manifest Document No. :	1 1081
4	Transporter's name and address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
5	Type of vehicle :	(Truck/Tanker/Special Vehicle)
6	Transporter's registration No. :	1-MD(E)/X/06
7	Vehicle registration No. :	WB 31N 0062
8	Receiver's name and mailing address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
9	Receiver's authorization No. :	34/25(HH)-4531/2022
10	Waste description :	silica gel
11	Total quantity No of Containers :	1 TON .....m3 or MT .....Nos.
12	Physical form :	(Solid/Semi-Solid/Sludge/Oily/Tarry/Slurry/Liquid)
13	Special handling instructions and additional information :	used proper PPE, Chemical gloves, helmet
14	Sender's Certificate	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping categorized, packed, marked and name and are labeled and are in all respects in proper conditions for transport by road according to applicable National Government Regulations.
	Name and Stamp	Signature — Day 28 Month 02 Year 2024
15	Transporter acknowledgement of receipt of Wastes : Name and Stamp	Signature — Day Month Year
16	Receiver's certificate for receipt hazardous and other wastes : Name and Stamp	Signature — Day Month Year

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

FROM 10

2nd Copy

WEST BENGAL WASTE MANAGEMENT LIMITED

Vill, : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158, West Bengal.

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's name and mailing address (including Phone No. and e-mail) :	Essar oil and gas exploration and production ltd Vill and Post → malandighi Dist → Paschim Burdwan, 713212
2	Sender's authorization No. :	190/25(HW)-2449/2008
3	Manifest Document No. :	1 1083
4	Transporter's name and address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
5	Type of vehicle :	(Truck/Tanker/Special Vehicle)
6	Transporter's registration No. :	1-MD(E)/X/06
7	Vehicle registration No. :	WB31N0062
8	Receiver's name and mailing address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
9	Receiver's authorization No. :	34/25(HW)-4531/2022
10	Waste description :	Waste filter
11	Total quantity No of Containers :	1 TON .....m3 or MT .....Nos.
12	Physical form :	(Solid/Semi-Solid/Sludge/Oily/Tarry/Slurry/Liquid)
13	Special handling instructions and additional information :	Used Proper PPE, Chemical gloves, helmet
14	Sender's Certificate	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping categorized, packed, marked and name and are labeled and are in all respects in proper conditions for transport by road according to applicable National Government Regulations.
	Name and Stamp	Signature Day 28 Month 02 Year 2024
15	Transporter acknowledgement of receipt of Wastes :	
	Name and Stamp	Signature 26/2/24 Day Month Year
16	Receiver's certificate for receipt hazardous and other wastes :	
	Name and Stamp	Signature Day Month Year

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

FROM 10

2nd Copy

WEST BENGAL WASTE MANAGEMENT LIMITED

Vill, : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158, West Bengal.

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1	Sender's name and mailing address (including Phone No. and e-mail) :	Essar oil and gas exploration and production ltd Vill and post -> Molandighi Dist -> Paschim burdwan. 713212
2	Sender's authorization No. :	190/25 (HW) - 2449/2008
3	Manifest Document No. :	1 1080
4	Transporter's name and address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
5	Type of vehicle :	(Truck/Tanker/Special Vehicle)
6	Transporter's registration No. :	1-MD(E)/X/06
7	Vehicle registration No. :	WB 31N 0062
8	Receiver's name and mailing address (including Phone No. and e-mail)	**West Bengal Waste Management Limited** Vill. : Pabayan, P. S. : Saltora, Dist. : Bankura, Pin : 722 158 Mobile : 9002983363/7477796110 E-mail : wbwml.saltora@resustainability.com
9	Receiver's authorization No. :	34/25 (HW)- 4531/2022
10	Waste description :	cotton waste
11	Total quantity No of Containers :	1 TON .....m3 or MT .....Nos.
12	Physical form :	(Solid/Semi-Solid/Sludge/Oily/Tarry/Slurry/Liquid)
13	Special handling instructions and additional information :	used proper ppe, chemical gloves, helmet.
14	Sender's Certificate	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping categorized, packed, marked and name and are labeled and are in all respects in proper conditions for transport by road according to applicable National Government Regulations.
	Name and Stamp	Signature Day 28 Month 02 Year 2024
15	Transporter acknowledgement of receipt of Wastes :	
	Name and Stamp	Signature Day Month Year
16	Receiver's certificate for receipt hazardous and other wastes :	
	Name and Stamp	Signature Day Month Year

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

FORM 10

[See rule 19 (1)]

MANIFEST FOR HAZARDOUS AND OTHER WASTE

1.	Sender's name and mailing address (including Phone No. and e-mail)	Essar oil and gas exploration and production ltd. Vill and Post → Molandighi, 713212 DIST → Paschim Burdwan
2.	Sender's authorisation No. :	190/25(H/W)-2449/2008
3.	Manifest Document No. :	
4.	Transporter's name and address : (including Phone No. and e-mail)	Inspec Oils Limited. A/122, phase III. Block-A. Kalyani
5.	Type of Vehicle :	(Truck / Tanker / Special Vehicle)
6.	Transporter's registration No. :	182/25(HW)-2545/2009.
7.	Vehicle registration No. :	WB19K1695
8.	Receiver's name and mailing address (including Phone No. and e-mail)	Inspec Oils Limited. A/122, phase. III. Block. A. Kalyani. Nadia
9.	Receiver's authorisation No.	182/25(HW)-2545/2009.
10.	Waste description :	- Used oil -
11.	Total quantity : No. of Containers :	7200 LTR m³ or MT/ Ltrs 36 Drums Nos.
12.	Physical form :	(Solid / Semi - Solid / Sludge / Oily / Tarry / Slurry / Liquid)
13.	Special handling instructions and additional information :	Handle with Care
14.	Sender's Certificate	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked and labelled and are in all respects in proper conditions for transport by road according to applicable national government regulations.
	Name and Stamp : [Stamp: Essar Oil and Gas Exploration and Production Limited, Durgapur CBM Projects] Signature : [signature]	Month 02 Day 07 Year 2024
15.	Transporter acknowledgement of receipt of Wastes	
	Name and Stamp : Manoj Das [Stamp: Inspec Oils, Kalyani] Signature : [signature]	Month Day Year 2024
16.	Receiver's certification for receipt of hazardous and other waste	
	Name and Stamp : Signature :	Month Day Year

ANNEXURE X

LAND SUBSIDENCE STUDY AT CBM – RANIGANJ BLOCK

Submitted To

ESSAR OIL AND GAS EXPLORATION AND PRODUCTION LIMITED.
DURGAPUR

Prepared By

Department of Earth and Environmental Studies
NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR
DURGPUR - 713209

March-April 2024

Dr. Kalyan Adhikari
Depratment of EES

Principal Investigator

Table of Contents

IMPORTANT TERMS

- **Base Station:** A base station is a receiver placed at a known point on a job site that tracks the same satellites as an RTK rover, and provides a real-time differential correction message stream through radio to their Rover, to obtain centimeter level positions on a continuous real-time basis. A base station can also be a part of a virtual reference station network, or a location at which GPS observations are collected over a period of time, for subsequent post processing to obtain the most accurate position for the location.
- **RINEX (Receiver Independent Exchange Format):** RINEX is the standard format that allows the management and disposal of the measures generated by a receiver, as well as their off-line processing by a multitude of applications, whatever the manufacturer of both the receiver and the computer application.

- **Rover:** A rover is any mobile GPS receiver that is used to collect or update data in the field, typically at an unknown location.
- **WGS84 (World Geodetic System):** A geodetic datum is the tool used to define the shape and size of the earth, as well as the reference point for the various coordinate systems used in mapping the earth. All GPS coordinates are based on theWGS-84 datum surface. The projection system adopted is UTM. The study area belong to UTM Zone #45

- **Coordinate systems: -** Aligning geographic data to a known coordinate system so it can be viewed, queried, and analyzed with other geographic data. Geo-referencing may involve shifting, rotating, scaling, skewing, and in some cases warping, rubber sheeting, or ortho-rectifying the data.

ABBREVIATIONS

PCP : Primary control points.

DGPS : Differential Global Positioning System.

RTK : Real Time Kinematic mode.

ETS : Electronic Total station.

RINEX : Receiver Independent Exchange Format

UTM : Universal Transverse Mercator

GIS : Geographical Information System

GCP : Ground Control Point.

1. Introduction:

Essar Oil Limited (EOL) was awarded block RG (East)-CBM-2001/1 covering an area of approx. 500 sq km under the CBM-I Round, contract signed on 26th July 2002. EOL holds 100% participating interest in the block. The Petroleum Exploration License (PEL) was issued by the Government of West Bengal on 29th March 2005.

The Ministry of Environment & Forests (MoEF) granted Environment Clearance for drilling 650 development cum production wells, laying 8 Gas Gathering Stations, 1 Main Compressor Station and pipeline vide F.No.J-11011/491/2011-IA II(I) dated 26th February, 2013.

It was further suggested by MoEF to get the land subsidence study carried out by an institute of repute. In view of above, it was requested by ESSAR to Department of Earth and Environmental Studies, National Institute of Technology (NIT) Durgapur for carrying out land subsidence study on prefixed control stations (vertical concrete pillars) at RG (E) –CBM-2001/1 block. Project work order was awarded to the Department of Earth and Environmental Studies, NIT Durgapur for a period of two years with half yearly frequency subsidence monitoring to all established monitoring stations. Accordingly, a visit was made by the Investigators for reconnaissance study of the site in the month of June 2016. During the study, it was observed that few controlling stations are in damaged conditions. However, first, second, third, fourth and fifth phase monitoring work was executed in the mid of June, 2016, mid of January 2017, first week of February, 2019, last week of July, 2019. After the 2 year term finished, EOGEPL issued work order for execution of the monitoring work once in the year 2020 and accordingly the work was carried out in September, 2020. The sixth phase study was carried out in May-June, 2022. The seventh phase study has been carried out in March – April, 2024. The report has been prepared based on the data obtained from the site.

This report mainly consists of the following

- A brief description of the Essar CBM Block, RG (East)-CBM-2001/1
- Details of locations of monitoring stations over the surface of the CBM block, RG (East)-CBM-2001/1
- Methodology adopted for subsidence study through DGPS observation.
- Plot of ground elevation of the control stations.

2. Location and Accessibility:

Block: RG (East)-CBM-2001/1 covers an area of 500 sq.km. (Approximately) and is located in the eastern-most part of the Raniganj Coalfield. It falls largely in Bardhaman district (90%), West Bengal. The block is bounded by Latitude 23°21'45" and 23°41'12" N and Longitude: 87°14'40" and 87°28'46" E. It lies in the Survey of India Topographical Sheet Nos. 73 M/2, M/3, M/6 & M/7 (1:50,000).

3. Development of subsidence

Coal seam gas production often involves the extraction of groundwater to facilitate depressurization of the target coal seam. The disposal or reuse of this collected water is an area of great public interest, as depressurization results in compaction of the ground and leads to settlement of the ground surface (surface subsidence). The reduction in pressure results in compaction of the geological units in which depressurization occurs. In addition, the liberation of gas from coal seams results in compaction of the coal. Subsidence at the ground surface is some component of the total compaction occurring within (potentially) multiple geological units. It is dependent on the magnitude and direction of compression (which is dictated by pressure changes from groundwater withdrawal and desorption of gas from coal seams), the depth and depth-interval over which compression occurs, and the geotechnical properties of the geological units throughout the depth profile.

4. Impacts of subsidence

Land subsidence may affect a variety of assets, including infrastructure (such as buildings, roads, railways, pipelines, dams, water channels, levees and electrical infrastructure) and environmental assets (such as aquifers, groundwater dependent ecosystems, streams, lakes, springs, and other surface water resources). Impacts of subsidence on infrastructure could

include structural damage to buildings, buried pipes and sewers, and reduction in stability of buildings and electrical transmission lines and towers/poles. The serviceability of roads and railways may be affected by distortion of the road surface and rail foundation. Depressions in the ground surface due to subsidence may increase exposure to flooding, overflowing levees or storm surges in areas near the coast. Impacts of subsidence on environmental assets could include the formation of ground fissures and partial or complete loss of surface water drainage to deeper strata, stream bed and bank erosion, development of subsidence troughs and ponding of water, disruption to hillside groundwater springs and sensitive wetlands or swamps, and potential shearing of groundwater supply wells.

5. Instruments:

For DGPS Survey we have used the following instruments as detailed below:

a) DGPS (Leica Make) GNSS, GPS/GLONASS/GALILEO with Triple frequency RTK receiver.

GS14 is loaded with a multitude of features and functions to meet the many different needs of users all over the world, yet it is remarkably easy to use.

GS14 receivers: GX1230+ GNSS/ ATX1230+ GNSS

- Triple frequency
- GPS/ GLONASS/ Galileo/ Compass[1]
- 120 Channels
- L1/L2/L5 GPS
- L1/L2 GLONASS
- E1/ E5a/ E5b /Alt-BOC Galileo
- 4 SBAS
- Full Real Time RTK
- Use as rover or reference

Base:

-GX1230 GPS L1/L2 Receiver

-RX1210 Terminal
-AX1202 GPS L1/L2 Antenna w/ Cable
-Leica Pro Tribrach w/ Optical Plummet
-GRT144 Carrier w/ Stub and Quick Change Adapter
-Pacific Crest PDL Radio 35w, 450-470MHz w/ 1/4 Wave Antenna, Power/Data Cable, and Pelican Case.
-32MB Industrial CF Memory Card
-Leica Power Cable w/ Car Battery Adapter
-GZS4-1 Height Hook

Rover:

-RX1250X GPS Data Collector, Smartworx v8.50. Ext. OWI key. GLONASS ready.
-ATX1230 GG GNSS Antenna w/ Bluetooth
-GHT56 GFU Cradle w/ Rod Clamp
-GFU15-2 PDL Radio, 450-470MHz w/ Antenna
-GKL211 Charger
-GEB221 Battery (New Aftermarket)
-3 x GEB211 Battery (New Aftermarket)
-32MB Industrial CF Memory Card
-USB CF Multi Card Reader (New)

b) Prismatic Compass with all standard accessories.

A prismatic compass is a navigation and surveying instrument which is extensively used for determining course, waypoints (an endpoint of the leg of a course) and direction, and for calculating bearings of survey lines and included angles between them. Compass surveying is a type of surveying in which the directions of surveying lines are determined with a magnetic compass, and the length of the surveying lines are measured with a tape or chain or laser range finder. The compass is generally used to run a traverse line. The compass calculates bearings of lines with respect to magnetic north. The included angles can then be calculated using suitable formulas in case of clockwise and anti-clockwise traverse respectively. For each survey line in the traverse, surveyors take two bearings that is fore bearing and back bearing which should exactly differ by 180° if local attraction is negligible.

The name Prismatic compass is given to it because it essentially consists of a prism which is used for taking observations more accurately.

6. Procedure:

Survey work conducted from one DGPS Control Pillar to another control pillar by using DGPS static mode of observation. After completion of field survey the raw data was processed through Leica software. During processing tropospheric & ionospheric model corrections were made to compute the model and the Total Vertical Height (field Instrument height + Vertical offset) was measured as height correction.

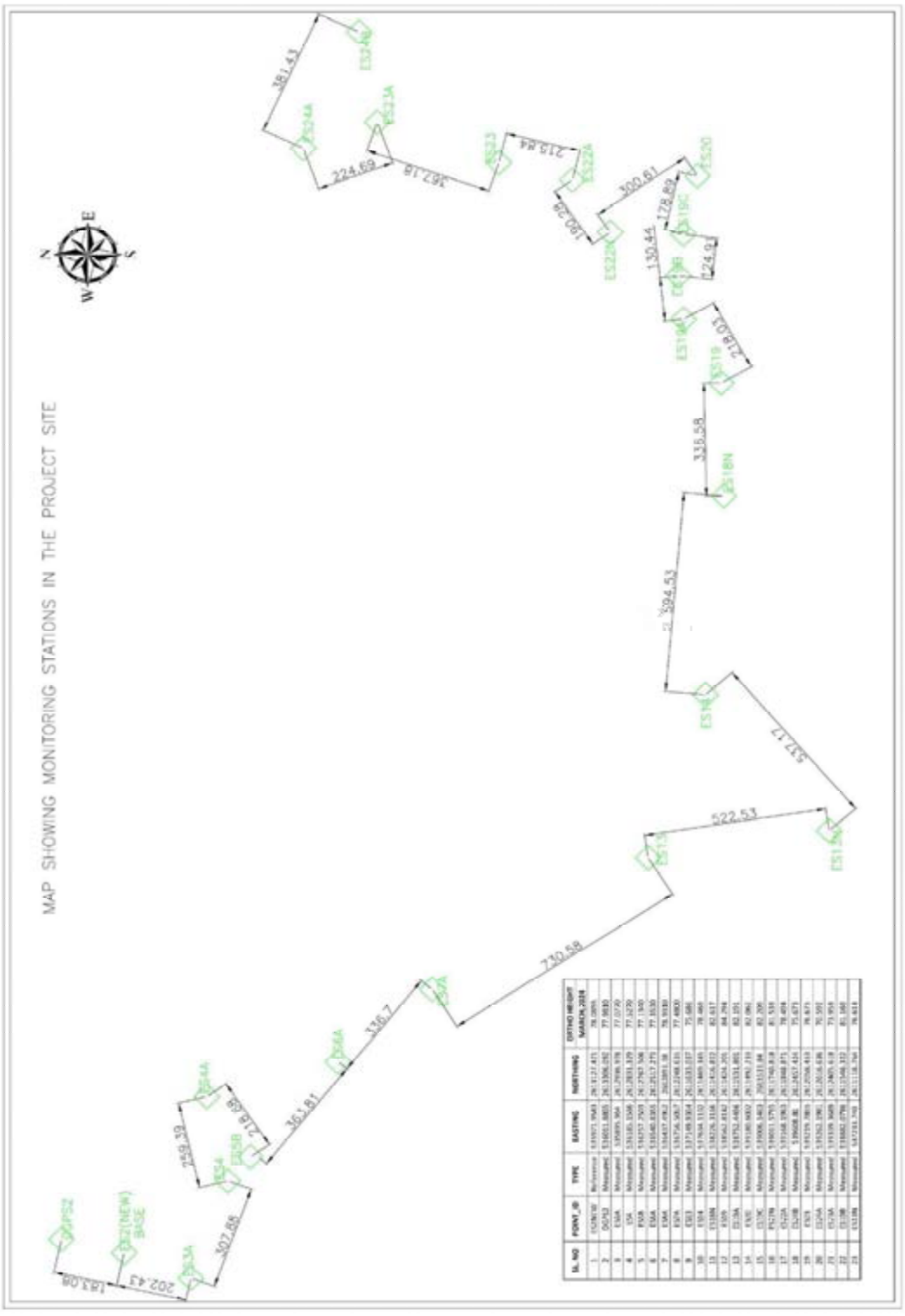
The phase-wise subsidence monitoring studies were conducted by measuring the ground elevation of all pre-established permanent control station near the well locations at the project site. The coordinates (X, Y, Z) of the stations were also checked. These control stations were found established by embedding and casting concrete pillars in the ground to a depth of at least 0.5 meters. During the survey work it was found that some control points are partly or completely damaged. At some well locations, existing concrete cemented foundation blocks were selected and control points were marked on the block using the appropriate markers. Table 1 exhibits the identification marks, corresponding Station ID and present status of the control points.

Table 1 :Control station detail

Station no.	Location detail	Present Status
DGPS2	CULVERT OPPOSITE TO SCHOOL	Ok
ES2 (NEW)	CONCRETE PILLAR NEAR GGS-1 ENTRANCE OLD SECURITY ROOM	Treated as New Base
ES3A	CONCRETE SMALL PILLAR NEAR SECURITY ROOM AT EDD009	Ok
ES4	CONCRETE SMALL PILLAR NEAR SECURITY ROOM AT EDD011	Ok
ES4A	CONCRETE SMALL PILLAR NEAR SECURITY ROOM AT EDD006	Ok
ES5B	CONCRETE PILLAR NEAR WATER TANK AT EDD011	Under High Voltage Electrical Line
ES6A	CONCRETE PILLAR NEAR BOUNDARY AT EDD010	Ok
ES7A	CONCRETE PILLAR NEAR BOUNDARY & GATE AT EDD003	Under Dense Tree Cover
ES8N	PAINT MARK ON EXISTING FOUNDATION OF EARTH PROTECTOR PIPE NEAR ROAD SIDE TOWARDS EDD003	Missing
ES9	CONCRETE SMALL PILLAR NEAR BOUNDARY AT ROAD SIDE NEAR NEAM TREE	Missing
ES11B	KM MILESTONE PILLAR ROADSIDE LEADING TO KANTABERIA	Damage
ES13	EDD004	Ok

Station no.	Location detail	Present Status
ES13N	EDD026	New constructed Pillar shifted to nearest location
ES14	EDD012	Ok
ES15B	ROAD SIDE RIGHT HAND CULVERT AFTER KANTABERIA CHOWK	Damaged
ES15C	ROAD SIDE KM MILE STONE AFTER KANTABERIA CHOWK	Completely Damaged
ES18N	NEAR BOUNDARY WALL OF PLAYGROUND AFTER KANTABERIA CHOWK	Ok
ES19	EDD008	Ok
ES19A	PAINT MARK ON FOUNDATION OF PIPE LINE SIGN BOARD RIGHT SIDE ROAD AFTER EDD008	Almost Not Visible
ES19B	PAINT MARK ON FOUNDATION OF EARTH PROTECTOR RIGHT SIDE ROAD AFTER EDD008	Almost Not Visible
ES19C	PAINT MARK ON KM MILE STONE RIGHT SIDE ROAD AFTER EDD008	Ok
ES20	EDD005	Ok
ES22N	IN FRONT OF EDD013 ON HIGH MOUND GROUND NEAR TEMPORARY SHED	Ok
ES22A	LEFT SIDE CULVERT NEAR WATER SETLING POND AFTER EDD013	Ok
ES23	EDD002	Ok
ES23A	CONCRETE PILLAR LEFT SIDE OF ROAD AFTER EDD002, BARREN LAND	Ok
ES24A	EDD018	Ok
ES24B	EDD025	Ok

Fig. 1: Location map of Survey stations



7. Results:

The R.L. (Elevation Z) as observed during the third Phase (III), fourth phase (IV), fifth phase (V), sixth phase (VI) & seventh phase (VII) at the established control stations surrounding the well locations [ES2 (new) to ES24B] are given in Table 2, Table 3, Table 4, Table 5 & Table 6 respectively. Few photographs of subsidence monitoring study conducted at RG (East) CBM block are given in Annexure-1.

Table 2: Total Easting, Northing and ground elevation at the control stations during February 2019

SL NO.	POINT_ID	TYPE	EASTING	NORTHING	ORTHO HEIGHT
1	ES2NEW	Reference	535971.9543	2613127.421	78.0855
2	DGPS2	Measured	536011.8835	2613306.092	77.9812
3	ES3A	Measured	535895.964	2612936.978	77.1294
4	ES4	Measured	536185.1536	2612831.329	77.5271
5	ES6	Measured	536509.599	2612543.385	77.3298
6	ES5A	Measured	536258.5991	2612746.836	77.0865
7	ES5B	Measured	536257.2503	2612767.506	77.1344
8	ES6A	Measured	536540.8355	2612517.273	77.3532
9	ES4A	Measured	536437.4952	2612891.38	78.9292
10	ES11B	Measured	537079.5726	2611752.896	76.9967
11	ES7A	Measured	536756.5057	2612248.635	77.4838
12	ES13	Measured	537149.9354	2611633.037	75.686
13	ES12	Measured	537152.1329	2611691.748	76.6908
14	ES14	Measured	537634.1102	2611469.345	78.4697
15	ES15A	Measured	537860.2241	2611474.448	80.9516
16	ES15	Measured	537820.6173	2611389.821	80.6117
17	ES15B	Measured	537942.6787	2611477.142	81.7059
18	ES15C	Measured	538047.3177	2611456.367	81.8705
19	ES18N	Measured	538226.3166	2611416.822	82.6185
20	ES19	Measured	538562.8142	2611424.201	84.2948
21	ES19A	Measured	538752.4456	2611531.801	82.1911
22	ES20	Measured	539180.6002	2611492.233	82.0627
23	ES19C	Measured	539006.1463	2611531.84	82.2092
24	ES22N	Measured	539011.5765	2611740.818	81.5396
25	ES22A	Measured	539168.1963	2611848.871	78.4946
26	ES24B	Measured	539608.81	2612457.424	75.6738
27	ES23	Measured	539219.7855	2612058.453	76.6745
28	ES24A	Measured	539262.1981	2612616.636	70.5945
29	ES23A	Measured	539339.3689	2612405.618	73.96
30	ES19B	Measured	538882.0786	2611546.322	81.2674
31	ES13A	Measured	537233.7395	2611118.764	76.7189
32	ES9	Measured	536956.5858	2612029.666	77.4691
33	ES8N	Measured	536806.1786	2612341.566	78.5734

Table 3: Total Easting, Northing and ground elevation at the control stations during July 2019

POINT_ID	EASTING	NORTHING	ORTHO HEIGHT
ES2NEW	535971.9543	2613127.421	78.0855
DGPS2	536011.8835	2613306.092	77.9809
ES3A	535895.964	2612936.978	77.0770
ES4	536185.1536	2612831.329	77.5270
ES4A	536437.4952	2612891.38	78.9289
ES5A	536258.5991	2612746.836	77.0866
ES5B	536257.2503	2612767.506	77.1338
ES6	536509.599	2612543.385	77.3280
ES6A	536540.8355	2612517.273	77.3530
ES7A	536756.5057	2612248.635	77.4795
ES8N	536806.1786	2612341.566	78.5728
ES9	536956.5858	2612029.666	77.4689
ES11B	537079.5726	2611752.896	76.9970
ES12	537152.1329	2611691.748	76.5820
ES13	537149.9354	2611633.037	75.6858
ES13A	537233.74	2611118.764	76.6140
ES14	537634.1102	2611469.345	78.4689
ES15	537820.6173	2611389.821	80.6114
ES15B	537942.6787	2611477.142	81.7046
ES15C	538047.3177	2611456.367	81.8703
ES18N	538226.3166	2611416.822	82.6179
ES19	538562.8142	2611424.201	84.2944
ES19A	538752.4456	2611531.801	82.1909
ES19B	538882.0786	2611546.322	81.1690
ES19C	539006.1463	2611531.84	82.2082
ES20	539180.6002	2611492.233	82.0624
ES22A	539168.1963	2611848.871	78.4939
ES22N	539011.5765	2611740.818	81.5385
ES23	539219.7855	2612058.453	76.6743
ES23A	539339.3689	2612405.618	73.9590
ES24A	539262.1981	2612616.636	70.5929
ES24B	539608.81	2612457.424	75.6730

Table 4: Total Easting, Northing and ground elevation at the control stations during September, 2020

SL. NO	POINT_ID	TYPE	EASTING	NORTHING	ORTHO HEIGHT
1	ES2NEW	Reference	535971.9543	2613127.421	78.0855
2	DGPS2	Measured	536011.8835	2613306.092	77.9812
3	ES3A	Measured	535895.964	2612936.978	77.0768
4	ES4	Measured	536185.1536	2612831.329	77.5271
5	ES5B	Measured	536257.2503	2612767.506	77.1335
6	ES6A	Measured	536540.8355	2612517.273	77.3531
7	ES4A	Measured	536437.4952	2612891.38	78.9302
8	ES11B	Measured	537079.5726	2611752.896	76.9963
9	ES7A	Measured	536756.5057	2612248.635	77.4801
10	ES13	Measured	537149.9354	2611633.037	75.686
11	ES14	Measured	537634.1102	2611469.345	78.4689
12	ES15B	Measured	537942.6787	2611477.142	81.7051
13	ES15C	Measured	538047.3177	2611456.367	81.8707
14	ES18N	Measured	538226.3166	2611416.822	82.6166
15	ES19	Measured	538562.8142	2611424.201	84.2942
16	ES19A	Measured	538752.4456	2611531.801	82.1911
17	ES20	Measured	539180.6002	2611492.233	82.0624
18	ES19C	Measured	539006.1463	2611531.84	82.2088
19	ES22N	Measured	539011.5765	2611740.818	81.5385
20	ES22A	Measured	539168.1963	2611848.871	78.4936
21	ES24B	Measured	539608.81	2612457.424	75.6735
22	ES23	Measured	539219.7855	2612058.453	76.6748
23	ES24A	Measured	539262.1981	2612616.636	70.592
24	ES23A	Measured	539339.3689	2612405.618	73.9589
25	ES19B	Measured	538882.0786	2611546.322	81.1691
26	ES13N	Measured	537233.740	2611118.764	76.6138
27	ES9	Measured	536956.5858	2612029.666	77.4691
28	ES8N	Measured	536806.1786	2612341.566	78.573

Table 5: Total Easting, Northing and ground elevation at the control stations during May, 2022

SL. NO	POINT_ID	TYPE	EASTING	NORTHING	ORTHO HEIGHT
1	ES2NEW	Reference	535971.9543	2613127.421	78.0855
2	DGPS2	Measured	536011.8835	2613306.092	77.9819
3	ES3A	Measured	535895.964	2612936.978	77.0782
4	ES4	Measured	536185.1536	2612831.329	77.5268
5	ES5B	Measured	536257.2503	2612767.506	77.1336
6	ES6A	Measured	536540.8355	2612517.273	77.3533
7	ES4A	Measured	536437.4952	2612891.38	78.9278
8	ES11B	Measured	537079.5726	2611752.896	76.997
9	ES7A	Measured	536756.5057	2612248.635	77.48
10	ES13	Measured	537149.9354	2611633.037	75.6852
11	ES14	Measured	537634.1102	2611469.345	78.4677
12	ES15B	Measured	537942.6787	2611477.142	81.7058
13	ES18N	Measured	538226.3166	2611416.822	82.6161
14	ES19	Measured	538562.8142	2611424.201	84.2934
15	ES19A	Measured	538752.4456	2611531.801	82.1925
16	ES20	Measured	539180.6002	2611492.233	82.0618
17	ES19C	Measured	539006.1463	2611531.84	82.2101
18	ES22N	Measured	539011.5765	2611740.818	81.5388
19	ES22A	Measured	539168.1963	2611848.871	78.4933
20	ES24B	Measured	539608.81	2612457.424	75.6729
21	ES23	Measured	539219.7855	2612058.453	76.6747
22	ES24A	Measured	539262.1981	2612616.636	70.5922
23	ES23A	Measured	539339.3689	2612405.618	73.9609
24	ES19B	Measured	538882.0786	2611546.322	81.1681
25	ES13N	Measured	537233.740	2611118.764	76.6152
26	ES8N	Measured	536806.1786	2612341.566	78.5719

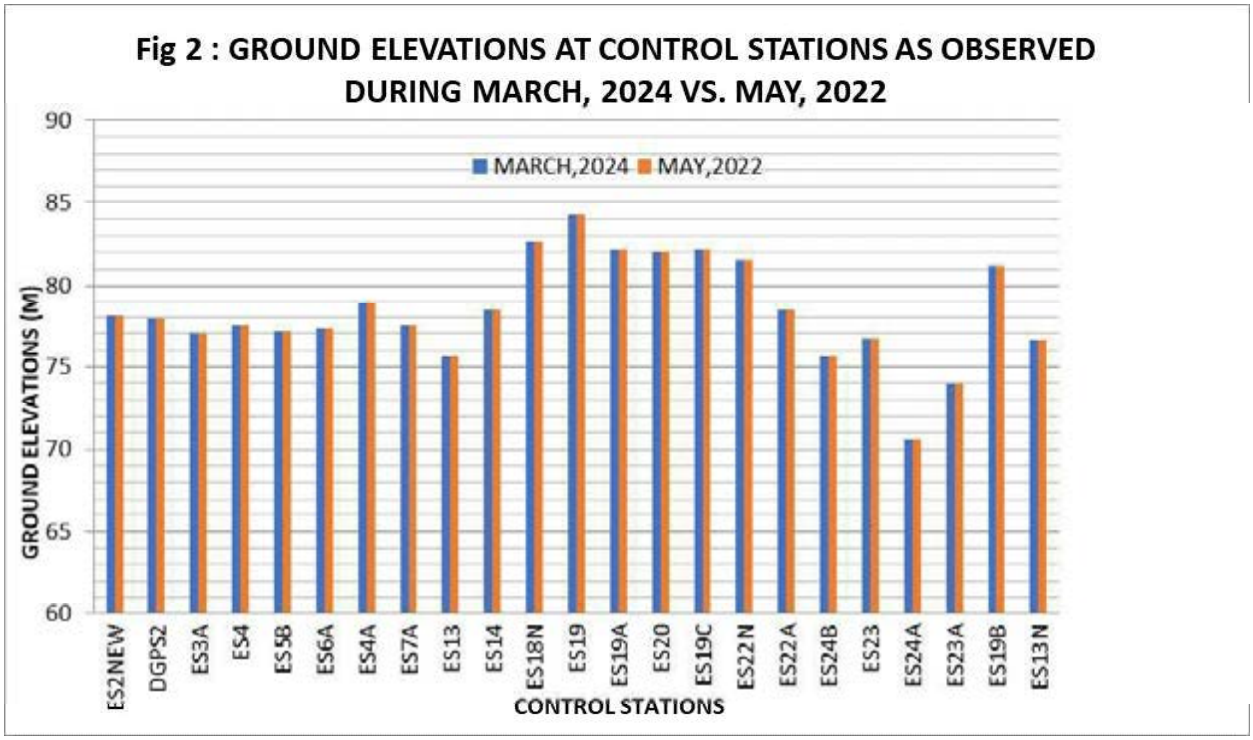
Table 6: Total Easting, Northing and ground elevation at the control stations during March, 2024

SL. NO	POINT_ID	TYPE	EASTING	NORTHING	ORTHO HEIGHT
1	ES2NEW	Reference	535971.9543	2613127.421	78.0855
2	DGPS2	Measured	536011.8835	2613306.092	77.9810
3	ES3A	Measured	535895.964	2612936.978	77.0770
4	ES4	Measured	536185.1536	2612831.329	77.5270
5	ES5B	Measured	536257.2503	2612767.506	77.1340
6	ES6A	Measured	536540.8355	2612517.273	77.3530
7	ES4A	Measured	536437.4952	2612891.38	78.9310
8	ES7A	Measured	536756.5057	2612248.635	77.4800
9	ES13	Measured	537149.9354	2611633.037	75.686
10	ES14	Measured	537634.1102	2611469.345	78.469
11	ES18N	Measured	538226.3166	2611416.822	82.617

SL. NO	POINT_ID	TYPE	EASTING	NORTHING	ORTHO HEIGHT
12	ES19	Measured	538562.8142	2611424.201	84.294
13	ES19A	Measured	538752.4456	2611531.801	82.191
14	ES20	Measured	539180.6002	2611492.233	82.062
15	ES19C	Measured	539006.1463	2611531.84	82.209
16	ES22N	Measured	539011.5765	2611740.818	81.539
17	ES22A	Measured	539168.1963	2611848.871	78.494
18	ES24B	Measured	539608.81	2612457.424	75.673
19	ES23	Measured	539219.7855	2612058.453	76.675
20	ES24A	Measured	539262.1981	2612616.636	70.592
21	ES23A	Measured	539339.3689	2612405.618	73.959
22	ES19B	Measured	538882.0786	2611546.322	81.169
23	ES13N	Measured	537233.740	2611118.764	76.614

Table 7: Comparison of measured ground elevation at the control stations during May 2022 Vs. March 2024

SL. NO	POINT_ID	TYPE	EASTING	NORTHING	ORTHO HEIGHT	
					MAY,2022	MARCH,2024
1	ES2NEW	Reference	535971.9543	2613127.421	78.0855	78.0855
2	DGPS2	Measured	536011.8835	2613306.092	77.9819	77.9810
3	ES3A	Measured	535895.964	2612936.978	77.0782	77.0770
4	ES4	Measured	536185.1536	2612831.329	77.5268	77.5270
5	ES5B	Measured	536257.2503	2612767.506	77.1336	77.1340
6	ES6A	Measured	536540.8355	2612517.273	77.3533	77.3530
7	ES4A	Measured	536437.4952	2612891.38	78.9278	78.9310
8	ES7A	Measured	536756.5057	2612248.635	77.48	77.4800
9	ES13	Measured	537149.9354	2611633.037	75.6852	75.686
10	ES14	Measured	537634.1102	2611469.345	78.4677	78.469
11	ES18N	Measured	538226.3166	2611416.822	82.6161	82.617
12	ES19	Measured	538562.8142	2611424.201	84.2934	84.294
13	ES19A	Measured	538752.4456	2611531.801	82.1925	82.191
14	ES20	Measured	539180.6002	2611492.233	82.0618	82.062
15	ES19C	Measured	539006.1463	2611531.84	82.2101	82.209
16	ES22N	Measured	539011.5765	2611740.818	81.5388	81.539
17	ES22A	Measured	539168.1963	2611848.871	78.4933	78.494
18	ES24B	Measured	539608.81	2612457.424	75.6729	75.673
19	ES23	Measured	539219.7855	2612058.453	76.6747	76.675
20	ES24A	Measured	539262.1981	2612616.636	70.5922	70.592
21	ES23A	Measured	539339.3689	2612405.618	73.9609	73.959
22	ES19B	Measured	538882.0786	2611546.322	81.1681	81.169
23	ES13N	Measured	537233.740	2611118.764	76.6152	76.614



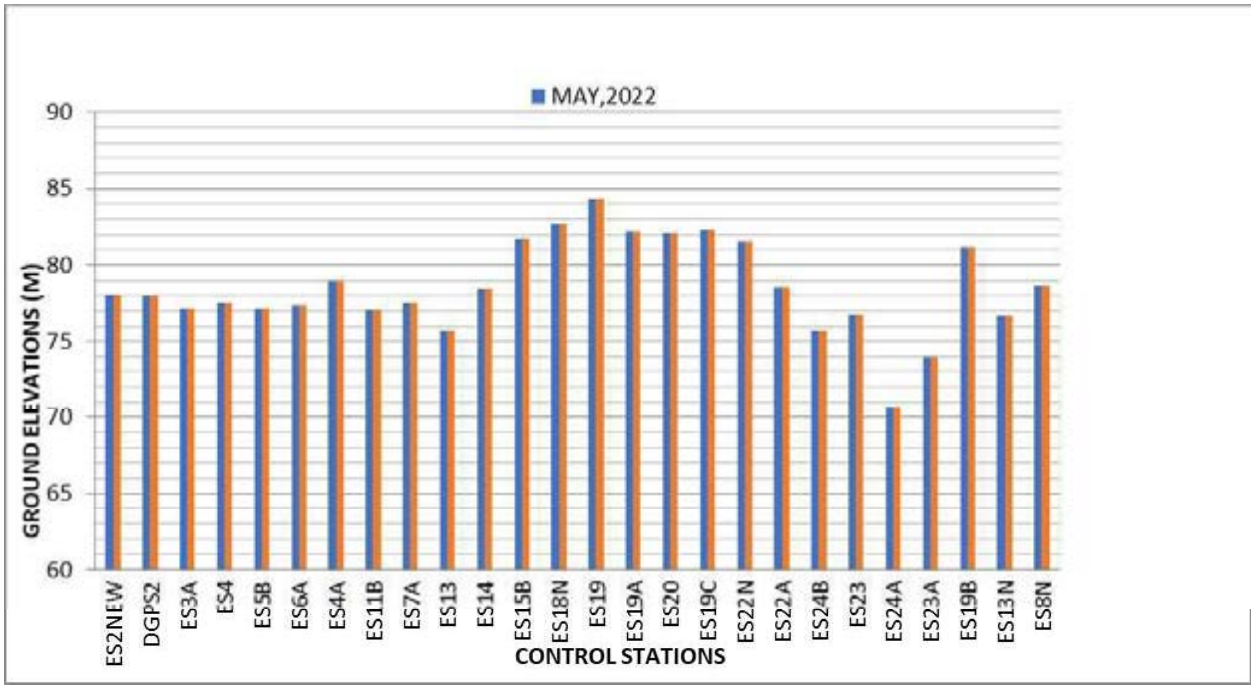


Fig.3: Ground elevations at control stations as observed during September 2020 vs. May 2022

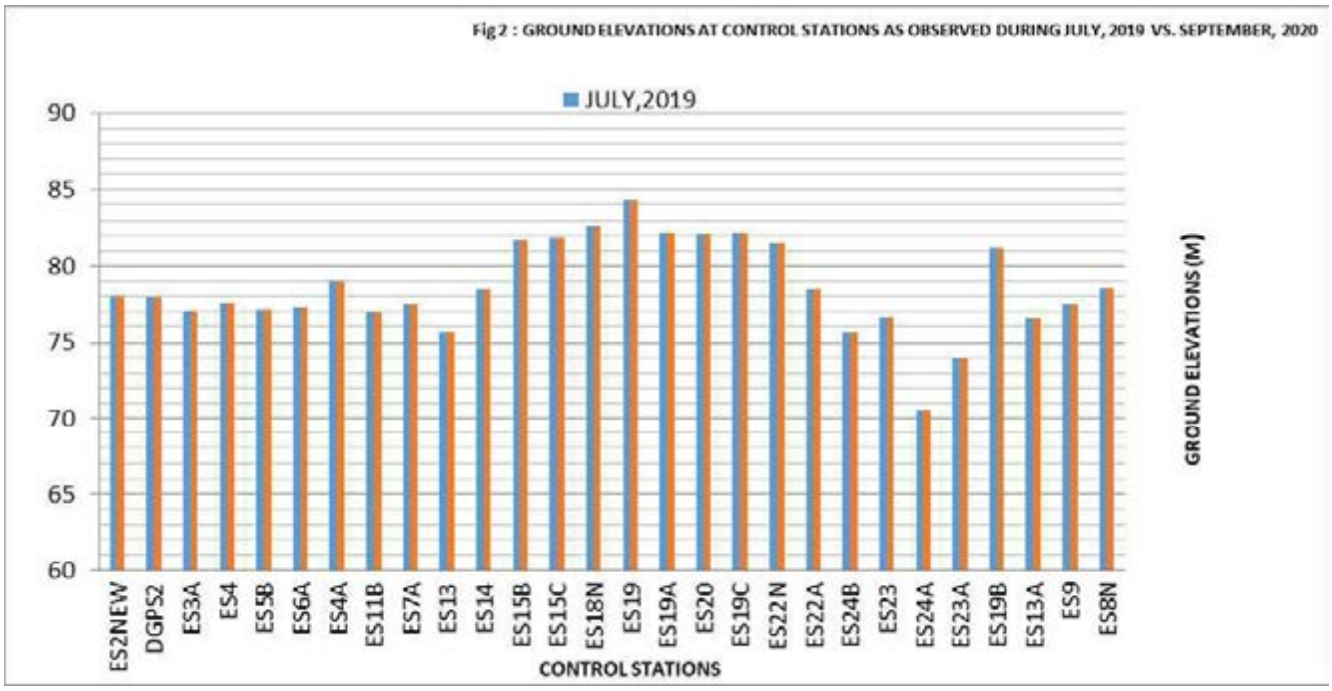


Fig.4: Ground elevations at control stations as observed during July 2019 vs. September 2020

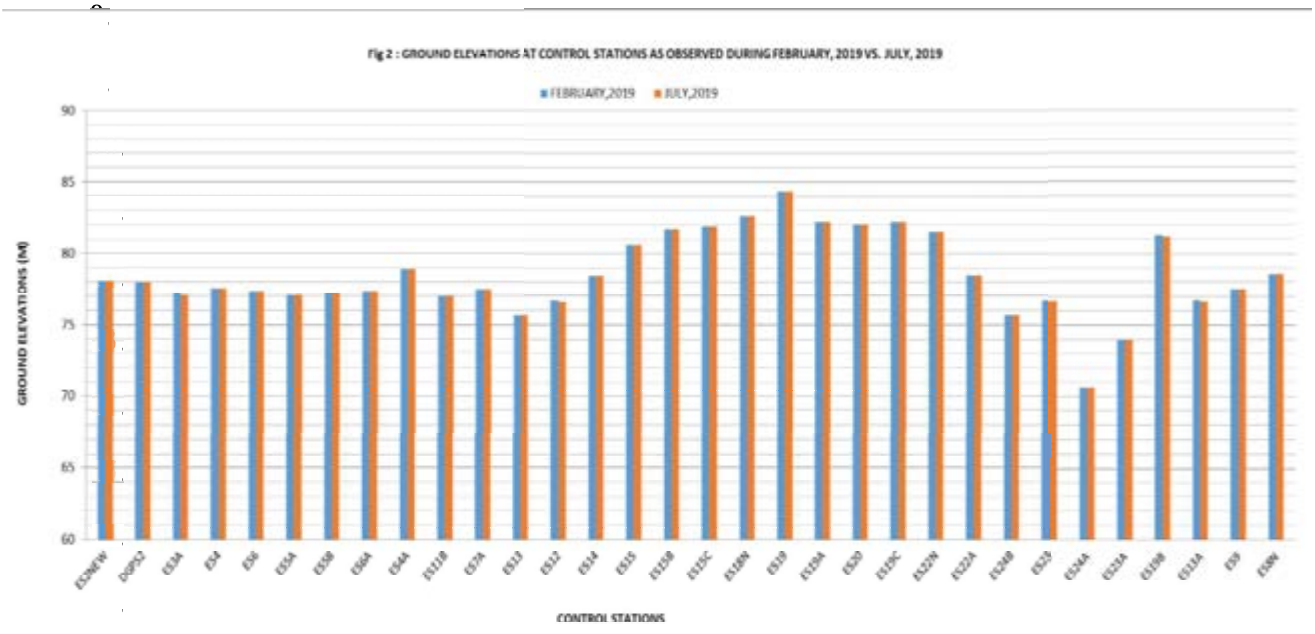


Fig.5: Ground elevations at control stations as observed during February 2019 vs. July 2019

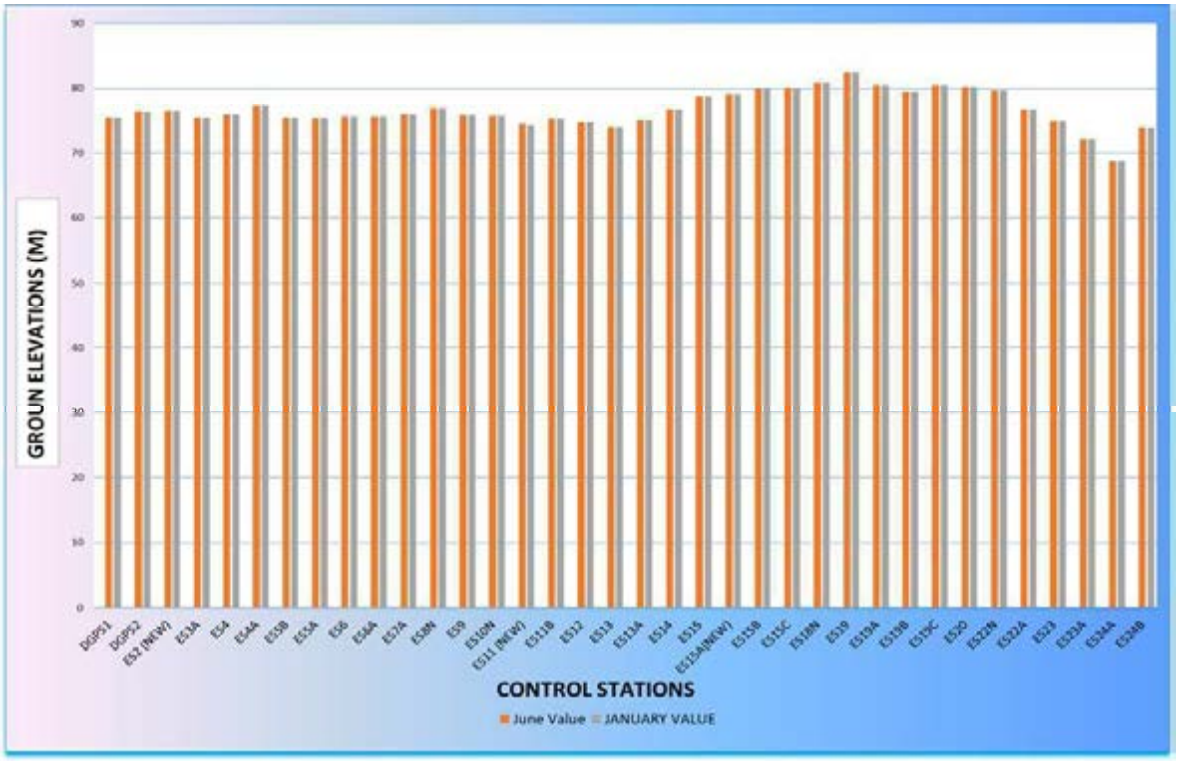


Fig.6: Ground elevations at control stations as observed during June 2016 vs. January 2017

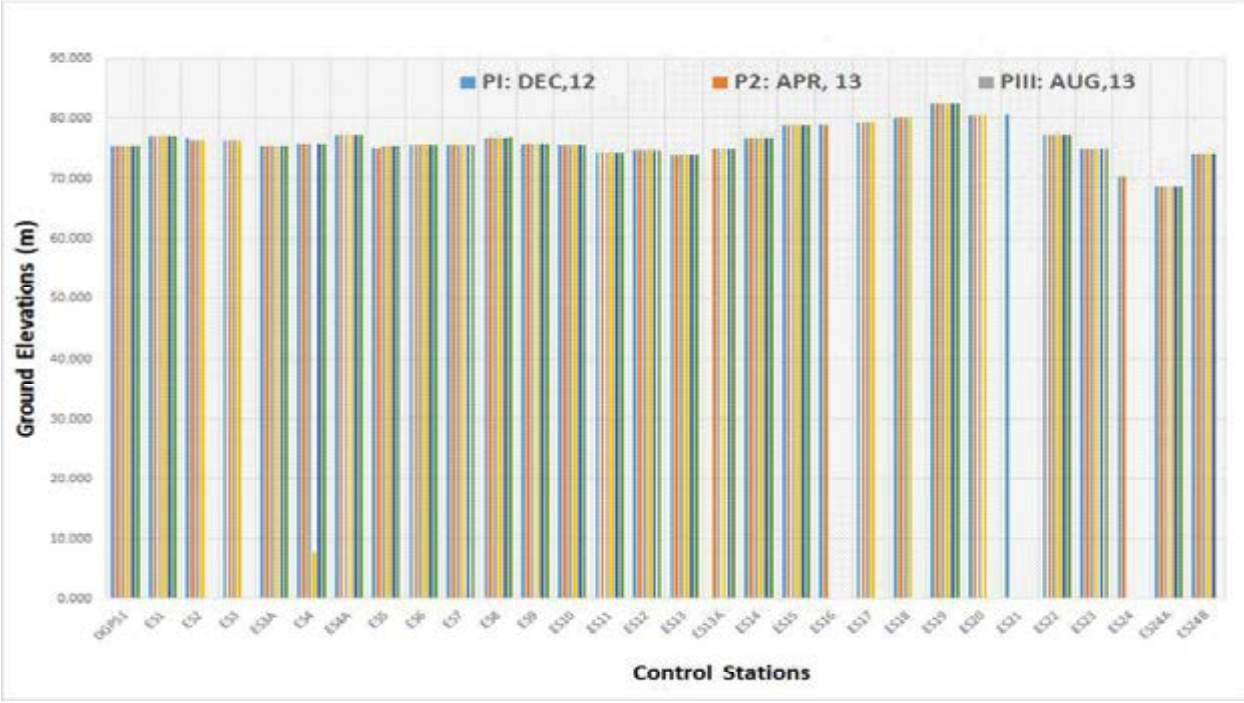


Fig.7: Ground elevation at ESSAR Raniganj CBM Block during Dec, 12 to May, 15. Source-as per report of Department of Mining Engineering, Indian School of Mines, Dhanbad supplied by Essar Oil Limited (EOL).

Conclusion & Recommendation:

The R.Ls. (Elevation) of all intact survey control points were measured during the present phases of subsidence survey with DGPS instrument. The comparison between the elevation data of each intact control point of latest study and the same control points of immediate preceding study (2022) reveal no significant subsidence in the area of the present study as shown in Table 7. During the subsidence monitoring since 2012 in the present study area of CBM block conducted initially by Department of Mining Engineering, Indian School of Mines, Dhanbad (December 2012 – May 2015) and later (June 2016- April 2024) the study performed by Department of EES, National Institute of Technology Durgapur till April, 2024, no active subsidence was observed at the control points close to the CBM Gas wells, plant sites as well as places of habitats.

The established control stations should be preserved carefully without causing any ground disturbance at the surroundings. **However, during the present study at the site, it was observed that 3 no. of control stations named ES8N, ES11B & ES15B were either disturbed or removed/broken and were not considered for collection of data.** Therefore, suitable precautionary measures should be taken to preserve the survey control stations from any external disturbances. A very careful preservation of control stations are required because subsidence study is a long term study and comparison of time series elevation data of each control station will depict the occurrence of subsidence, if any. Proper fencing arrangements surrounding the control stations along with sign boards displaying names of subsidence monitoring stations with their elevations are recommended to be provided at control stations. The already disturbed control stations are to be repaired prior to next phase of the monitoring study. At present the no. of control stations has been reduced to 23. It is recommended to establish one control station each between ES7A and ES 13 (730.58m), ES13 and ES13N (522.53m), ES13N and ES14 (537.17m). As number of control stations have become substantially reduced as compared to the studies of initial phases It is also recommended to revive the old control stations which had been discarded time to time due to damaged conditions. Periodic monitoring is essential to examine the ground subsidence in and around the area of production of CBM due to compaction and collapse of overlying litho units as a result of continuous withdrawal of CBM gases. Precise positioning of GCPs can help in better monitoring of subsidence phenomenon.

9. Deliverables:

- ✓ Text report - Text report explaining the procedure adopted for DGPS survey.

- ✓ Tabulated reading of the DGPS readings (in UTM and Ortho Heights) and temporal comparison

10. Site Photographs:

Plate 1: Subsidence monitoring station at ES24A

Plate 2: Subsidence monitoring station at ES4

Plate 3: Subsidence monitoring station at ES20

Plate 4: Subsidence monitoring station at ES19

Plate 5: Subsidence monitoring station at ES13

Plate 6: Subsidence monitoring station at ES23A

Plate 7: Subsidence monitoring station at ES24B

Plate 8: Subsidence monitoring station at ES6A

ANNEXURE XI

ANNEXURE XI

Ground Water Level report of surrounding areas of CBM Ranigan project of Essar Oil and Gas Exploration and Production Ltd.
(Period: Oct.'23 - Mar.'24)

S. No.	Location	Latitude	Longitude	Parapet wall height (m)	Well Diameter (m)	Depth to Water from Parapet top (m)	Depth to Water below ground level (m)
1	Nachan	23°36'42.4"N	87°19'58.9"E	0.6	1	2.08	1.48
2	kalikapur	23°37'46.4"N	87°20'15.1"E	0.66	1.85	1.06	0.4
3	Dhabani	23°35'51.9"N	87°22.0.85"E	0.93	1.8	1.72	0.79
4	Bansia	23°37'34.3"N	87°19'00.1"E	0.76	0.97	1.7	0.94
5	Labnapara	23°35'05.36"N	87°22'15.8"E	1.2	1.5	3.75	2.55
6	Akandara	23°34'46.1"N	87°23'0.13"E	0.6	1.85	3.47	2.87
7	Saraswatiganj	23°35'22.6"N	87°24'78.4"E	0.45	1.75	3.75	3.3
8	Ghtakdanga	23°34'14.7"N	87°24'30.8"E	0.83	2.4	3.63	2.8
9	Sarenga	23°31'36.22"N	87°24'58.12"E	1.01	1.67	3.96	2.95
10	Gopalpur	23°30'63.9"N	87°23'40.8"E	0.5	1.53	2.99	2.49
11	Jatgoria	23°36'97.3"N	87°23'43.2"E	0.6	1.8	1.87	1.27
12	Kantaberia	23°36'82.9"N	87°22'24.2"E	0.83	1.3	2.89	2.04
13	Bargoria	23°37'58.0"N	87°21'39.7"E	0.7	2.5	2.66	1.96
14	Khatgoria	23°30'05"N	87°23'41"E	0.76	1.77	2.81	2.05