



IREL (India) Limited
Six Monthly Compliance Report (October 2020 to March 2021)



आईआरईएल (इंडिया) लिमिटेड

IREL (India) Limited

(Formerly INDIAN RARE EARTHS LIMITED)

(भारत सरकार का उपक्रम - परमाणु ऊर्जा विभाग)

(A Government of India Undertaking - Dept. of Atomic Energy)

Orissa Sands Complex, Matikhalo (P.O)

उड़ीसा सैंड्स कॉम्प्लेक्स, माटिखलो (डाक) Chatrapur (Ganjam). Odisha -761 045. INDIA

छत्रपुर (गंजाम), ओडिशा- 761045, भारत

ISO 9001: 2015, ISO 14001: 2015 & ISO 45001: 2018 Company

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TS/ENVR/EC/ OSCOM/

31st May 2021

To,
 The Additional Principal Chief Conservator of Forests,
 Government of India,
 Ministry of Environment, Forests & Climate Change (MoEF & CC),
 Eastern Regional Office (Eastern Zone),
 A/3, Chandrasekharpur, Bhubaneswar-751 023.

Dear Sir,

Sub.- Half-yearly progress report on Mining & Mineral Separation Units of OSCOM.

Ref.-i. MoEF&CC letter no. 21/18/84 ENI/IA II dated 14th May 1991.

ii. Our compliance report TS/ENVR/05/OSCOM/4943A dated 23rd November 2018.

iii. MoEF&CC Environmental Clearance (EC) letter No.J-11015/528/2007-IA.II(M) dated 11th January 2019 for capacity expansion of Mining & Mineral Separation Units.

This has reference to the above subject & references, we are herewith enclosing the compliance report for OSCOM operation for the period October 2020 to March 2021 for your kind information.

Accordingly, OSPCB issued a Consent Order No.695/CTO-48/2014 dated 01.03.2019 for production capacity of 3,70,200 TPA of total heavy minerals comprising of heavy minerals e.g. Ilmenite, Rutile, Zircon, Sillimanite, Monazite & Garnet.

As advised, we are submitting the soft-copy to email ID - roez.bsr-mef@nic.in for kind information.

With regards.

Yours truly,
 For IREL (India) Limited,

CGM & HEAD (OSCOM)



IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)

Format for filling up of Compliance report

Annexure-1

Name of the project: 1. Mining & Mineral Separation of OSCOM, IREL (India) Limited

Clearance letters No and Date:

- i. MoEF letter no.21/18/84 ENI/IA II dated 14th May 1991 & No.J-14011/5/91/IA-II dated 7th Apr'2000 for Mining & Mineral Separation of IREL, OSCOM.
- ii. Environmental Clearance(EC) vide letter No.J-11015/528/2007- IA.II(M) dated 11th January 2019 for capacity expansion of Mining & Mineral Separation Units.

Period of Compliance Report: **October 2020 to March 2021**

Sub: Compliance of various points raised by MoEF letter no.21/18/84 ENI/IA II dated 14th May 1991 & No.J-14011/5/91/IA- II dated 7th Apr'2000 for Mining & Mineral Separation of IREL, OSCOM.

S.No.	Description of Conditions	Status
I	The project authority must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.	The Consent Order No. 636/2021 dated 19.03.2021, issued by Odisha State Pollution Control Board (OSPCB) under Water & Air Act, is having validity upto 31.3.2026. All the conditions mentioned in the Consent Order and directives issued time to time by OSPCB are being strictly followed.
ii	Any expansion of the plant, either with the existing product mix or new product can be taken up only with the prior approval of the Ministry.	Agreed. MoEF & CC has already issued Environmental Clearance(EC) vide letter No.J-11015/528/2007-IA.II(M) dated 11 th January 2019 for capacity expansion of Mining & Mineral Separation Units.
iii	The project authority must, submit comprehensive EIA, report for the proposed, activity along with any further activity proposed/approved by the Ministry within one year i.e. by 14.5.1992	Comprehensive EIA & EMP report was prepared for OSCOM operation and submitted to MoEF, New Delhi vide our letter No. TS/Envir/4669-A dated 26 th April 1994 to MoEF Regional Office (Eastern Zone), Bhubaneswar vide our letter No.TS/Envir/7401-A dated 24 th June 1994.
iv	The gaseous emissions from various process unit conform to the standard prescribed by the concerned authorities, from time to time. At no time the emission level should go beyond the stipulated standards. In event of failure of any pollution control system adopt in the unit, the respective unit should be put out of operation immediately and should not be restarted until the concerned measures are rectified to achieve the desired efficiencies.	Gaseous emissions: Gaseous emissions from Mineral Separation Plant (MSP) are maintained strictly as per the conditions stipulated by Odisha State Pollution Control Board. The Particulate Matter (PM) values in the stack emissions were found within the permissible limit of 150mg/m ³ during the Period: October'20 to March'21. The monitoring report on stack emissions during the period Period: October'20 to March'21 is enclosed in Annexure-2.



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S.No.	Description of Conditions	Status
v	Adequate number (a minimum 3 to 5) of air quality monitoring stations should be set up in the downwind direction as well as where maximum ground level contend is anticipated. Also the manual monitoring of stack emissions should be carried out at regular intervals. The result of monitoring should be statistically analysed and submitted to Pollution Control Board, every three months and to this Ministry every six months.	Five no of Air Quality Monitoring (AQM) stations monitoring is being carried out by M/s Centre for Envotech & Management Consultancy Pvt.Ltd., Bhubaneswar, a NABL accredited & MoEF&CC authorized agency, at four stations (Mining area, IREL Colony, Bada Arjipalli & Kanamana) and in plant area on regular basis. The data for the period: : October'20 to March'21 is enclosed in Annexure-2. From the monitoring data it is seen that the PM ₁₀ levels are within the norm of 100 µg/m ³ and PM _{2.5} levels are within the norm of 60 µg/m ³ .
vii	Radiation levels at different location of the plant at full production level should be predicted and a report should be submitted to this department by 31.12.1991.	<p>Radiation level: Prediction of radiation levels at different locations of the Plant at full production is already informed to the Ministry vide our letter No.TS/Envir/11714A dated 30th September 1991.</p> <p>Radiation levels during the period: October'20 to March'21 is enclosed in Annexure-2. From the monitoring data, it is seen that the radiation level in the mining area, before mining was 0.4 to 0.8 µGy/h which reduced to 0.05 to 0.1 µGy/h after carrying out the mining activity.</p>
viii	The project authorities will submit a report every six months regarding complaints if any made by people who are living within 3 Kms radius.	No complaint received during the period: October'20 to March'21.
ix	The project authorities will submit health survey report of the employees as well as random sample of people who are living within three Kilometers. The survey should be carried out as per guidelines of Health Physics Division/ Atomic Energy Regulatory Board.	Regular employees & Contractual Workers are subjected to initial & periodic Medical Examinations as per Statutory guidelines and records maintained at Medial Department, total cases attended during 2020 are 6870. Villagers of adjoining areas are provided medical treatment facilities on regular basis through Family Health Clinic & Occupational Health Centre & record maintained, total cases attended during 2020 are 3264. The annual disease profile of the local village & employee's area is enclosed herewith as Annexure-2, .



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S.No.	Description of Conditions	Status
X	Replantation programmed in mined out areas should be submitted within six months with complete details of physical targets to be achieved with definite time frames.	Being complied. Afforestation and green belt development: The details are enclosed in Annexure-2. During the year 2020-21, total 53,800 numbers of plantations of Casuarina trees along with Cashew trees, date palm, coconut etc. were carried out in the 22.5 ha of mined out area, plant & colony area.
xi	The project authorities should recycle the waste to the maximum extent and liquid effluent coming out of the plants should meet the stipulated standards. There should be only minimum discharge. Action plan along with the implementation schedule to reduce the waste water discharge and increased recycling should be submitted by 31.8.1991.	Being complied. The waste water generated from Mineral Separation Plant is taken to Pond No.1. After settling of slime in the pond, the water is recycled for the same plant @ ~100 m ³ /h. The monitoring results of liquid effluent from Pond No.1 & 2 during the period: : October'20 to March'21 are given in in Annexure-2.From the monitoring data, it is seen that all the parameters were within the permissible limit. Process efficiency is being improvised by fine tuning of equipments for minimization of wastes.

xii	Adequate number of effluent quality monitoring stations must be set up in consultation with the State Pollution Control Board and the effluents monitored and should be statistically analysed and the report sent to this Ministry.	Being complied. All the liquid effluents and gaseous effluents are monitored as per the stipulations of OSPCB in the Consent Oder. The monitoring results of liquid effluent from Pond No.1 & 2 during the period: October'20 to March'21 are given in Annexure-2.
xiii	The treated effluent confirming to the prescribed standards should be utilized for green belt development to the maximum extent possible. The plan for rouse of waste water should be included in the comprehensive EIA report.	Complied. The water from Pond No.1 is reused for plantation development in the mined out area and post plantation care activities.
xiv	A detailed green belt development programmed should be submitted to the Ministry by 30.8.1991. For green belt the effluent water should be used to the maximum level possible.	Complied. The waste water are collected in Pond No.1and a part of that water is reused for plantation development in the mined out area. The details of plantation and green belt development are mentioned in Annexure-2.



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xv.	A separate environmental management cell with suitable qualified people to carry out various functions should be set up under the control of Senior Executive who will report directly to the head of the Organization.	Complied. Environment Management Cell is constituted and functioning. In addition, Environment Management Review meetings are being conducted on quarterly basis to carry out to review of the progress of requirements of Environment Management system as per ISO 14001.
xvi	The project authority must set up a laboratory facility for collection and analysis of samples under the supervision of competent technical personnel who will directly report to the Chief Executive.	Complied. Full-fledged laboratory facilities as well as Health Physics Laboratory of Bhaba Atomic Research Centre exist at site for carrying out environmental monitoring & surveillance studies. However, for environmental sample collection and analysis is being carried out by M/s Centre for Envotech & Management Consultancy Pvt. Limited, Bhubaneswar, a MoEF&CC Authorized and NABL accredited agency. Financial provision is already made to meet the requirement.



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TS/ENVR/ EC/REEP/

31st May 2021

To,
The Additional Principal Chief Conservator of Forests,
Government of India,
Ministry of Environment & Forests(MoEF),
Eastern Regional Office (Eastern Zone),
A/3, Chandrasekharpur, Bhubaneswar-751 023.

Dear Sir,

Sub. - Half-yearly progress report on Rare Earth Extraction Plant (REEP)(Earlier named MoPP)

Ref.-i. MoEF letter no.11015/348/2009-IA.II (M) dated 9th February 2011.

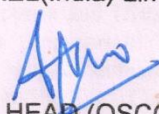
ii. Our compliance report TS/ENVR/05/2333A dated 25th May 2018.

With reference to above, we are herewith enclosing the compliance report for REEP (Earlier named MoPP) operation for the period October 2020 to March 2021 for your information please.

As advised, we are submitting the soft copy in PDF to email ID – roez.bsr-mef@nic.in for kind information.

With regards.

Yours truly,
For IREL(India) Limited


CGM & HEAD (OSCOM)



Format for filling up of Compliance report

Annexure-1

Name of the project: 1. Rare Earth Extraction Plant (earlier named MoPP) of OSCOM, IREL (India) Limited

Clearance letters No and Date: i. MoEF letter no. 11015/348/2009-IA.II (M) dated 9th February 2011 for REEP(Earlier named as MoPP)

Period of Compliance Report: **October 2020 to March 1**

6A. Specific Conditions	Compliances
(i) The project proponent shall obtain prior Consent to Establish and Consent to Operate for the project from the State Pollution Control Board, Orissa and shall effectively implement all the conditions stipulated therein.	Consent to Establish is obtained from Odisha State Pollution Control Board (OSPCB) vide letter No.27002/Ind-II-NoC-3625 dated 23.12.2008. Consent to Operate is obtained from OSPCB for REEP operation vide letter No.5456/ Ind-I-Con-6419 dated 31 st March 2014 and all the stipulated conditions are being implemented. Consent to Operate Order No.2794 has been obtained vide OSPCB letter No.2304 dated 3rd March 2018 for REEP which is having validity upto 31 st March 2023. All the stipulated conditions are being implemented.
(ii) The project proponent shall ensure that no natural watercourse and/or water resources shall be obstructed due to any operations of the project.	No natural water course/ water resource has been obstructed during trial operation of REEP.
(iii) The existing slurry pipeline shall be used and no new pipeline shall be laid through the CRZ area. The discharge shall also be made through the existing pipeline. No new activity relating to the project shall be undertaken in CRZ area without obtaining requisite prior clearance under the CRZ Notification, 2011.	REEP treated effluent is reused in MSP using the existing pipeline. No new pipeline will be laid through the CRZ area and no new activity relating to the project will be undertaken in CRZ area
(iv) No ash/waste shall be discharged or dumped in the CRZ area.	Ash/waste is not dumped/discharged in CRZ area. Fly Ash are being dumped in low lying mined out area.
(v) The project proponent shall develop effective emergency response procedure to ensure appropriate risk management measures in the public domain, If any, due to the project.	Emergency Preparedness & Response and Distasted Management Plan to ensure appropriate risk management measures in the public domain is prepared and submitted to MoEF&CC, Central Regional Office, and Bhubaneswar vide our letter No.TS/ENVR/05G/5601A dated 6 th October 2017.
(vi) The AERB clearance for the site as applicable shall be obtained before starting any construction work and a copy of the same shall be provided to the Ministry of Environment and Forests and its Regional office located at Bhubaneswar.	We have obtained AERB clearance for setting up of REEP (copy already submitted vide our letter No.TS/ENVR/05/ OSCOM/10801A dated 26 th December 2011).



<p>(vii) Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of particulate matter such as loading and unloading point and all transfer points. Extensive water sprinkling shall be carried out on roads. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.</p>	<p>Water sprinkling is being carried out for existing operations for suppression of dust. Suitable ventilation arrangements have been provided at critical air pollution prone areas.</p> <p>Air Quality Monitoring (AQM) stations: AQM monitoring is being carried out by M/s Centre for Envotech & Management Consultancy Pvt.Ltd., Bhubaneswar, a NABL accredited & MoEF&CC authorized agency, at five stations (Mining area, IREL Colony, North mining, Bada Arjipalli & Kanamana) and in plant area on regular basis. The data for the period October 2020 to March 2021 is enclosed in Annexure-2. From the monitoring data it is seen that the PM10 levels are within the norm of 100 µg/m³ and PM2.5 levels are within the norm of 60 µg/m³.</p>
<p>(viii) Regular monitoring of conventional gaseous pollutants, radioactive pollutants in the air as well in the discharged water shall be monitored regularly as per AERB standards.</p>	<p>Monitoring of gaseous pollutants, radioactive pollutants in the air and treated effluent are regularly monitored and AERB standards are maintained during Plant operation. The monitoring report on Stack gas emission, radioactivity levels and for treated effluent for the period October 2020 to March 2021 are enclosed in Annexure-2 respectively.</p>
<p>(ix) A Disaster Management Plan and Emergency Preparedness Plan shall be prepared and put in place as per the norms of AERB. Regular mock drills shall be undertaken and based on the same, any modification required, if any, shall also be incorporated.</p>	<p>Emergency Preparedness & Response and Distasted Management Plan is prepared in line with AERB norms submitted to MoEF&CC, Central Regional Office, Bhubaneswar vide our letter No.TS/ENVR/05G/5601A dated 6th October 2017. Regular mock drills are conducted.</p>
<p>(x) The radioactive waste, if any shall be managed as per the norms prescribed by the AERB. ,</p>	<p>The radioactive waste management is being carried out as per the norms prescribed by AERB.</p>
<p>(xi) Plantation including a green belt of at least 7.5m width all around the plant shall be developed by planting the native species in consultation with the local DFO/ Agriculture Department.</p>	<p>Plantation activity were regularly being carried out in mined out areas & inside plant & housing colony areas of OSCOM & REEP. The details of plantation activities, carried out at mining area, plant & Housing Colony area along with photographs of the plantation in plant area (including plantation in 7.5m width boundary) & mining area were submitted to MoEF&CC, Central Regional Office, Bhubaneswar vide our letter No.TS/ENVR/05G/5601A dated 6th October 2017.</p>
<p>(xii) The project authority shall implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.</p>	<p>Implementation of Rain Water harvesting & construction of artificial recharge structures in IREL Plant site as well as in Housing Colony have already been taken up in consultation with the Regional Director, Central Ground Water Board to augment the ground water resources in the area.</p>



<p>(xiii) Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers in and around the project area especially around the trenches to be used for storage of waste material generated in the processing plant. The periodic monitoring [(at least four times in a year- pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January); once in, each season)] shall be carried out in consultation with the State Ground Water Board/Central Ground Water Authority and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional Office Bhubaneswar, the Central Ground Water Authority and the Regional Director, Central Ground Water Board. If at any stage, it is observed that the groundwater table and quality is getting affected due to the project activity, necessary corrective measures shall be carried out.</p>	<p>Ground water monitoring is regularly carried out inside OSCOM on monthly basis and around OSCOM (from local villages) on quarterly basis in a year and half yearly reports are sent to the Regional Office, Ministry of Environment and Forests, Bhubaneswar regularly. The monitoring report for the period October 2020 to March 2021 is enclosed as in Annexure-2.</p> <p>Commercial production of REEP is initiated from April 2015 onwards. Periodic monitoring of ground water is under progress and the monitoring data is being sent to the Ministry of Environment and Forests and its Regional Office Bhubaneswar, the Central Ground Water Authority and the Regional Director, Central Ground Water Board regularly.</p> <p>Corrective measures shall be immediately taken if it is observed that the groundwater table and quality is getting affected due to the REEP operation.</p>
<p>(xiv) The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water(surface water and groundwater) required for the project.</p>	<p>The existing two numbers of borewells of Thorium Plant are used for REEP for which there are having permission.</p>
<p>(xv) Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, Central Ground Water Board.</p>	<p>Implementation of Rain Water harvesting & construction of artificial recharge structures in IREL Plant site as well as in Housing Colony have already been taken up in consultation with the Regional Director, Central Ground Water Board to augment the ground water resources in the area.</p>
<p>(xvi) Monitoring of background radiation levels in water, soil and ambient air should be carried out periodically in the study area (core and buffer zone) of the project through an expert agency like Health Physics Division of Bhaba Atomic Research Centre (BARC).</p>	<p>Monitoring of background radiation levels in water, soil and ambient air were carried out in the study area (core and buffer zone) of REEP by Health Physics Unit (HPU) of Bhaba Atomic Research Centre (BARC), stationed at OSCOM and results were incorporated in EIA & EMP Report of REEP (submitted to MoEF, New Delhi vide our letter TS/ENVR/43A/6257A dated 12th July 2010 and to MoEF, Regional Office, Bhubaneswar vide our letter No.TS/ENVR/43A/2555A dated 15th March 2010. Periodic monitoring is being carried out regularly by HPU during REEP operation and reports are regularly submitted to MoEF & to the Regional Office, Bhubaneswar. The monitoring report on radiation levels during the period October 2020 to March 2021 is enclosed in Annexure-2.</p>



<p>(xvii) Sewage treatment plant shall be installed for the colony. ETP shall also be provided for the workshop and the wastewater generated during the processing process. Discharges from the treatment plant and settling pits should be constantly monitored for concentration of radio nuclides.</p>	<p>Construction of STP having capacity 0.6MLD /600KLD worth value Rs 1,42,00,269(One crore Forty Two Lakhs Two Hundred Sixty Nine Only)vide work order no.12-CAP-2739 ON DATED 29.02.2020 TO M/S Essel Enviro System Pvt.Ltd) is under progress.80 % of civil work has been completed. All the effluents are being monitored as per OSCPB & AERB norms.</p>
<p>(xviii) Sludge from the treatment plant and settling pit should be transported in safe containment.</p>	<p>Sludge from the effluent treatment plant and settling pit are transported to RCC Trenches as per AERB recommendation.</p>
<p>(xix) The project authorities should undertake sample survey to generate data on pre-project community health status within a radius of 1 km from the proposed project.</p>	<p>As OSCOM is an existing unit, health survey of nearby village population is being regularly carried out and record is maintained. Regular employees & Contractual Workers are subjected to initial & periodic Medical Examinations as per Statutory guidelines and records maintained at Medial Department, total cases attended during 2020 are 6870. Villagers of adjoining areas are provided medical treatment facilities on regular basis through Family Health Clinic & Occupational Health Centre & record maintained, total cases attended during 2020 are 3264. The annual disease profile of the local village & employee's area is sent to the MoEF, New Delhi as well as to the Regional Office, MoEF, and Bhubaneswar along with half yearly compliance report.</p>
<p>(xx) Occupational health surveillance program of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed. Health records of the workers shall be maintained.</p>	<p>Occupational health surveillance program of the workers are being carried out periodically to observe any contractions due to exposure to dust/radiation and corrective measures are being taken. The same practice is being followed for the employees who are working in REEP and record is maintained. The annual disease profile of the local village & employee's area is enclosed herewith as Annexure-2,</p>
<p>(xxi) Pre-placement medical examination and periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly.</p>	<p>Pre-placement medical examination and periodical medical examination of the workers are regularly carried out as per Mining Rules & AERB Rules for the employees following schedule of health examination and record is maintained.</p>
<p>(xxii) The plants growing in the area, soil invertebrate animals and local agricultural produce should be analysed to check the buildup of radioactivity levels, if any.</p>	<p>The report on radioactivity levels in plants growing in the area, soil invertebrate animals and local agricultural produce, carried out by Health Physic Unit, Bhava Atomic Research Center, stationed at OSCOM was submitted to MoEF & CC, Central Regional Office, Bhubaneswar vide our letter No.TS/ ENVR/05G/5601A dated 6th</p>



	October 2017.
(xxiii)The project proponent shall have an emergency response plan to ensure that all potentially affected people understand the possible causes and consequences of radiation and other project related activities.	Emergency Preparedness Plan is already available. The possible causes and consequences of radiation and other related activities have been identified and necessary action for remedy of the same has been mentioned.
(xxiv)The project proponent shall take all precautionary measures during mining operation for conservation and protection of flora and endangered fauna namely olive ridley turtle etc. spotted in the study area. Action plan for conservation of flora and fauna prepared shall be implemented in consultation with the State Forest and Wildlife Department. All the safeguard measures brought /out in the Wildlife Conservation Plan so approved specific to this project site shall be effectively implemented. Necessary allocation of funds for implementation of the conservation plan shall be made and the funds so allocated shall be included in the project cost. A copy of action plan shall be submitted to the Ministry of Environment and Forests and its Regional Office, Bhubaneswar.	<p>All the precautionary measures during mining operation for conservation and protection of flora and fauna are being carried out. The mining is open cast type. After separation of heavy minerals, the mined out area is simultaneously back filled by the reject sand. The mined out area is leveled to near original topography and left for one year for sand stabilization. After one year, the area is planted with suitable local species e.g. Casurina, Cashew nut. Plantation is taken by giving the area by way of offering a contract to private contractor/ Co-operative Society of the local villages. The growth of herbaceous trees/creepers further stabilizes the sand and the ecological conditions are restored back. The biological report on flora and, fauna, duly authenticated by PCCF & WLW, separately for core and buffer zone considering 10 km from mine lease boundary was furnished in Annexure-23 in EIA & EMP Report.</p> <p>As per approved plan, Rs. 46.0 lakhs has already been paid as per advice of Divisional Forest Officer (D.F.O.), Berhampur. Odisha Forest Department is taking necessary measures for conservation of sea turtles as per the approved plan. We are also providing necessary essential items/supports, as advised by D.F.O., Berhampur, during the breeding activity of Olive Reedley sea turtles in every year.</p>
(xxv) Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Most of the labourers engaged for construction work were belonging to nearby villages. However, for outside labourers, the Contractor as well as IREL provided necessary facilities like fuel for cooking, toilets, safe drinking water, change room etc. Medical facilities and safety appliances were provided to all the contractual labourers. The temporary housing sheds were removed after the completion of the project.
6B. General Conditions	
(i) No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	Expansion or modification of REEP will be carried out only after obtaining prior approval of the Ministry of Environment and Forests.
(ii) Four ambient air quality-monitoring stations should be established in the core zone as well	Ambient air quality monitoring is already carried out in three permanent stations, thrice in a



as in the buffer zone for RSPM (Particulate matter with size less than 10 micron i.e. PM ₁₀), NO _x and SO ₂ monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.	month, around IREL and one spot inside plant premises, monthly once basis which is in consultation with Odisha State Pollution Control Board. The monitoring results for the period October 2020 to March 2021 are enclosed in Annexure-2 for ready reference please.
(iii) Data on ambient air quality RSPM (Particulate matter with size less than 10 micron i.e., PM ₁₀), NO _x and SO ₂ should be regularly submitted to the Ministry of Environment and Forests including its Regional office located at Bhubaneswar and the State Pollution Control Board / Central Pollution Control Board once in six months.	Ambient air quality with respect to parameters RSPM (PM ₁₀), NO _x and SO ₂ are regularly monitored and submitted to Odisha State Pollution Control Board once in a month and to the Regional office, Ministry of Environment and Forests, Bhubaneswar vide half yearly compliance report.
(iv) Measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. shall be provided with ear plugs / muffs.	Noise levels are regularly monitored and submitted to the Regional office, Ministry of Environment and Forests, Bhubaneswar. Personnel engaged in noisy areas are provided with ear plugs / muffs. The same practice will also be followed for REEP operation. The monitoring data on noise level is enclosed in Annexure-2.
(v) Industrial wastewater shall be properly collected and treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 th May 1993 and 31 st December, 1993 or as amended from time to time. The treated wastewater shall be utilized for plantation purpose.	After re-engineering for effective utilization of water, 15-17 m ³ /day of treated effluent is generated from REEP operation, after conforming to the prescribed standards, the same is used for plantation & reuse in MSP.
(vi) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.	Personnel working in dusty areas are provided appropriate protective respiratory devices such as nose masks, goggles. Adequate training and information on safety and health aspects are regularly provided to all the employees of OSCOM & REEP.
(vii) Separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.	Environment Management Cell is constituted and functioning. In addition, quarterly Environment Management Review meetings are being conducted to carry out to review the progress of requirements of Environment Management system as per ISO 14001.



<p>(viii) The project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.</p>	<p>Date of Financial Closure: Rs.98.31 crores during the year 2007 which was revised to Rs148.49 crores on 25th August 2011. Date of final approval of the Project: 25th August 2011 Date of start of land development work: 15th May 2011</p>
<p>(ix) The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar.</p>	<p>Fund has already been allocated to meet the expenditures for protection and maintaining the environmental safeguards in respect of existing operations and the year wise expenditure is regularly informed to the Regional Office, MoEF, Bhubaneswar. The same practice will be followed for REEP operation also.</p>
<p>(x) The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.</p>	<p>Co-operation will be fully extended to the officials of Regional Office, MoEF, Bhubaneswar and all the information/data shall be provided as per requirement.</p>
<p>(xi) The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions including results of monitored data (both In hard copies as well as by e-mail) to the Ministry of Environment and Forests, its Regional Office Bhubaneswar, the respective Zonal Office of Central Pollution Control Board, the State Pollution Control Board. The proponent shall upload the status of compliance of the environmental 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 Ministry of Environment and Forests, Bhubaneswar, the respective Zonal Office of Central Pollution Control Board and the State Pollution Control Board.</p>	<p>Six monthly compliance report along with monitoring data as per the conditions stipulated in the environmental clearance letter will be regularly provided to the MoEF, its Regional Office Bhubaneswar, Odisha State Pollution Control Board. Environmental Statement report is being displayed in IREL website and the same will be updated periodically. The compliance reports and monitoring data will be displayed in IREL website and the same will be updated periodically.</p>
<p>(xii) A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parisad/ 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 website of the Company by the proponent.</p>	<p>The copy of the clearance letter was sent to the Panchayat of villages e.g. Kalipalli, Arjipalli, Kanamana, Zilla Parishad, District Industries Office etc. Copy of the above letter was sent to the Regional Office, MoEF, and Bhubaneswar for information. The clearance letter is put on the website of IREL.</p>



(xiii) The State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and the Collector's office/ Tehsildar's Office for 30 days.	The Regional Officer of Odisha State Pollution Control Board informed during discussion that necessary action was taken in this regard.
(xiv) The environmental statement for each financial year ending 31 st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently shall also be put on the website of the company along, with the status of compliance of environmental clearance conditions and shall also be sent to the Regional Office of the Ministry of Environment and Forests, Bhubaneswar by e-mail.	The environmental statement for each financial year ending 31 st March for existing operations of REEP is prepared and submitted in Form-V to the Odisha State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended thereon. It is also uploaded in IREL website along with the status of compliance of environmental clearance conditions.
xv) The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at http://lenvfor.nic.in and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubaneswar.	The matter regarding issue of the environmental clearance letter for setting up of a Monazite Processing Plant within the existing OSCOM premises was published in two local daily news papers i.e. in 'Indian Express' & in 'Samaj' in English & Oriya languages respectively on 16 th February 2011. The copies of the same advertisements were sent to the Regional Office, MoEF, Bhubaneswar vide our letter No.TS/ENVR/43A/2291A dated 18 th March 2011.
7. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.	Agreed.
8. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act, 1986.	Agreed.
9. The above conditions will be enforced inter-alia, under the provision the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rule made there under and also any other orders passed by the Hon'ble Supreme Court of India/High Court of Orissa and any other Court of Law relating to subject matter.	Agreed.



आईआरईएल (इंडिया) लिमिटेड

IREL (India) Limited

(Formerly INDIAN RARE EARTHS LIMITED)

(भारत सरकार का उपक्रम - परमाणु ऊर्जा विभाग)

(A Government of India Undertaking - Dept. of Atomic Energy)

Orissa Sands Complex, Matikhalo (P.O)

Chatraour (Ganiam), Odisha - 761 045. INDIA

उड़ीसा सैंड्स कॉम्प्लेक्स, माटिखलो (डाक)

छत्रापुर (गंजाम), ओडिशा- 761045, भारत

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TS/ENVR/ EC /SWDP/

31st May 2021

To,
The Additional Principal Chief Conservator of Forests,
Government of India,
Ministry of Environment, Forests & Climate Change (MoEF&CC),
Eastern Regional Office (Eastern Zone),
A/3, Chandrasekharpur, Bhubaneswar-751 023.

Dear Sir,

Sub. - Half-yearly progress report on Sea Water Desalination Plant(SWDP).

Ref.- i. CRZ clearance vide MoEF&CC letter No. 11-41/2015-IA-III dated 16-08-2018.

ii. MoEF&CC Regional Office letter No.101-1066/EPE/753 dated 24.04.2019.

With reference to the above letter of MoEF&CC, we would like to inform that subsequent to obtaining approval of MoEF & CC-CRZ clearance dated. 16-08-18, the contract awarding work for sea water intake-outfall has been taken-up. The construction work in CRZ area is in advanced stage.

We are herewith enclosing the compliance report for operation of Sea Water Desalination Plant (SWDP) with respect to the above referred EC letters for the period October 2020 to March 2021 for kind information please.

As advised, we are submitting the soft copy in PDF to the email ID – roez.bsr-mef@nic.in for kind information.

With regards.

Yours truly,
For IREL (India) Limited

CGM & HEAD (OSCOM)



Format for filling up of Compliance report

Annexure-1

Name of the project: Sea Water Desalination Plant (SWDP).

Clearance letters No and Date: i. CRZ clearance vide MoEF&CC letter No. 11-41/2015-IA-III dtd 16-08-2018.

ii. MoEF &CC Regional Office letter No.101-1066/EPE/753 dated 24.04.2019.

Period of Compliance Report: **October 2020 to March 2021**

Sr. No.	Condition	Compliance
PART-A	SPECIFIC CONDITIONS	
i.	The project proponent shall ensure that the guidelines for building and construction projects issued vide this Ministry's OM No.19-2/2013-IA.III dated 9th June, 2015.1 are followed to ensure sustainable environmental management.	Construction of sea water intake pump house and laying of intake-outfall pipelines etc. has already started but work is not completed. While doing construction work, guideline are followed.
ii.	The project activity shall be carried out strictly be as per the provisions of CRZ Notification, 2011, and shall not affect the coastal ecology of the area including flora and fauna.	Yes, Noted please.
iii.	The Project Proponent shall ensure that there is no destruction of mangroves during the construction as well as the operation phase of the project.	There are no mangroves in the proposed project site.
iv.	No radiation related discharge shall be released in the coastal area including the Sea.	Desalination plant has no radiation linkage.
v.	There shall be no dressing or alteration of the sand dunes and natural features, including landscape changes for beautification, recreation and other such purpose.	Project site is within Gopalpur Ports(GPL). Activities like dressing or alteration of the sand dunes etc are not involved.
vi.	All conditions/recommendations stipulated by the Odisha Coastal Zone Management .Authority (OCZMA) vide their letter No 64/OCZMA dated 25.08.2015, shall strictly be complied with, as may be applicable.	Yes, agreed upon.
vii.	The project proponent shall obtain all necessary clearances/ permission from the concerned authorities as applicable.	Yes, agreed upon.
viii.	Solid waste shall be managed as per Solid Wastes Management Rules, 2016.	Yes, agreed upon.
ix.	Consent to Establish' as may be applicable, shall be obtained from State Pollution Control Board under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.	Complied.CTE already obtained.
x.	All waste (liquid and solid) arising from the proposed development will be disposed of as per the	Yes, agreed upon.



Sr. No.	Condition	Compliance
	norms prescribed by State Pollution Control Board. There shall not be any disposal of untreated effluent into the sea/coastal water bodies.	
xi.	No Permanent labour camp, machinery and material storage shall be allowed in CRZ area.	Yes, agreed upon.
xii.	There shall no ground water drawal within CRZ without prior approval of the Central Ground Water Authority.	Yes, agreed upon.
xiii.	Disposal of muck during construction phase should not create any adverse effect on the neighbouring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority	Construction is within Ports Area (GPL) and there are no neighbouring communities nearby.
PART-B	GENERAL CONDITION	
i.	A copy of the clearance letter shall also be displayed on the website of the concerned State Pollution Control Board. The Clearance letter shall also be displayed at the Regional Office, District Industries centre and Collector's Office/ Tehsildar's office for 30 days.	Copy of Clearance letter provided to OSPCB.
ii.	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its concerned Regional Office.	Yes, agreed upon. The Environmental protection measures were taken for all functions of OSCOM and shall be taken once the desalination plant is in operation.
iii.	Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Yes, agreed upon.
iv.	The above stipulations would be enforced among others under the provisions of the Water (Prevention and Control of Pollution) Act'. 1974, the Air (Prevention and control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public liability (Insurance) Act, 1991, the EIA Notification, 2006 and the CRZ Notification, 2011.	Yes, agreed upon.
v.	Full co-operation shall be extended to the officials from the Regional Office of MoEF&CC, during monitoring of implementation of environmental safeguards stipulated. It shall be ensured that documents/data sought pertinent is made available to the monitoring team. A complete set of all the documents submitted to MoEF&CC shall be forwarded to the concerned Regional Office of	Yes & Co-operation will be fully extended to the officials of Regional Office, MoEF, Bhubaneswar and all the information/data shall be provided as per requirement.



Sr. No.	Condition	Compliance
	MoEF&CC.	
vi.	In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by this Ministry.	No change in scope of project.
vii.	The Ministry reserves the right to add additional safeguard measures subsequently, if found necessary and to take action including revoking of the environment clearance under the provisions of the Environmental (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.	Yes, Noted please.
viii.	All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.	Yes, will be followed.
ix.	The project proponent should advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded CRZ Clearance and copies of clearance letters are available with the State Pollution Control Board (SPCB) and may also be seen on the website of the Ministry of Environment, forest and Climate Change at http://www.envfor.nic.in . The advertisement should be made within Seven days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the concerned Regional Office of this Ministry	Complied.



Six Monthly Compliance Report (October 2020 to March 2021)

4	This Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.	Yes, Noted please.
5	Any appeal against this clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	Yes, Noted please.
6	.A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad/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 website of the company by the proponent.	Copy of the clearance letter already sent to local Panchayats. The clearance letter is already displayed in IREL website.
7	The proponent shall upload the status of compliance of the stipulated 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 MoEF&CC, the respective Zonal Office of CPCB and the SPCB.	Yes, will be followed.
8	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 clearance conditions and shall also be sent to the respective Regional Office of the Ministry by e-mail.	Being complied regularly for all facilities of OSCOM, IREL & the environmental statement for each financial year ending 31st March in Form-V is submitted to OSPB.



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (October 2020 to March 2021)



आइआरइएल (इंडिया) लिमिटेड

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(भारत सरकार का उपक्रम – परमाणु ऊर्जा विभाग)

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website: www.irel.co.in



TS/ENVR/EC /TDP/

31st May 2021

To,
The Additional Principal Chief Conservator of Forests,
Government of India,
Ministry of Environment & Forests,
Eastern Regional Office (Eastern Zone),
A/3, Chandrasekharpur, Bhubaneswar-751 023.

Dear Sir,

Sub. - Half-yearly progress report on Technology Demonstration Plant .

Ref.-i. MoEF letter no. J- 11011/44/2014-IA.II (I) Dated.24th Dec.2018

We are herewith enclosing the compliance report for operation of Technology Demonstration Plant with respect to the above referred EC letters for the period October 2020 to March 2021 for kind information please.

As advised, we are submitting the soft-copy in PDF to email ID – roe.bsr-mef@nic.in for kind information.

With regards.

Yours truly,
For IREL (India) Limited

CGM & HEAD (OSCOM)

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IREL(India)Limited, OSCOM

Six Monthly Compliance Report (October 2020 to March 2021)

Format for filling up of Compliance report

Annexure-1

Name of the project: 1. Technology Demonstration Plant (TDP) IREL (India) Limited

Clearance letters No and Date: Compliance of various points raised by MoEF letter no. J-11011/44/2014-IA.II (I) Dated.24th Dec.2018

Period of Compliance Report: **October 2020 to March 2021**

Construction of TDP has not started and CTO shall be applied once the plant construction work completed.

Specific Conditions:

S.No.	Description of Conditions	Status
1	The project proponent shall conduct study on Bio-Degradation of hazardous primary amines and volatile solvents used for solvent extraction through a reputed scientific organization within one year and recommendations of the study shall be implemented. Meanwhile the project proponent shall dispose the solids in the TSDF as per the CPCB guideline.	A project has been given to ICT, Mumbai for the treatment of waste water containing primary amine solvent using novel approach of combined hydrodynamic cavitations & oxidation process during 17.6.2019. The project aimed at to ensure degradation of primary amine solvent in effluent of 5m3/h. Project report prepared by ICT, Mumbai.

General Conditions:

SlNo.	General Conditions	Compliance
1	Statutory compliance	
i.	The recommendations of the approval Turtle Conservation Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six- monthly compliance report.	Being complied.
ii.	The project proponent shall obtain Consent to Estabilsh/Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the Odisha State Pollution Control Board/Committee.	CTE has been obtained form OSPCB.
iii.	The project proponent shall obtain the necessary permission from the Central ground Water Authority, in case of drawl of ground water/ from the competent authority concerned in case of drawl of surface water required for the project.	NOC from CGWB has been obtained .
iv.	The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules,	The renewal of authorizations has been obtained vide letter no



	2016 as amended from time to time.	IND-IV-HW-12/13527 dated 17.12.2019 and valid up to 31.3.2024 and same shall be used for TDP.
2	Air quality monitoring and preservation	
i.	The project proponent shall install 24x7 continuous emission monitoring system at process stacks to monitor stack emissions with respect to standards prescribed in Environment (Protection) Rules, 1986 as amended from time to time and connect the systems to SPCB and CPCB online servers and calibrated these systems from time to time according to equipment supplier specification through the labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	The plant has not started & shall be complied once the plant starts.
ii.	The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognized under Environment (Protection) Act, 1986.	Shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognized under Environment when plant starts operation .
iii.	The project proponent shall install continuous Ambient Air Quality monitoring systems for monitoring of communication/ criteria parameters relevant to the main pollutants released (e.g. PM ₁₀ and PM _{2.5} in reference to Pm emission, And SO ₂ and NO _x in reference to SO ₂ and NO _x emissions) within and outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120° each), covering upwind and downwind directions.	Shall be complied once the plant starts.
iv.	The project proponent shall submit monthly report of continuous stack emission and ambient air quality monitoring along with results of manual stack monitoring and manual monitoring of air quality/fugitive emissions to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.	Shall submit monthly report of continuous stack emission and ambient air quality monitoring once the plant is in operation.
v.	Appropriate Air Pollution Control (APC) systems shall be provided at all the dust generating points including fugitive dust from all vulnerable sources, so as to comply with the prescribed stack emission and fugitive emission standards.	Air Pollution Control (APC) systems to be provided at all the dust generating points including fugitive dust from all vulnerable sources, so as to comply with the prescribed



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Six Monthly Compliance Report (October 2020 to March 2021)

		stack emission and fugitive emission standards.
vi.	The project proponent shall use leak proof trucks/dumpers for carrying ore and other raw materials and cover them with tarpaulin.	Yes, complied for other operations of OSCOM.
vii.	Wind breaking fence and chemical spraying shall be provided on the raw material stock piles.	Since plant has not started yet, same shall be complied.
viii.	The PP shall Design the ventilation system for adequate air changes as per ACGIH document for all tunnels, motor houses, Oil Cellars.	Since plant has not started yet, same shall be complied.
3.	Water quality monitoring and preservation	
i.	The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules, 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrated these systems from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Rules, 1986 or NABL accredited laboratories. (case to case basis small plants: Manual; Large plants: Continuous)	Procurement action for continuous effluent monitoring system has been initial. Same shall be Installed .
ii.	The project proponent shall monitor regularly the ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognized under Environment (Protection) Act, 1986 and NABL accredited laboratories.	Shall comply to the conditions.
iii.	The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water quality to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.	Shall comply to the conditions when plant starts.
iv.	The project proponent shall provide the slime disposal facility with impervious lining and collection wells for collection of seepage. The water collected from the slime pond shall be treated and recycled.	Same shall be complied once the plant has stated its operation.
v.	Adhere to 'Zero Liquid Discharge'	Shall be complied once the plant starts its operation.
vi.	Sewage Treatment Plant shall be provided for treatment of domestic waste water to meet the prescribed standards.	Construction of STP is under progress. Same to be used for TDP also.
vii.	Garland drains and collection pits shall be provided for each stock pile to arrest the run-off in the event of	Garland drains and collection pits are provided for each



Six Monthly Compliance Report (October 2020 to March 2021)

	heavy rains and to check the water pollution due to surface run-off.	stock pile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run-off.
viii.	The project proponent shall practice rainwater harvesting to maximum possible extent.	Implementation of Rain Water harvesting & construction of artificial recharge structures in IREL Plant site as well as in Housing Colony have already been taken up.
ix.	The project proponent shall make efforts to minimize water consumption in the plant complex by segregation of used water, practicing cascade use and by recycling treated water.	Efforts shall be made to recycle most of the water.
4.	Noise monitoring and prevention	
i.	Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as part of six-monthly compliance report.	Agreed upon ,shall be complied.
ii.	The ambient noise levels should conform to the standards prescribed under E (P) A Rules,1986 viz.75 dB(A) during day time and 70 dB (A) during night time.	Agreed upon ,shall be complied.
5.	Energy Conservation measures	
i.	Provide solar power generation on roof tops of buildings, for lighting of all common areas, street lights, parking around project area and maintain the same regularly.	Shall be complied.
ii.	Provide LED lights in the offices and residential areas.	LED lights were provided to offices and residential areas.
6.	Waste management	
i.	The waste oil, grease and other hazardous waste shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016.	Same shall be complied once the plant has stated its operation.
ii.	Kitchen waste shall be composted or converted to biogas for further use. <i>(to be decided on case to case basis depending on type and size of plant)</i>	Not applicable.
7.	Green Belt and EMP	
i.	Green belt shall be developed in an area equal to 33 % of the plant area with native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant.	The details of plantation and green belt development are mentioned in Annexure-2.
ii.	The project proponent shall prepare GHG emissions	Agreed upon



	inventory for the plant and shall submit a programme for reduction of the same including carbon sequestration and plantation.	
8.	Public hearing and Human health issues	
i.	Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.	Agreed upon & same shall be complied.
ii.	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.	Personnel working shall be provided with appropriate protective respiratory devices such as nose masks, goggles. Adequate training and information on safety and health aspects are to be provided.
iii.	Provision shall be made for the housing of construction labour 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 temporary structures to be dismantled/ removed after completion of the project.	Agreed & shall be complied.
iv.	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	Regular employees & Contractual Workers shall be done when plant shall be in operation.
9.	Corporate Environment Responsibility	
i.	The project proponent shall comply with the provisions contained in this Ministry's Om vide F.No. 22-65/2017-IA.III dated 1 st May 2018 as applicable, regarding Corporate Environment Responsibility.	Yes, Agreed upon
ii.	The company shall have a well laid down environmental policy duly approved by the Board of Directors. The environmental policy should prescribe for standard operating procedure to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental/ forest/ wildlife norms/ conditions. The company shall have defined system of reporting infringements/deviation/violation of the environmental/ forest/ wildlife norms/ conditions and /or share holders/ stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six- monthly report.	Being complied.



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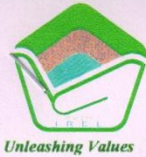
Six Monthly Compliance Report (October 2020 to March 2021)

iii.	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly report to the head of the organization.	Shall be Complied. Environment Management Cell is constituted and functioning. In addition, Environment Management Review meetings are being conducted on quarterly basis to carry out to review of the progress of requirements of Environment Management system as per ISO 14001.
iv.	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry / Regional Office along with the Six Monthly Compliance Report.	The year wise funds shall be earmarked for environmental protection measures are kept in separate account and are not diverted for any other purpose.
v.	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.	Agreed upon.
vi.	All the recommendations made in the Charter on Corporate Responsibility for Environmental Protection (CREP) for the Mineral Beneficiation plants shall be implemented.	Yes, Agreed Upon.



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (October 2020 to March 2021)



IREL (India) Limited
(Formerly INDIAN RARE EARTHS LIMITED)

(भारत सरकार का उपक्रम - परमाणु ऊर्जा विभाग)

(A Government of India Undertaking - Dept. of Atomic Energy)

उड़ीसा सैंड्स कॉम्प्लेक्स, माटिखलो (डाक)
छत्रपुर (गंजाम), ओडिशा- 761045 भारत
Orissa Sands Complex, Matikhalo (P.O)
Chatrapur (Ganjam). Odisha -761 045. INDIA

ISO 9001: 2015, ISO 14001: 2015 & ISO 45001: 2018 Company

फैक्स/FAX : 06811 - 257988
e-mail head-irel@irel.co.in
website www.irel.co.in



TS/ENVR/EC /TP/

31st May 2021

To,
The Additional Principal Chief Conservator of Forests,
Government of India,
Ministry of Environment & Forests,
Eastern Regional Office (Eastern Zone),
A/3, Chandrasekharapur, Bhubaneswar-751 023.

Dear Sir,

Sub. - Half-yearly progress report on Thorium Section operations at OSCOM

- Ref.-i. MOE&F letter no.J-14011/5/91/IA-I dated 24th Sept'93
ii. MOE&F letter no.J-14011/5/91/IA-II dated 7th Apr'2000
iii. Our compliance report TS/ENVR/05/TP/4944A dated 23rd November 2018.

We are herewith enclosing the compliance report for operation of Thorium Section(merged with Rare Earths Extraction Plant) with respect to the above referred EC letters for the period October 2020 to March 2021 for kind information please.

As advised, we are submitting the soft-copy in PDF to email ID – roez.bsr-mef@nic.in for kind information.

With regards.

Yours truly,
For IREL (India) Limited


CGM & HEAD (OSCOM)

कारपोरेट कार्यालय : प्लॉट नं. 1207, सिद्धि विनायक मंदिर के सामने, वीर सावरकर मार्ग, प्रभादेवी, मुंबई - 400 028
Corporate Office: Plot no:1207, Opp. Siddhi Vinayak Temple, Veer Savarkar Marg, Prabhadevi, Mumbai-400 028
☎+91-22-24211630, 24211851,24220230,24382042, Fax: +91-22-24220236, website: www.irel.co.in



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (October 2020 to March 2021)

Name of the project: 1. Thorium Plant of OSCOM, IREL (India)Limited

Clearance letters No and Date: i. letter no. J- 14011/5/91 /IA-I dtd. 24.9.93 & J-14011/5/91/IA-II dated 07.04.2000.

Period of Compliance Report: **October 2020 to March 2021**

S.No.	Description of Conditions	Status
1- i.	All the stipulations of Atomic Energy Regulatory Board (AERB) pertaining to safety and related aspects shall be implemented and it will be ensured that :- (a) Radioactive wastes (solids and semi-solids) are properly treated and disposed off after proper containment in accordance with the standards/guidelines prescribed by ICRP/AERB.	During the period all the radioactive wastes were treated, contained where-ever necessary & disposed off as per the plans submitted by OSCOM and approved by AERB. The plant has submitted necessary particulars of radioactive wastes disposed during the period: October'20-March'21 to as per the Radioactive Waste Management Rules 1989.
	(b) Thorium and Uranium content in Sodium Nitrate to be disposed off through sale shall be regularly monitored and shall not exceed the limits prescribed by AERB.	No sodium nitrate solution was disposed off through sales during the period: October'20-March'21. The sodium nitrate solution were stored in lined pond for natural evaporation & after evaporation, the sodium nitrate crystals were stored in RCC trenches.
	(c) The liquid effluents emanating from different processes are treated to conform to the standards prescribed by Central/State Pollution Control Board and International Commission for Radiological Protection (ICRP/AERB).	The radioactive liquid effluent mainly emanate from operation of Thorium Plant. The effluent is treated and after monitoring the same is pumped to neutralization tank and the supernatant is pumped to Pond No.2 through the neutralization system of OSCOM. The Gross α & Gross β activity levels in the treated effluent were well within AERB prescribed limits 37.0 Bq/L and 370 Bq/L respectively during the period October'20-March'21.



Six Monthly Compliance Report (October 2020 to March 2021)

S.No.	Description of Conditions	Status
1-ii	Adequate number of air quality monitoring stations should be set up keeping in view the direction of wind flow, sensitive receptors as well as where maximum ground level concentration is anticipated. Also the manual monitoring of stack emissions should be carried out at regular intervals.	<p>Air Quality Monitoring (AQM) stations: AQM monitoring is being carried out by M/s Centre for Envotech & Management Consultancy Pvt.Ltd., Bhubaneswar, a NABL accredited & MoEF & CC authorized agency, at four stations (Mining area, IREL Colony, Bada Arjipalli & Kanamana) and in plant area on regular basis. The data for the period: October'20-March'21 is enclosed in Annexure-2. From the monitoring data it is seen that the PM₁₀ levels are well within permissible norm of 100 µg/m³ and PM_{2.5} levels are well within permissible norm of 60 µg/m³.</p> <p>Stack monitoring is being carried out for all the stacks of running plants. The monitoring results indicate that the Acid mist values in the stack emission from Thorium plant (merged with REEP) were well within the permissible norm of 50 mg/m³. The stack emission monitoring report is enclosed in Annexure-2.</p>
1-iii	The quality of liquid effluents should be regularly monitored. The treated effluents conforming to the prescribed standards should be utilized for development of green belt.	Being complied. The monitoring results of liquid effluent from Pond No.1 & 2 during the period: October'20-March'21 are given in Annexure-2. The water from Pond No.1 is reused for MSP operation & also for plantation development in mined out area.
1-iv	Radiation level at different locations of the plant should be regularly monitored and records maintained.	Being complied. A Health Physics Unit of Bhaba Atomic Research Center is stationed at OSCOM and regular radiation monitoring is carried out in the plant and periodic reports are submitted to SARCOP/AERB, monitoring report enclosed in Annexure-2.
1-v	Health of occupational workers as well as population living in the proximity of the plant (5 Km) should be monitored and records maintained.	Regular employees & Contractual Workers are subjected to initial & periodic Medical Examinations as per Statutory guidelines and records maintained at Medial Department, total cases attended during 2020 are 6870. Villagers of adjoining areas are provided medical treatment facilities on regular basis through Family Health Clinic & Occupational Health Centre & record maintained, total cases attended during 2020 are 3264. The annual disease profile of the local village & employee's area is enclosed herewith as Annexure-2,.



Six Monthly Compliance Report (October 2020 to March 2021)

S.No.	Description of Conditions	Status
1-vi	The emergency power requirement will be met from the already installed DG sets (610 KVA) and no additional DG sets shall be installed.	Emergency power requirement is being met from the existing facilities. No additional equipment has been installed.
1-vii	The steam requirement will be met from the existing boiler sets and no additional boiler set shall be installed.	The new coal fired package boiler (steam generation capacity of 18 t/h X 2 Boilers) is under operation in place of coal fired Boiler to meet the steam requirement of Thorium Section.
1-viii	Necessary precautions should be taken in respect of Occupational workers in coal handling area of the boiler unit.	Water spraying is being carried out for suppression of dust. Personnel working in dusty areas are provided appropriate protective respiratory devices such as nose masks, goggles.
1-ix	A satisfactory comprehensive EIA report should be submitted by March 1994 incorporating all the suggestion / observations made during the presentation on rapid EIA report.	Complied
1-x	Action plan for implementation of the Environmental Management Plan relating to air, water, noise, solid wastes, social-economic aspects, green belt development and environmental surveillance shall be prepared and implemented as per schedule and report submitted to Ministry of Environment and Forests every six months.	Being complied as per EMP. Monitoring results on air, water, noise, soil etc. are enclosed in Annexure-2.
2.	A separate environment management cell with laboratory facilities and suitably qualified people should be set up.	Environment Management Cell is constituted and functioning. In addition, quarterly Environment Management Review meetings are being conducted to carry out to review the progress of requirements of Environment Management system as per ISO 14001;2015.
3.	Adequate financial provisions should be made item-wise for implementation of the above provisions and there must be no diversion of such fund specified funds.	Being complied. During the year 2019-20, expenditure of Rs.279.84 lakhs were made towards environmental up-gradation, pollution control and CSR activities. Financial provision for the year 2020-21 has already been made to meet the requirement.



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (October 2020 to March 2021)

S.No.	Description of Conditions	Status
4.	The stipulations could be modified, altered or additional incorporated if felt necessary by Ministry of Environment & Forests after reviewing the comprehensive EIA report to be submitted by the proponents.	Complied. The Comprehensive EIA & EMP report was prepared for OSCOM and Thorium Plant was prepared and submitted to MoEF, New Delhi vides our letter No. TS/Envir/4669-A dated 26 th April 1994 to MoEF Regional Office (Eastern Zone), Bhubaneswar vide our letter No.TS/Envir/7401-A dated 24 th June 1994.
5.	The stipulations will be implemented among others under the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981 and the Environment (Protection) Act, 1986.	Stipulations given by State Pollution Control Board, Odisha are complied with & monthly statement is being regularly submitted.



आईआरईएल (इंडिया) लिमिटेड

IREL (India) Limited

(Formerly INDIAN RARE EARTHS LIMITED)

(भारत सरकार का उपक्रम - परमाणु ऊर्जा विभाग)

(A Government of India Undertaking - Dept. of Atomic Energy)

उड़ीसा सैंड्स कॉम्प्लेक्स, माटिखलो (डाक) Orissa Sands Complex, Matikhalo (P.O)
छत्रपुर (गंजाम), ओडिशा- 761045, भारत Chatrapur (Ganjam), Odisha -761 045, INDIA

ISO 9001: 2015, ISO 14001: 2015 & ISO 45001: 2018 Company

TS
06811-257890 to 257895
फैक्स/FAX 06811 - 257988
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website www.irel.co.in



TS/ENVR/REPM

Date: 27.05.2021

To,

The Additional Principal Chief Conservator of Forests (Central)

Ministry of Environment Forest & Climate Change,
Regional Office (South Eastern Zone)
1st & 2nd Floor, HEPC Building,
No.34, Cathedral Garden Road,
Nungambakkam,
Chennai - 600034

Dear Sir,

Sub: Half-yearly Compliance Report to the Stipulated Environmental Clearance conditions issued to the Setting of Rare Earth Permanent Magnet Plant with a manufacturing capacity of 3 TPY Rare Earth Metal and 3 TPY Rare Earth Permanent Magnet at BARC Campus, Vizag by M/s IREL(India)Limited.

Ref: EC Letter No.: F.No.J-14011/3/2018-IA-1(N) dated 26.07.2019.

We are hereby submitting the **Half-yearly Compliance Report** of the stipulated Environmental Clearance conditions to the above said project for the period of October 2020 to March 2021.

With Regards.

Yours truly,
For IREL (India) Limited,

CGM & HEAD (OSCOM)
28/5/2021



PROJECT: Environmental Clearance for Setting of Rare Earth Permanent Magnet Plant with a Manufacturing Capacity of 3 TPY Rare Earth Metal and 3 TPY Rare Earth Permanent Magnet at BARC Campus, Vishakhapatnam.

EC Letter No.: F.No.J-14011/3/2018-IA-1(N) dated 26.07.2019.

1 INTRODUCTION

M/s. IREL(India) Limited has proposed to setting up a plant for production of Samarium-Cobalt (SmCo) Rare Earth Permanent Magnets (REPM) with production capacity of 3 TPA Rare Earth Permanent Magnets (REPM) (product mix of SmCo_5 - 1 TPA and $\text{Sm}_2\text{Co}_{17}$ - 2 TPA) in an area of 5.0 Ac of acquired land within Bhabha Atomic Research Centre (BARC), Vizag Campus, Achutapuram, District Vishakhapatnam, State-Andhra Pradesh. Estimated cost of REPM project is Rs. 120.68 Crores.

Samarium-Cobalt (Sm-Co) Magnets are used by Department of Atomic Energy (DAE) and Defense due to their superior properties for strategic purposes. For the production facilities of the Samarium-Cobalt (SmCo) Rare Earth Permanent Magnets, a special purpose vehicle (SPV) under Department of Atomic Energy (DAE) will be formed and IREL(India)Limited will act as a management agent of the SPV to run the same.

2 BENEFITS

Samarium cobalt RE Permanent magnets find applications in Atomic Energy, space and Defense sectors for strategic purposes due to their superior qualities in the terms of high magnetic strength, corrosion resistance, device miniaturization capability and stability at the high temperatures. Presently our country is solely dependent on the imports settings of this project will supply the SmCo magnets in a continuous manner of various strategic projects. Product output of the project will be fully utilized by the Department of Atomic Energy/ DMRL to meet strategic need of the country.

The project is first of its kind in the country and manufacturing technology of Rare Earth Metal alloys and Permanent Magnets are developed by BARC and DMRL indigenously. REPM are essentially required by DoE for meeting strategic objectives pertaining to Atomic Energy Programme. The proposed REPM production facilities will be of strategic importance to the nation and is a "Make in India" initiative by Department of Atomic Energy (DAE). The project will be operated through SPV and IREL(India)Limited will be the management agent for the same.

3 OVERVIEW OF THE PROJECT

As per EIA Notification dated 14.09.2006 and its subsequent amendments, the project falls under Serial No.3 (a) Metallurgical Industry (Ferrous & Non-ferrous). Project will be setup in the acquired land and there will be no displacement of people. The water requirement for process and washing will be 24 KLD, for Chiller Plant cooling water



Six Monthly Compliance Report (Oct 2020 to Mar 2021)

requirement will be 120 KLD and Domestic water requirement will be 5 KLD. The waste water generated from process & washing will be 0.4 KLD, from DM plant water reject & back wash will be 1.0 KLD and from cooling tower blow down will be 1.92 KLD.

The plant will be designed as zero discharges (ZED) as far as the process effluents are concerned. The water will be re-circulated after process use, through required cooling and treatment. STP of capacity 5 KLD will be installed at the project site to treat domestic waste water. All the backwash water from DM plant, process waste water, after neutralization shall be used for toilet flushing, floor washing etc., along with STP treated waste water.

No fossil fuel will be used in the proposed facility as proposed project will be based on electric furnace/Vacuum Induction Melting Furnace. It is laboratory scale vacuum induction type batch furnace. Emission is negligible and hence no pollution control equipment envisaged. DG set of 750 KVA will be installed for backup power and HSD will be the fuel.

The solid waste generated from the process will be Calcium Hydroxide (0.75 TPA), Material Fines (0.04 TPA), Slag (0.237 TPA), Samarium Oxide (0.108 TPA) and Used Oil (0.165 LPA). No hazardous waste will be generated from the process except the Used Oil, which will be sold to registered recyclers, Calcium Hydroxide & Material Fines generated will be sold to outside agencies, Slag & Samarium Oxide generated will be reused in process and R-D route.

The rainwater harvesting pond of approx. 1500 cubic meter capacity would be considered. There would be generation of surface run-off of approx. 6725 cubic meter. It is expected that 60% of run-off (4035 cubic meters) will be collected in the pond, from the proposed plant facility. The plant runoff would be collected in the harvesting pond for use within the plant. 0.39 Ha (i.e. 33%) of area will be developed as greenbelt within the project site.

There is no forest land involved in the proposed area of 5.0 Ac for REPM project. No Wildlife Sanctuary / National Park / Mark Park located within 10 kms study area from the project site. No rare, endemic and endangered species found in the Study area. No Schedule-I species was found in the study area. No major river is within the 1 km of the project site. This REPM site is located at a distance of 4 Kms away from Bay of Bengal and thus does not require CRZ clearance.

4 STATUS OF COMPLIANCE WITH ENVIRONMENTAL CLEARANCE CONDITIONS

Vide E.C Letter *F.No.J-14011/3/2018-IA-1(N)* dated 26.07.2019 is described hereunder. Copy of the Latest Site Photographs is given in **Annexure I**.



S.No.	Conditions	Compliance
Specific Conditions		
1.	The project proponent shall obtain the necessary permissions/clearances from the BARC safety council before commencement of the project.	Agreed upon All necessary permissions/ clearances from the BARC safety council will be obtained before obtaining Consent To Operate from SPCB.
2.	Regular monitoring of conventional radioactive pollutants in the environment shall be ensured by the BARC Council as per the AERB standards.	Since the operation does not involve handling/production of any radioactive substance, monitoring of the radioactive pollutants in the environment is not required. BSC has given consent for necessary waiver in this regard.
3.	Soil and groundwater samples shall be tested to ascertain that there is no deterioration of groundwater quality by leaching heavy metals, radio nuclides and other toxic contaminants.	In view of clarifications at Sl.No.2, all conditions under this point, except related to radio nuclides, shall be complied. BSC has given consent for necessary waiver with respect to condition related to radio nuclides under this point. As per Environmental Monitoring Plan, regular monitoring will cover quality of Soil and Groundwater. Same will be reported to Regional Office – MoEF through Six monthly compliance report.
4.	The radioactive liquid waste emanating from the plant shall be treated and managed as per the guidelines of Atomic Energy Regulatory Board (AERB)/International Commission on Radiological Protection (ICRP) in this regard.	In view of clarifications at Sl.No.2, this condition is not applicable. BSC has given consent for necessary waiver in this regard.
5.	The clearance from NBWL shall be ensured, if applicable.	No Forest Land falls within the proposed project area.
6.	The radioactive levels in the different matrices of environment including food chain, air, water and soil shall be monitored regularly in the surrounding areas as per AERB standards and records to be maintained.	In view of clarifications at Sl. No.2, this condition is not applicable. BSC has given his consent for necessary waiver in this regard.
7.	The conventional pollutants shall also be	Agreed upon



IREL(India)Limited

Six Monthly Compliance Report (Oct 2020 to Mar 2021)

	monitored and records maintained	As per Environmental Monitoring Plan, regular monitoring will be carried out and same will be reported to Regional Office – MoEF through Compliance Report.
8.	Periodic health survey of the population residing within 5 km around the proposed plant site shall be undertaken.	Agreed upon Periodic health survey within 5 km around the project site will conducted and recorder.
9.	Green belt shall be developed in 33 % area around the project boundary with the native species of adequate density and width. In addition, plantation shall be raised in other vacant areas within the plant site	Agreed upon The area is net of green belt area considering the whole BARC Vizag facility. RD(Vizag) has informed that green belt adjacent to the plant site will be developed which is more than 33%.
10.	A Disaster Management Plan and Emergency Preparedness Plan shall be prepared and put up in place as per the norms of AERB. Regular mock drills shall be undertaken and based on the same, any modification required, if any, shall also be incorporated.	Agreed upon As per the norms of AERB, Disaster Management Plan and Emergency Preparedness Plan will be kept in records before commencement of the project. The mock drills will be conducted and recorded under regular basis.
11.	The Risk Analysis and Probabilistic Safety Assessment reports to be verified by the competent authority in BARC Safety Council and RO, MoEF&CC.	Agreed upon Risk analysis already is carried out and submitted. The plant set up is of normal industrial facility (small scale plant) and first of its kind in India. This is not a nuclear facility, hence probabilistic safety assessment report to quantify risk is not required.
12.	Suitable provision shall be made for sewage/waste water disposal and storm water independently.	Agreed upon Sewage/ waste water disposal and storm water will be nowhere connected and disposed/ reused as committed in EIA/ EMP Report.
13	Adequate rain water harvesting system shall be put in place as committed in EIA/EMP report.	Agreed upon Will be implemented as committed in EIA/EMP report.
14	The ventilation air shall be released into the atmosphere after necessary control and at adequate height so that the radiation release rate as well as the increase in radiation in the surrounding area above the background levels is within the permissible limits as	Agreed upon Radiation release rate as well as the increase in radiation levels will be controlled within the permissible limits by providing necessary control and adequate release height as committed in EIA/EMP report.



IREL(India)Limited

Six Monthly Compliance Report (Oct 2020 to Mar 2021)

	prescribed by the regulatory agency.	
General Conditions		
1.	Environmental clearance is subject to obtaining all the requisite clearances from the competent authorities including Forest Clearance, if applicable and shall strictly adhere to the stipulations of the SPCB and State Government or any other statutory body.	Complied Consent for Establishment was obtained from Andhra Pradesh Pollution Control Board Vide Order no. 481/ APPCB/ CFE/ RO - VSP/ HO/ 2019 dated 29.10.2019. (Annexure II) Plant will be operated after obtaining CFO.
2	Installation of STP should be certified by concerned Pollution Control Board.	Complied APPCB has occurred Consent for Establishment of STP.
3	It shall be ensured that the noise levels in the work zone both during construction and operation phase are within permissible limits. For people working in high noise area, requisite personal protective equipment like earplugs/ear muffs etc. shall be provided.	Agreed Upon Noise generation sources like DG set, pumps & motors will be installed with acoustic enclosures and labours will be allowed to work with mandatory PPE's.
4	Installation and operation of DG sets shall comply with notified guidelines	Agreed Upon Will be strictly followed.
5	The solid wastes shall be managed and disposed as per the norms of the Solid Waste Management Rules, 2016.	Agreed Upon Will be complied as per the norms of the Solid Waste Management Rules, 2016 and Consent order by APPCB.
6	Any wastes from construction and demolition activities related thereto shall be managed so as to strictly conform to the Construction and Demolition Rules, 2016	Agreed Upon Will be conformed to the Construction and Demolition Rules, 2016. As the construction process has started ,the same shall be complied in next half yearly report.
7	Hazardous waste (like used oil) generated in the plant will be disposed of as per Hazardous Waste (Management, Handling & Transboundary Movement) rules, 2016.	Agreed Upon Will be complied as per the norms of the Hazardous Waste (Management, Handling & Transboundary Movement) rules, 2016 and Consent order by APPCB.
8	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the	Agreed Upon Compliance of the stipulated EC conditions will be regularly submitted to RO, MoEF along with six monthly environmental baseline study reports.



IREL(India)Limited

Six Monthly Compliance Report (Oct 2020 to Mar 2021)

	requisite data/information/monitoring reports.	
9	The project proponent shall obtain Consent to Establish/ Operate under the Air Act, 1981 and the Water Act, 1974 from the concerned State Pollution Control Board.	Agreed Upon Consent for Establishment was obtained from A.P Pollution Control Board Vide Order no. 481/ APPCB/ CFE/ RO - VSP/ HO/ 2019 dated 29.10.2019. (Annexure II)
10	The project proponent shall abide by all the commitments and recommendations made in the EIA/ EMP report and also that during their presentation to the EAC.	Agreed Upon We will abide by all the commitments and recommendations made in the EIA/ EMP report and also that during their presentation to the EAC.
11	Install system to carryout Ambient Air Quality monitoring for common/ criterion parameters relevant to the main pollutants released.	Agreed Upon Will be complied at appropriate stage.
12	The project proponent shall submit six monthly compliance reports on the status of the implementation of the stipulated environmental conditions to the Regional Office, Ministry of Environment, Forest and Climate Change.	Agreed Upon Will be complied regularly.



IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)



CENTRE FOR ENVOTECH AND MANAGEMENT CONSULTANCY PVT. LTD.

An ISO 9001:2008 & OHSAS 18001:2007 Certified Company, Empanelled with OCCL, ORSAC and SPCB of Govt. of Odisha
Accredited by NABET, QCI for EIA Studies as 'A' Category Consultant Organization.
Empanelled with PCCF(Wildlife) & CWLW, Odisha
Enlisted in CIDC (established by the Planning Commission Govt. of India), NABL
MoEF&CC, Govt. of India, Recognised Environment Laboratory under Environment (Protection) Act, 1986.



Certificate No.-TC 6646

Report no. - CEMC/IREL/ST1

Issued Date-22.05.2021

STACK EMISSION MONITORING TEST REPORT

Issued to	M/s.IREL(India) Limited , Matikhala, Chatrapur, Ganjam, Odisha
Work Order No.	R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020
Locations	ST-1 Boiler, ST-2- Main Dryer, ST-3- Shaft Dryer-Ilemenite, ST-4- Shaft Dryer- Rutile, ST-5- Sillimanite Dryer, ST-6-Monazite Upgradation Section, ST-7-Zircon Dryer, ST-8-REEP Processing Plant-Stack-1, ST-9- REEP Processing Plant-Stack-2
Nature of Sampling	Source Emission
Sampling By	Mr.Suresh Pradhan
Instrument Used	Stack monitoring kit, Flue Gas Analyzer
Sampling Period	October' 2020 to March'2021
Parameter	Particulate Matter

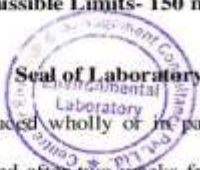
FREQUENCY		LOCATIONS								
Month	Week	ST-1	ST-2	ST-3	ST-4	ST-5	ST-6	ST-7	ST-8	ST-9
October	1st	104.6	52.4	51.6	50.1	50.8	51.2	51.8	6.1	5.7
	3rd	108.2	51.2	50.8	48.6	50.2	51.6	49.4	5.9	6.1
November	1st	118.3	50.7	49.4	48.9	51.6	49.5	50.2	6.3	6.1
	3rd	107.9	50.1	49.2	50.8	48.7	49.3	51.1	6.1	6.2
December	1st	112.3	49.6	51.2	50.7	51.4	48.9	49.8	6.3	6.1
	3rd	109.6	49.1	50.3	49.5	48.7	49.3	50.2	6.0	--
January	1st	117.3	50.5	49.8	51.4	48.7	50.1	51.2	6.4	6.5
	3rd	111.6	48.9	50.3	49.8	50.5	--	50.7	6.1	6.2
February	1st	114.7	49.3	48.6	50.2	51.4	--	49.8	6.1	6.1
	3rd	109.8	50.1	51.3	49.4	48.9	--	49.6	6.4	6.2
March	1st	121.4	50.3	49.4	51.2	50.4	--	51.1	6.2	6
	3rd	114.8	50.6	--	--	51.4	--	49.5	5.9	6.1
MAXIMUM		121.4	52.4	51.6	51.4	51.6	51.6	51.8	6.4	6.5
MINIMUM		104.6	48.9	48.6	48.6	48.7	48.9	49.4	5.9	5.7
AVERAGE		112.54	50.29	50.16	50.04	50.214	50.044	50.4	6.15	6.12
STD DEVIATION		4.9046	0.973	0.9768	0.914728	1.175604	1.036707	0.792388	0.1732	0.1888

OSPCB Permissible Limits- 150 mg/Nm³

M. Prasad
Authorized Signatory

Notes:

- This Test Report shall not be reproduced wholly or in part without prior written consent of the laboratory.
- The samples received shall be destroyed after two weeks from the date of issue of the Test Report unless specified otherwise.
- This Test Report shall not be used in any advertising media or as evidence in the court of Law without prior written consent of the laboratory.



Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

Regd. Office: 1st Floor, N-5/305, IRC village, Nayapalli, Bhubaneswar-751015, Odisha, India, Mobile: 9861032826
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Laboratory At: Plot No. 800/1274, Johal, Pahal, Bhubaneswar-752101,
E-mail: ccmclab@yahoo.in, Mobile: 9937631956, 8895177314



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Six Monthly Compliance Report (October 2020 to March 2021)



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Certificate No-TC 6646

Report no. - CEMC/IREL/St2

Issued Date-22.05.2021

STACK EMISSION MONITORING TEST REPORT

Issued to	M/s.IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha
Work Order No.	R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020
Locations	ST-8- Processing Plant-Stack-1, ST-9- REEP Processing Plant-Stack-2
Nature of Sampling	Source Emission
Sampling By	Mr.Suresh Pradhan
Instrument Used	Stack monitoring kit, Flue Gas Analyzer
Sampling Period	October' 2020 to March'2021
Parameter	Acid Mist

FREQUENCY		LOCATIONS	
Month	Week	ST-8	ST-9
October	1st	5.7	5.8
	3rd	5.6	5.8
November	1st	5.9	5.9
	3rd	5.8	6.1
December	1st	5.9	5.9
	3rd	5.5	--
January	1st	6.1	6
	3rd	5.8	6.1
February	1st	6	5.9
	3rd	6.2	6.1
March	1st	6.1	6.1
	3rd	6.2	6.1
MAXIMUM		6.2	6.1
MINIMUM		5.5	5.8
AVERAGE		5.90	5.98
STD DEVIATION		0.2296	0.1250

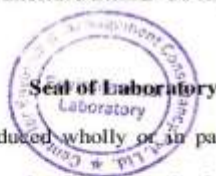
OSPCB Permissible Limits- 50 mg/Nm³

M. Pradhan

Authorized Signatory

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Certificate No. TC 6646

Report no. - CEMC/IREL/A1

Date-22.05.2021

AMBIENT AIR QUALITY MONITORING TEST REPORT

Issued to	M/s. IREL (India) Limited, Matikhala, Chatrapur, Ganjam, Odisha
Work Order No.	R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020
Nature of Sampling	Ambient Air Sample
Sampling By	Mr. Suresh Pradhan
Sampling Location	Mining Area (SMP-1) (A1)
Instrument Used	Respirable Dust Sampler, Fine Dust Sampler, Gaseous Attachment, CO Meter, Benzene Sampler
Sampling Period	October' 2020 - March' 2021

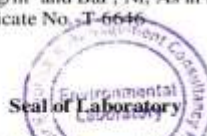
ANALYSIS RESULT

Month	Week	SO ₂	NO _x	PM ₁₀	PM _{2.5}	Lead	As	NH ₃	O ₃	BaP#	Ni#	C ₆ H ₆ #	CO#
October	1st	8.8	12.1	56.6	28.8	<0.06	<0.44	<20	<10	<1.0	<15	<1.0	<1.15
	2nd	9	10.2	56.4	28.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.6	11.4	58.2	29.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
November	1st	9.4	11.9	59.3	30.7	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.6	11.8	60.1	31.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.3	11.6	58.6	30.9	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
December	1st	9.6	11.8	60.1	31.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.8	12.4	61.3	31.7	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.9	12.7	61.8	33.5	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
January	1st	10.1	13	65.8	34.9	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.3	13.4	66.9	36.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.4	13.6	67.4	36.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
February	1st	9.9	13.3	68.6	37.9	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.1	13.2	67.3	36.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.4	13.7	68.2	36.5	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
March	1st	10.3	12.2	64.3	33.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.2	12.4	64.9	33.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.3	12.8	66.5	34.3	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
MAXIMUM		10.40	13.70	68.60	37.90	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
MINIMUM		8.80	10.20	56.40	28.20	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
AVERAGE		9.83	12.37	62.87	33.04	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
SD		0.48	0.90	4.19	2.90	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
NAAQ Standard		80	80	100	60	1	6	400	180	1	20	5	4

*All units are representing in $\mu\text{g}/\text{m}^3$ except CO in mg/m^3 and BaP, Ni, As in ng/m^3

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No. T-6646

M. Prasad
Authorized Signatory



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IREL (India) Limited

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Report no. - CEMC/IREL/A2

Date-22.05.2021

AMBIENT AIR QUALITY MONITORING TEST REPORT

Issued to	M/s.IREL(India) Limited , Matikhala, Chatrapur, Ganjam, Odisha
Work Order No.	R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020
Nature of Sampling	Ambient Air Sample
Sampling By	Mr. Suresh Pradhan
Sampling Location	I.R.E.L Colony (A2)
Instrument Used	Respirable Dust Sampler, Fine Dust Sampler, Gaseous Attachment, CO Meter, Benzene Sampler
Sampling Period	October' 2020 - March' 2021

ANALYSIS RESULT

Month	Week	SO ₂	NO _x	PM ₁₀	PM _{2.5}	Lead	As	NH ₃	O ₃	BaP#	Ni#	C ₆ H ₆ #	CO#
October	1st	8.8	12.1	56.6	28.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.2	11.4	58.6	29.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.2	11.8	57.4	29	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
November	1st	9.1	12.4	58.9	31.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.8	12.2	59.4	31.7	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.2	11.9	54.8	29.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
December	1st	9.8	12.2	59.4	31.7	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.9	12.9	59.8	30.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.7	13.1	60.6	32.3	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
January	1st	10.4	14.5	67.2	35.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.5	14.8	68.7	36.9	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.3	14.5	66.5	35.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
February	1st	10.1	14.8	69.1	37.6	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.2	14.4	66.5	35.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.5	14.3	66.8	36.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
March	1st	10.1	12.5	65.1	34.5	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.4	12.6	66.8	34.5	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.2	13.1	65.3	34.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
MAXIMUM		10.5	14.8	69.1	37.6	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
MINIMUM		8.8	11.4	54.8	28.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
AVERAGE		9.835	13.085	62.57	33.055	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
SD		0.54	1.15	4.64	2.94	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
NAAQ Standard		80	80	100	60	1	6	400	180	1	20	5	4

*All units are representing in $\mu\text{g}/\text{m}^3$ except CO in mg/m^3 and BaP, Ni, As in ng/m^3

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Certificate No-TC 6646

Report no. - CEMC/IREL/A3

Date-22.05.2021

AMBIENT AIR QUALITY MONITORING TEST REPORT

Issued to	M/s.IREL(India) Limited , Matikhala, Chatrapur, Ganjam, Odisha
Work Order No.	R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020
Nature of Sampling	Ambient Air Sample
Sampling By	Mr. Suresh Pradhan
Sampling Location	Bada Arjipalli Port (A3)
Instrument Used	Respirable Dust Sampler, Fine Dust Sampler, Gaseous Attachment, CO Meter, Benzene Sampler
Sampling Period	October' 2020 - March' 2021

ANALYSIS RESULT

Month	Week	SO ₂	NO _x	PM ₁₀	PM _{2.5}	Lead	As	NH ₃	O ₃	BaP#	Ni#	CoHd#	CO#
October	1st	9	11.6	57.4	28.6	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.4	11.8	57.6	28.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.8	12.2	58.6	29.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
November	1st	9.5	11.8	57.8	30.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.4	11.6	58.5	31.3	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.1	11.4	52.9	30.5	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
December	1st	9.4	11.6	58.5	31.3	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.8	12.6	57.9	31.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.8	12.8	59.7	31.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
January	1st	10.6	13.7	64.6	34.3	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.9	14.1	65.4	35.7	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.2	14.3	65.7	35.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
February	1st	10.3	14.2	67.4	35.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.4	14	65.1	36.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.6	14.1	65.9	36.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
March	1st	10.4	12	61.7	31.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.5	12.3	63.6	33.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.4	12.4	62.9	33.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
MAXIMUM		10.90	14.30	67.40	36.40	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
MINIMUM		9.00	11.40	52.90	28.60	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
AVERAGE		9.97	12.71	61.08	32.54	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
SD		0.58	1.07	4.03	2.58	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
NAAQ Standard		80	80	100	60	1	6	400	180	1	20	5	4

*All units are representing in µg/m³ except CO in mg/m³ and BaP, Ni, As in ng/m³

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M. Prasad
Authorized Signatory
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Certificate No-TC 9646

Report no. - CEMC/IREL/A4

Date-22.05.2021

AMBIENT AIR QUALITY MONITORING TEST REPORT

Issued to	M/s. IREL (India) Limited, Matikhala, Chatrapur, Ganjam, Odisha
Work Order No.	R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020
Nature of Sampling	Ambient Air Sample
Sampling By	Mr. Suresh Pradhan
Sampling Location	Kana Mana Village (A4)
Instrument Used	Respirable Dust Sampler, Fine Dust Sampler, Gaseous Attachment, CO Meter, Benzene Sampler
Sampling Period	October' 2020 - March' 2021

ANALYSIS RESULT

Month	Week	SO ₂	NO _x	PM ₁₀	PM _{2.5}	Lead	As	NH ₃	O ₃	BaP#	Ni#	C ₆ H ₆ #	CO#
October	1st	9.4	11.2	58.2	29.6	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.2	11.4	58.6	29.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9	11	57.6	29.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
November	1st	9.2	11.4	57.9	31.3	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.5	11.2	58.3	31.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9	11.1	53.5	30.3	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
December	1st	9.5	11.2	58.3	31	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.6	12.5	58.7	30.6	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.7	12.6	59.1	30.9	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
January	1st	10.7	13.8	63.9	34.6	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.8	13.9	65.9	36.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.5	14.1	64.8	34.7	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
February	1st	10.4	13.9	66.8	35.3	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.5	14.1	64.8	35.7	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.3	14.2	66.1	35.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
March	1st	10.2	12.1	62.4	32.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.3	12.1	63.9	33.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.1	12.5	63.2	33.5	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
MAXIMUM		10.80	14.20	66.80	36.10	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
MINIMUM		9.00	11.00	53.50	29.20	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
AVERAGE		9.89	12.48	61.12	32.48	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
SD		0.60	1.23	3.83	2.42	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
NAAQ Standard		80	80	100	60	1	6	400	180	1	20	5	4

*All units are representing in $\mu\text{g}/\text{m}^3$ except CO in mg/m^3 and BaP, Ni, As in ng/m^3

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

Authorized Signatory



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E-mail: ccmcclab@yahoo.in, Mobile: 9937631956, 8895177314



IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)



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Certificate No-TC 6646

Report no. - CEMC/IREL/A5

Date-22.05.2021

AMBIENT AIR QUALITY MONITORING TEST REPORT

Issued to	M/s.IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha
Work Order No.	R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020
Nature of Sampling	Ambient Air Sample
Sampling By	Mr. Suresh Pradhan
Sampling Location	North Mining Area(SMP-3) (A5)
Instrument Used	Respirable Dust Sampler, Fine Dust Sampler, Gaseous Attachment, CO Meter, Benzene Sampler
Sampling Period	October' 2020 - March' 2021

ANALYSIS RESULT

Month	Week	SO ₂	NO _x	PM ₁₀	PM _{2.5}	Lead	As	NH ₃	O ₃	BaP#	Ni#	C ₆ H ₆ #	CO#
October	1st	8.9	11.4	57.6	29.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.6	12.2	58.2	29.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.4	11.6	58.2	29.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
November	1st	9.3	11.6	58.7	30.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.5	11.7	59.6	30.9	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.4	11.5	57.3	30.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
December	1st	9.7	11.7	59.6	30.9	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	9.7	12.7	60.5	31.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	9.8	12.5	61.4	33.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
January	1st	10.3	12.9	65.3	36.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.6	13.2	66.1	36.5	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.4	13.9	66.7	35.9	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
February	1st	10	13.1	68.2	37.4	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.2	13.3	67.6	36.2	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.5	13.6	67.9	36.8	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
March	1st	10.1	12.3	63.9	32.7	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	2nd	10.1	12.5	65.4	33.6	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
	3rd	10.4	12.9	66.7	34.1	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
MAXIMUM		10.60	13.90	68.20	37.40	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
MINIMUM		8.90	11.40	57.30	29.20	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
AVERAGE		9.87	12.50	62.72	33.03	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
SD		0.48	0.78	4.04	2.91	<0.06	<0.44	<20	<10	<1.0	<15.0	<1.0	<1.15
NAAQ Standard		80	80	100	60	1	6	400	180	1	20	5	4

*All units are representing in µg/m³ except CO in mg/m³ and BaP, Ni, As in ng/m³

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No. T-6646

[Signature]
Authorized Signatory
Notes



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Certificate No-TC 666

Report no. - CEMC/IREL/WW1

Date-22.05.2021

EFFLUENT WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Description

: Treated Effluent Quality (Pond-1)

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Permissible Norms by CPCB	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value	—	5.5 to 9.0	7.02	6.89	7.73	7.31	6.94	7.42	7.73	6.89	7.241	0.327
2	Temp	°C	—	30.1	31.2	29.6	27.4	29.8	32.7	32.7	27.4	30.112	1.765
3	Turbidity	NTU	—	14	11	5	7	5	5	14	5	8.25	3.816
4	Colour	Hazen	—	15	12	6	8	7	5	15	5	9.125	3.868
5	Alkalinity	mg/l	—	120	104	116	82	76	104	120	76	99.75	17.81
6	TDS	mg/l	—	310.8	212.4	256.32	238.3	268.8	250.6	310.8	212.4	257.55	32.89
7	TSS	mg/l	100	21.8	16.9	12.3	10.4	9.5	14.2	21.8	9.5	14.55	4.586
8	O&G	mg/l	20	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9	BOD	mg/l	100	4.6	4.2	4	2.2	2.2	4.4	4.6	2.2	3.55	1.102
10	COD	mg/l	250	20	15	20	14	16	20	20	14	17.375	2.81
11	DO	mg/l	—	5.2	4.9	4.4	5.4	5.2	4.2	5.4	4.2	4.8625	0.483
12	Chloride	mg/l	—	42.9	31.6	38.1	29.6	30.1	37.6	42.9	29.6	35.3	5.357
13	Sulphate	mg/l	—	12.8	9.1	10.7	9.3	9.7	10.3	12.8	9.1	10.475	1.357
14	Fluoride	mg/l	15.0	0.16	0.14	0.14	0.11	0.12	0.14	0.16	0.11	0.135	0.017
15	TH	mg/l	—	126	102	108	94	98	102	126	94	106.25	11.29
16	Calcium	mg/l	—	32.06	27.25	30.46	26.05	26.85	28.86	32.06	26.05	28.705	2.318
17	Magnesium	mg/l	—	11.17	8.26	7.78	7.05	7.53	7.29	11.17	7.05	8.4125	1.523
18	Sodium	mg/l	—	33.6	21.46	30.5	25.6	26.1	28.3	33.6	21.46	27.577	4.215
19	Potassium	mg/l	—	12.8	9.2	10.9	7.2	7.7	10.6	12.8	7.2	9.8	2.114
20	TN#	mg/l	—	3.9	3.1	3.7	3.9	4.4	3.8	4.4	3.1	3.7875	0.419
21	Diss PO ₄	mg/l	—	0.42	0.31	0.36	0.21	0.23	0.34	0.42	0.21	0.3125	0.079
22	Iron	mg/l	3.0	0.39	0.29	0.39	0.31	0.33	0.36	0.39	0.29	0.3437	0.041
23	Copper	mg/l	3.0	0	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium	mg/l	2.0	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	2.0	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc	mg/l	15.0	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	TCr	mg/l	2.0	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Cr ⁶⁺	mg/l	1.0	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	C ₆ H ₅ OH	mg/l	5.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
30	RFC#	mg/l	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	TKN#	mg/l	100	2.28	1.8	1.83	1.18	1.21	1.77	2.28	1.18	1.691	0.418

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Certificate No-TC 9446

32	Free NH ₃ #	mg/l	5.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
33	Arsenic	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
34	Mercury#	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
35	Selenium#	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
36	Nickel	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
37	Cyanide	mg/l	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
38	Sulphides#	mg/l	5.0	0.05	0.18	0.24	0.21	0.23	0.21	0.24	0.05	0.1762	0.07
39	Manganese	mg/l	2.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
40	Vanadium#	mg/l	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
41	NO ₃	mg/l	20	1.94	1.43	1.81	1.41	1.39	1.75	1.94	1.39	1.6325	0.24
42	Bio-assay Test#	—	90% Survival of Fish after 96 hrs in 100% Effluent	91%	93%	93%	91%	92%	91%	93%	91%	91.8%	0.98 %
43	α- emitters*	Bq/l	3.7	0.16	0.15	0.16	0.21	0.13	0.3	0.3	0.13	0.1925	0.062
44	β- emitters*	Bq/l	37	0.21	0.45	0.24	0.57	0.48	1.08	1.08	0.21	0.54	0.314

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable

*Sample Tested By Health Physics Unit of BARC, OSCOM

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

M. K. Rout

Authorized Signatory

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Certificate No-TC 6646

Report no. - CEMC/IREL/WW2

Date-22.05.2021

EFFLUENT WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Description

: Treated Effluent Quality (Pond-2)

Sample Quantity

: 2.0 Litrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Permissible Norms by CPCB	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value	--	5.5 to 9.0	7.46	6.58	7.65	7.58	7.06	7.46	7.65	6.58	7.252	0.406
2	Temp	°C	--	29.9	30.6	29.9	27.6	29.4	32.4	32.4	27.6	29.97	1.565
3	Turbidity	NTU	--	11	10	7	7	5	5	11	5	7.625	2.509
4	Colour	Hazen	--	10	9	6	6	8	5	10	5	7.375	1.966
5	Alkalinity	mg/l	--	110	112	120	84	78	110	120	78	101.5	17.03
6	TDS	mg/l	--	282.4	220.6	276.8	242.5	271.4	268.3	282.4	220.6	258.1	23.83
7	TSS	mg/l	100	18.2	17.3	13.2	10.8	9.9	15.6	18.2	9.9	14.13	3.423
8	O&G	mg/l	20	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9	BOD	mg/l	100	4.2	4	4.4	2.2	2.4	4.2	4.4	2.2	3.5	0.991
10	COD	mg/l	250	15	16	24	16	18	24	24	15	19	4.119
11	DO	mg/l	--	5	5.1	4.8	5.4	5.6	4.4	5.6	4.4	5.037	0.427
12	Chloride	mg/l	--	39.9	32.1	38.9	29.9	30.6	38.9	39.9	29.9	35.01	4.651
13	Sulphate	mg/l	--	10.6	9.8	11.2	9.6	9.9	11.4	11.4	9.6	10.43	0.765
14	Fluoride	mg/l	15.0	0.14	0.15	0.15	0.12	0.13	0.14	0.15	0.12	0.137	0.011
15	TH	mg/l	--	116	108	116	96	100	110	116	96	107.2	8.238
16	Calcium	mg/l	--	31.26	28.86	33.67	26.45	27.25	32.06	33.67	26.45	29.95	2.854
17	Magnesium	mg/l	--	9.23	8.75	7.78	7.29	7.78	7.29	9.23	7.29	8.08	0.797
18	Sodium	mg/l	--	31.2	23.5	32.6	25.9	26.7	30.4	32.6	23.5	28.3	3.539
19	Potassium	mg/l	--	11.6	9.8	11.8	7.8	7.9	11.2	11.8	7.8	9.96	1.818
20	TN#	mg/l	--	3.5	3.4	3.9	4.2	4.7	3.9	4.7	3.4	3.962	0.47
21	Diss PO ₄	mg/l	--	0.34	0.33	0.38	0.23	0.24	0.38	0.38	0.23	0.313	0.06
22	Iron	mg/l	3.0	0.36	0.31	0.41	0.33	0.35	0.39	0.41	0.31	0.358	0.03
23	Copper	mg/l	3.0	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium	mg/l	2.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead	mg/l	2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc	mg/l	15.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	TCr	mg/l	2.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Cr ⁺⁶	mg/l	1.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	C ₆ H ₅ OH	mg/l	5.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Laboratory At: Plot No. 800/1274, Jhal, Pahal, Bhubaneswar-752101,

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IREL (India) Limited

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Certificate No.-TC 9446

30	RPC#	mg/l	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	TKN#	mg/l	100	2	1.9	1.98	1.21	1.24	1.89	2	1.21	1.678	0.37
32	Free NH ₃ #	mg/l	5.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	Arsenic	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
34	Mercury#	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
35	Selenium#	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
36	Nickel	mg/l	5.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
37	Cyanide	mg/l	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
38	Sulphides#	mg/l	5.0	0.32	0.19	0.29	0.22	0.24	0.26	0.32	0.19	0.253	0.047
39	Manganese	mg/l	2.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
40	Vanadium#	mg/l	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
41	NO ₃	mg/l	20	1.9	1.51	1.89	1.43	1.42	1.82	1.9	1.42	1.66	0.231
42	Bio-assay Test#	--	90% Survival of Fish after 96 hrs in 100% Effluent	92%	92%	92%	91%	91%	91%	92%	91%	91.5 %	0.547 %
43	α- emitters*	Bq/l	3.7	0.12	0.14	0.12	0.18	—	—	0.18	0.12	0.143	0.028
44	β- emitters*	Bq/l	37	0.31	0.39	0.33	0.32	—	—	0.39	0.31	0.341	0.035

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable

*Sample Tested By Health Physics Unit of BARC, OSCOM

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646


Authorized Signatory



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IREL (India) Limited

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Certificate No-TC 6646

Report no. - CEMC/IREL/S1

Issued Date-22.05.2021

SOIL QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Location

: Matikhala (S1), Basan Putty (S2)

Sample Quantity

: 1.0 kg

LOCATION-Matikhala (S1)

Month	Week	pH	EC	SAR	CEC	SO ₄	NO ₃	N	P	Ca	Na	K	Fe	Org Mat
Unit		--	µS/cm	--	Meq/100	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
Dec	2nd	7.07	113.1	19.3	7.3	19.5	2.7	0.049	10.1	15.4	13.5	8.9	364.7	0.038
Mar	2nd	7.02	108.6	19.3	11.2	16.8	2.9	0.049	10.1	15.4	12.1	8.2	364.7	0.39
MAXIMUM		7.07	113.1	19.3	11.2	19.5	2.9	0.049	10.1	15.4	13.5	8.9	364.7	0.39
MINIMUM		7.02	108.6	19.3	7.3	16.8	2.7	0.049	10.1	15.4	12.1	8.2	364.7	0.038
AVERAGE		7.045	110.9	19.3	9.25	18.15	2.8	0.049	10.1	15.4	12.8	8.55	364.7	0.214
STD DEVIATION		0.035355	3.182	0	2.758	1.909	0.141	0	0	0	0.99	0.495	0	0.248902

LOCATION-Basan Putty(S2)

Month	Week	pH	EC	SAR	CEC	SO ₄	NO ₃	N	P	Ca	Na	K	Fe	Org Mat
Unit		--	µS/cm	--	Meq/100	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
Dec	2nd	6.94	102.8	18.5	9.1	18.9	2.3	0.047	9.3	14.8	12.7	8.2	299.3	0.029
Mar	2nd	6.87	121.8	18.5	9.8	18.7	2.5	0.047	9.3	14.8	13.5	9.4	299.3	0.34
MAXIMUM		6.94	121.8	18.5	9.8	18.9	2.5	0.047	9.3	14.8	13.5	9.4	299.3	0.34
MINIMUM		6.87	102.8	18.5	9.1	18.7	2.3	0.047	9.3	14.8	12.7	8.2	299.3	0.029
AVERAGE		6.905	112.3	18.5	9.45	18.8	2.4	0.047	9.3	14.8	13.1	8.8	299.3	0.1845
STD DEVIATION		0.049497	13.44	0	0.495	0.141	0.141	0	0	0	0.566	0.849	0	0.21991

All Parameter Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

Authorized Signatory

Seal of Laboratory

Notes:

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IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)



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Report no. - CEMC/IREL/S2

Issued Date-22.05.2021

SOIL QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s. IREL (India) Limited, Matikhala,
Chhatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr. Suresh Pradhan

Sample Location

: Solid Waste Storage (S3), Sodium Nitrate
Storage (S4)

Sample Quantity

: 1.0 kg

LOCATION-Solid Waste Storage (S3)

Month	Week	pH	EC	SAR	CEC	SO ₄	NO ₃	N	P	Ca	Na	K	Fe	Org Mat
Unit		--	µS/cm	--	Meq/100	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
Dec	2nd	7.28	153.4	29.1	6.5	26.1	3.6	0.053	11.2	17.3	21.6	12.4	627.8	0.056
Mar	2nd	7.13	161.5	29.1	7.9	23.4	3.3	0.053	11.2	17.3	18.6	12.7	627.8	0.56
MAXIMUM		7.28	161.5	29.1	7.9	26.1	3.6	0.053	11.2	17.3	21.6	12.7	627.8	0.56
MINIMUM		7.13	153.4	29.1	6.5	23.4	3.3	0.053	11.2	17.3	18.6	12.4	627.8	0.056
AVERAGE		7.205	157.5	29.1	7.2	24.75	3.45	0.053	11.2	17.3	20.1	12.55	627.8	0.308
STD DEVIATION		0.106066	5.728	0	0.99	1.909	0.212	0	0	0	2.121	0.212	0	0.356382

LOCATION-Sodium Nitrate Storage (S4)

Month	Week	pH	EC	SAR	CEC	SO ₄	NO ₃	N	P	Ca	Na	K	Fe	Org Mat
Unit		--	µS/cm	--	Meq/100	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
Dec	2nd	7.51	217.2	31.8	9.4	31.5	4.9	0.064	12.9	21.5	25.3	17.1	841.5	0.071
Mar	2nd	6.83	98.3	21.9	11.2	15.2	1.9	0.039	8.9	12.7	11.8	7.3	289.2	0.25
MAXIMUM		7.51	217.2	31.8	11.2	31.5	4.9	0.064	12.9	21.5	25.3	17.1	841.5	0.25
MINIMUM		6.83	98.3	21.9	9.4	15.2	1.9	0.039	8.9	12.7	11.8	7.3	289.2	0.071
AVERAGE		7.17	157.8	26.85	10.3	23.35	3.4	0.052	10.9	17.1	18.55	12.2	565.4	0.1605
STD DEVIATION		0.480833	84.07	7	1.273	11.53	2.121	0.018	2.828	6.223	9.546	6.93	390.5	0.126572

All Parameter Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

Authorized Signatory



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Report no. - CEMC/IREL/S3

Issued Date-22.05.2021

SOIL QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Location

: Kanamana (S5), BadaArijpalli (S6)

Sample Quantity

: 1.0 kg

LOCATION-Kanamana (S5)

Month	Week	pH	EC	SAR	CEC	SO ₄	NO ₃	N	P	Ca	Na	K	Fe	Org Mat
Unit		--	µS/cm	--	Meq/100	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
Dec	2nd	6.79	98.3	21.9	7.7	14.8	2.1	0.039	8.9	12.7	11.5	7.8	289.2	0.026
Mar	2nd	7.05	112.5	19.5	6.8	15.9	3.1	0.052	10.8	16.7	18.6	20.5	365.1	0.81
MAXIMUM		7.05	112.5	21.9	7.7	15.9	3.1	0.052	10.8	16.7	18.6	20.5	365.1	0.81
MINIMUM		6.79	98.3	19.5	6.8	14.8	2.1	0.039	8.9	12.7	11.5	7.8	289.2	0.026
AVERAGE		6.92	105.4	20.7	7.25	15.35	2.6	0.046	9.85	14.7	15.05	14.15	327.2	0.418
STD DEVIATION		0.183848	10.04	1.697	0.636	0.778	0.707	0.009	1.344	2.828	5.02	8.98	53.67	0.554372

LOCATION-Bada Arijpalli(S6)

Month	Week	pH	EC	SAR	CEC	SO ₄	NO ₃	N	P	Ca	Na	K	Fe	Org Mat
Unit		--	µS/cm	--	Meq/100	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
Dec	2nd	7.12	109.4	15.6	8.2	21.3	2.4	0.048	10.7	15.2	13.9	9.2	312.4	0.035
Mar	2nd	7.19	109.4	15.6	9.6	21.3	2.1	0.048	10.7	15.2	12.4	10.5	312.4	0.39
MAXIMUM		7.19	109.4	15.6	9.6	21.3	2.4	0.048	10.7	15.2	13.9	10.5	312.4	0.39
MINIMUM		7.12	109.4	15.6	8.2	21.3	2.1	0.048	10.7	15.2	12.4	9.2	312.4	0.035
AVERAGE		7.155	109.4	15.6	8.9	21.3	2.25	0.048	10.7	15.2	13.15	9.85	312.4	0.2125
STD DEVIATION		0.049497	0	0	0.99	0	0.212	0	0	0	1.061	0.919	0	0.251023

All Parameter Analyzed by Eko Pro Engineers, Gajapati, Certificate No.-T-6646

M. Prasad
Authorized Signatory



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Certificate No-TC 9646

Report no. - CEMC/IREL/WI

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Location

: Hand Pump of Matikhah Village

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	6.92	6.51	7.78	6.79	6.61	7.83	7.83	6.51	7.0733	0.584
2	Temperature	°C	30.6	30.6	29.6	27.8	28.9	32.3	32.3	27.8	29.987	1.562
3	Turbidity	NTU	3	4	1	1	1	1	4	1	1.833	1.329
4	Colour	Hazen	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
5	Alkalinity (as CaCO ₃)	mg/l	132	102	138	108	114	144	144	102	123	17.66
6	Total Dissolved Solids	mg/l	322	278	333	312.4	321.6	348	348	278	319.16	23.56
7	Total Suspended Solids	mg/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	5	5	6	8.8	9.2	8	9.2	5	7.025	1.901
11	Dissolved Oxygen	mg/l	5.2	5.4	5.6	5.6	5.8	5	5.8	5	5.425	0.294
12	Chloride (as Cl)	mg/l	21.9	19.6	20.6	25.9	26.1	19.9	26.1	19.6	22.333	2.949
13	Sulphate (as SO ₄)	mg/l	15.1	13.9	16.2	14	14.5	13.8	16.2	13.8	14.583	0.928
14	Fluoride (as F)	mg/l	0.14	0.12	0.14	0.21	0.19	0.13	0.21	0.12	0.155	0.036
15	Total Hardness (as CaCO ₃)	mg/l	130	112	136	112	116	114	136	112	120	10.35
16	Calcium (as Ca)	mg/l	38.47	34.47	39.28	32.06	32.87	36.87	39.28	32.06	35.67	2.987
17	Magnesium (as Mg)	mg/l	8.26	6.34	9.23	7.78	8.26	5.35	9.23	5.35	7.5366	1.427
18	Sodium (as Na)	mg/l	23.6	18.5	23.8	19.6	20.3	21.5	23.8	18.5	21.216	2.157
19	Potassium (as K)	mg/l	6.8	5.2	6.9	8.4	8.6	5.2	8.6	5.2	6.85	1.477
20	Total Nitrogen#	mg/l	0.56	0.51	1.1	0.89	0.88	1.2	1.2	0.51	0.856	0.278
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.25	0.25	0.25	0.29	0.27	0.21	0.29	0.21	0.258	0.026
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Laboratory At: Plot No. 800/1274, Jhal, Pahal, Bhubaneswar-752101,
E-mail: ccmcclab@yahoo.in, Mobile: 9937631956, 8895177314



IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)



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Certificate No-TC 6646

	(as Cr)											
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	Depth of Water Level	Meter	--	--	--	--	--	--	--	--	--	--

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

Authorized Signatory



Notes:

- The result given above related to the tested sample, as received. The customer asked for the above test only.
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Certificate No.-TC 6646

Report no. - CEMC/IREL/W2

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Location

: Railway Platform

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.46	7.13	7.82	7.68	7.68	7.88	7.88	7.13	7.608	0.275
2	Temperature	°C	30.7	31.2	29.8	27.9	28.4	31.9	31.9	27.9	29.983	1.584
3	Turbidity	NTU	7	5	6	6	5	5	7	5	5.666	0.816
4	Colour	Hazen	5	5	5	5	5	5	5	5	5	0
5	Alkalinity (as CaCO ₃)	mg/l	186	164	198	160	152	208	208	152	178	22.62
6	Total Dissolved Solids	mg/l	910	720	964	458	432	732	964	432	702.66	221.6
7	Total Suspended Solids	mg/l	8.8	7.1	8.6	9.3	8.1	8.1	9.3	7.1	8.333	0.755
8	Oil & Grease	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	10	12	12	15.2	13.9	14	15.2	10	13.275	1.871
11	Dissolved Oxygen	mg/l	5.1	5.2	5.2	5	4.8	5.8	5.8	4.8	5.183	0.337
12	Chloride (as Cl)	mg/l	60.9	51.3	65.6	39.6	37.2	48.3	65.6	37.2	50.483	11.29
13	Sulphate (as SO ₄)	mg/l	31.6	27.6	34.5	26.2	25.8	28.7	34.5	25.8	29.066	3.379
14	Fluoride (as F)	mg/l	0.17	0.15	0.19	0.26	0.25	0.17	0.26	0.15	0.1983	0.045
15	Total Hardness (as CaCO ₃)	mg/l	190	164	204	164	156	196	204	156	179	20.06
16	Calcium (as Ca)	mg/l	53.71	44.09	56.91	44.89	43.29	56.11	56.91	43.29	49.833	6.399
17	Magnesium (as Mg)	mg/l	13.61	13.12	15.07	12.64	11.66	13.61	15.07	11.66	13.285	1.138
18	Sodium (as Na)	mg/l	78.4	56.8	82.8	33.5	31.3	75.4	82.8	31.3	59.7	22.93
19	Potassium (as K)	mg/l	30.7	19.4	34.5	14.1	13.2	31.3	34.5	13.2	23.866	9.424
20	Total Nitrogen#	mg/l	9.28	7.93	10.9	7.1	6.8	9.6	10.9	6.8	8.6016	1.593
21	Phosphorus (as PO ₄)	mg/l	0.14	0.11	0.17	0.14	0.12	0.18	0.18	0.11	0.143	0.027
22	Iron (as Fe)	mg/l	0.36	0.29	0.41	0.42	0.39	0.39	0.42	0.29	0.3766	0.047
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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E-mail: ccmcclab@yahoo.in, Mobile: 9937631956, 8895177314



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Certificate No-TC 6646

28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	Depth of Water Level	Meter	2.7	2.3	3.1	2.5	2.7	3.1	3.1	2.3	2.733	0.320

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No. -T-6646

Authorized Signatory



Notes:

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Certificate No-TC 9646

Report no. - CEMC/IREL/W3

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s. IREL (India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr. Suresh Pradhan

Sample Location

: Composite Water from MSP

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	6.78	6.39	7.44	7.23	7.23	7.72	7.72	6.39	7.131	0.476
2	Temperature	°C	30.8	31	29.9	27.8	28.6	32.1	32.1	27.8	30.033	1.603
3	Turbidity	NTU	5	5	8	6	5	6	8	5	5.833	1.169
4	Colour	Hazen	5	5	5	5	5	5	5	5	5	0
5	Alkalinity (as CaCO ₃)	mg/l	140	106	128	120	120	136	140	5	5	0
6	Total Dissolved Solids	mg/l	355.2	289	320	316	304	364	364	289	324.7	29.24
7	Total Suspended Solids	mg/l	7.2	6.7	6.7	7.1	6.6	5.8	7.2	5.8	6.683	0.495
8	Oil & Grease	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	5	5	6	11.4	9	10	11.4	5	7.733	2.761
11	Dissolved Oxygen	mg/l	5.2	5	5.4	4.4	4.6	5.2	5.4	4.4	4.966	0.388
12	Chloride (as Cl)	mg/l	23.9	20.9	21.8	27.9	25.3	20.6	27.9	20.6	23.4	2.855 171
13	Sulphate (as SO ₄)	mg/l	17.8	14.5	15.2	14.8	13.8	14.4	17.8	13.8	15.083	1.409
14	Fluoride (as F)	mg/l	0.15	0.12	0.14	0.11	0.14	0.15	0.15	0.11	0.135	0.016
15	Total Hardness (as CaCO ₃)	mg/l	136	116	128	116	112	120	136	112	121.33	9.003
16	Calcium (as Ca)	mg/l	35.27	32.06	32.06	32.87	32.06	32.06	35.27	32.06	32.73	1.285 83
17	Magnesium (as Mg)	mg/l	11.66	8.75	11.66	8.26	7.78	11.66	11.66	7.78	9.961	1.885
18	Sodium (as Na)	mg/l	25.2	18.9	22.4	20.1	19.6	21.9	25.2	18.9	21.35	2.317 542
19	Potassium (as K)	mg/l	7.9	5.3	6.1	8.5	8.2	5.8	8.5	5.3	6.966	1.388
20	Total Nitrogen#	mg/l	5.8	4.7	5.4	5.4	5.1	5.1	5.8	4.7	5.25	0.372
21	Phosphorus (as PO ₄)	mg/l	0.08	0.06	0.09	0.11	0.09	0.12	0.12	0.06	0.0916	0.021
22	Iron (as Fe)	mg/l	0.25	0.25	0.22	0.31	0.28	0.22	0.31	0.22	0.255	0.035
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No-T-6646

26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	Depth of Water Level	Meter	2.1	2	2.3	2.2	2.3	2.7	2.7	2	2.266	0.242

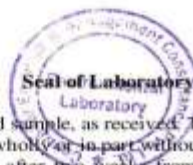
N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

M. Raut

Authorized Signatory

Notes:

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IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)



CENTRE FOR ENVOTECH AND MANAGEMENT CONSULTANCY PVT. LTD.

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Certificate No.-TC 6646

Report no. - CEMC/IREL/W4

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Location Sample Quantity	: M/s.IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr.Suresh Pradhan : MOPP up (No.1) : 2.0 Ltrs
--	---

ANALYSIS RESULT

Sl. No	Parameter	Unit	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	6.61	6.42	7.01	6.96	7.18	7.28	7.28	6.42	6.91	0.332385
2	Temperature	°C	30.8	30.8	29.7	27.5	29.3	32.3	32.3	27.5	30.06	1.635
3	Turbidity	NTU	8	8	5	6	5	6	8	5	6.333	1.414
4	Colour	Hazen	5	5	5	5	5	5	5	5	5	0
5	Alkalinity (as CaCO ₃)	mg/l	124	124	136	178	192	196	196	124	158.33	34.04
6	Total Dissolved Solids	mg/l	408	408	458	304	412	635	635	304	437.5	109.2149
7	Total Suspended Solids	mg/l	7.6	7.6	7.7	5	5	8.4	8.4	5	6.883	1.489
8	Oil & Grease	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	5	5	8	8.6	10.8	14.2	14.2	5	8.6	3.534
11	Dissolved Oxygen	mg/l	4.9	4.9	4.4	4.4	4	4.2	4.9	4	4.466	0.366
12	Chloride (as Cl)	mg/l	32.6	32.6	36.1	28.6	30.9	47.8	47.8	28.6	34.766	6.841
13	Sulphate (as SO ₄)	mg/l	23.4	23.4	25.6	15.1	18.6	32.8	32.8	15.1	23.15	6.078
14	Fluoride (as F)	mg/l	0.12	0.12	0.11	0.13	0.15	0.14	0.15	0.11	0.1283	0.014
15	Total Hardness (as CaCO ₃)	mg/l	170	170	172	122	136	194	194	122	160.66	26.52
16	Calcium (as Ca)	mg/l	52.9	52.9	54.51	34.46	37.68	57.7	57.7	34.46	48.358	9.731
17	Magnesium (as Mg)	mg/l	9.23	9.23	8.75	8.75	10.21	12.15	12.15	8.75	9.72	1.304
18	Sodium (as Na)	mg/l	64.2	64.2	63.4	23.8	31.5	78.2	78.2	23.8	54.216	21.44
19	Potassium (as K)	mg/l	18.6	18.6	18.2	9.1	12.3	24.3	24.3	9.1	16.85	5.370
20	Total Nitrogen#	mg/l	5.3	5.3	6.6	3.9	5.2	6.7	6.7	3.9	5.5	1.037
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.34	0.34	0.33	0.24	0.24	0.34	0.34	0.24	0.305	0.050498
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No-TC 9986

24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	Depth of Water Level	Meter	3.6	3.3	3.1	3.1	3.2	3.1	3.6	3.1	3.233

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

[Signature]
Authorized Signatory



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Certificate No.-TC 6646

Report no. - CEMC/IREL/W5

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Location Sample Quantity	: M/s. IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr. Suresh Pradhan : MOPP down (No.2) : 2.0 Ltrs
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ANALYSIS RESULT

Sl. No	Parameter	Unit	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.22	6.81	7.72	7.05	6.92	8.13	8.13	6.81	7.308	0.513
2	Temperature	°C	30.9	30.1	29.4	27.7	29.4	32.1	32.1	27.7	29.93	1.497
3	Turbidity	NTU	5	5	6	5	5	8	8	5	5.666	1.211
4	Colour	Hazen	5	5	5	5	5	5	5	5	5	0
5	Alkalinity (as CaCO ₃)	mg/l	132	124	128	116	202	164	202	116	144.33	32.70
6	Total Dissolved Solids	mg/l	321	310	396	230	446	498	498	230	366.83	98.36
7	Total Suspended Solids	mg/l	5.4	5.1	5.2	5.1	5.8	6.9	6.9	5.1	5.5833	0.696
8	Oil & Grease	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	5	4	6	8.8	11.6	12	12	4	7.9	3.421
11	Dissolved Oxygen	mg/l	4.8	5.2	4.6	4.2	4	4.4	5.2	4	4.533	0.432
12	Chloride (as Cl)	mg/l	28.4	24.9	29.2	21.3	32.3	36.2	36.2	21.3	28.716	5.267
13	Sulphate (as SO ₄)	mg/l	21.2	20.1	22.3	9.1	19.2	26.2	26.2	9.1	19.68	5.727
14	Fluoride (as F)	mg/l	0.11	0.14	0.1	0.12	0.16	0.13	0.16	0.1	0.126	0.021
15	Total Hardness (as CaCO ₃)	mg/l	156	152	148	96	144	166	166	96	143.66	24.54
16	Calcium (as Ca)	mg/l	47.29	46.49	44.89	26.05	39.28	49.7	49.7	26.05	42.283	8.684
17	Magnesium (as Mg)	mg/l	9.23	8.75	8.75	7.53	11.18	10.21	11.18	7.53	9.275	1.272
18	Sodium (as Na)	mg/l	58.3	53.9	55.9	16.2	32.6	65.7	65.7	16.2	47.1	18.76241
19	Potassium (as K)	mg/l	17.4	16.8	14.3	5.1	13.4	20.4	20.4	5.1	14.566	5.255
20	Total Nitrogen#	mg/l	5.4	5.1	4.9	3	5.8	5.1	5.8	3	4.883	0.974
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.33	0.31	0.28	0.21	0.26	0.31	0.33	0.21	0.283	0.043
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No-TC 9886

24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	Depth of Water Level	Meter	2.3	2.1	3.4	2	2.1	2.2	3.4	2	2.35	0.524

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

M. K. Rout
Authorized Signatory



Notes:

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Certificate No.-TC 9646

Report no. - CEMC/IREL/W6

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Location

: Upstream of Solar Evaporation Storage
Pond

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	—	6.53	6.26	6.78	6.85	6.85	7.06	7.06	6.26	6.721	0.283
2	Temperature	°C	30.6	30.9	29.8	27.9	27.9	31.8	31.8	27.9	29.816	1.616
3	Turbidity	NTU	4	5	5	6	6	5	6	4	5.166	0.752
4	Colour	Hazen	5	5	5	5	5	5	5	5	5	0
5	Alkalinity (as CaCO ₃)	mg/l	130	104	112	140	156	156	156	104	133	21.89
6	Total Dissolved Solids	mg/l	420	247	509	290	343	466	509	247	379.16	102.7
7	Total Suspended Solids	mg/l	8.8	8.1	8.1	5.5	6.7	7.7	8.8	5.5	7.483	1.190
8	Oil & Grease	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	10	6	12	8.4	8.8	10.8	12	6	9.333	2.096
11	Dissolved Oxygen	mg/l	4.8	5	4.2	4.4	4.2	4.4	5	4.2	4.5	0.328
12	Chloride (as Cl)	mg/l	21.2	16.3	40.3	27.2	25.1	34.6	40.3	16.3	27.45	8.777
13	Sulphate (as SO ₄)	mg/l	26.6	18.2	23.5	14.3	11.5	24.6	26.6	11.5	19.783	6.077
14	Fluoride (as F)	mg/l	0.15	0.13	0.14	0.13	0.11	0.12	0.15	0.11	0.13	0.014
15	Total Hardness (as CaCO ₃)	mg/l	174	144	188	120	102	158	188	102	147.66	32.53
16	Calcium (as Ca)	mg/l	54.51	44.89	53.71	32.06	29.66	43.29	54.51	29.66	43.02	10.47
17	Magnesium (as Mg)	mg/l	9.23	7.78	13.12	9.72	6.8	12.15	13.12	6.8	9.8	2.447
18	Sodium (as Na)	mg/l	65.1	51.4	69.8	23.1	21.3	60.8	69.8	21.3	48.583	21.32
19	Potassium (as K)	mg/l	19.2	15.6	25.6	8.9	7.6	17.1	25.6	7.6	15.666	6.694
20	Total Nitrogen#	mg/l	4.1	3.9	7.8	4	4.2	4.2	7.8	3.9	4.7	1.523
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.29	0.24	0.39	0.26	0.19	0.28	0.39	0.19	0.275	0.066
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

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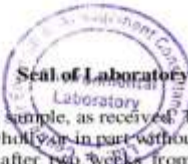
Certificate No-TC 6646

27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	Depth of Water Level	Meter	3.2	3	2.4	2.9	3.1	2.6	3.2	2.4	2.866	0.307

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

M. K. Rout
Authorized Signatory



Notes:

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Laboratory At: Plot No. 800/1274, Jhal, Pahal, Bhubaneswar-752101,
E-mail: cmclab@yahoo.in, Mobile: 9937631956, 8895177314



IREL (India) Limited

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Certificate No-TC 9848

Report no. - CEMC/IREL/W7

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s. IREL (India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr. Suresh Pradhan

Sample Location

: Downstream of Solar Evaporation Storage
Pond

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	8.54	8.92	8.27	7.69	9.43	8.27	9.43	7.69	8.52	0.600
2	Temperature	°C	31.3	30.8	29.3	27.6	29.5	31.5	31.5	27.6	30	1.488
3	Turbidity	NTU	8	10	6	6	8	4	10	4	7	2.097
4	Colour	Hazen	10	15	8	5	7	6	15	5	8.5	3.619
5	Alkalinity (as CaCO ₃)	mg/l	180	192	184	152	208	190	208	152	184.33	18.52
6	Total Dissolved Solids	mg/l	620	654	592	524	816	594	816	524	633.33	99.17
7	Total Suspended Solids	mg/l	14.8	15.6	11.3	6.7	10.9	10.2	15.6	6.7	11.583	3.249
8	Oil & Grease	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	2	2	2	2.2	2.6	2	2.6	2	2.133	0.242
10	Chemical Oxygen Demand	mg/l	25	32	28	9.2	12.8	28	32	9.2	22.5	9.251
11	Dissolved Oxygen	mg/l	4.6	4.4	4.2	4.2	4	4.2	4.6	4	4.266	0.206
12	Chloride (as Cl)	mg/l	42.9	44.3	35.9	32.3	51.6	35.9	51.6	32.3	40.483	7.112
13	Sulphate (as SO ₄)	mg/l	16.2	18.5	14.3	14.5	29.2	14.3	29.2	14.3	17.833	5.803
14	Fluoride (as F)	mg/l	0.12	0.14	0.14	0.13	0.21	0.14	0.21	0.12	0.146	0.032
15	Total Hardness (as CaCO ₃)	mg/l	188	196	192	150	214	192	214	150	188.66	21.03
16	Calcium (as Ca)	mg/l	47.29	49.7	49.7	42.48	63.33	49.7	63.33	42.48	50.366	6.943
17	Magnesium (as Mg)	mg/l	17.01	17.49	16.5	10.69	13.61	16.5	17.49	10.69	15.3	2.634
18	Sodium (as Na)	mg/l	34.4	38.7	34.3	21.7	44.2	34.3	44.2	21.7	34.6	7.424
19	Potassium (as K)	mg/l	11.8	13.2	13.8	10.8	21.4	13.8	21.4	10.8	14.133	3.753
20	Total Nitrogen#	mg/l	4.5	4.9	4.7	5.1	8.5	4.7	8.5	4.5	5.4	1.532
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.28	0.29	0.35	0.29	0.56	0.35	0.56	0.28	0.353	0.105
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RSA
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Laboratory At: Plot No. 800/1274, Johal, Pahal, Bhubaneswar-752101,
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Six Monthly Compliance Report (October 2020 to March 2021)



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Certificate No.-TC 6646

27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	Depth of Water Level	Meter	2.8	2.5	2.7	2.5	2.6	2.8	2.8	2.5	2.65	0.137

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

M. Rout
Authorized Signatory



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Certificate No-TC 988

Report no. - CEMC/IREL/WS

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Location

: Upstream of Solid Waste Trench (W8)

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Oct	Nov	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	—	7.48	7.06	7.51	7.51	7.51	7.06	7.39	0.2204
2	Temperature	°C	31.2	31.6	30.1	30.8	31.6	30.1	30.925	0.639
3	Turbidity	NTU	6	5	6	5	6	5	5.5	0.577
4	Colour	Hazen	5	5	5	5	5	5	5	0
5	Alkalinity (as CaCO ₃)	mg/l	126	108	126	136	136	108	124	11.66
6	Total Dissolved Solids	mg/l	358	302	418	416	418	302	373.5	55.193
7	Total Suspended Solids	mg/l	5	5	5	5	5	5	5	0
8	Oil & Grease	mg/l	<1	<1	<1	<1	<1	<1	<1	<1
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	10	8	18	18	18	8	13.5	5.259
11	Dissolved Oxygen	mg/l	5.2	5.4	4.4	4.4	5.4	4.4	4.85	0.525
12	Chloride (as Cl)	mg/l	25.8	23.3	26.9	26.9	26.9	23.3	25.725	1.697
13	Sulphate (as SO ₄)	mg/l	8.9	8.4	9.6	9.6	9.6	8.4	9.125	0.585
14	Fluoride (as F)	mg/l	0.08	0.08	0.09	0.09	0.09	0.08	0.085	0.005
15	Total Hardness (as CaCO ₃)	mg/l	118	102	134	134	134	102	122	15.318
16	Calcium (as Ca)	mg/l	28.85	24.05	36.07	36.07	36.07	24.05	31.26	5.889
17	Magnesium (as Mg)	mg/l	11.18	10.21	10.69	10.69	11.18	10.21	10.6925	0.396
18	Sodium (as Na)	mg/l	28.4	23.1	23.8	23.8	28.4	23.1	24.775	2.439
19	Potassium (as K)	mg/l	5.6	5.3	8.9	8.9	8.9	5.3	7.175	1.995
20	Total Nitrogen#	mg/l	2.2	2.1	3.1	3.1	3.1	2.1	2.625	0.55
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.21	0.19	0.23	0.23	0.23	0.19	0.215	0.0191
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, R&GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No.-TC 9646

26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND
33	Depth of Water Level	Meter	4.3	4.1	4	3.7	4.3	3.7	4.025	0.25

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

Authorized Signatory



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Certificate No.-TC 6646

Report no. - CEMC/IREL/W9

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Location

: Downstream of Solid Waste Trench (W9)

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl No	Parameter	Unit	Oct	Nov	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.52	6.96	7.66	7.66	7.66	6.96	7.45	0.333
2	Temperature	°C	30.6	30.9	29.4	32.1	32.1	29.4	30.75	1.109
3	Turbidity	NTU	5	5	5	5	5	5	5	0
4	Colour	Hazen	5	5	5	5	5	5	5	0
5	Alkalinity (as CaCO ₃)	mg/l	138	102	148	150	150	102	134.5	22.2935
6	Total Dissolved Solids	mg/l	402	294	436	448	448	294	395	70.095
7	Total Suspended Solids	mg/l	5	5	5	5	5	5	5	0
8	Oil & Grease	mg/l	<1	<1	<1	<1	<1	<1	<1	<1
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	10	8	22	22	22	8	15.5	7.5498
11	Dissolved Oxygen	mg/l	4.9	5.2	4.2	4.2	5.2	4.2	4.625	0.5058
12	Chloride (as Cl)	mg/l	31.9	22.1	30.3	29.3	31.9	22.1	28.4	4.3343
13	Sulphate (as SO ₄)	mg/l	11.9	8.2	10.8	10.8	11.9	8.2	10.425	1.5713
14	Fluoride (as F)	mg/l	0.09	0.08	0.11	0.11	0.11	0.08	0.0975	0.015
15	Total Hardness (as CaCO ₃)	mg/l	138	100	152	152	152	100	135.5	24.569
16	Calcium (as Ca)	mg/l	33.66	23.24	40.88	40.88	40.88	23.24	34.665	8.342
17	Magnesium (as Mg)	mg/l	13.12	10.21	12.15	12.15	13.12	10.21	11.9075	1.220
18	Sodium (as Na)	mg/l	25.8	22.7	28.6	28.6	28.6	22.7	26.425	2.812
19	Potassium (as K)	mg/l	7.6	5.1	10.2	10.2	10.2	5.1	8.275	2.445
20	Total Nitrogen#	mg/l	2.9	2	3.7	3.7	3.7	2	3.075	0.809
21	Phosphorus (as	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No.-TC 6646

	PO ₄									
22	Iron (as Fe)	mg/l	0.25	0.18	0.29	0.29	0.29	0.18	0.2525	0.051
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ^{VI})	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND
33	Depth of Water Level	Meter	2.6	2.3	2.9	3.1	3.1	2.3	2.725	0.35

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

M. K. Rout

Authorized Signatory

Notes:

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IREL (India) Limited

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Certificate No.-TC 6646

Report no. - CEMC/IREL/W10

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Location

: Odisha PHD

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.82	7.69	7.79	7.52	7.61	7.54	7.82	7.52	7.6616	0.126
2	Temperature	°C	30.7	30.2	29.3	27.9	29.2	32.3	32.3	27.9	29.933	1.505
3	Turbidity	NTU	4	3	5	1	1	1	5	1	2.5	1.760
4	Colour	Hazen	5	5	5	5	5	5	5	5	5	0
5	Alkalinity (as CaCO ₃)	mg/l	80	76	80	104	96	88	104	76	87.333	10.85
6	Total Dissolved Solids	mg/l	181	172	178	312	298	290	312	172	238.5	67.79
7	Total Suspended Solids	mg/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
8	Oil & Grease	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	5	5	8	6.6	6.2	9.2	9.2	5	6.666	1.671
11	Dissolved Oxygen	mg/l	5.1	5.4	5.4	5.6	5.8	5.6	5.8	5.1	5.483	5.1
12	Chloride (as Cl)	mg/l	14.9	15.6	12.3	14.1	14.6	12	15.6	12	13.91	14.9
13	Sulphate (as SO ₄)	mg/l	7.8	8.2	7.4	8.6	8.1	7.4	8.6	7.4	7.916	7.8
14	Fluoride (as F)	mg/l	0.06	0.07	0.06	0.07	0.08	0.07	0.08	0.06	0.0683	0.06
15	Total Hardness (as CaCO ₃)	mg/l	86	88	84	72	70	88	88	70	81.333	86
16	Calcium (as Ca)	mg/l	23.24	25.65	24.85	20.04	19.24	25.65	25.65	19.24	23.111	23.24
17	Magnesium (as Mg)	mg/l	6.8	5.83	5.35	5.35	5.35	5.83	6.8	5.35	5.751	6.8
18	Sodium (as Na)	mg/l	11.3	11.1	10.6	8.6	8.1	10.2	11.3	8.1	9.983	11.3
19	Potassium (as K)	mg/l	3.2	3.2	2.7	2.5	2.2	2.7	3.2	2.2	2.75	3.2
20	Total Nitrogen#	mg/l	3.6	3.1	3.2	3.2	3.1	3.1	3.6	3.1	3.216	3.6
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.15	0.12	0.11	0.12	0.11	0.13	0.15	0.11	0.1233	0.15
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No.-TC 6646

25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

M. K. Rout
Authorized Signatory



Notes:

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Certificate No-TC 666

Report no. - CEMC/IREL/W11

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Location

: Lily Pond

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Oct	Nov	Dec	Jan	Feb	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	6.73	6.81	7.12	7.43	7.52	7.73	7.73	6.73	7.223	0.403
2	Temperature	°C	30.5	30.1	29.1	27.8	30.2	32.6	32.6	27.8	30.05	1.593
3	Turbidity	NTU	5	5	5	5	5	2	5	2	4.5	1.224
4	Colour	Hazen	10	8	7	5	5	5	10	5	6.666	2.065
5	Alkalinity (as CaCO ₃)	mg/l	74	86	84	68	72	94	94	68	79.666	9.912
6	Total Dissolved Solids	mg/l	156	224	196	201	201	304	304	156	213.66	49.44
7	Total Suspended Solids	mg/l	7.8	8.6	6.1	5.3	5.3	5.5	8.6	5.3	6.433	1.422
8	Oil & Grease	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9	Biochemical Oxygen Demand 3 days@ 27°C	mg/l	2	2.4	2.4	2	2	2.2	2.4	2	2.1666	0.196
10	Chemical Oxygen Demand	mg/l	10	14	12	6.4	6.6	10.8	14	6.4	9.966	3.005
11	Dissolved Oxygen	mg/l	5.6	5.2	4.2	4	4.2	5.4	5.6	4	4.766	0.708
12	Chloride (as Cl)	mg/l	8.9	9.6	9.8	10.6	11.3	13.9	13.9	8.9	10.68	1.781
13	Sulphate (as SO ₄)	mg/l	5.2	5.9	6.2	5.8	5.4	7.8	7.8	5.2	6.05	0.928
14	Fluoride (as F)	mg/l	0.06	0.08	0.08	0.09	0.1	0.09	0.1	0.06	0.0833	0.013
15	Total Hardness (as CaCO ₃)	mg/l	84	98	86	64	64	90	98	64	81	14.01
16	Calcium (as Ca)	mg/l	24.05	26.45	25.65	19.24	19.24	26.05	26.45	19.24	23.4466	3.358
17	Magnesium (as Mg)	mg/l	5.83	7.78	5.35	3.89	3.89	6.08	7.78	3.89	5.47	1.472
18	Sodium (as Na)	mg/l	9.7	12.3	11.2	7.1	7.3	11.3	12.3	7.1	9.8166	2.191
19	Potassium (as K)	mg/l	2.6	3.4	2.9	2.2	2.4	3.2	3.4	2.2	2.783	0.466
20	Total Nitrogen#	mg/l	3.2	3.5	3.5	3.1	3.2	3.3	3.5	3.1	3.3	0.167
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.12	0.13	0.13	0.14	0.09	0.16	0.16	0.09	0.128	0.023
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Environmental Studies (EIA & EMP) Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No.-TC 9648

26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	30	40	22	22	22	17	40	17	25.5	8.240
31	Faecal Coliform	MPN/100ml	9	9	4	2	2	2	9	2	4.6666	3.444
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

M. Raut
Authorized Signatory



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Certificate No.-TC 6646

Report no. - CEMC/IREL/W12

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Description Sample Quantity	: M/s.IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr.Suresh Pradhan : Kanamana Village (W12) : 2.0 Ltrs
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ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	6.87	7.28	7.28	6.87	7.075	0.290
2	Temperature	°C	28.4	31.9	31.9	28.4	30.150	2.475
3	Turbidity	NTU	<1	<1	<1	<1	<1	<1
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	148	180	180	148	164	22.627
6	Total Dissolved Solids	mg/l	497.6	824	824	497.6	660.8	230.8
7	Total Suspended Solids	mg/l	<5	<5	<5	<5	<5	<5
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	4	2.4	4	2.4	3.2	1.131
12	Chloride (as Cl)	mg/l	90.9	177.3	177.3	90.9	134.1	61.094
13	Sulphate (as SO ₄)	mg/l	38.6	69.3	69.3	38.6	53.95	21.708
14	Fluoride (as F)	mg/l	0.19	0.16	0.19	0.16	0.175	0.021
15	Total Hardness (as CaCO ₃)	mg/l	126	152	152	126	139	18.385
16	Calcium (as Ca)	mg/l	36.07	39.27	39.27	36.07	37.67	2.263
17	Magnesium (as Mg)	mg/l	8.75	13.12	13.12	8.75	10.935	3.090
18	Sodium (as Na)	mg/l	42.6	65.6	65.6	42.6	54.1	16.263
19	Potassium (as K)	mg/l	16.9	14.4	16.9	14.4	15.65	1.768
20	Total Nitrogen#	mg/l	1.4	1.3	1.4	1.3	1.35	0.071
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.32	0.37	0.37	0.32	0.345	0.0354
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Laboratory At: Plot No. 800/1274, Jhal, Pahal, Bhubaneswar-752101,
 E-mail: ccmclab@yahoo.in, Mobile: 9937631956, 8895177314



IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)



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Certificate No.-TC 6646

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

MPN

Authorized Signatory

Notes:

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Certificate No-TC 6646

Report no. - CEMC/IREL/W13

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Description Sample Quantity	: M/s. IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr. Suresh Pradhan : Bada Arjipally (W13) : 2.0 Ltrs
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ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	6.82	7.87	7.87	6.82	7.345	0.742
2	Temperature	°C	28.6	31.6	31.6	28.6	30.1	2.121
3	Turbidity	NTU	<1	<1	<1	<1	<1	<1
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	102	122	122	102	112	14.142
6	Total Dissolved Solids	mg/l	261.8	292	292	261.8	276.9	21.355
7	Total Suspended Solids	mg/l	<5	<5	<5	<5	<5	<5
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	4.2	2.8	4.2	2.8	3.5	0.990
12	Chloride (as Cl)	mg/l	36.3	53.9	53.9	36.3	45.1	12.445
13	Sulphate (as SO ₄)	mg/l	19.5	25.1	25.1	19.5	22.3	3.960
14	Fluoride (as F)	mg/l	0.09	0.11	0.11	0.09	0.1	0.014
15	Total Hardness (as CaCO ₃)	mg/l	86	84	86	84	85	1.414
16	Calcium (as Ca)	mg/l	23.25	22.4	23.25	22.4	22.825	0.601
17	Magnesium (as Mg)	mg/l	6.8	6.8	6.8	6.8	6.8	0.000
18	Sodium (as Na)	mg/l	22.8	18.5	22.8	18.5	20.65	3.041
19	Potassium (as K)	mg/l	9.3	6.7	9.3	6.7	8	1.838
20	Total Nitrogen#	mg/l	0.56	0.98	0.98	0.56	0.77	0.297
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.13	0.24	0.24	0.13	0.185	0.078
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No-TC 9646

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

MPout

Authorized Signatory

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Certificate No.-TC 6646

Report no. - CEMC/IREL/W14

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Description Sample Quantity	: M/s. IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr. Suresh Pradhan : Sana Arjipally (W14) : 2.0 Ltrs
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ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	6.88	6.93	6.93	6.88	6.905	0.035
2	Temperature	°C	28.9	31.4	31.4	28.9	30.15	1.768
3	Turbidity	NTU	<1	<1	<1	<1	<1	<1
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	98	96	98	96	97	1.414
6	Total Dissolved Solids	mg/l	380.4	236	380.4	236	308.2	102.106
7	Total Suspended Solids	mg/l	<5	<5	<5	<5	<5	<5
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	ND	ND	ND	ND	ND	ND
12	Chloride (as Cl)	mg/l	4.4	2.6	4.4	2.6	3.5	1.273
13	Sulphate (as SO ₄)	mg/l	58.6	48.6	58.6	48.6	53.6	7.071
14	Fluoride (as F)	mg/l	27.2	17.2	27.2	17.2	22.2	7.071
15	Total Hardness (as CaCO ₃)	mg/l	0.12	0.09	0.12	0.09	0.105	0.021
16	Calcium (as Ca)	mg/l	102	72	102	72	87	21.213
17	Magnesium (as Mg)	mg/l	28.06	20.04	28.06	20.04	24.05	5.671
18	Sodium (as Na)	mg/l	7.78	5.35	7.78	5.35	6.565	1.718
19	Potassium (as K)	mg/l	33.9	16.3	33.9	16.3	25.1	12.445
20	Total Nitrogen#	mg/l	12.7	5.8	12.7	5.8	9.25	4.879
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.21	0.22	0.22	0.21	0.215	0.007
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No.-TC 6646

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

[Signature]
Authorized Signatory



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Certificate No-TC 9646

Report no. - CEMC/IREL/W15

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Description Sample Quantity	: M/s.IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr.Suresh Pradhan : Upallu Putty (W15) : 2.0 Ltrs
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ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.29	7.29	7.29	7.29	7.29	0
2	Temperature	°C	27.9	32.3	32.3	27.9	30.1	3.111
3	Turbidity	NTU	<1	<1	<1	<1	<1	<1
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	118	104	118	104	111	9.899
6	Total Dissolved Solids	mg/l	596.4	582	596.4	582	589.2	10.182
7	Total Suspended Solids	mg/l	<5	<5	<5	<5	<5	<5
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	3.8	4.2	4.2	3.8	4	0.283
12	Chloride (as Cl)	mg/l	99.3	91.6	99.3	91.6	95.45	5.445
13	Sulphate (as SO ₄)	mg/l	21.5	18.5	21.5	18.5	20	2.121
14	Fluoride (as F)	mg/l	0.16	0.15	0.16	0.15	0.155	0.007
15	Total Hardness (as CaCO ₃)	mg/l	104	104	104	104	104	0
16	Calcium (as Ca)	mg/l	28.06	28.06	28.06	28.06	28.06	0
17	Magnesium (as Mg)	mg/l	8.26	8.26	8.26	8.26	8.26	0
18	Sodium (as Na)	mg/l	38.3	36.5	38.3	36.5	37.4	1.273
19	Potassium (as K)	mg/l	8.1	9.2	9.2	8.1	8.65	0.778
20	Total Nitrogen#	mg/l	1.36	1.2	1.36	1.2	1.28	0.113
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.33	0.32	0.33	0.32	0.325	0.0071
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁺⁶)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No-TC 6646

N.B: ND-Not Detectable, MPN-Most Probable Number

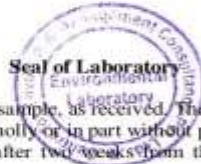
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MPN

Authorized Signatory

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Laboratory At: Plot No. 800/1274, Johal, Pahal, Bhubaneswar-752101,

E-mail: cemclab@yahoo.in, Mobile: 9937631956, 8895177314



IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)



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Certificate No-TC 9986

Report no. - CEMC/IREL/W16

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Description Sample Quantity	: M/s.IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr.Suresh Pradhan : Bada Putty (W16) : 2.0 Ltrs
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ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.16	7.16	7.16	7.16	7.16	0
2	Temperature	°C	28.7	31.9	31.9	28.7	30.3	2.2627
3	Turbidity	NTU	<1	<1	<1	<1	<1	<1
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	92	88	92	88	90	2.828
6	Total Dissolved Solids	mg/l	442.7	431	442.7	431	436.85	8.273
7	Total Suspended Solids	mg/l	<5	<5	<5	<5	<5	<5
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	4	4	4	4	4	0
12	Chloride (as Cl)	mg/l	78.9	72.3	78.9	72.3	75.6	4.667
13	Sulphate (as SO ₄)	mg/l	13.6	12.3	13.6	12.3	12.95	0.919
14	Fluoride (as F)	mg/l	0.13	0.13	0.13	0.13	0.13	0
15	Total Hardness (as CaCO ₃)	mg/l	86	86	86	86	86	0
16	Calcium (as Ca)	mg/l	23.25	23.25	23.25	23.25	23.25	0
17	Magnesium (as Mg)	mg/l	6.32	6.32	6.32	6.32	6.32	0
18	Sodium (as Na)	mg/l	26.7	23.1	26.7	23.1	24.9	2.5456
19	Potassium (as K)	mg/l	5.2	6.4	6.4	5.2	5.8	0.8485
20	Total Nitrogen#	mg/l	0.79	0.86	0.86	0.79	0.825	0.0495
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.24	0.26	0.26	0.24	0.25	0.0141
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ¹⁶)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No.-TC 6646

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

M. Rout

Authorized Signatory

Notes:

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Certificate No-TC 9646

Report no. - CEMC/IREL/W17

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Description Sample Quantity	: M/s.IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr.Suresh Pradhan : Busan Putty (W17) : 2.0 Ltrs
---	--

ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.45	7.45	7.45	7.45	7.45	0
2	Temperature	°C	28.3	32.1	32.1	28.3	30.2	2.687
3	Turbidity	NTU	1.6	1.6	1.6	1.6	1.6	0
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	136	132	136	132	134	2.828
6	Total Dissolved Solids	mg/l	708.2	694	708.2	694	701.1	10.041
7	Total Suspended Solids	mg/l	<5	<5	<5	<5	<5	<5
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	3.6	4.4	4.4	3.6	4	0.5657
12	Chloride (as Cl)	mg/l	121.6	122.9	122.9	121.6	122.25	0.9192
13	Sulphate (as SO ₄)	mg/l	28.4	29.7	118.4	113.9	72.6	0.9192
14	Fluoride (as F)	mg/l	0.19	0.21	0.21	0.19	0.2	0.0141
15	Total Hardness (as CaCO ₃)	mg/l	128	128	128	128	128	0
16	Calcium (as Ca)	mg/l	36.87	36.87	36.87	36.87	36.87	0
17	Magnesium (as Mg)	mg/l	8.75	8.75	8.75	8.75	8.75	0
18	Sodium (as Na)	mg/l	49.1	48.3	49.1	48.3	48.7	0.5657
19	Potassium (as K)	mg/l	11.4	15.6	15.6	11.4	13.5	2.9698
20	Total Nitrogen#	mg/l	1.7	1.8	1.8	1.7	1.75	0.0707
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.41	0.44	0.44	0.41	0.425	0.0212
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No-TC 6646

M. Rout

Authorized Signatory

Notes:

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Certificate No-TC 9646

Report no. - CEMC/IREL/W18

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited , Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Description

: Takeriya Borewell (W18)

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	6.98	7.76	7.76	6.98	7.37	0.552
2	Temperature	°C	28.3	31.7	31.7	28.3	30	2.404
3	Turbidity	NTU	1	1	1	1	1	0
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	152	112	152	112	132	28.284
6	Total Dissolved Solids	mg/l	966	312	966	312	639	462.448
7	Total Suspended Solids	mg/l	6.5	6.1	6.5	6.1	6.3	0.283
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	2.8	4.4	4.4	2.8	3.6	1.131
12	Chloride (as Cl)	mg/l	122.3	62.3	122.3	62.3	92.3	42.426
13	Sulphate (as SO ₄)	mg/l	67.5	22.9	67.5	22.9	45.2	31.537
14	Fluoride (as F)	mg/l	0.23	0.13	0.23	0.13	0.18	0.071
15	Total Hardness (as CaCO ₃)	mg/l	214	114	214	114	164	70.711
16	Calcium (as Ca)	mg/l	66.53	29.66	66.53	29.66	48.095	26.071
17	Magnesium (as Mg)	mg/l	11.7	9.72	11.7	9.72	10.71	1.400
18	Sodium (as Na)	mg/l	94.2	33.1	94.2	33.1	63.65	43.204
19	Potassium (as K)	mg/l	35.8	9.2	35.8	9.2	22.5	18.809
20	Total Nitrogen#	mg/l	4.3	1.2	4.3	1.2	2.75	2.192
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.32	0.45	0.13	0.45	0.13	0.29
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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N.B: ND-Not Detectable, MPN-Most Probable Number
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646


Authorized Signatory



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Certificate No.-TC 6646

Report no. - CEMC/IREL/W19

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Description Sample Quantity	: M/s. IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr. Suresh Pradhan : Kandara Arjipalli (W19) : 2.0 Ltrs
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ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	6.67	8.09	8.09	6.67	7.38	1.004
2	Temperature	°C	28.1	31.8	31.8	28.1	29.95	2.616
3	Turbidity	NTU	<1	<1	<1	<1	<1	<1
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	96	208	208	96	152	79.196
6	Total Dissolved Solids	mg/l	504	806	806	504	655	213.546
7	Total Suspended Solids	mg/l	4.1	5.3	5.3	4.1	4.7	0.849
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	3.2	4	4	3.2	3.6	0.566
12	Chloride (as Cl)	mg/l	114.9	126.9	126.9	114.9	120.9	8.485
13	Sulphate (as SO ₄)	mg/l	39.3	41.5	41.5	39.3	40.4	1.556
14	Fluoride (as F)	mg/l	0.19	0.17	0.19	0.17	0.18	0.014
15	Total Hardness (as CaCO ₃)	mg/l	148	210	210	148	179	43.841
16	Calcium (as Ca)	mg/l	43.29	64.13	64.13	43.29	53.71	14.736
17	Magnesium (as Mg)	mg/l	9.72	12.15	12.15	9.72	10.935	1.718
18	Sodium (as Na)	mg/l	45.4	64.5	64.5	45.4	54.95	13.506
19	Potassium (as K)	mg/l	18.6	20.4	20.4	18.6	19.5	1.273
20	Total Nitrogen#	mg/l	3.1	2.7	3.1	2.7	2.9	0.283
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.33	0.22	0.33	0.22	0.275	0.078
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Laboratory At: Plot No. 800/1274, Jhal, Pahal, Bhubaneswar-752101,
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IREL (India) Limited
Six Monthly Compliance Report (October 2020 to March 2021)



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Certificate No.-TC 6646

N.B: ND-Not Detectable, MPN-Most Probable Number
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

MPN

Authorized Signatory
Notes:



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Certificate No.-TC 6646

Report no. - CEMC/IREL/W20

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Description Sample Quantity	: M/s.IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr.Suresh Pradhan : SW Near Port (W20) : 2.0 Ltrs
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ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.96	7.93	7.96	7.93	7.945	0.021
2	Temperature	°C	27.8	32.4	32.4	27.8	30.1	3.253
3	Turbidity	NTU	5	1	5	1	3	2.828
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	90	116	116	90	103	18.385
6	Total Dissolved Solids	mg/l	392	356	392	356	374	25.456
7	Total Suspended Solids	mg/l	4.6	9.5	9.5	4.6	7.05	3.465
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	9.6	9.8	9.8	9.6	9.7	0.14
11	Dissolved Oxygen	mg/l	3.6	4.2	4.2	3.6	3.9	0.424
12	Chloride (as Cl)	mg/l	41.6	64.6	64.6	41.6	53.1	16.263
13	Sulphate (as SO ₄)	mg/l	18.7	24.2	24.2	18.7	21.45	3.889
14	Fluoride (as F)	mg/l	0.12	0.14	0.14	0.12	0.13	0.014
15	Total Hardness (as CaCO ₃)	mg/l	104	115	115	104	109.5	7.778
16	Calcium (as Ca)	mg/l	25.65	30.06	30.06	25.65	27.855	3.118
17	Magnesium (as Mg)	mg/l	9.7	9.7	9.7	9.7	9.7	0
18	Sodium (as Na)	mg/l	39.8	36.2	39.8	36.2	38	2.546
19	Potassium (as K)	mg/l	11.2	10.8	11.2	10.8	11	0.283
20	Total Nitrogen#	mg/l	1.7	1.3	1.7	1.3	1.5	0.283
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.26	0.14	0.26	0.14	0.2	0.085
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No.-TC 6646

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

MRout

Authorized Signatory

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Certificate No-TC 6646

Report no. - CEMC/IREL/W21

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Description

: Kalibali Village (W21)

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.21	7.28	7.28	7.21	7.245	0.049
2	Temperature	°C	28.3	31.9	31.9	28.3	30.1	2.546
3	Turbidity	NTU	1	1	1	1	1	0
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	144	116	144	116	130	19.799
6	Total Dissolved Solids	mg/l	526.3	528.6	528.6	526.3	527.45	1.626
7	Total Suspended Solids	mg/l	5.6	5.1	5.6	5.1	5.35	0.354
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	3.2	4.2	4.2	3.2	3.7	0.707
12	Chloride (as Cl)	mg/l	44.1	39.6	44.1	39.6	41.85	3.182
13	Sulphate (as SO ₄)	mg/l	26.8	21.3	26.8	21.3	24.05	3.889
14	Fluoride (as F)	mg/l	0.15	0.14	0.15	0.14	0.145	0.007
15	Total Hardness (as CaCO ₃)	mg/l	114	114	114	114	114	0
16	Calcium (as Ca)	mg/l	29.66	29.66	29.66	29.66	29.66	0
17	Magnesium (as Mg)	mg/l	9.72	9.72	9.72	9.72	9.72	0
18	Sodium (as Na)	mg/l	52.8	36.3	52.8	36.3	44.55	11.667
19	Potassium (as K)	mg/l	18.2	13.6	18.2	13.6	15.9	3.253
20	Total Nitrogen#	mg/l	1.7	1.6	1.7	1.6	1.65	0.071
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.38	0.34	0.38	0.34	0.36	0.028
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No-TC 9646

M. K. Rout

Authorized Signatory

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Certificate No.-TC 9648

Report no. - CEMC/IREL/W22

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Description

: Haripur (W22)

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.29	7.36	7.36	7.29	7.325	0.049
2	Temperature	°C	27.8	32.4	32.4	27.8	30.1	3.253
3	Turbidity	NTU	1.4	1.4	1.4	1.4	1.4	0.000
4	Colour	Hazen	<5	<5	<5	<5	<5	<5
5	Total Alkalinity (as CaCO ₃)	mg/l	132	108	132	108	120	16.971
6	Total Dissolved Solids	mg/l	441.6	452.3	452.3	441.6	446.95	7.566
7	Total Suspended Solids	mg/l	5.2	5	5.2	5	5.1	0.141
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	<2	<2	<2	<2	<2	<2
10	Chemical Oxygen Demand	mg/l	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	3.6	4	4	3.6	3.8	0.283
12	Chloride (as Cl)	mg/l	39.8	34.9	39.8	34.9	37.35	3.465
13	Sulphate (as SO ₄)	mg/l	22.3	17.5	22.3	17.5	19.9	3.394
14	Fluoride (as F)	mg/l	0.13	0.12	0.13	0.12	0.125	0.007
15	Total Hardness (as CaCO ₃)	mg/l	106	106	106	106	106	0.000
16	Calcium (as Ca)	mg/l	28.06	28.06	28.06	28.06	28.06	0.000
17	Magnesium (as Mg)	mg/l	8.75	8.75	8.75	8.75	8.75	0.000
18	Sodium (as Na)	mg/l	46.9	29.4	46.9	29.4	38.15	12.374
19	Potassium (as K)	mg/l	11.7	10.3	11.7	10.3	11	0.990
20	Total Nitrogen#	mg/l	1.1	1.2	1.2	1.1	1.15	0.071
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.35	0.27	0.35	0.27	0.31	0.057
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

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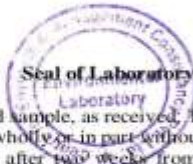
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Accredited by NABET, QCI for EIA Studies as 'A' Category Consultant Organization.
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Certificate No-TC 6646


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Notes

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Regd. Office: 1st Floor, N-5/305, IRC village, Nayapalli, Bhubaneswar-751015, Odisha, India, Mobile: 9861032826

E-mail- cemc_consultancy@yahoo.co.in, cemc122@gmail.com, website: www.cemc.in, Landline: 0674-2360344.

Laboratory At: Plot No. 800/1274, Jchal, Pahal, Bhubaneswar-752101,

E-mail: cemclab@yahoo.in, Mobile: 9937631956, 8895177314



IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)



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Certificate No-TC 6646

Report no. - CEMC/IREL/W23

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Description

: Tampara Lake (W23)

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.96	7.96	7.96	7.96	7.96	0
2	Temperature	°C	27.3	32.5	32.5	27.3	29.9	3.677
3	Turbidity	NTU	8	5	8	5	6.5	2.121
4	Colour	Hazen	6	5	6	5	5.5	0.707
5	Total Alkalinity (as CaCO ₃)	mg/l	148	136	148	136	142	8.485
6	Total Dissolved Solids	mg/l	396.4	396.4	396.4	396.4	396.4	0.000
7	Total Suspended Solids	mg/l	7.5	6.4	7.5	6.4	6.95	0.778
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	2.4	2.2	2.4	2.2	2.3	0.141
10	Chemical Oxygen Demand	mg/l	16	14	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	6	5.4	6	5.4	5.7	0.424
12	Chloride (as Cl)	mg/l	56.3	52.6	56.3	52.6	54.45	2.616
13	Sulphate (as SO ₄)	mg/l	28.2	24.3	28.2	24.3	26.25	2.758
14	Fluoride (as F)	mg/l	0.22	0.22	0.22	0.22	0.22	0.000
15	Total Hardness (as CaCO ₃)	mg/l	136	118	136	118	127	12.728
16	Calcium (as Ca)	mg/l	42.08	42.08	42.08	42.08	42.08	0.000
17	Magnesium (as Mg)	mg/l	7.53	7.53	7.53	7.53	7.53	0.000
18	Sodium (as Na)	mg/l	55.7	49.2	55.7	49.2	52.45	4.596
19	Potassium (as K)	mg/l	13.8	13.4	13.8	13.4	13.6	0.283
20	Total Nitrogen#	mg/l	29.7	2.7	29.7	2.7	16.2	19.092
21	Phosphorus (as PO ₄)	mg/l	0.11	0.12	0.12	0.11	0.115	0.007
22	Iron (as Fe)	mg/l	0.41	0.34	0.41	0.34	0.375	0.049
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

N.B: ND-Not Detectable, MPN-Most Probable Number

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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Certificate No-TC 6646


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Certificate No-TC 9646

Report no. - CEMC/IREL/W24

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

: M/s.IREL(India) Limited, Matikhala,
Chatrapur, Ganjam, Odisha

Work Order No.

: R-07/O/01692 3532A OSCOM/SOP/07/O/01692
S.C.-1424, Dated-10.08.2020

Sampling Period

: October' 2020 to March' 2021

Sampling by

: Mr.Suresh Pradhan

Sample Description

: Nolia Niuagoan (W24)

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	7.88	7.88	7.88	7.88	7.88	0
2	Temperature	°C	28.5	32.1	32.1	28.5	30.3	2.546
3	Turbidity	NTU	1	1	1	1	1	0
4	Colour	Hazen	5	5	5	5	5	0
5	Total Alkalinity (as CaCO ₃)	mg/l	132	124	132	124	128	5.657
6	Total Dissolved Solids	mg/l	364.6	356.6	364.6	356.6	360.6	5.657
7	Total Suspended Solids	mg/l	3	4	4	3	3.5	0.707
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days @ 27°C	mg/l	2	2.4	2.4	2	2.2	0.283
10	Chemical Oxygen Demand	mg/l	8	8	8	8	8	0
11	Dissolved Oxygen	mg/l	2.6	2.8	2.8	2.6	2.7	0.141
12	Chloride (as Cl)	mg/l	48.4	48.4	48.4	48.4	48.4	0
13	Sulphate (as SO ₄)	mg/l	26.1	21.1	26.1	21.1	23.6	3.536
14	Fluoride (as F)	mg/l	0.18	0.18	0.18	0.18	0.18	0.000
15	Total Hardness (as CaCO ₃)	mg/l	114	112	114	112	113	1.414
16	Calcium (as Ca)	mg/l	36.07	36.07	36.07	36.07	36.07	0
17	Magnesium (as Mg)	mg/l	5.83	5.83	5.83	5.83	5.83	0
18	Sodium (as Na)	mg/l	49.2	43.4	49.2	43.4	46.3	4.101
19	Potassium (as K)	mg/l	12.9	12.6	12.9	12.6	12.75	0.212
20	Total Nitrogen#	mg/l	2.1	2.1	2.1	2.1	2.1	0
21	Phosphorus (as PO ₄)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
22	Iron (as Fe)	mg/l	0.38	0.31	0.38	0.31	0.345	0.049
23	Copper (as Cu)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
26	Zinc (as Zn)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

Environmental Studies (EIA & EMP), Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.

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N.B: ND-Not Detectable, MPN-Most Probable Number

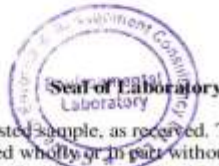
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-T-6646

MPN

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Certificate No.-TC 6646

Report no. - CEMC/IREL/W25

Date-22.05.2021

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client Work Order No. Sampling Period Sampling by Sample Description Sample Quantity	: M/s.IREL(India) Limited, Matikhala, Chatrapur, Ganjam, Odisha : R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1424, Dated-10.08.2020 : October' 2020 to March' 2021 : Mr.Suresh Pradhan : IREL Sea Water (W25) : 2.0 Ltrs
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ANALYSIS RESULT

Sl. No	Parameter	Unit	Dec	Mar	Max	Min	Avg	SD
1	pH Value @ 25°C	--	8.15	8.15	8.15	8.15	8.15	0
2	Temperature	°C	27.4	31.9	31.9	27.4	29.65	3.182
3	Turbidity	NTU	5	4	5	4	4.5	0.707
4	Colour	Hazen	6	6	6	6	6	0.000
5	Total Alkalinity (as CaCO ₃)	mg/l	914	912	914	912	913	1.414
6	Total Dissolved Solids	mg/l	19748	19624	19748	19624	19686	87.681
7	Total Suspended Solids	mg/l	9.2	8	9.2	8	8.6	0.849
8	Oil & Grease	mg/l	ND	ND	ND	ND	ND	ND
9	Biochemical Oxygen Demand 3 days@ 27°C	mg/l	2.6	2.8	2.8	2.6	2.7	0.141
10	Chemical Oxygen Demand	mg/l	32	32	ND	ND	ND	ND
11	Dissolved Oxygen	mg/l	7.2	7.2	7.2	7.2	7.2	0.000
12	Chloride (as Cl)	mg/l	8236	8214	8236	8214	8225	15.556
13	Sulphate (as SO ₄)	mg/l	290.8	292.6	292.6	290.8	291.7	1.273
14	Fluoride (as F)	mg/l	1.43	0.88	1.43	0.88	1.155	0.389
15	Total Hardness (as CaCO ₃)	mg/l	2188	2176	2188	2176	2182	8.485
16	Calcium (as Ca)	mg/l	634.8	634.8	634.8	634.8	634.8	0
17	Magnesium (as Mg)	mg/l	146.77	146.77	146.77	146.77	146.77	0
18	Sodium (as Na)	mg/l	4718	4704	4718	4704	4711	9.899
19	Potassium (as K)	mg/l	206.3	201.8	206.3	201.8	204.05	3.182
20	Total Nitrogen#	mg/l	72.4	78.5	78.5	72.4	75.45	4.313
21	Phosphorus (as PO ₄)	mg/l	2.5	2.8	2.8	2.5	2.65	0.212
22	Iron (as Fe)	mg/l	1.57	0.93	1.57	0.93	1.25	0.453
23	Copper (as Cu)	mg/l	0.79	0.72	0.79	0.72	0.755	0.049
24	Cadmium (as Cd)	mg/l	0.04	0.04	0.04	0.04	0.04	0
25	Lead (as Pb)	mg/l	0.33	0.51	0.51	0.33	0.42	0.1273
26	Zinc (as Zn)	mg/l	0.41	0.63	0.63	0.41	0.52	0.1556
27	Total Chromium (as Cr)	mg/l	0.05	0.08	0.08	0.05	0.065	0.0212
28	Hexavalent Chromium (as Cr ⁶⁺)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Total Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
31	Faecal Coliform	MPN/100ml	ND	ND	ND	ND	ND	ND
32	E. Coli	MPN/100ml	ND	ND	ND	ND	ND	ND

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Certificate No.-TC 6646

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Authorized Signatory

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Government of India
 Bhabha Atomic Research Centre
 Health Physics Division,
 Radiation Protection Section (NF)
 (H.P. Unit, IREL(India) LTD. OSCOM)

Ref : HPU/03(08)/ 270 (2)

Date: 13/05/2021

Water activity level monitored during
 October 2020 to March 2021

Sl.No	Location	Activity Levels(Bq/l)	
		Gross α	Gross β
1	Matikhalo	0.07	0.18
2	Badaputty	0.07	0.48
3	Basana putty	0.08	0.35
4	T Berhampur	0.16	0.45
5	K Arjipalli	0.08	0.3
6	Bada Arjipalli	0.08	0.28
7	Kanamana	0.14	0.65
8	Dredge Pond	-	-
9	Lily pond	0.2	0.55
10	OPHD	0.1	0.4
11	Pond-1	0.2	0.55
12	Mopp-up	0.6	0.85
13	Mopp-dwn	0.3	0.7
14	Bore hole near platform	1.45	3.7
15	Composite msp	0.4	0.4
16	Sep-up	0.3	0.8
17	Sep-dwn	0.8	1.7

T.L.V - Gross α = 0.1 Bq/l Gross β = 1.0 Bq/l

for 
 13/05/21
 OIC, HPU

TO
 DGM, (IS)

CC: CGM & Head OSCOM
 O/C



IREL (India) Limited
Six Monthly Compliance Report (October 2020 to March 2021)

Government of India
 Bhabha Atomic Research Centre
 Health Physics Division,
 Radiation Protection Section (NF)
 (H.P. Unit, IREL(India) LTD, OSCOM)

Ref: HPU/03(08)/ 270 (c)

Date: 13/05/2021

Ref: Analysis of Soil Samples collected during the period
 October 2020 to March 2021

Sl.No	Location	Period	Analysis Details	
			Gross α, Bq/g	Gross β, Bq/g
01	Mining Area	Oct 2020 to Dec 2020	1.33	2.46
02	Mined Out Area		0.08	0.76
03	Matikhalo Village Area		1.58	2.28
04	Kanamana Village		2.47	3.51
05	Solid Waste Trench area		1.9	2.8
06	SodiumNitrate Storage Pond area		9.8	5.1
01	Mining area	Jan 2021 to Mar 2021	1.84	2.74
02	Mined Out Area		0.06	0.38
03	Matikhalo Village Area		4.39	2.48
04	Kanamana Village		5.93	1.39
05	Solid Waste Trench area		5.11	2.82
06	SodiumNitrate Storage Pond area		9.3	2.9

TO
 DGM, (TS)

e/c

for *W. Patra*
 (Abinash Sahu) 30/5/21
 OIC, HPU



IREL (India) Limited
Six Monthly Compliance Report (October 2020 to March 2021)

Government of India
 Bhabha Atomic Research Centre
 Health Physics Division,
 Radiation Protection Section (NF)
 (H.P. Unit, IREL(India) LTD, OSCOM)

Ref: HPU/03(08)/270 (A)

Date: 13/05/2021

Noise level monitored during the period
 October 2020 to March 2021

Sl. No	Area Monitored	Exact Location	Noise Level dB(A)	Duration of Exposure	Personal Protective Equipments used
01	Dredge & Wet up gradation Plant (General Area)	Ground Floor	68-87	8 hrs	Ear Muff/ Ear Plug
02	Dredge & Wet upgradation Plant (Other Area)	Control Room	58-76	8 hrs	
03	Mineral Separation Plant (General Area)	Shift Office Room	61-84	8 hrs	
04	Mineral Separation Plant (At 12 mtr. near IRMS)	Near IRMS	76-96	8 hrs	Ear Muff/ Ear Plug
05	Mineral Separation Plant (Near Air Table)	General area	76-90	Occasional	Ear Muff/ Ear Plug
06	Mineral Separation Plant (Near Vibrating Screen)	Vibrating Screen	80-99	8 hrs	Ear Muff/ Ear Plug
07	Compressor House REEP	At REEP	85-96	Occasional	Ear Muff/ Ear Plug
08	Compressor House REEP (Operator Room)	At REEP	74-78	8 hrs	
09	Attack Plant REEP (General Area)	Middle Area Of Process Building(GF)	79-93	Occasional	Ear Muff/ Ear Plug
10	Active Plant REEP (General Area)	Middle Area Of Process Building(GF)	67-86	8 hrs	Ear Muff/ Ear Plug
11	Active Plant REEP (Scrubber Fan Area)	Near Scrubber Fan	87-95	Occasional	Ear Muff/ Ear Plug
12	Boiler House (General Area)	In Side Boiler House	84-99	8 hrs	Ear Muff/ Ear Plug
13	Workshop (General Area)	Carpentry area in general	51-75	8 hrs	
14	Autoshop (General Area)	Near Autopool Area	68-74	8 hrs	

TLV-85 dB(A)/ 8 hrs

for (Abinash Sahu)
 OIC, HPU

TO
 DGM, (TS)

b/c



IREL (India) Limited
Six Monthly Compliance Report (October 2020 to March 2021)

Government of India
 Bhabha Atomic Research Centre
 Health Physics Division,
 Radiation Protection Section (NF)
 (H.P. Unit, IREL(India) LTD, OSCOM)

Ref: HPU/03(08)/ 270 (B)

Date: 13/05/2021

Radiation level monitored during the period October 2020 to March 2021

Sl.No	Location	Gamma Exposure Rate($\mu\text{Gy.h}^{-1}$)	
		Contact	1 mtr away
1.1	Mining Area (Before Mining)	-	0.4-0.8
1.2	Mined Out Area (After Mining)	-	0.05-0.1
2.0	MINERAL SEPARATION PLANT		
2.1	Ground Floor (In General)	-	0.2-4.0
2.2	4.5 mtr Level (In General)	-	2-7
2.3	9.0 mtr Level (In General)	-	2-4.5
2.4	12.0 mtr Level (In General)	-	1.5-5.0
2.5	16.0 mtr Level (In General)	-	1.5-3.0
2.6	Monazite Trench	100-120	20-30
2.7	Reject Disposal Site	-	0.3-0.6
3.0	REEP		
3.1	Monazite Stores	60-130	15-70
3.2	Feed Area	15-75	4-35
3.3	Attack Plant in general	10-11	5-10
3.4	Control room Attack Plant	-	0.2-0.5
3.5	RE Chloride Plant/Stores	-	0.2-0.4
3.4	Active Plant GF Area	-	10-60
3.5	Active Plant Top Area	-	10-25
3.6	Active Plant Control room	-	0.4-2
3.7	Uranium -thorium separation section	-	0.5-2
3.8	Uranium -Section	-	0.5-2
3.9	thorium section	-	6-25
3.10	Product Stores	-	5-40
3.11	Solid Waste Stacking Area(temp)	-	2-25
3.12	Solid Waste Trench Area	-	1-17
3.13	Sodium nitrate storage pond area	-	30-50
3.14	REEP-Effluent treatment plant	-	1-9
3.15	REEP Office Area	-	0.1-0.7
4.0	Boiler House Area	-	0.2-0.6
5.0	Workshop Area	-	0.1-0.5

TO
 DGM, (TS)

O/c

for (Abinash Sahu)
 OIC, HPU



IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)

आई आर ई एल (इंडिया) लिमिटेड / ऑसकॉम ***IREL (India) Limited / OSCOM

चिकित्सा विभाग / Medical Department

Ref: IREL/Med/549

Date: 13-05-2021

Disease Profile Analysis for the Year-2020

1. Random samples were analysed by taking data from OPD Registers maintained at OHC & FHC. The picture thus emerged by analysing all types of diagnosis of cases are submitted as below:-

S. No	CATEGORIES OF DISEASE OBSERVED	EMPLOYEES					LOCAL VILLAGERS				
		OHC	FHC	Total	Total Patient	%	OHC	FHC	Total	Total Patient	%
1	DIARRHOEA & DYSENTRY	100	274	374	6870	5.44	84	93	177	3264	5.42
2	PARASITIC/ INFECTION	06	40	46	6870	0.67	01	06	07	3264	0.21
3	DYSPEPSIA & FLATULENCE	17	10	27	6870	0.39	10	04	14	3264	0.43
4	A.P.D / HYPERACIDITY	174	330	504	6870	7.34	112	125	237	3264	7.26
5	ENTERIC FEVER	01	02	03	6870	0.04	--	02	02	3264	0.06
6	MALARIA FEVER	02	05	07	6870	0.10	--	01	01	3264	0.03
7	OTHER FEVER CASES	12	230	242	6870	3.52	33	68	101	3264	3.09
8	COMMON COLD	307	920	1227	6870	17.86	305	306	611	3264	18.72
9	OTHER RESPIRATORY INFECTION	124	423	547	6870	7.96	55	102	157	3264	4.81
10	URINARY TRACT INFECTION	08	74	82	6870	1.19	01	09	10	3264	0.31
11	BRONCHIAL ASTHMA	03	26	29	6870	0.42	--	02	02	3264	0.06
12	HYPERTENSION	89	169	258	6870	3.76	35	28	63	3264	1.93
13	HYPOTENSION	12	30	42	6870	0.61	06	04	10	3264	0.31
14	CARDIAC CASES	04	03	07	6870	0.10	07	--	07	3264	0.21
15	DIABETES MELLITUS	15	120	135	6870	1.97	00	11	11	3264	0.34
16	TUBERCULOSIS	--	--	--	6870	--	--	--	--	3264	0.00
17	HENSENS' DISEASES	--	--	--	6870	--	--	--	--	3264	0.00
18	SKIN DISEASES	--	--	--	6870	--	--	--	--	3264	0.12
	A. FUNGAL INFECTION	24	156	180	6870	2.62	23	29	52	3264	1.59
	B. SCABIES	01	03	04	6870	0.06	00	01	01	3264	0.03
	C. ECZEMA (ALLIED etc.)	01	01	02	6870	0.03	--	--	--	3264	--
	D. LEUCODERMA	--	--	--	6870	--	--	--	--	3264	--
19	PROTEIN CALORIE DEFICIENCY	--	--	--	6870	--	--	--	--	3264	--
20	VITAMIN DEFICIENCY	54	311	365	6870	5.31	29	81	110	3264	3.37
21	ANEMIA	02	06	08	6870	0.12	01	07	08	3264	0.25
22	HEPATITIS (JAUNDICE)	--	--	--	6870	--	--	--	--	3264	--
23	ALLERGIC DISEASES	10	18	28	6870	0.41	06	05	11	3264	0.34
	A. DRUG ALLERGIC	03	06	09	6870	0.13	--	--	--	3264	--
	B. URTICARIAS etc.	17	51	68	6870	0.99	11	11	22	3264	0.67
24	FILARIASIS	--	03	03	6870	0.04	01	--	01	3264	0.03
25	VENEREAL DISEASES	--	--	--	6870	--	--	--	--	3264	--
26	CHRONIC ARTHRITIS	01	10	11	6870	0.16	06	03	09	3264	0.28
	A. LIMB JOINTS	120	366	486	6870	7.07	154	171	325	3264	9.96
	B. VERTEBRAL JOINTS	35	53	88	6870	1.28	62	23	85	3264	2.60
27	PSYCHIATRIC CASES / EPILEPSY	02	01	03	6870	0.04	--	--	--	3264	--
28	EYE DISEASES	--	--	--	6870	--	--	--	--	3264	--
	A. EYE INFECTIONS	46	144	190	6870	2.76	126	32	158	3264	4.84
	B. EYE INJURY	01	01	02	6870	0.03	03	01	04	3264	0.12
	C. DEFECTIVE VISIONS	14	--	14	6870	0.20	16	--	16	3264	0.49
29	DENTAL INFECTIONS	25	62	87	6870	1.27	18	11	29	3264	0.89
30	EAR INFECTIONS (CSOM / ASOM)	14	54	68	6870	0.99	18	10	28	3264	0.86
31	PILES	03	05	08	6870	0.12	--	--	--	3264	--
32	MENSTRUAL DISORDERS	04	14	18	6870	0.26	--	--	--	3264	--
33	DISLOCATIONS & SPRAINS	36	89	125	6870	1.82	38	30	68	3264	2.08
34	BURNS & SCALDS	06	08	14	6870	0.20	11	04	15	3264	0.46

Contd.....2/-



IREL (India) Limited
Six Monthly Compliance Report (October 2020 to March 2021)

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Disease Profile Analysis for the Year-2020

35	INJURY INCIDENCES	--	93	93	6870	1.35	81	79	160	3264	4.90
36	NEUROLOGICAL DEFICIENCIES	--	06	06	6870	0.09	--	--	--	3264	--
37	MALIGNANCY	--	--	--	6870	--	--	--	--	3264	--
38	CONGENITAL ANOMALY	--	--	--	6870	--	--	--	--	3264	--
39	NOTIFIABLE DISEASES	--	--	--	6870	--	--	--	--	3264	--
40	MISC CASES	352	1069	1421	6870	20.68	379	293	672	3264	20.59

2. The above is for your information please.

Dr (Lt-Col) Ardhendu Pal
Certifying Surgeon & HoD (Med)
for IREL (India) Limited / OSCOM

✓ To,
Shri PK Mishra
Chief Manager (Tech Service)



IREL (India) Limited

Six Monthly Compliance Report (October 2020 to March 2021)

Ref : Details of Afforestation & Green belt Development

YEAR	Area mined (Ha)	Area planted in, (Ha)			No. of trees Planted		
		Mined out area	Others (Plant & colony)	Total	Mined out area	Others (Plant & colony)	Total
1987-88	4.0	7.0	--	7.0	14,000	--	14,000
1988-89	5.0	10.0	--	10.0	20,000	--	20,000
1989-90	8.0	7.5	--	7.5	15,000	--	15,000
1990-91	6.0	3.0	--	3.0	6,000	--	6,000
1991-92	12.0	8.5	--	8.5	16,500	--	16,500
1992-93	8.0	14.5	--	14.5	29,000	--	29,000
1993-94	6.67	9.88	--	9.88	25,000	--	25,000
1994-95	12.92	8.23	3.0	11.23	40,000	8,500	48,500
1995-96	16.94	8.5	--	8.5	42,000	--	42,000
1996-97	11.7	8.5	2.0	10.5	40,000	6,000	46,000
1997-98	15.5	8.5	3.0	11.5	40,000	5,000	45,000
1998-99	14.16	9.0	4.4	13.4	45,000	5,000	50,000
1999-2000	12.42	5.0	--	5.0	50,900	--	50,900
2000-2001	20.94	7.5	1.5	9.0	74,800	3,575	78,375
2001-2002	13.12	10.23	--	10.23	80,000	1,959	81,959
2002-2003	14.51	16.8	--	16.8	75,300	--	75,300
2003-2004	17.25	18.5	Avenue plantation	18.5	82,000	400	82,400
2004-2005	26.76	18.0	Avenue plantation	18.0	80,000	500	80,500
2005-2006	21.02	17.0	0.24	17.24	75,600	5,500	81,100
2006-2007	25.2	21.47	0.13	21.6	95,553	5,500	1,01,053
2007-2008	22.11	22.68	--	22.68	1,00,583	229	1,00,812
2008-2009	24.62	16.95	Avenue plantation	16.95	75,130	5,400	80,530
2009-2010	28.45	24.89	--	24.89	1,10,623	--	1,10,623
2010-2011	28.73	13.79	--	13.79	59,482	--	59,482
2011-2012	25.03	18.61	--	18.61	84,523	--	84,523
2012-2013	26.55	16.0	0.5	16.5	60,674	640	61,314
2013-2014	24.86	10	--	10	62,870	--	62,870
2014-2015	35.42	20	0.12	20.12	54,500	300	54,800
2015-2016	32.78	22	0.5	22.5	54,000	500	54,500
2016-2017	29.44	32	Avenue plantation	32.0	80,000	200	80,200
2017-2018	33.32	16	--	16	40,600	--	40,600
2018-2019	63.94	22	0.1	22.1	54,900	200	55,100
2019-2020	24.28	23	0.6	24.88	56000	600	56,600
2020-2021	22.5	20.23	1.53	21.76	50,000	3800	53,800



IREL (India) Limited
Six Monthly Compliance Report (October 2020 to March 2021)

Ref: Details of Raw Materials used, Production & Waste Generation from OSCOM & REEP during the period October 2020 to March 2021

A. List of the raw materials used for OSCOM & REEP

Sl.No.	<i>Description</i>		<i>During October 2020 to March 2021</i>
1	Mining		
1.1	Raw sand, t	(for production of upgraded heavy minerals consisting of ilmenite, rutile, zircon, monazite sillimanite & garnet.)	18,93,316
2	MSP		
2.1	Furnace oil, KL	(for production of ilmenite, rutile, zircon, monazite sillimanite & garnet.)-	2699.10
2.2	Sodium chloride, Kg	(for production of sillimanite)	17400
2.3	Soda ash, Kg	-do-	6330
2.4	Sodium silicate, Kg	-do-	5600
2.5	Oleic acid, Kg	-do-	7920
3	REEP & Boiler		
3.1	Monazite	For processing & production total products in REEP	2850
3.2	Hydrochloric acid (~30% w/w), t	For production of Rare earths chloride etc.	3991.79
3.3	Barium chloride, Kg	For production of Rare earths (RE) chloride.	61000
3.4	Sodium sulphide, Kg		42250
3.5	Magnesium Sulphate, Kg		43150
3.6	Iron powder, Kg		13500
3.7	Sodium sulphate, Kg	For TSP production	8000
3.8	Caustic lye, t	For production Thorium nitrate, Rare earths chloride, Tri-sodium Phosphate etc.	4657
3.9	Thorium oxalate, t	For production of Thorium nitrate	33.25
3.10	Nitric acid, t		125.06
3.11	Soda ash, t		63.5



IREL (India) Limited
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3.12	Hydrogen peroxide, Kg	For production of Thorium nitrate	50
3.13	Alamine, Kg/L	For production of Nuclear Grade Ammonium Diuranate(NGADU)	640
3.14	Oxalic acid, t	For production of Thorium Oxalate	120
3.15	Flocculants, Kg (Flomine & Kemfloc)	For RE Chloride & Thorium Oxalate production	700 Kg Flomine Kemfloc – 10 kg
3.16	Tri-n-butyl phosphate(TBP), Kg	For production of NG Ammonium Diuranate & Thorium nitrate	600
3.17	Petrofin, Kg		4115
3.18	Isodecanol, Kg		350
3.19	Ammonia, Kg	For production of NG Ammonium Diuranate	1300
3.20	EDTA, Kg		28.9
3.21	DTPA, Kg		7.2
3.22	Hydrochloric acid (~30% w/w), t	For DM Plant	Included above
3.23	Sodium hydroxide, t		Included above
3.24	Coal, t	For steam generation	10285

B. Production

(During the period October 2020 to March 2021):

Sl.No	Description	Quantity						
OSCOM								
MINING		Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	TOTAL
1.	Heavy Mineral Output, t	64312	63613	66803	67022	27992	5683	295425
MSP								
1	Ilmenite, t	21002	17880	21279	22076	17614	3845	103696
2	Rutile, t	867	696	788	890	856	301	4398
3	Sillimanite, t	1834	1255	1774	2041	2121	1362	10387
4	Zircon, t	583	450	590	677	597	181	3078
5	Monazite, t	319	213	405	370	130	65	1502
6	Garnet, t	5743	7074	6753	6611	5053	1657	32891
REEP								
1	Thorium Nitrate, t	2.2	2.2	2.1	2.2	2	2.5	13.2
2.	Thorium Oxide, t	0	0	0	0	0	0	0
3.	Thorium Oxalate, t	95	95	60	95	106	92	543
4.	Trisodium Phosphate, t	647	612	493	466	600	554	3372
5.	Rare Earths Chloride, t	501	466	326	483	518	468	2762
6.	Nuclear grade Ammonium Di-Uranate as U3O8, t	0.7	0.7	0.44	0.7	0.6	0.6	3.74



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C. Solid Waste & Radioactive Waste generation:

(During the period October 2020 to March 2021):

Sl. No	Description	Quantity	Disposal activity
OSCOM			
MINING	Tails generated, t	16,85,537 t	Back filled & Plantation will be developed over the disposal site after sand stabilization.
MSP	Reject sand, t	MSP:15525 t HUS: 33725 t	MSP tailings are stockpiled in mined out area for future use.
REEP & Boiler			
1.	ETP cake, t	41	Stored in RCC trenches as per AERB norms
2.	Iron Carbonate cake, t	122.84	
3.	Lead Barium cake, t	287	
4.	Insoluble Muck cake, t	566.78	
5.	Ash from Boiler, t	4114	Stored in low-lying areas

HUS: Heavy up gradation section, MSP: Mineral separation plant

D. Liquid Waste generation:

(During the period October 2020 to March 2021):

Sl. No	Description	Quantity	Disposal activity
OSCOM			
MSP	Waste water, m ³	2,02,315 m ³	Taken to Pond No.1 and a part of water was recycled back to MSP process after slime settling at Pond.
REEP & Boiler			
1.	Non-Nitrate Effluent ,m ³	1482 m ³	Reused at MSP after treatment
2.	Nitrate Effluent, m ³	36.5 m ³	After treatment, sodium nitrate solution was stored in lined storage pond