



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



आईआरईएल (इंडिया) लिमिटेड
IREL (India) Limited
 (Formerly Indian Rare Earths Limited)
 (भारत सरकार का उपक्रम)
 (A Govt. of India Undertaking)

CIN : U15100MH1950GOI008187 Website : www.irel.co.in

ISO 9001:2015, ISO 14001: 2015 & OHSAS 18001 : 2007 Company



TS/ENVR/ OSCOM/

27th Nov 2020

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. In this context, we would like to inform that after obtaining the fresh EC dated 11th January 2019 for capacity expansion of Mining & Mineral Separation Units, we approached Odisha State Pollution Control Board(OSPCB) requesting for issue of an interim Consent Order for production of 3,70,200 TPA of total heavy minerals comprising of heavy minerals e.g. Ilmenite, Rutile, Zircon, Sillimanite, Monazite & Garnet in place of 2,84,000TPA (which is due to enhancement of the heavy minerals content of in raw sand) using the same process & equipments keeping the pollution load same. Accordingly, OSPCB issued a fresh Consent Order No.695/CTO-48/2014 dated 01.03.2019 for the same production capacity which is already submitted.

We are herewith enclosing the compliance report for OSCOM operation for the period April 2020 to September 2020 with respect to MoEF& CC letter 21/18/84 ENI/IA II dated 14th May 1991 for kind information.

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

Thanking you.

Yours truly,
 For IREL (India) Limited,

CGM & HEAD (OSCOM)

उड़ीसा सैंड्स कॉम्प्लेक्स, माटिखालो (डाक) छत्रपुर (गंजाम), ओडिशा - 761045, भारत
 Orissa Sands Complex, Matikhalo (P.O) Chatrapur (Ganjam), Odisha - 761 045, INDIA
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पंजीकृत कार्यालय: प्लॉट नं. 1207, वीर सावरकर मार्ग, सिद्धिविनायक मंदिर के पास, प्रभादेवी, मुंबई - 400 028.

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IREL(India)Limited, OSCOM

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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: **April 2020 to September 2020**

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. 695/CTO-48/2014 dated 01.03.2019, issued by Odisha State Pollution Control Board (OSPCB) under Water & Air Act, is having validity upto 31.3.2021. 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 | During setting up of New Thorium Plant, Comprehensive EIA & EMP report was prepared for OSCOM and Thorium Plant 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. |



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| S.No. | Description of Conditions | Status |
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| 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), Rare Earths Extraction Plant (REEP) (formerly Monazite Processing Plant), Boiler 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: April'20 to Sept'20. The monitoring report on stack emissions during the period Period: Apr'20 to Sept'20 is enclosed in Annexure-2. |
| 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. | 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: : April '20- Sept '20 is enclosed in Annexure-2. From the monitoring data it is seen that the PM_{10} levels are within the norm of $100\text{ }\mu\text{g/m}^3$ and $\text{PM}_{2.5}$ levels are within the norm of $60\text{ }\mu\text{g/m}^3$. |
| 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. | 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. Radiation levels during the period: : April '20- Sept'20 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 $0.5\text{ }\mu\text{Gy/h}$ which reduced to 0.05 to $0.1\text{ }\mu\text{Gy/h}$ after carrying out the mining activity. |
| 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: April '20- Sept '20 |



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| S.No. | Description of Conditions | Status |
|-------|--|---|
| 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 2019 are 11005. 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 2019 are 4648. The annual disease profile of the local village & employee's area is enclosed herewith as Annexure-2, . |
| 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 2019-20, total 56,000 numbers of plantations of Casuarina trees along with Cashew trees, date palm, coconut etc. were carried out in the 63.94 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: : April '20- Sept '20 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. |



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| 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: : April '20- Sept '20are 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. |
| 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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आईआरईएल (इंडिया) लिमिटेड IREL (India) Limited (Formerly Indian Rare Earths Limited) (भारत सरकार का उपक्रम) (A Govt. of India Undertaking)

CIN : U15100MH1950GOI008187 Website : www.irel.co.in

ISO 9001:2015, ISO 14001: 2015 & OHSAS 18001 : 2007 Company



TS/ENVR/ /REEP/

27th Nov 2020

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 April 2020 to September 2020 for your information please.

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

Thanking you.

Yours truly,

For IREL(India) Ltd

CGM & HEAD (OSCOM)

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उड़ीसा सैंड्स कॉम्प्लेक्स, माटिखालो (डाक) छत्रपुर (गंजाम), ओडिशा - 761045, भारत
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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: **April 2020 to September 2020**

| 6A. Specific Conditions | Compliances |
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| (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. |
| (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 | 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). |



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| office located at Bhubaneswar. | |
| (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. | 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. 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 April 2020 to Sept 2020 is enclosed in Annexure-2. From the monitoring data it is seen that the PM10 levels are within the norm of 100 µg/m ³ and PM2.5 levels are within the norm of 60 µg/m ³ . |
| (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. | 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 April 2020 to Sept 2020 are enclosed in Annexure-2 respectively. |
| (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. | 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. |
| (x) The radioactive waste, if any shall be managed as per the norms prescribed by the AERB. , | The radioactive waste management is being carried out as per the norms prescribed by AERB. |
| (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. | Plantation activity already in progress 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 6 th October 2017. |
| (xii) The project authority shall implement suitable conservation measures to augment | Implementation of Rain Water harvesting & construction of artificial recharge structures in |



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| ground water resources in the area in consultation with the Regional Director, Central Ground Water Board. | 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. |
| (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. | 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 April 2020 to Sept 2020 is enclosed as in Annexure-2. 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. Corrective measures shall be immediately taken if it is observed that the groundwater table and quality is getting affected due to the REEP operation. |
| (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. | The existing two numbers of borewells of Thorium Plant are used for REEP for which are having permission. |
| (xv) Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, Central Ground Water Board. | 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. |
| (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 | 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 |



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| an expert agency like Health Physics Division of Bhaba Atomic Research Centre (BARC). | (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 12 th July 2010 and to MoEF, Regional Office, Bhubaneswar vide our letter No.TS/ENVR/43A/2555A dated 15 th 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 April 2020 to Sept 2020 is enclosed in Annexure-2. |
| (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. | Work order for construction of STP having capacity 0.6MLD /600KLD has been released on 29 th feb 2020 having 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). Construction work of STP is under progress. All the effluents are being monitored as per OSCPB & AERB norms. |
| (xviii) Sludge from the treatment plant and settling pit should be transported in safe containment. | Sludge from the effluent treatment plant and settling pit are transported to RCC Trenches as per AERB recommendation. |
| (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. | 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 2019 are 11005. 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 2019 are 4648. 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. |
| (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 | 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 |



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| needed. Health records of the workers shall be maintained. | 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, |
| (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. | 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. |
| (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. | 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 6 th 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. | 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- |



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| | <p>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> |
| <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.</p> | <p>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 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.</p> |
| 6B. General Conditions | |
| <p>(i) No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.</p> | <p>Expansion or modification of REEP will be carried out only after obtaining prior approval of the Ministry of Environment and Forests.</p> |
| <p>(ii) Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RSPM (Particulate matter with size less than 10 micron i.e. PM₁₀), NO_x and SO₂ 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.</p> | <p>Ambient air quality monitoring is already carried out in three permanent stations, thrice in a 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 April 2020 to Sept 2020 are enclosed in Annexure-2 for ready reference please.</p> |
| <p>(iii) Data on ambient air quality RSPM (Particulate matter with size less than 10 micron i.e., PM₁₀), NO_x and SO₂ 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.</p> | <p>Ambient air quality with respect to parameters RSPM (PM₁₀), NO_x and SO₂ 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.</p> |



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

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| <p>(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.</p> | <p>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.</p> |
| <p>(v) Industrial wastewater shall be properly collected and treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December, 1993 or as amended from time to time. The treated wastewater shall be utilized for plantation purpose.</p> | <p>After re-engineering for effective utilization of water, 15-17 m³/day of treated effluent is generated from REEP operation, after conforming to the prescribed standards, the same is used for slurry transportation of MSP using existing pipelines.</p> |
| <p>(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.</p> | <p>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.</p> |
| <p>(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.</p> | <p>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> |
| <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> |



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| <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> |



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Six Monthly Compliance Report (April 2020 to September 2020)

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| (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 OSCOM & 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://llevfor.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. |



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Six Monthly Compliance Report (April 2020 to September 2020)

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| <p>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.</p> | <p>Agreed.</p> |
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R. W. K. S.



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



आईआरईएल (इंडिया) लिमिटेड
IREL (India) Limited
 (Formerly Indian Rare Earths Limited)
 (भारत सरकार का उपक्रम)
 (A Govt. of India Undertaking)

CIN : U15100MH1950GOI008187 Website : www.irel.co.in

ISO 9001:2015, ISO 14001: 2015 & OHSAS 18001 : 2007 Company



TS/ENVR/ /SWDP/

27th Nov 2020

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 dtd 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 April 2020 to September 2020 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.

Thanking you.

Yours truly,

For IREL (India) Limited

CGM & HEAD (OSCOM)

Handwritten signature

उड़ीसा सैंड्स कॉम्प्लेक्स, माटिखालो (डाक) छत्रपुर (गंजाम), ओडिशा - 761045, भारत
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पंजीकृत कार्यालय: प्लॉट नं. 1207, वीर सावरकर मार्ग, सिद्धिविनायक मंदिर के पास, प्रभादेवी, मुंबई - 400 028.

Regd. Office: Plot No.1207, Veer Savarkar Marg, Near Siddhivinayak Temple, Prabhadevi, Mumbai - 400 028.



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Six Monthly Compliance Report (April 2020 to September 2020)

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: **April 2020 to September 2020**

| 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. 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, Noted please. |
| vii. | The project proponent shall obtain all necessary clearances/ permission from the concerned authorities as applicable. | Yes, Noted please. |
| viii. | Solid waste shall be managed as per Solid Wastes Management Rules, 2016. | Yes, Noted please. |
| ix. | Consent to Establish' as may be applicable, shall be | Complied.CTE already obtained. |



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

| Sr. No. | Condition | Compliance |
|---------------|---|---|
| | 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. | |
| x. | All waste (liquid and solid) arising from the proposed development will be disposed of as per the norms prescribed by State Pollution Control Board. There shall not be any disposal of untreated effluent into the sea/coastal water bodies. | Yes, Noted please. |
| xi. | No Permanent labour camp, machinery and material storage shall be allowed in CRZ area. | Yes, Noted please. |
| xii. | There shall no ground water drawal within CRZ without prior approval of the Central Ground Water Authority. | Yes, Noted please. |
| 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, Noted please. |
| 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, Noted please. |
| iv. | The above stipulations would be enforced among others under the provisions of the Water (Prevention and Control of Pollution) Act'. 1974, the Air | Yes, Noted please. |



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

| Sr. No. | Condition | Compliance |
|---------|---|--------------------------------|
| | (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. | |
| 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 MoEF&CC. | Yes & will be complied. |
| 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 | Complied. |



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

| Sr. No. | Condition | Compliance |
|---------|---|---|
| | copy of the same should be forwarded to the concerned Regional Office of this Ministry | |
| 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 Parishad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the 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. |

R. K. Kulkarni



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



आईआरईएल (इंडिया) लिमिटेड
IREL (India) Limited
 (Formerly Indian Rare Earths Limited)
 (भारत सरकार का उपक्रम)
 (A Govt. of India Undertaking)

CIN : U15100MH1950GOI008187 Website : www.irel.co.in

ISO 9001:2015, ISO 14001: 2015 & OHSAS 18001 : 2007 Company



TS/ENVR/ /TDP/

27th Nov 2020

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 April 2020 to September 2020 for kind information please.

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

Thanking you.

Yours truly,
 For IREL (India) Limited

28/11/2020
 CGM & HEAD (OSCOM)

उड़ीसा सैंड्स कॉम्प्लेक्स, माटिखालो (डाक) छत्रपुर (गंजाम), ओडिशा - 761045, भारत
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पंजीकृत कार्यालय: प्लॉट नं. 1207, वीर सावरकर मार्ग, सिद्धिविनायक मंदिर के पास, प्रभादेवी, मुंबई - 400 028.

Regd. Office: Plot No.1207, Veer Savarkar Marg, Near Siddhivinayak Temple, Prabhadevi, Mumbai - 400 028.



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

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: **April 2020 to Sept 2020**

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 5m ³ /h. Interim project report prepared by ICT, Mumbai. |

General Conditions:

| S.No. | Description of Conditions | Status |
|-------|---|---|
| 1- 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. 695/CTO-48/2014 dated 01.03.2019, issued by Odisha State Pollution Control Board (OSPCB) under Water & Air Act, is having validity upto 31.3.2021. All the conditions mentioned in the Consent Order and directives issued time to time by OSPCB are being strictly followed. |
| | 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 11th January 2019 for capacity expansion of Mining & Mineral Separation Units. |



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

| S.No. | Description of Conditions | Status |
|-------|--|--|
| | 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 | During setting up of New Thorium Plant, Comprehensive EIA & EMP report was prepared for OSCOM and Thorium Plant and submitted to MoEF, New Delhi vide our letter No. TS/Envir/4669-A dated 26th April 1994 to MoEF Regional Office (Eastern Zone), Bhubaneswar vide our letter No.TS/Envir/7401-A dated 24th June 1994. |
| 1-ii | 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. | <p>Gaseous emissions:</p> <p>Gaseous emissions from Mineral Separation Plant (MSP), Rare Earths Extraction Plant (REEP) (formerly Monazite Processing Plant), Boiler 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/m³ during the Period: April'20-Sept '20. The monitoring report on stack emissions during the period Period: April'20- Sept '20 is enclosed in Annexure-2.</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 REEP were within the permissible norm of 50 mg/m³. The stack emission monitoring report is enclosed in Annexure-2.</p> |



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

| S.No. | Description of Conditions | Status |
|-------|--|--|
| 1-iii | 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. | 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: : April'20-Sept '20 is enclosed in Annexure-2.From the monitoring data it is seen that the PM10 levels are within the permissible norm of 100 µg/m3 and PM2.5 levels are within the permissible norm of 60 µg/m3. |

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| 1-iv | 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. | 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. Radiation levels during the period: April'20- Sept '20 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 0.5 µGy/h which reduced to 0.05 to 0.1 µGy/h after carrying out the mining activity. |
| 1-v | 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: April'20- Sept '20 |



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|-------|--|---|
| 1-vi | 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 2019 are 11005. 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 2019 are 4648. The annual disease profile of the local village & employee's area is enclosed herewith as Annexure-2, . |
| 1-vii | 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 2019-20, total 56,000 numbers of plantations of Casuarina trees along with Cashew trees, date palm, coconut etc. were carried out in the 63.94 ha of mined out area, plant & colony area. |
| viii | 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: : April'20- Sept '20 are given 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. |
| ix | 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: April'20- Sept '20 are given in Annexure-2. |



| | | |
|------|---|---|
| x | The treated effluent confirming to the prescribed standards should be utilized for green belt development to the maximum extent possible. The plan for reuse 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. |
| xi | 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.1 and 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. |
| xii. | 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. |
| xiii | 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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IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



आईआरईएल (इंडिया) लिमिटेड
IREL (India) Limited
 (Formerly Indian Rare Earths Limited)
 (भारत सरकार का उपक्रम)
 (A Govt. of India Undertaking)

CIN : U15100MH1950GOI008187 Website : www.irel.co.in

ISO 9001:2015, ISO 14001: 2015 & OHSAS 18001 : 2007 Company



TS/ENVR/ /TP/

27th Nov 2020

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 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 April 2020 to September 2020 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.

Thanking you.

Yours truly,
 For IREL (India) Limited

[Signature]
 CGM & HEAD (OSCOM)

P. W. K.

उड़ीसा सैंड्स कॉम्प्लेक्स, माटिखालो (डाक) छत्रपुर (गंजाम), ओडिशा - 761045, भारत
 Orissa Sands Complex, Matikhalo (P.O) Chatrapur (Ganjam), Odisha - 761 045, INDIA
 फोन / Tel. : 06811 - 257890 - 95 फैक्स / Fax : 06811 - 257988

पंजीकृत कार्यालय: प्लॉट नं. 1207, वीर सावरकर मार्ग, सिद्धिविनायक मंदिर के पास, प्रभादेवी, मुंबई - 400 028.
 Regd. Office: Plot No.1207, Veer Savarkar Marg, Near Siddhivinayak Temple, Prabhadevi, Mumbai - 400 028.



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

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: **April 2020 to September 2020**

| 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: April'20-Sept'20 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: April'20-Sept'20. 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 April'20-Sept'20. |



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

| 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: April'20-Sept'20 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 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: April'20-Sept'20 are given in Annexure-2. The water from Pond No.1 is reused 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 2019 are 11005. 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 2019 are 4648. The annual disease profile of the local village & employee's area is enclosed herewith as Annexure-2,. |



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

| 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. Full-fledged Laboratory facilities exist for Environmental studies. However, presently environmental monitoring is being carried out by engaging M/s Centre for Envotech & Management Consultancy Private Ltd., Bhubaneswar, a NABL accredited & MoEF&CC Authorized laboratory. |



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

| S.No. | Description of Conditions | Status |
|-------|--|---|
| 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. |
| 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 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. |
| 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. |

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IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



आईआरईएल (इंडिया) लिमिटेड
IREL (India) Limited
(Formerly Indian Rare Earths Limited)
(भारत सरकार का उपक्रम)
(A Govt. of India Undertaking)



CIN : U15100MH1950GOI008187 Website : www.irel.co.in

ISO 9001:2015, ISO 14001: 2015 & OHSAS 18001 : 2007 Company

TS/ENVR/REPM

Date: 28.11.2020

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-I(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 April 2020 to September 2020.

Thanking You

Yours truly,
For IREL (India) Limited,

CGM & HEAD (OSCOM)

उड़ीसा सैंड्स कॉम्प्लेक्स, माटिखालो (डाक) छत्रपुर (गंजाम), ओडिशा - 761045, भारत
Orissa Sands Complex, Matikhalo (P.O) Chatrapur (Ganjam), Odisha - 761 045, INDIA
फोन / Tel. : 06811 - 257890 - 95 फेक्स / Fax : 06811 - 257988

पंजीकृत कार्यालय: प्लॉट नं. 1207, वीर सावरकर मार्ग, सिद्धिविनायक मंदिर के पास, प्रभादेवी, मुंबई - 400 028.

Regd. Office: Plot No.1207, Veer Savarkar Marg, Near Siddhivinayak Temple, Prabhadevi, Mumbai - 400 028.



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.

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.

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.

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 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.

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 |



| | | |
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| | | 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 monitored and records maintained | Agreed upon 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 shall be conducted and recorded. |



| | | |
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| 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 prescribed by the regulatory agency. | 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. |



| 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. |
| 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 requisite data/information/monitoring | Agreed Upon Compliance of the stipulated EC conditions will be regularly submitted to RO, MoEF along with six monthly environmental baseline study reports. |



| | | |
|----|--|---|
| | 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. |

R. W. K. R.



IREL (India) Limited
OSCOM

Annexure -2

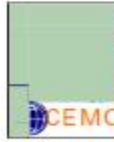
Ref: Details of monitoring reports & other reports

| Sl. No. | Description | Page No. |
|---------|---|----------|
| 1 | Stack emission monitoring reports (Period: Apr '20- Sept'20) | 6-7 |
| 2 | Ambient air quality monitoring reports (Period: Apr '20- Sept'20) | 8-12 |
| 3 | Effluent water quality monitoring reports (Period: Apr '20- Sept'20) | 13-16 |
| 4 | Soil quality monitoring reports (Period: Apr '20- Sept'20) | 17-19 |
| 5 | Surface water / ground water / drinking water monitoring reports (Period: Apr '20- Sept'20) | 20-71 |
| 6 | Half yearly report on Radioactivity levels in Surface water / ground water / drinking water (Period: Apr '20- Sept'20) | 72 |
| 7 | Half yearly report on Radiation levels in Soil samples (Period: Apr '20- Sept'20) | 73 |
| 8 | Half yearly report on Ambient Noise levels (Period: Apr '20- Sept'20) | 74 |
| 9 | Half yearly report on Radiation levels in Plant area (Period: Apr '20- Sept'20) | 75 |
| 10 | Disease profile report for the year 2019 | 76-77 |
| 11 | Details on Afforestation and Green Belt developments in OSCOM & TP in 2019-20 | 78 |
| 12 | Details on Raw material, Production data & Waste generation from OSCOM & REEP (Period: Apr '20- Sept'20) | 79-81 |



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



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.



Report no. - CEMC/IREL/St1

Issued Date-20.11.2020

STACK EMISSION MONITORING TEST REPORT

| | |
|--------------------|--|
| Issued to | M/s. IREL(India) Limited, Matikhalo, Chatrapur, Ganjam, Odisha |
| Work Order No. | R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1344, Dated-12.09.2019 |
| Locations | ST-1 Boiler, ST-2- Main Dryer, ST-3- Shaft Dryer-Ilmenite, ST-4- Shaft Dryer- Rutile, ST-5- Sillimanite Dryer, ST-6-Monazite Upgradation Section, ST-7-Zircon Dryer, ST-8-MoPP Processing Plant-Stack-1, ST- MoPP Processing Plant-Stack-2 |
| Nature of Sampling | Source Emission |
| Sampling By | Mr.S Pradhan and Mr. R. Das |
| Instrument Used | Stack monitoring kit, Flue Gas Analyzer |
| Sampling Period | April' 2020 to September'2020 |
| Parameter | Particulate Matter |

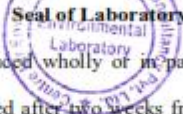
| FREQUENCY | | LOCATIONS | | | | | | | | |
|---------------|------|-----------|------|------|------|------|------|------|------|------|
| Month | Week | ST-1 | ST-2 | ST-3 | ST-4 | ST-5 | ST-6 | ST-7 | ST-8 | ST-9 |
| April | 3rd | 102.2 | 49.2 | 49.6 | 49 | 50.4 | 48.2 | 50.2 | 6.4 | 6.5 |
| May | 1st | 117.4 | 51.5 | 48.4 | 49.6 | 49.7 | 51.2 | 50.2 | 6.7 | 6.2 |
| | 3rd | 108.6 | 50.3 | 49.7 | 50.7 | 48.8 | 49.8 | 49.8 | 6.4 | 6.3 |
| June | 1st | 108.1 | 50.2 | 49.7 | 51.2 | 50.9 | 49.6 | 49.6 | 6.2 | 6.2 |
| | 3rd | 113.6 | 49.1 | 50.3 | 49.5 | 48.7 | 49.3 | 50.2 | 6 | 6.1 |
| July | 1st | 107.4 | 50.4 | 49.4 | 51 | 50.6 | 52.2 | 49.8 | 6 | 6.1 |
| | 3rd | 112.8 | 49.6 | 50.6 | 49.2 | 48.4 | 49.6 | 50.8 | 6.2 | 6.1 |
| August | 1st | 102.8 | 48.6 | 48.2 | 49.6 | 49.2 | 51.6 | 48.6 | 5.8 | 6 |
| | 3rd | 100.4 | 47.2 | 46.6 | 48.2 | 48.8 | 50.4 | 48 | 6 | 6.2 |
| September | 1st | 103.5 | 51.2 | 50.3 | 49.1 | 49.7 | 50 | 50.1 | 6 | 5.8 |
| | 3rd | 113.6 | 49.1 | 50.3 | 49.5 | 48.7 | 49.3 | 50.2 | 5.8 | 6 |
| MAXIMUM | | 117.4 | 51.5 | 50.6 | 51.2 | 50.9 | 52.2 | 50.8 | 6.7 | 6.5 |
| MINIMUM | | 100.4 | 47.2 | 46.6 | 48.2 | 48.4 | 48.2 | 48 | 5.8 | 5.8 |
| AVERAGE | | 108.2 | 49.7 | 49.4 | 49.7 | 49.4 | 50.1 | 49.8 | 6.1 | 6.1 |
| STD DEVIATION | | 5.6 | 1.2 | 1.2 | 0.9 | 0.9 | 1.2 | 0.8 | 0.3 | 0.2 |

OSPCB Permissible Limits- 150 mg/Nm³

M. Pradhan
Authorized Signatory

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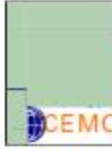
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E-mail- ccmc_consultancy@yahoo.co.in, ccmc122@gmail.com, website: www.ccmc.in, Landline: 0674-2360344.

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



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



CENTRE FOR ENVOTECH AND MANAGEMENT CONSULTANCY PVT. LTD.

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Certificate No.-TC 6666

Report no. - CEMC/IREL/St2

Issued Date-20.11.2020

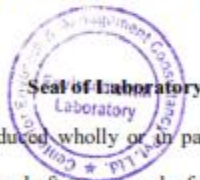
STACK EMISSION MONITORING TEST REPORT

| | |
|--------------------|---|
| Issued to | M/s. IREL(India) Limited, Matikhalo, Chatrapur, Ganjam, Odisha |
| Work Order No. | R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1344, Dated-12.09.2019 |
| Locations | ST-8-REEP(MoPP) Plant-Stack-1, ST- REEP(MoPP) Plant-Stack-2 |
| Nature of Sampling | Source Emission |
| Sampling By | Mr.S Pradhan and Mr. R. Das |
| Instrument Used | Stack monitoring kit, Flue Gas Analyzer |
| Sampling Period | April' 2019 to September'2020 |
| Parameter | Acid Mist |

| FREQUENCY | | LOCATIONS | |
|---------------|------|-----------|------|
| Month | Week | ST-8 | ST-9 |
| April | 3rd | 6 | 6.1 |
| May | 1st | 6.2 | 6 |
| | 3rd | 5.8 | 6.1 |
| June | 1st | 5.8 | 6 |
| | 3rd | 5.9 | 5.7 |
| July | 1st | 5.7 | 5.8 |
| | 3rd | 5.8 | 5.6 |
| August | 1st | 5.6 | 5.7 |
| | 3rd | 5.6 | 5.8 |
| September | 1st | 5.5 | 5.6 |
| | 3rd | 5.7 | 5.8 |
| MAXIMUM | | 6.2 | 6.1 |
| MINIMUM | | 5.5 | 5.6 |
| AVERAGE | | 5.8 | 5.8 |
| STD DEVIATION | | 0.2 | 0.2 |

OSPCB Permissible Limits- 50 mg/Nm³

M. Pradhan
Authorized Signatory



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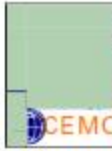
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Laboratory At: Plot No. 800/1274, Johal, Pahal, Bhubaneswar-752101,
E-mail: ccmclab@yahoo.in, Mobile: 9937631956, 8895177314



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Six Monthly Compliance Report (April 2020 to September 2020)



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Report no. - CEMC/IREL/A1

Date-20.11.2020

AMBIENT AIR QUALITY MONITORING TEST REPORT

| | |
|--------------------|---|
| Issued to | M/s. IREL(India) Limited , Matikhalo, Chatrapur, Ganjam, Odisha |
| Work Order No. | R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1344, Dated-12.09.2019 |
| Nature of Sampling | Ambient Air Sample |
| Sampling By | Mr. S. Pradhan |
| Sampling Location | Mining Area (SMP-1) |
| Instrument Used | Respirable Dust Sampler, Fine Dust Sampler, Gaseous Attachment, CO Meter, Benzene Sampler |
| Sampling Period | April 20-September 20 |

ANALYSIS RESULT

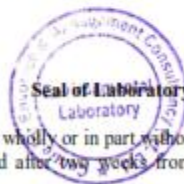
| Month | Week | SO ₂ | NO _x | PM ₁₀ | PM _{2.5} | Lead | As | NH ₃ | O ₃ | BaP# | Ni | C ₆ H ₆ # | CO# |
|---------------|------|-----------------|-----------------|------------------|-------------------|-------|-------|-----------------|----------------|------|-------|---------------------------------|-------|
| April '20 | 2nd | 10.4 | 14.1 | 71.1 | 36.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.9 | 14.6 | 70.8 | 35.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| May '20 | 1st | 9.3 | 12.1 | 68.6 | 35.9 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.2 | 12.6 | 63.5 | 34.5 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.8 | 13.2 | 64.6 | 35.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| June '20 | 1st | 8.9 | 11.8 | 61.4 | 31.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.2 | 12.3 | 60.2 | 31.1 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.4 | 12.7 | 61.6 | 32.1 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| July '20 | 1st | 7.6 | 10.2 | 58.2 | 29.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 7.8 | 10.6 | 58.8 | 29.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 8 | 10.8 | 58.2 | 29.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| August '20 | 1st | 7.2 | 9.6 | 55.8 | 28.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 6.8 | 9.2 | 54.2 | 27.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 6.4 | 8.8 | 53.6 | 27 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| September '20 | 1st | 8.8 | 10.2 | 56.4 | 28.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.5 | 13.4 | 54.7 | 29.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9 | 12.7 | 49.6 | 27.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| MAXIMUM | | 10.4 | 14.6 | 71.1 | 36.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| MINIMUM | | 6.4 | 8.8 | 49.6 | 27 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| AVERAGE | | 8.66 | 11.70 | 60.08 | 31.11 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| SD | | 1.15 | 1.74 | 6.13 | 3.29 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |

*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.-TC-5063

M. Rout
Authorized Signatory

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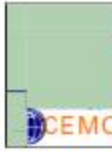
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E-mail: ccmc_consultancy@yahoo.co.in, ccmc122@gmail.com, website: www.ccmc.in, Landline: 0674-2360344.

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



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



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Report no. - CEMC/IREL/A2

Date-20.11.2020

AMBIENT AIR QUALITY MONITORING TEST REPORT

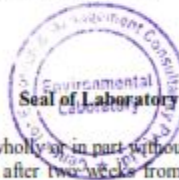
| | |
|--------------------|---|
| Issued to | M/s. IREL(India) Limited , Matikhalo, Chatrapur, Ganjam, Odisha |
| Work Order No. | R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1344, Dated-12.09.2019 |
| Nature of Sampling | Ambient Air Sample |
| Sampling By | Mr. S. Pradhan, Mr. R. Das |
| Sampling Location | L.R.E. Colony |
| Instrument Used | Respirable Dust Sampler, Fine Dust Sampler, Gaseous Attachment, CO Meter, Benzene Sampler |
| Sampling Period | April 20-September 20 |

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# |
|---------------|------|-----------------|-----------------|------------------|-------------------|-------|-------|-----------------|----------------|------|-------|---------------------------------|-------|
| April '20 | 2nd | 9.9 | 13.2 | 73.4 | 37.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.8 | 13.5 | 71.5 | 36.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| May '20 | 1st | 9.3 | 12.9 | 60.8 | 32.1 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.1 | 12.5 | 56.2 | 29.7 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.4 | 12.8 | 60.2 | 33.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| June '20 | 1st | 9.3 | 12.9 | 60.8 | 32.1 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.5 | 13.1 | 59.3 | 30.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.7 | 13.3 | 60.2 | 31.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| July '20 | 1st | 8.2 | 11.2 | 57.4 | 28.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 8.3 | 11 | 57.8 | 28.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 8.4 | 11.2 | 57.4 | 28.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| August '20 | 1st | 7.9 | 10.4 | 56.4 | 27.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 7.2 | 9.8 | 56 | 28.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 7 | 9.6 | 54.2 | 27.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| September '20 | 1st | 8.4 | 11.8 | 56.2 | 28 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.1 | 12.5 | 56.2 | 29.7 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 8.8 | 12 | 49 | 27.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| MAXIMUM | | 9.9 | 13.5 | 73.4 | 37.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| MINIMUM | | 7 | 9.6 | 49 | 27.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| AVERAGE | | 8.78 | 11.98 | 59.00 | 30.51 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| SD | | 0.87 | 1.25 | 5.82 | 3.15 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |

*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.- TC-5063

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Report no. - CEMC/IREL/A3

Date-20.11.2020

AMBIENT AIR QUALITY MONITORING TEST REPORT

| | |
|--------------------|---|
| Issued to | M/s. IREL(India) Limited , Matikhalo, Chatrapur, Ganjam, Odisha |
| Work Order No. | R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1344, Dated-12.09.2019 |
| Nature of Sampling | Ambient Air Sample |
| Sampling By | Mr. S. Pradhan, Mr. R. Das |
| Sampling Location | Bada Arjipalli |
| Instrument Used | Respirable Dust Sampler, Fine Dust Sampler, Gaseous Attachment, CO Meter, Benzene Sampler |
| Sampling Period | April 20-September 20 |

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# |
|---------------|------|-----------------|-----------------|------------------|-------------------|-------|-------|-----------------|----------------|------|-------|---------------------------------|-------|
| April '20 | 2nd | 9.5 | 13.6 | 62.9 | 34.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.5 | 13.4 | 63.3 | 33.5 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| May '20 | 1st | 9.1 | 12.4 | 59.2 | 34.1 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.4 | 12.2 | 58.5 | 30.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.1 | 12.5 | 58.4 | 33 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| June '20 | 1st | 9.4 | 12.2 | 58.5 | 30.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.6 | 12.4 | 57.1 | 29.7 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.5 | 13 | 58.9 | 30.9 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| July '20 | 1st | 8.3 | 10.8 | 56.8 | 27.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 8.1 | 10.4 | 56.2 | 27.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 8.2 | 10.6 | 56.4 | 27.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| August '20 | 1st | 7.8 | 10.2 | 56.2 | 27.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 7.4 | 9.6 | 55.8 | 28.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 7.2 | 9.8 | 55.4 | 28.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| September '20 | 1st | 8.6 | 11.2 | 56.9 | 28.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.6 | 13 | 52.3 | 28 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.1 | 11.8 | 48.3 | 26.5 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| MAXIMUM | | 9.6 | 13.6 | 63.3 | 34.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| MINIMUM | | 7.2 | 9.6 | 48.3 | 26.5 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| AVERAGE | | 8.79 | 11.71 | 57.12 | 29.82 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| SD | | 0.81 | 1.28 | 3.47 | 2.57 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |

*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. - TC-5063

M. Prasad
Authorized Signatory

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IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



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Certificate No.-TC 6666

Report no. - CEMC/IREL/A4

Date-20.11.2020

AMBIENT AIR QUALITY MONITORING TEST REPORT

| | |
|--------------------|---|
| Issued to | M/s. IREL(India) Limited , Matikhalo, Chatrapur, Ganjam, Odisha |
| Work Order No. | R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1344, Dated-12.09.2019 |
| Nature of Sampling | Ambient Air Sample |
| Sampling By | Mr. S. Pradhan, Mr. R. Das |
| Sampling Location | Kanamana Village |
| Instrument Used | Respirable Dust Sampler, Fine Dust Sampler, Gaseous Attachment, CO Meter, Benzene Sampler |
| Sampling Period | April 20-September 20 |

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# |
|--------------|------|-----------------|-----------------|------------------|-------------------|-------|-------|-----------------|----------------|------|-------|---------------------------------|-------|
| April'20 | 2nd | 9.8 | 13 | 61.8 | 33.9 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.7 | 13.5 | 62.7 | 33.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| May'20 | 1st | 9.2 | 12.5 | 58.7 | 33.1 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.3 | 11.9 | 58 | 30.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| June'20 | 3rd | 9.3 | 12.7 | 59.1 | 33.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 1st | 9.3 | 11.9 | 58 | 30.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| July'20 | 2nd | 9.5 | 12.5 | 56.5 | 29.3 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.8 | 12.9 | 58.3 | 30.7 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| August'20 | 1st | 8 | 10.4 | 56.2 | 27.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 8.2 | 10 | 56.6 | 27.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| September'20 | 3rd | 8.3 | 10.2 | 56.2 | 27.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 1st | 7.6 | 9.4 | 54.6 | 27.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| MAXIMUM | 2nd | 7 | 9.4 | 54.8 | 27 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 7.4 | 9.4 | 55.2 | 27.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| MINIMUM | 1st | 9 | 10.8 | 57.6 | 29 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.5 | 12.6 | 51.2 | 27.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| AVERAGE | 3rd | 9 | 11.8 | 47.8 | 26.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | SD | 0.89 | 1.42 | 3.52 | 2.62 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |

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

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Authorized Signatory

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Certificate No.-TC 6666

Report no. - CEMC/IREL/A5

Date-20.11.2020

AMBIENT AIR QUALITY MONITORING TEST REPORT

| | |
|--------------------|---|
| Issued to | M/s. IREL(India) Limited , Matikhalo, Chatrapur, Ganjam, Odisha |
| Work Order No. | R-07/O/01692 3532A OSCOM/SOP/07/O/01692 S.C.-1344, Dated-12.09.2019 |
| Nature of Sampling | Ambient Air Sample |
| Sampling By | Mr. S. Pradhan, Mr. R. Das |
| Sampling Location | North Mining Area (SMP-3) |
| Instrument Used | Respirable Dust Sampler, Fine Dust Sampler, Gaseous Attachment, CO Meter, Benzene Sampler |
| Sampling Period | April 20-September 20 |

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# |
|--------------|------|-----------------|-----------------|------------------|-------------------|-------|-------|-----------------|----------------|------|-------|---------------------------------|-------|
| April'20 | 2nd | 10.2 | 14.2 | 69.4 | 36.9 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 10.1 | 14.4 | 71.5 | 35.5 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| May'20 | 1st | 9.5 | 12.8 | 61.4 | 32.3 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.3 | 12.4 | 58.2 | 30.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| June'20 | 3rd | 9.2 | 12.4 | 48.4 | 27 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 1st | 9 | 12 | 61.7 | 31.9 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| July'20 | 2nd | 9.3 | 12.4 | 58.2 | 30.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 9.5 | 12.8 | 61.4 | 32.3 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| August'20 | 1st | 7.8 | 10.6 | 58.8 | 29.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 7.4 | 10.2 | 58.2 | 29.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| September'20 | 3rd | 7.6 | 10.4 | 57.8 | 29.2 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 1st | 7.7 | 10 | 56 | 28 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| MAXIMUM | 2nd | 7.5 | 10.2 | 55.6 | 27.8 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 3rd | 7.2 | 10.1 | 55 | 27.4 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| MINIMUM | 1st | 8.7 | 11.1 | 57.2 | 28.6 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | 2nd | 9.6 | 13.2 | 54.2 | 29 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| AVERAGE | 3rd | 9.2 | 12.4 | 48.4 | 27 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |
| | SD | 1.00 | 1.44 | 5.95 | 2.84 | <0.06 | <0.44 | <20 | <10 | <1.0 | <15.0 | <1.0 | <1.15 |

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

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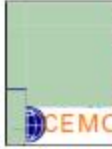
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Report no. - CEMC/IREL/WW1

Date-20.11.2020

EFFLUENT WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Sampling Period

April' 2020 to September' 2020

Sampling by

Mr.S Pradhan & Mr. R Das

Sample Description

Treated Effluent Quality (Pond-1)

Sample Quantity

2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Permissible Norms by CFCB | Apr | May | June | July | August | September | Max | Min | Avg | SD |
|--------|----------------------------------|-------|--|--------|--------|--------|--------|--------|-----------|--------|--------|--------|--------|
| 1 | pH Value | — | 5.5 to 9.0 | 7.28 | 7.46 | 6.53 | 6.62 | 7.41 | 7.68 | 7.68 | 6.53 | 7.16 | 0.47 |
| 2 | Temp | °C | — | 29.8 | 30.4 | 31.7 | 31.8 | 31.2 | 29.9 | 31.8 | 29.8 | 30.60 | 0.89 |
| 3 | Turbidity | NTU | — | 8 | 11 | 9 | 10 | 16 | 12 | 16 | 8 | 11.00 | 2.83 |
| 4 | Colour | Hazen | — | 5 | 5 | 5 | 5 | 10 | 10 | 10 | 5 | 6.67 | 2.58 |
| 5 | Alkalinity | mg/l | — | 96 | 102 | 96 | 98 | 102 | 108 | 108 | 96 | 100.33 | 4.63 |
| 6 | TDS | mg/l | — | 264.2 | 282.6 | 271.4 | 262.2 | 271.4 | 242.2 | 282.6 | 231.4 | 259.00 | 18.93 |
| 7 | TSS | mg/l | 100 | 12.8 | 17.4 | 12.6 | 15.2 | 21.2 | 23.4 | 23.4 | 12.6 | 17.10 | 4.45 |
| 8 | O&G | mg/l | 20 | <5 | <2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| 9 | BOD | mg/l | 100 | 3.4 | 3.2 | 3 | 3.2 | 3.8 | 4.2 | 4.2 | 3 | 3.47 | 0.45 |
| 10 | COD | mg/l | 250 | 20 | 24 | 20 | 25 | 30 | 25 | 30 | 20 | 24.00 | 3.74 |
| 11 | DO | mg/l | — | 5.2 | 4.8 | 5.6 | 5.4 | 5.2 | 5 | 5.6 | 4.8 | 5.20 | 0.28 |
| 12 | Chloride | mg/l | — | 31.0 | 33.6 | 31.9 | 29.9 | 26.9 | 36.9 | 36.9 | 26.9 | 31.88 | 3.37 |
| 13 | Sulphate | mg/l | — | 11.1 | 12.3 | 11.7 | 10.2 | 9.2 | 10.2 | 12.3 | 8.2 | 10.62 | 1.44 |
| 14 | Fluoride | mg/l | 15.0 | 0.12 | 0.13 | 0.13 | 0.12 | 0.11 | 0.13 | 0.13 | 0.11 | 0.12 | 0.01 |
| 15 | TH | mg/l | — | 106 | 120 | 112 | 108 | 100 | 106 | 120 | 100 | 108.67 | 6.77 |
| 16 | Calcium | mg/l | — | 28.86 | 33.67 | 32.06 | 31.26 | 29.6 | 29.66 | 33.67 | 28.86 | 30.85 | 1.82 |
| 17 | Magnesium | mg/l | — | 8.3 | 8.75 | 7.78 | 7.29 | 6.32 | 7.8 | 8.75 | 6.32 | 7.71 | 0.84 |
| 18 | Sodium | mg/l | — | 31.2 | 31.9 | 30.2 | 29.8 | 26.2 | 29.6 | 31.9 | 26.2 | 29.82 | 1.98 |
| 19 | Potassium | mg/l | — | 10.8 | 11.2 | 10.4 | 9.4 | 8.9 | 10.2 | 11.2 | 8.9 | 10.15 | 0.86 |
| 20 | TNO | mg/l | — | 2.7 | 2.9 | 2.5 | 2.6 | 2.8 | 3.4 | 3.4 | 2.5 | 2.82 | 0.32 |
| 21 | Diss PO ₄ | mg/l | — | 0.32 | 0.34 | 0.31 | 0.32 | 0.38 | 0.39 | 0.39 | 0.31 | 0.34 | 0.03 |
| 22 | Iron | mg/l | 3.0 | 0.39 | 0.41 | 0.38 | 0.36 | 0.32 | 0.37 | 0.41 | 0.32 | 0.37 | 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 | <0.01 | <0.01 | <0.01 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 30 | BPC ₉ | mg/l | 1.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 31 | TKN ₉ | mg/l | 100 | 1.22 | 1.28 | 1.25 | 1.22 | 1.78 | 1.91 | 1.91 | 1.22 | 1.44 | 0.31 |
| 32 | Free NH ₄ | 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 ⁹ | 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 ⁹ | 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 | <0.05 | <0.05 | <0.05 | <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 ⁹ | mg/l | 5.0 | 0.21 | 0.23 | 0.21 | 0.2 | 0.18 | 0.22 | 0.23 | 0.18 | 0.21 | 0.02 |
| 39 | Manganese | mg/l | 2.0 | <0.05 | <0.05 | <0.02 | <0.02 | <0.02 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 40 | Vanadium ⁹ | 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 | 1.4 | 1.81 | 1.49 | 1.42 | 1.38 | 1.74 | 1.74 | 1.38 | 1.49 | 0.13 |
| 42 | Bio-assay Test ⁹ | — | 90% Survival of Fish after 96 hrs in 100% Effluent | 91% | 92% | 93% | 92% | 93% | 92% | 93% | 92% | 93% | 0.01 |
| 43 | -cmiles ⁹ | Bq/l | 3.7 | 0.06 | 0.13 | 0.06 | 0.09 | 0.13 | 0.06 | 0.13 | 0.06 | 0.09 | 0.03 |
| 44 | -cmiles ⁹ | Bq/l | 37 | 0.16 | 0.42 | 0.31 | 0.31 | 0.34 | 0.28 | 0.42 | 0.28 | 0.34 | 0.05 |

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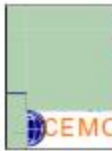
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E-mail: ccmclab@yahoo.in, Mobile: 9937631956, 8895177314



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Certificate No.-TC 6646

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

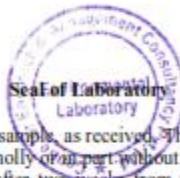
*Sample Tested By Health Physics Unit of BARC, OSCOM

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

Authorized Signatory

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



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Certificate No.-TC 6666

Report no. - CEMC/IREL/WW2

Date-20.11.2020

EFFLUENT WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

: R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Sampling Period

: April' 2020 to September' 2020

Sampling by

: Mr.S Pradhan & Mr. R Das

Sample Description

: Pond-2 (RPP Pit, Inlet)

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Permissible Norms by CPCB | Apr | May | June | July | August | September | Max | Min | Avg | SD |
|--------|----------------------------------|-------|---|--------|--------|--------|--------|--------|-----------|--------|--------|--------|--------|
| 1 | pH Value | — | 5.5 to 9.0 | 7.51 | 7.42 | 7.36 | 7.41 | 6.94 | 7.24 | 7.51 | 6.94 | 7.31 | 0.20 |
| 2 | Temp | °C | — | 29.7 | 30.2 | 31.5 | 31.6 | 31 | 29.7 | 31.6 | 29.7 | 30.62 | 0.87 |
| 3 | Turbidity | NTU | — | 9 | 10 | 9 | 10 | 18 | 16 | 18 | 9 | 12.00 | 3.95 |
| 4 | Colour | Hazen | — | 5 | 5 | 5 | 5 | 10 | 10 | 10 | 5 | 6.67 | 2.58 |
| 5 | Alkalinity | mg/l | — | 100 | 108 | 102 | 104 | 100 | 100 | 108 | 100 | 102.33 | 3.20 |
| 6 | TDS | mg/l | — | 278.8 | 296.3 | 283.2 | 276.6 | 243.2 | 264.4 | 296.3 | 243.2 | 273.75 | 18.18 |
| 7 | TSS | mg/l | 100 | 18.6 | 19.8 | 13.5 | 17.6 | 23.6 | 25.6 | 25.6 | 13.5 | 19.78 | 4.34 |
| 8 | Oil&G | mg/l | 20 | <5 | <5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| 9 | BOD | mg/l | 100 | 3.2 | 3.4 | 3.2 | 3.4 | 4.2 | 4.8 | 4.8 | 3.2 | 3.70 | 0.65 |
| 10 | COD | mg/l | 250 | 25 | 28 | 26 | 30 | 30 | 30 | 30 | 25 | 28.17 | 2.23 |
| 11 | DO | mg/l | — | 5 | 4.8 | 5 | 5.2 | 5 | 4.9 | 5.2 | 4.8 | 4.98 | 0.13 |
| 12 | Chloride | mg/l | — | 33.9 | 35.3 | 34.1 | 32.9 | 27.9 | 37.4 | 37.4 | 27.9 | 33.58 | 3.18 |
| 13 | Sulphate | mg/l | — | 11.8 | 12.9 | 12.2 | 11.4 | 8.9 | 9.8 | 12.9 | 8.9 | 11.17 | 1.52 |
| 14 | Fluoride | mg/l | 15.0 | 0.13 | 0.14 | 0.13 | 0.12 | 0.11 | 0.14 | 0.14 | 0.11 | 0.13 | 0.01 |
| 15 | TH | mg/l | — | 116 | 128 | 120 | 116 | 104 | 108 | 128 | 104 | 115.33 | 8.55 |
| 16 | Calcium | mg/l | — | 31.26 | 35.27 | 34.07 | 32.86 | 30.46 | 30.46 | 35.27 | 30.46 | 32.40 | 2.00 |
| 17 | Magnesium | mg/l | — | 8.75 | 9.72 | 8.5 | 8.26 | 6.8 | 7.77 | 9.72 | 6.8 | 8.30 | 0.98 |
| 18 | Sodium | mg/l | — | 30.5 | 32.3 | 31.6 | 30.9 | 27.4 | 30.8 | 32.3 | 27.4 | 30.58 | 1.69 |
| 19 | Potassium | mg/l | — | 11.2 | 11.8 | 11.1 | 10.2 | 9.1 | 11.4 | 11.8 | 9.1 | 10.80 | 0.99 |
| 20 | TSS | mg/l | — | 2.9 | 3.4 | 3.1 | 3.2 | 3 | 3.6 | 3.6 | 2.9 | 3.20 | 0.26 |
| 21 | Diss PO ₄ | mg/l | — | 0.33 | 0.35 | 0.33 | 0.34 | 0.4 | 0.36 | 0.4 | 0.33 | 0.35 | 0.03 |
| 22 | Iron | mg/l | 3.0 | 0.42 | 0.45 | 0.42 | 0.4 | 0.34 | 0.38 | 0.45 | 0.34 | 0.40 | 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 | <0.01 | <0.01 | <0.01 | <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 | <0.01 | <0.01 | <0.01 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 30 | BPC# | mg/l | 1.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 31 | TKN# | mg/l | 100 | 1.24 | 1.32 | 1.29 | 1.25 | 1.82 | 2.1 | 2.1 | 1.24 | 1.50 | 0.37 |
| 32 | Free NH ₄ # | 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 | <0.05 | <0.05 | <0.05 | <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 | Sulphide# | mg/l | 5.0 | 0.24 | 0.25 | 0.23 | 0.22 | 0.2 | 0.27 | 0.27 | 0.2 | 0.24 | 0.02 |
| 39 | Manganese | mg/l | 2.0 | <0.05 | <0.05 | <0.02 | <0.02 | <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 | 1.42 | 1.58 | 1.52 | 1.49 | 1.41 | 1.82 | 1.82 | 1.41 | 1.54 | 0.15 |
| 42 | Bio-assay Test# | — | 90% Survival of Fish after 96 hrs in 100% | 92% | 93% | 92% | 92% | 93% | 91% | 93% | 91% | 92% | 0.01 |

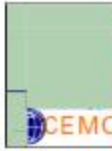
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Certificate No.-TC 6646

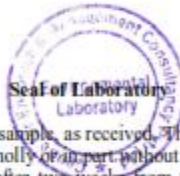
| | | | Effluent | | | | | | | | | | |
|----|------------|------|----------|------|------|------|------|------|------|------|------|------|------|
| 43 | -cmitters* | Bq/l | 3.7 | 0.04 | 0.1 | 0.07 | 0.11 | 0.09 | 0.1 | 0.11 | 0.04 | 0.09 | 0.03 |
| 44 | -cmitters* | Bq/l | 37 | 0.3 | 0.39 | 0.3 | 0.34 | 0.3 | 0.37 | 0.39 | 0.3 | 0.33 | 0.04 |

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.-TC-5063

M. K. Rout
Authorized Signatory



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Report no. - CEMC/IREL/S1

Issued Date-20.11.2020

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.-1344,
Dated-12.09.2019
Date of Sampling : April 2020 to September 2020
Sampling by : Mr.S Pradhan and Mr. R. Das
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 | % |
| June | 2nd | 6.91 | 131.9 | 23.2 | 9.7 | 21.3 | 1.9 | 0.05374 | 7.1 | 16.8 | 21.5 | 7.8 | 239.9 | 0.51 |
| Sept | 2nd | 6.88 | 142.4 | 24.4 | 9.9 | 22.8 | 2.1 | 0.05422 | 7.8 | 17.2 | 22.4 | 8.2 | 242.4 | 0.62 |
| MAXIMUM | | 6.91 | 142.4 | 24.4 | 9.9 | 22.8 | 2.1 | 0.054 | 7.8 | 17.2 | 22.4 | 8.2 | 242.4 | 0.62 |
| MINIMUM | | 6.88 | 131.9 | 23.2 | 9.7 | 21.3 | 1.9 | 0.053 | 7.1 | 16.8 | 21.5 | 7.8 | 239.9 | 0.51 |
| AVERAGE | | 6.90 | 137.15 | 23.80 | 9.80 | 22.05 | 2.00 | 0.05 | 7.45 | 17.00 | 21.95 | 8.00 | 241.15 | 0.57 |
| STD DEVIATION | | 0.02 | 7.42 | 0.85 | 0.14 | 1.06 | 0.14 | 0.00 | 0.49 | 0.28 | 0.64 | 0.28 | 1.77 | 0.08 |

LOCATION-Basan Putty (S2)

| Month | Week | pH | EC | SAR | CEC | SO ₄ | NO ₃ | N | P | Ca | Na | K | Fe | Org |
|---------------|------|------|--------|-------|---------|-----------------|-----------------|---------|-------|-------|-------|-------|--------|------|
| Unit | | -- | µS/cm | -- | Meq/100 | mg/kg | mg/kg | % | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | % |
| June | 2nd | 7.12 | 121.8 | 25.8 | 8.6 | 24.1 | 2.8 | 0.05711 | 9.4 | 18.5 | 20.8 | 10.2 | 276.1 | 0.67 |
| Sept | 2nd | 7.04 | 132.6 | 26.2 | 8.5 | 25.6 | 3.2 | 0.05812 | 9.7 | 19.4 | 21.6 | 10.7 | 281.2 | 0.71 |
| MAXIMUM | | 7.12 | 132.6 | 26.2 | 8.6 | 25.6 | 3.2 | 0.05812 | 9.7 | 19.4 | 21.6 | 10.7 | 281.2 | 0.71 |
| MINIMUM | | 7.04 | 121.8 | 25.8 | 8.5 | 24.1 | 2.8 | 0.05711 | 9.4 | 18.5 | 20.8 | 10.2 | 276.1 | 0.67 |
| AVERAGE | | 7.08 | 127.20 | 26.00 | 8.55 | 24.85 | 3.00 | 0.06 | 9.55 | 18.95 | 21.20 | 10.45 | 278.65 | 0.69 |
| STD DEVIATION | | 0.06 | 7.64 | 0.28 | 0.07 | 1.06 | 0.28 | 0.001 | 0.21 | 0.64 | 0.57 | 0.35 | 3.61 | 0.03 |

All Parameter Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

M. Prasad
Authorized Signatory

Seal of Laboratory

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Report no. - CEMC/IREL/S2

Issued Date-20.11.2020

SOIL QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

: R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Date of Sampling

: April' 2020 to September' 2020

Sampling by

: Mr.S.Pradhan and Mr. R. Das

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 | % |
| June | 2nd | 7.28 | 174.5 | 31.7 | 9.3 | 27.8 | 3.3 | 0.04951 | 11.9 | 19.1 | 26.4 | 11.9 | 769.3 | 0.63 |
| Sept | 2nd | 7.17 | 182.2 | 32.8 | 9.6 | 28.2 | 3.8 | 0.05024 | 12.1 | 20.2 | 27.6 | 12.4 | 772.4 | 0.68 |
| MAXIMUM | | 7.28 | 182.2 | 32.8 | 9.6 | 28.2 | 3.8 | 0.05024 | 12.1 | 20.2 | 27.6 | 12.4 | 772.4 | 0.68 |
| MINIMUM | | 7.17 | 174.5 | 31.7 | 9.3 | 27.8 | 3.3 | 0.04951 | 11.9 | 19.1 | 26.4 | 11.9 | 769.3 | 0.63 |
| AVERAGE | | 7.23 | 178.35 | 32.25 | 9.45 | 28.00 | 3.55 | 0.05 | 12.00 | 19.65 | 27.00 | 12.15 | 770.85 | 0.66 |
| STD DEVIATION | | 0.08 | 5.44 | 0.78 | 0.21 | 0.28 | 0.35 | 0.001 | 0.14 | 0.78 | 0.85 | 0.35 | 2.19 | 0.04 |

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 | % |
| June | 2nd | 7.81 | 162.3 | 36.4 | 10.5 | 19.6 | 2.7 | 0.04896 | 9.8 | 17.2 | 23.6 | 15.7 | 694.8 | 0.58 |
| Sept | 2nd | 7.76 | 170.8 | 38.3 | 10.9 | 20.4 | 2.82 | 0.04924 | 10.4 | 18.8 | 24.2 | 16.3 | 698.4 | 0.64 |
| MAXIMUM | | 7.81 | 170.8 | 38.3 | 10.9 | 20.4 | 2.82 | 0.04924 | 10.4 | 18.8 | 24.2 | 16.3 | 698.4 | 0.64 |
| MINIMUM | | 7.76 | 162.3 | 36.4 | 10.5 | 19.6 | 2.7 | 0.04896 | 9.8 | 17.2 | 23.6 | 15.7 | 694.8 | 0.58 |
| AVERAGE | | 7.79 | 166.55 | 37.35 | 10.70 | 20.00 | 2.76 | 0.05 | 10.10 | 18.00 | 23.90 | 16.00 | 696.60 | 0.61 |
| STD DEVIATION | | 0.04 | 6.01 | 1.34 | 0.28 | 0.57 | 0.08 | 0.000 | 0.42 | 1.13 | 0.42 | 0.42 | 2.55 | 0.04 |

All Parameter Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

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



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



CENTRE FOR ENVOTECH AND MANAGEMENT CONSULTANCY PVT. LTD.

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MoEF&CC, Govt. of India, Recognised Environment Laboratory under Environment (Protection) Act, 1986.

Report no. - CEMC/IREL/S3

Issued Date-20.11.2020

SOIL QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

: R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Date of Sampling

: April' 2020 to September' 2020

Sampling by

: Mr.S.Pradhan and Mr. R. Das

Sample Location

: Kanamana (S5), BadaArjipalli (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 | % |
| June | 2nd | 6.73 | 112.4 | 19.5 | 7.1 | 17.9 | 3.9 | 0.04996 | 10.2 | 18.4 | 18.2 | 18.1 | 331.6 | 0.76 |
| Sept | 2nd | 6.68 | 121.3 | 18.2 | 7.4 | 19.2 | 4.06 | 0.05046 | 10.6 | 19.7 | 19.3 | 18.8 | 339.4 | 0.81 |
| MAXIMUM | | 6.73 | 121.3 | 19.5 | 7.4 | 19.2 | 4.06 | 0.05046 | 10.6 | 19.7 | 19.3 | 18.8 | 339.4 | 0.81 |
| MINIMUM | | 6.68 | 112.4 | 18.2 | 7.1 | 17.9 | 3.9 | 0.04996 | 10.2 | 18.4 | 18.2 | 18.1 | 331.6 | 0.76 |
| AVERAGE | | 6.71 | 116.85 | 18.85 | 7.25 | 18.55 | 3.98 | 0.05 | 10.40 | 19.05 | 18.75 | 18.45 | 335.50 | 0.79 |
| STD DEVIATION | | 0.04 | 6.29 | 0.92 | 0.21 | 0.92 | 0.11 | 0.0004 | 0.28 | 0.92 | 0.78 | 0.49 | 5.52 | 0.04 |

LOCATION-Bada Arjipalli(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 | % |
| June | 2nd | 6.82 | 109.7 | 20.6 | 5.8 | 20.4 | 3.5 | 0.04726 | 12.1 | 16.3 | 14.1 | 15.5 | 263.2 | 0.59 |
| Sept | 2nd | 6.73 | 117.4 | 22.4 | 6.3 | 22.8 | 3.92 | 0.04784 | 12.5 | 17.2 | 14.8 | 15.7 | 269.4 | 0.64 |
| MAXIMUM | | 6.82 | 117.4 | 22.4 | 6.3 | 22.8 | 3.92 | 0.04784 | 12.5 | 17.2 | 14.8 | 15.7 | 269.4 | 0.64 |
| MINIMUM | | 6.73 | 109.7 | 20.6 | 5.8 | 20.4 | 3.5 | 0.04726 | 12.1 | 16.3 | 14.1 | 15.5 | 263.2 | 0.59 |
| AVERAGE | | 6.78 | 113.55 | 21.50 | 6.05 | 21.60 | 3.71 | 0.05 | 12.30 | 16.75 | 14.45 | 15.60 | 266.30 | 0.62 |
| STD DEVIATION | | 0.06 | 5.44 | 1.27 | 0.35 | 1.70 | 0.30 | 0.0004 | 0.28 | 0.64 | 0.49 | 0.14 | 4.38 | 0.04 |

All Parameter Analyzed by Eko Pro Engineers, Gzaabad, Certificate No.-TC-5063

Authorized Signatory

Seal of Laboratory

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Report no. - CEMC/IREL/W1

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

: R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Sampling Period

: Apr'2020 to Sept'2020

Sampling by

: Mr. S.Pradhan & Mr. R Das

Sample Location

: Hand Pump of Matikhal Village

Sample Quantity

: 2.0 Ltrs

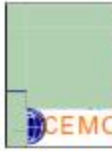
ANALYSIS RESULT

| SL No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|-------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 6.77 | 6.83 | 6.89 | 6.92 | 6.84 | 7.03 | 7.03 | 6.77 | 6.88 | 0.09 |
| 2 | Temperature | °C | 29.2 | 29.7 | 30.2 | 30.3 | 31.2 | 31.4 | 31.4 | 29.2 | 30.33 | 0.85 |
| 3 | Turbidity | NTU | 3 | 4 | 3 | 4 | 5 | 2 | 5 | 2 | 3.5 | 1.05 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | <5 | 0 | 0 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 116 | 122 | 128 | 130 | 126 | 130 | 130 | 116 | 125.33 | 5.47 |
| 6 | Total Dissolved Solids | mg/l | 322 | 334 | 346 | 332 | 304 | 314 | 346 | 304 | 325.33 | 15.11 |
| 7 | Total Suspended Solids | mg/l | <5 | <5 | <5 | <5 | 5.4 | <5 | 5.4 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 10 | 11.2 | 11.4 | 10 | 5 | 5 | 11.4 | 5 | 8.77 | 2.98 |
| 11 | Dissolved Oxygen | mg/l | 5.3 | 5.6 | 5.4 | 5.3 | 5.4 | 5.3 | 5.6 | 5.3 | 5.38 | 0.12 |
| 12 | Chloride (as Cl) | mg/l | 24.9 | 25.3 | 25.9 | 23.9 | 18.9 | 19.9 | 25.9 | 18.9 | 23.13 | 2.98 |
| 13 | Sulphate (as SO ₄) | mg/l | 17.2 | 17.5 | 17.8 | 16.4 | 14.4 | 14.9 | 17.8 | 14.4 | 16.37 | 1.42 |
| 14 | Fluoride (as F) | mg/l | 0.13 | 0.13 | 0.14 | 0.13 | 0.12 | 0.13 | 0.14 | 0.12 | 0.13 | 0.01 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 120 | 126 | 130 | 128 | 126 | 128 | 130 | 120 | 126.33 | 3.44 |
| 16 | Calcium (as Ca) | mg/l | 33.7 | 36.07 | 38.07 | 37.67 | 36.87 | 37.67 | 38.07 | 33.7 | 36.68 | 1.62 |
| 17 | Magnesium (as Mg) | mg/l | 8.75 | 8.75 | 8.51 | 8.26 | 8.26 | 8.26 | 8.75 | 8.26 | 8.47 | 0.24 |
| 18 | Sodium (as Na) | mg/l | 23.2 | 23.8 | 24.3 | 23.2 | 21.8 | 22.4 | 24.3 | 21.8 | 23.12 | 0.91 |
| 19 | Potassium (as K) | mg/l | 5.8 | 6.4 | 6.8 | 6.2 | 5.4 | 6.1 | 6.8 | 5.4 | 6.12 | 0.48 |
| 20 | Total Nitrogen# | mg/l | 0.71 | 0.75 | 0.79 | 0.72 | 0.68 | 0.7 | 0.79 | 0.68 | 0.73 | 0.04 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 22 | Iron (as Fe) | mg/l | 0.23 | 0.24 | 0.26 | 0.25 | 0.24 | 0.24 | 0.26 | 0.23 | 0.24 | 0.01 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 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, Johal, Pahal, Bhubaneswar-752101,
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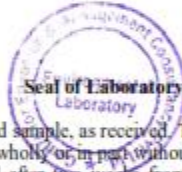


Certificate No.-TC 6666

| | | | | | | | | | | | | |
|----|--|---------------|------------|--------|-------|-------|-------|-------|-------|-------|-------|----|
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 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 | ND |
| 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 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.00 1 | <0.001 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/1 00ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/1 00ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/1 00ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 33 | Depth of Water Level | Meter | -- | -- | -- | -- | -- | -- | -- | -- | -- | ND |

N.B: ND-Not Detectable, MPN-Most Probable Number,NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

Authorized Signatory



Notes:

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Report no. - CEMC/IREL/W2

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

: R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Sampling Period

: Apr'2020 to Sept'2020

Sampling by

: Mr. S.Pradhan & Mr. R Das

Sample Location

: Railway Platform

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|--------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| 1 | pH Value (@ 25°C) | -- | 7.95 | 8.14 | 8.36 | 8.42 | 8.38 | 7.71 | 8.42 | 7.71 | 8.16 | 0.28 |
| 2 | Temperature | °C | 29.4 | 32.2 | 31.3 | 31.4 | 31.1 | 31.3 | 32.2 | 29.4 | 31.12 | 0.92 |
| 3 | Turbidity | NTU | 5 | 6 | 8 | 9 | 11 | 10 | 11 | 5 | 8.17 | 2.32 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | <5 | 0 | 0 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 134 | 140 | 182 | 192 | 188 | 190 | 192 | 134 | 171.00 | 26.62 |
| 6 | Total Dissolved Solids | mg/l | 330 | 342 | 976 | 944 | 912 | 930 | 976 | 330 | 739.00 | 312.89 |
| 7 | Total Suspended Solids | mg/l | 8.8 | 9.1 | 9.8 | 10.2 | 11.6 | 10.2 | 11.6 | <5 | <5 | ND |
| 8 | Oil & Grease | mg/l | <5 | <5 | <1 | <1 | <1 | <1 | ND | ND | ND | ND |
| 9 | Biochemical Oxygen Demand 3 days @ 27°C | mg/l | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 12.8 | 13.4 | 14.8 | 15 | 10 | 10 | 15 | 10 | 12.67 | 2.23 |
| 11 | Dissolved Oxygen | mg/l | 4.9 | 4.6 | 4.8 | 4.9 | 5.1 | 5 | 5.1 | 4.6 | 4.88 | 0.17 |
| 12 | Chloride (as Cl) | mg/l | 32.9 | 34.1 | 72.4 | 69.9 | 61.9 | 63.9 | 72.4 | 32.9 | 55.85 | 17.73 |
| 13 | Sulphate (as SO ₄) | mg/l | 23.2 | 23.9 | 39.2 | 32.8 | 29.6 | 32.2 | 39.2 | 23.2 | 30.15 | 6.01 |
| 14 | Fluoride (as F) | mg/l | 0.15 | 0.16 | 0.21 | 0.2 | 0.18 | 0.19 | 0.21 | 0.15 | 0.18 | 0.02 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 138 | 150 | 196 | 192 | 188 | 192 | 196 | 138 | 176.00 | 25.20 |
| 16 | Calcium (as Ca) | mg/l | 38.5 | 41.68 | 54.51 | 53.71 | 52.9 | 54.51 | 54.51 | 38.5 | 49.30 | 7.23 |
| 17 | Magnesium (as Mg) | mg/l | 10.21 | 11.18 | 14.58 | 14.1 | 13.61 | 13.61 | 14.58 | 10.21 | 12.88 | 1.76 |
| 18 | Sodium (as Na) | mg/l | 30.8 | 32.4 | 88.6 | 81.9 | 78.6 | 80.6 | 88.6 | 30.8 | 65.48 | 26.46 |
| 19 | Potassium (as K) | mg/l | 7.2 | 7.9 | 32.6 | 31.4 | 29.2 | 31.3 | 32.6 | 7.2 | 23.27 | 12.23 |
| 20 | Total Nitrogen# | mg/l | 6.4 | 6.2 | 12.5 | 10.8 | 9.7 | 10.2 | 12.5 | 6.2 | 9.30 | 2.51 |
| 21 | Phosphorus (as PO ₄) | mg/l | 0.11 | 0.12 | 0.18 | 0.16 | 0.14 | 0.15 | 0.18 | 0.11 | 0.14 | 0.03 |
| 22 | Iron (as Fe) | mg/l | 0.33 | 0.34 | 0.41 | 0.4 | 0.38 | 0.38 | 0.41 | 0.33 | 0.37 | 0.03 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |

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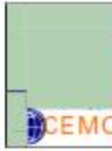
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Certificate No.-TC 6666

| | | | | | | | | | | | | |
|----|--|-----------|--------|--------|-------|-------|-------|-------|-------|-------|-------|----|
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 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 | ND |
| 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 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.001 | <0.001 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 33 | Depth of Water Level | Meter | 2.7 | 2.9 | 2.8 | 2.7 | 2.4 | 2.9 | -- | -- | -- | ND |

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

M. Rout
Authorized Signatory



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E-mail: ccmc_consultancy@yahoo.co.in, ccmc122@gmail.com, website: www.ccmc.in, Landline: 0674-2360344.

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 (April 2020 to September 2020)



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Certificate No.-TC 6666

Report no. - CEMC/IREL/W3

Date-16.11.2019

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

: R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Sampling Period

: Apr'2020 to Sept'2020

Sampling by

: Mr. S.Pradhan & Mr. R Das

Sample Location

: Composite Water from MSP

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|--------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 7.16 | 7.16 | 6.71 | 6.79 | 6.62 | 7.18 | 7.18 | 6.62 | 6.94 | 0.26 |
| 2 | Temperature | °C | 29.1 | 29.1 | 31.4 | 31.5 | 31.3 | 31.1 | 31.5 | 29.1 | 30.58 | 1.16 |
| 3 | Turbidity | NTU | 4 | 4 | 5 | 4 | 6 | 7 | 7 | 4 | 5.00 | 1.26 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | <5 | 0 | 0 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 108 | 108 | 138 | 138 | 130 | 136 | 138 | 108 | 126.33 | 14.50 |
| 6 | Total Dissolved Solids | mg/l | 306 | 314 | 381 | 362 | 338 | 346 | 381 | 306 | 341.17 | 28.39 |
| 7 | Total Suspended Solids | mg/l | 6.7 | 7.6 | 8.1 | 7.4 | 8.4 | 9.8 | 9.8 | <5 | <5 | ND |
| 8 | Oil & Grease | mg/l | <5 | <5 | <1 | <1 | <1 | <1 | ND | ND | ND | ND |
| 9 | Biochemical Oxygen Demand 3 days @ 27°C | mg/l | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 9.4 | 9.8 | 12.2 | 10 | 5 | 5 | 12.2 | 5 | 8.57 | 2.93 |
| 11 | Dissolved Oxygen | mg/l | 4.8 | 5 | 5 | 5.1 | 5.2 | 5.3 | 5.3 | 4.8 | 5.07 | 0.18 |
| 12 | Chloride (as Cl) | mg/l | 24.9 | 25.1 | 26.3 | 24.9 | 20.9 | 22.9 | 26.3 | 20.9 | 24.17 | 1.94 |
| 13 | Sulphate (as SO ₄) | mg/l | 16.2 | 16.7 | 19.4 | 18.6 | 16.2 | 17.4 | 19.4 | 16.2 | 17.42 | 1.33 |
| 14 | Fluoride (as F) | mg/l | 0.12 | 0.14 | 0.16 | 0.15 | 0.13 | 0.15 | 0.16 | 0.12 | 0.14 | 0.01 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 114 | 118 | 136 | 132 | 130 | 134 | 136 | 114 | 127.33 | 9.09 |
| 16 | Calcium (as Ca) | mg/l | 32.86 | 33.67 | 36.07 | 35.27 | 33.67 | 34.47 | 36.07 | 32.86 | 34.34 | 1.18 |
| 17 | Magnesium (as Mg) | mg/l | 7.8 | 8.26 | 11.18 | 10.69 | 11.18 | 12.15 | 12.15 | 7.8 | 10.21 | 1.76 |
| 18 | Sodium (as Na) | mg/l | 20.3 | 20.8 | 26.1 | 25.4 | 23.6 | 24.6 | 26.1 | 20.3 | 23.47 | 2.41 |
| 19 | Potassium (as K) | mg/l | 5.1 | 5.6 | 7.2 | 6.8 | 6.2 | 7.2 | 7.2 | 5.1 | 6.35 | 0.87 |
| 20 | Total Nitrogen# | mg/l | 5.3 | 5.5 | 6.1 | 5.8 | 5.6 | 6.1 | 6.1 | 5.3 | 5.73 | 0.33 |
| 21 | Phosphorus (as PO ₄) | mg/l | 0.09 | 0.11 | 0.13 | 0.11 | 0.1 | 0.1 | 0.13 | 0.09 | 0.11 | 0.01 |
| 22 | Iron (as Fe) | mg/l | 0.24 | 0.25 | 0.28 | 0.26 | 0.25 | 0.25 | 0.28 | 0.24 | 0.26 | 0.01 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 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 6666

| | | | | | | | | | | | | |
|----|--|-----------|--------|--------|-------|-------|-------|-------|-------|-------|-------|----|
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 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 | ND |
| 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 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.001 | <0.001 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 33 | Depth of Water Level | Meter | 2.2 | 2.4 | 2.2 | 2 | 1.8 | 2.2 | -- | -- | -- | ND |

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

M. K. Rout
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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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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Report no. - CEMC/IREL/W4

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : Apr'2020 to Sept'2020
Sampling by : Mr. S.Pradhan & Mr. R Das
Sample Location : REEP up No1
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| SL No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|-------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|----------|
| 1 | pH Value (@ 25°C | -- | 7.38 | 7.21 | 6.98 | 7.04 | 6.98 | 7.28 | 7.38 | 6.98 | 7.15 | 0.17 |
| 2 | Temperature | °C | 29 | 31.1 | 31.4 | 31.3 | 31.1 | 30.6 | 31.4 | 29 | 30.75 | 0.90 |
| 3 | Turbidity | NTU | 5 | 7 | 8 | 5 | 6 | 6 | 8 | 5 | 6.17 | 1.17 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | <5 | 0 | 0 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 126 | 154 | 128 | 130 | 128 | 130 | 154 | 126 | 132.67 | 10.56 |
| 6 | Total Dissolved Solids | mg/l | 351 | 630 | 451 | 442 | 424 | 416 | 630 | 351 | 452.33 | 93.88 |
| 7 | Total Suspended Solids | mg/l | 7.2 | 7.6 | 7.1 | 8.2 | 8.8 | 9.2 | 9.2 | <5 | <5 | ND |
| 8 | Oil & Grease | mg/l | <5 | <5 | <1 | <1 | <1 | <1 | ND | ND | ND | ND |
| 9 | Biochemical Oxygen Demand 3 days @ 27°C | mg/l | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 10 | 15.4 | 13.6 | 15 | 10 | 5 | 15.4 | 5 | 11.50 | 3.97 |
| 11 | Dissolved Oxygen | mg/l | 4.9 | 4 | 4.2 | 4.4 | 4.5 | 4.8 | 4.9 | 4 | 4.47 | 0.34 |
| 12 | Chloride (as Cl) | mg/l | 29.9 | 47.6 | 39.3 | 38.9 | 36.9 | 34.9 | 47.6 | 29.9 | 37.92 | 5.85 |
| 13 | Sulphate (as SO ₄) | mg/l | 21.2 | 37.8 | 28.5 | 26.4 | 25.2 | 24.1 | 37.8 | 21.2 | 27.20 | 5.73 |
| 14 | Fluoride (as F) | mg/l | 0.14 | 0.14 | 0.12 | 0.11 | 0.1 | 0.09 | 0.14 | 0.09 | 0.12 | 0.02 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 132 | 194 | 172 | 170 | 166 | 164 | 194 | 132 | 166.33 | 19.98 |
| 16 | Calcium (as Ca) | mg/l | 38.48 | 57.7 | 55.3 | 54.51 | 53.71 | 52.9 | 57.7 | 38.48 | 52.10 | 6.87 |
| 17 | Magnesium (as Mg) | mg/l | 8.75 | 12.15 | 8.26 | 8.26 | 7.78 | 7.29 | 12.15 | 7.29 | 8.75 | 1.74 |
| 18 | Sodium (as Na) | mg/l | 28.2 | 78.2 | 66.8 | 65.2 | 64.3 | 62.8 | 78.2 | 28.2 | 60.92 | 16.95 |
| 19 | Potassium (as K) | mg/l | 6.8 | 24.3 | 19.4 | 19 | 18.2 | 17.4 | 24.3 | 6.8 | 17.52 | 5.78 |
| 20 | Total Nitrogen# | mg/l | 5.4 | 6.7 | 6.3 | 6.1 | 5.8 | 5.4 | 6.7 | 5.4 | 5.95 | 0.52 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | 0 | 0 | #DIV/0 ! | #DIV /0! |

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 6666

| | | | | | | | | | | | | |
|----|--|-----------|--------|--------|-------|-------|-------|-------|-------|-------|-------|------|
| 22 | Iron (as Fe) | mg/l | 0.29 | 0.34 | 0.34 | 0.33 | 0.32 | 0.33 | 0.34 | 0.29 | 0.33 | 0.02 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 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 | ND |
| 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 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.001 | <0.001 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 33 | Depth of Water Level | Meter | 3.6 | 3.8 | 3.6 | 3.7 | 3.4 | 3.5 | -- | -- | -- | ND |

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

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

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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- ✓ The samples received shall be destroyed after two weeks from the date of issue of the Test Report unless specified otherwise.
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Laboratory At: Plot No. 800/1274, Johal, Pahal, Bhubaneswar-752101,
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Certificate No.-TC 6666

Report no. - CEMC/IREL/W5

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : Apr'2020 to Sept'2020
Sampling by : Mr. S.Pradhan & Mr. R Das
Sample Location : REEP down (No.2)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| SL No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|-------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 7.77 | 8.51 | 7.93 | 7.98 | 7.91 | 7.31 | 8.51 | 7.31 | 7.90 | 0.39 |
| 2 | Temperature | °C | 29.2 | 31.3 | 31.8 | 31.6 | 31.2 | 30.8 | 31.8 | 29.2 | 30.98 | 0.94 |
| 3 | Turbidity | NTU | 6 | 8 | 8 | 6 | 8 | 7 | 8 | 6 | 7.17 | 0.98 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 148 | 138 | 122 | 124 | 120 | 136 | 148 | 120 | 131.33 | 11.08 |
| 6 | Total Dissolved Solids | mg/l | 512 | 508 | 402 | 386 | 332 | 344 | 512 | 332 | 414.00 | 78.73 |
| 7 | Total Suspended Solids | mg/l | 8.4 | 7.9 | 6.8 | 5.6 | 5.4 | 4.8 | 8.4 | 4.8 | 6.48 | 1.45 |
| 8 | Oil & Grease | mg/l | <5 | <5 | <1 | <1 | <1 | <1 | ND | ND | ND | ND |
| 9 | Biochemical Oxygen Demand 3 days@ 27°C | mg/l | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 12 | 12.4 | 12.2 | 10 | 5 | 5 | 12.4 | 5 | 9.43 | 3.54 |
| 11 | Dissolved Oxygen | mg/l | 4.7 | 4.2 | 4.6 | 4.3 | 4.4 | 4.6 | 4.7 | 4.2 | 4.47 | 0.20 |
| 12 | Chloride (as Cl) | mg/l | 35.9 | 36.2 | 33.1 | 31.9 | 30.9 | 29.9 | 36.2 | 29.9 | 32.98 | 2.60 |
| 13 | Sulphate (as SO ₄) | mg/l | 28.7 | 29.2 | 27.1 | 26.3 | 24.8 | 23.6 | 29.2 | 23.6 | 26.62 | 2.18 |
| 14 | Fluoride (as F) | mg/l | 0.19 | 0.13 | 0.11 | 0.11 | 0.1 | 0.11 | 0.19 | 0.1 | 0.13 | 0.03 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 154 | 166 | 162 | 158 | 154 | 152 | 166 | 152 | 157.67 | 5.43 |
| 16 | Calcium (as Ca) | mg/l | 42.5 | 49.7 | 48.1 | 47.3 | 45.7 | 45.7 | 49.7 | 42.5 | 46.50 | 2.48 |
| 17 | Magnesium (as Mg) | mg/l | 11.66 | 10.21 | 10.21 | 9.27 | 9.72 | 9.23 | 11.66 | 9.23 | 10.05 | 0.90 |
| 18 | Sodium (as Na) | mg/l | 35.2 | 65.7 | 59.3 | 57.8 | 55.4 | 57.2 | 65.7 | 35.2 | 55.10 | 10.37 |
| 19 | Potassium (as K) | mg/l | 8.9 | 20.4 | 17.2 | 16.8 | 14.2 | 16.8 | 20.4 | 8.9 | 15.72 | 3.88 |
| 20 | Total Nitrogen# | mg/l | 6.7 | 5.1 | 5.8 | 5.2 | 5 | 5.2 | 6.7 | 5 | 5.50 | 0.65 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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.

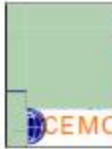
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E-mail: ccmc_consultancy@yahoo.co.in, ccmc122@gmail.com, website: www.ccmc.in, Landline: 0674-2360344.

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



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| | | | | | | | | | | | | |
|----|--|-----------|--------|--------|-------|-------|-------|-------|-------|-------|-------|------|
| 22 | Iron (as Fe) | mg/l | 0.33 | 0.31 | 0.31 | 0.32 | 0.3 | 0.32 | 0.33 | 0.3 | 0.32 | 0.01 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 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 | ND |
| 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 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.001 | <0.001 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 33 | Depth of Water Level | Meter | 2.5 | 2.6 | 2.5 | 2.6 | 2.3 | 2.5 | 2.6 | 2.3 | 2.5 | 0.11 |

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

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Notes:



- ✓ The result given above related to the tested sample, as received. The customer asked for the above test only.
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Six Monthly Compliance Report (April 2020 to September 2020)



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Report no. - CEMC/IREL/W6

Date-16.11.2019

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

: R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Sampling Period

: Apr'2020 to Sept'2020

Sampling by

: Mr. S.Pradhan & Mr. R Das

Sample Location

: Upstream of Solar Evaporation Storage
Pond

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|--------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 6.98 | 6.84 | 6.41 | 6.52 | 6.47 | 6.56 | 6.98 | 6.41 | 6.63 | 0.23 |
| 2 | Temperature | °C | 29.1 | 31.2 | 31.6 | 31.5 | 31.3 | 31.4 | 31.6 | 29.1 | 31.02 | 0.95 |
| 3 | Turbidity | NTU | 5 | 6 | 7 | 4 | 5 | 3 | 7 | 3 | 5.00 | 1.41 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 124 | 116 | 106 | 110 | 106 | 108 | 124 | 106 | 111.67 | 7.09 |
| 6 | Total Dissolved Solids | mg/l | 332 | 453 | 374 | 362 | 340 | 362 | 453 | 332 | 370.50 | 43.30 |
| 7 | Total Suspended Solids | mg/l | 5.2 | 8.1 | 5.6 | 7.2 | 6.2 | 7.1 | 8.1 | 5.2 | 6.57 | 1.09 |
| 8 | Oil & Grease | mg/l | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ND |
| 9 | Biochemical Oxygen Demand 3 days@ 27°C | mg/l | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 10 | 9.6 | 9 | 10 | 10 | 10 | 10 | 9 | 9.77 | 0.41 |
| 11 | Dissolved Oxygen | mg/l | 4.8 | 4.4 | 4.6 | 4.5 | 4.6 | 4.7 | 4.8 | 4.4 | 4.60 | 0.14 |
| 12 | Chloride (as Cl) | mg/l | 28.9 | 34.6 | 28.2 | 26.9 | 24.9 | 21.9 | 34.6 | 21.9 | 27.57 | 4.27 |
| 13 | Sulphate (as SO ₄) | mg/l | 19.2 | 27.4 | 21.8 | 21.2 | 19.6 | 17.9 | 27.4 | 17.9 | 21.18 | 3.35 |
| 14 | Fluoride (as F) | mg/l | 0.13 | 0.12 | 0.11 | 0.1 | 0.09 | 0.1 | 0.13 | 0.09 | 0.11 | 0.01 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 122 | 158 | 148 | 146 | 144 | 140 | 158 | 122 | 143.00 | 11.92 |
| 16 | Calcium (as Ca) | mg/l | 35.27 | 43.29 | 40.08 | 40.08 | 39.27 | 38.47 | 43.29 | 35.27 | 39.41 | 2.61 |
| 17 | Magnesium (as Mg) | mg/l | 8.26 | 12.15 | 11.66 | 11.18 | 11.18 | 10.69 | 12.15 | 8.26 | 10.85 | 1.36 |
| 18 | Sodium (as Na) | mg/l | 25.8 | 60.8 | 52.4 | 51.2 | 49.7 | 48.3 | 60.8 | 25.8 | 48.03 | 11.74 |
| 19 | Potassium (as K) | mg/l | 6.4 | 17.1 | 15.3 | 15.1 | 14.6 | 13.8 | 17.1 | 6.4 | 13.72 | 3.75 |
| 20 | Total Nitrogen# | mg/l | 4.9 | 4.2 | 4.4 | 4.2 | 3.8 | 3.7 | 4.9 | 3.7 | 4.20 | 0.43 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.28 | 0.28 | 0.28 | 0.26 | 0.24 | 0.27 | 0.28 | 0.24 | 0.27 | 0.02 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 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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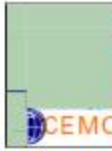
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E-mail: ccmclab@yahoo.in, Mobile: 9937631956, 8895177314



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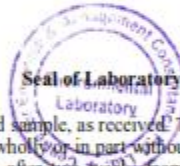


Certificate No.-TC 6666

| | | | | | | | | | | | |
|----|--|-----------|--------|--------|-------|-------|-------|-------|-------|-------|------|
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 28 | Hexavalent Chromium (as Cr ⁶⁺) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.001 | <0.001 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 33 | Depth of Water Level | Meter | 3.5 | 3.7 | 3.5 | 3.7 | 3.2 | 3.4 | 3.7 | 3.2 | 0.19 |

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

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Notes:

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Report no. - CEMC/IREL/W7

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

: R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Sampling Period

: Apr'2020 to Sept'2020

Sampling by

: Mr. S.Pradhan & Mr. R Das

Sample Location

: Downstream of Solar Evaporation Storage
Pond

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

| SL No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|-------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | — | 7.98 | 8.06 | 8.31 | 8.36 | 8.28 | 8.38 | 8.38 | 7.98 | 8.23 | 0.17 |
| 2 | Temperature | °C | 29.3 | 30.3 | 30.9 | 30.7 | 30.4 | 29.8 | 30.9 | 29.3 | 30.23 | 0.59 |
| 3 | Turbidity | NTU | 7 | 8 | 9 | 7 | 9 | 7 | 9 | 7 | 7.83 | 0.98 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | 7 | 7 | <5 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 148 | 156 | 168 | 160 | 154 | 162 | 168 | 148 | 158.00 | 6.93 |
| 6 | Total Dissolved Solids | mg/l | 586 | 524 | 606 | 592 | 592 | 524 | 606 | 524 | 570.67 | 36.74 |
| 7 | Total Suspended Solids | mg/l | 10 | 9.2 | 9.8 | 7.2 | 8.4 | 12.2 | 12.2 | 7.2 | 9.47 | 1.69 |
| 8 | Oil & Grease | mg/l | <5 | <5 | <1 | <1 | <1 | <1 | <5 | <5 | <5 | ND |
| 9 | Biochemical Oxygen Demand 3 days @ 27°C | mg/l | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 32 | 24 | 28 | 30 | 25 | 20 | 32 | 20 | 26.50 | 4.37 |
| 11 | Dissolved Oxygen | mg/l | 4 | 4.2 | 4 | 4.3 | 4.4 | 4.8 | 4.8 | 4 | 4.28 | 0.30 |
| 12 | Chloride (as Cl) | mg/l | 38.9 | 39.3 | 48.9 | 47.9 | 45.8 | 32.9 | 48.9 | 32.9 | 42.28 | 6.26 |
| 13 | Sulphate (as SO ₄) | mg/l | 18.9 | 17.3 | 22.4 | 21.2 | 20.4 | 13.2 | 22.4 | 13.2 | 18.90 | 3.31 |
| 14 | Fluoride (as F) | mg/l | 0.14 | 0.15 | 0.17 | 0.16 | 0.15 | 0.11 | 0.17 | 0.11 | 0.15 | 0.02 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 184 | 188 | 204 | 200 | 196 | 170 | 204 | 170 | 190.33 | 12.42 |
| 16 | Calcium (as Ca) | mg/l | 48.9 | 48.09 | 52.9 | 52.1 | 51.3 | 44.08 | 52.9 | 44.08 | 49.56 | 3.26 |
| 17 | Magnesium (as Mg) | mg/l | 15.06 | 16.52 | 17.5 | 17.01 | 16.52 | 14.58 | 17.5 | 14.58 | 16.20 | 1.14 |
| 18 | Sodium (as Na) | mg/l | 34.2 | 32.6 | 41.8 | 40.2 | 38.6 | 29.8 | 41.8 | 29.8 | 36.20 | 4.71 |
| 19 | Potassium (as K) | mg/l | 16.4 | 15.8 | 19.2 | 18.7 | 17.6 | 10.6 | 19.2 | 10.6 | 16.38 | 3.12 |
| 20 | Total Nitrogen# | mg/l | 5.9 | 6.4 | 6.9 | 6.4 | 6 | 4.3 | 6.9 | 4.3 | 5.98 | 0.90 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.33 | 0.34 | 0.38 | 0.37 | 0.35 | 0.28 | 0.38 | 0.28 | 0.34 | 0.04 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |

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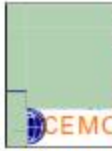
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E-mail: ccmclab@yahoo.in, Mobile: 9937631956, 8895177314



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Certificate No.-TC 6666

| | | | | | | | | | | | | |
|----|--|-----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 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 | ND |
| 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 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.001 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 33 | Depth of Water Level | Meter | 2.7 | 2.8 | 2.6 | 2.5 | 2.3 | 2.6 | 2.8 | 2.3 | 2.583 | 0.17 |

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

MPout
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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Laboratory At: Plot No. 800/1274, Johal, Pahal, Bhubaneswar-752101,
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Certificate No.-TC 6666

Report no. - CEMC/IREL/W8

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : Apr'2020 to Sept'2020
Sampling by : Mr. S.Pradhan & Mr. R Das
Sample Location : Odisha PHD
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|--------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 7.75 | 7.84 | 7.89 | 7.92 | 7.88 | 7.72 | 7.92 | 7.72 | 7.83 | 0.08 |
| 2 | Temperature | °C | 29.2 | 30.5 | 31.2 | 31.3 | 30.8 | 30.4 | 31.3 | 29.2 | 30.57 | 0.76 |
| 3 | Turbidity | NTU | 5 | 5 | 5 | 4 | 5 | 7 | 7 | 4 | 5.17 | 0.98 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 100 | 94 | 90 | 82 | 80 | 76 | 100 | 76 | 87.00 | 9.19 |
| 6 | Total Dissolved Solids | mg/l | 288 | 212 | 204 | 192 | 176 | 172 | 288 | 172 | 207.33 | 42.44 |
| 7 | Total Suspended Solids | mg/l | 5.8 | 5.1 | 5 | <5 | <5 | <5 | 5.8 | 5 | 5.30 | 0.44 |
| 8 | Oil & Grease | mg/l | <5 | <5 | <1 | <1 | <1 | <1 | <5 | <5 | <5 | ND |
| 9 | Biochemical Oxygen Demand 3 days @ 27°C | mg/l | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 18 | 12 | 10 | 5 | 10 | 5 | 18 | 5 | 10.00 | 4.86 |
| 11 | Dissolved Oxygen | mg/l | 4.8 | 5.2 | 5.4 | 5.2 | 5.3 | 4.9 | 5.4 | 4.8 | 5.13 | 0.23 |
| 12 | Chloride (as Cl) | mg/l | 15.9 | 14.6 | 14.1 | 11.9 | 9.9 | 12.9 | 15.9 | 9.9 | 13.22 | 2.13 |
| 13 | Sulphate (as SO ₄) | mg/l | 9.4 | 9.8 | 9.3 | 8.8 | 7.9 | 7.2 | 9.8 | 7.2 | 8.73 | 1.00 |
| 14 | Fluoride (as F) | mg/l | 0.09 | 0.09 | 0.08 | 0.08 | 0.07 | 0.06 | 0.09 | 0.06 | 0.08 | 0.01 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 134 | 102 | 96 | 94 | 90 | 82 | 134 | 82 | 99.67 | 18.08 |
| 16 | Calcium (as Ca) | mg/l | 36.87 | 28.06 | 26.45 | 25.65 | 24.85 | 24.05 | 36.87 | 24.05 | 27.66 | 4.72 |
| 17 | Magnesium (as Mg) | mg/l | 10.21 | 7.78 | 7.29 | 7.29 | 6.8 | 5.35 | 10.21 | 5.35 | 7.45 | 1.59 |
| 18 | Sodium (as Na) | mg/l | 15.2 | 14.9 | 12.4 | 11.8 | 10.2 | 10.9 | 15.2 | 10.2 | 12.57 | 2.07 |
| 19 | Potassium (as K) | mg/l | 5.7 | 5.2 | 5 | 4.9 | 4 | 2.8 | 5.7 | 2.8 | 4.60 | 1.04 |
| 20 | Total Nitrogen# | mg/l | 3.8 | 3.5 | 3.1 | 2.8 | 2.6 | 3.4 | 3.8 | 2.6 | 3.20 | 0.45 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.14 | 0.13 | 0.12 | 0.11 | 0.1 | 0.12 | 0.14 | 0.1 | 0.12 | 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 6666

| | | | | | | | | | | | | |
|----|--|-----------|--------|--------|-------|-------|-------|-------|-------|-------|-------|----|
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 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 | ND |
| 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 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.001 | <0.001 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | ND | ND | <2 | ND | ND | ND | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | ND | ND | <2 | ND | ND | ND | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | ND | ND | <2 | ND | ND | ND | <2 | <2 | <2 | ND |

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

M. K. Rout
Authorized Signatory



Notes:

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Certificate No.-TC 6666

Report no. - CEMC/IREL/W9

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

: R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Sampling Period

: Apr'2020 to Sept'2020

Sampling by

: Mr. S.Pradhan & Mr. R Das

Sample Location

: Lily Pond

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

| Sl No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|-------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 7.78 | 7.81 | 7.88 | 7.95 | 7.71 | 7.57 | 7.95 | 7.57 | 7.78 | 0.13 |
| 2 | Temperature | °C | 29.1 | 30.4 | 31.6 | 31.4 | 30.6 | 30.2 | 31.6 | 29.1 | 30.55 | 0.90 |
| 3 | Turbidity | NTU | 6 | 7 | 8 | 6 | 8 | 9 | 9 | 6 | 7.33 | 1.21 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | 10 | <5 | <5 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 110 | 102 | 106 | 102 | 98 | 82 | 110 | 82 | 100.00 | 9.72 |
| 6 | Total Dissolved Solids | mg/l | 318 | 218 | 230 | 216 | 196 | 212 | 318 | 196 | 231.67 | 43.70 |
| 7 | Total Suspended Solids | mg/l | 6.2 | 5.4 | 5.9 | 10.2 | 11.6 | 8.4 | 11.6 | 5.4 | 7.95 | 2.54 |
| 8 | Oil & Grease | mg/l | <5 | <5 | <1 | <1 | <1 | <1 | <5 | <5 | <5 | ND |
| 9 | Biochemical Oxygen Demand 3 days @ 27°C | mg/l | <2 | <2 | <2 | <2 | <2 | 2.4 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 22 | 16 | 18 | 15 | 20 | 10 | 22 | 10 | 16.83 | 4.22 |
| 11 | Dissolved Oxygen | mg/l | 5.6 | 5.6 | 5.8 | 5.4 | 5.5 | 5.4 | 5.8 | 5.4 | 5.55 | 0.15 |
| 12 | Chloride (as Cl) | mg/l | 13.9 | 12.9 | 13.1 | 12.9 | 10.9 | 10.4 | 13.9 | 10.4 | 12.35 | 1.38 |
| 13 | Sulphate (as SO ₄) | mg/l | 7.8 | 9.6 | 9.8 | 9.2 | 8.4 | 6 | 9.8 | 6 | 8.47 | 1.42 |
| 14 | Fluoride (as F) | mg/l | 0.12 | 0.11 | 0.11 | 0.11 | 0.1 | 0.07 | 0.12 | 0.07 | 0.10 | 0.02 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 112 | 106 | 112 | 108 | 102 | 90 | 112 | 90 | 105.00 | 8.27 |
| 16 | Calcium (as Ca) | mg/l | 30.46 | 30.46 | 32.06 | 31.26 | 30.46 | 25.65 | 32.06 | 25.65 | 30.06 | 2.25 |
| 17 | Magnesium (as Mg) | mg/l | 8.75 | 7.78 | 7.78 | 7.29 | 6.32 | 6.32 | 8.75 | 6.32 | 7.37 | 0.94 |
| 18 | Sodium (as Na) | mg/l | 16.9 | 15.8 | 16.2 | 15.4 | 14.2 | 11.8 | 16.9 | 11.8 | 15.05 | 1.83 |
| 19 | Potassium (as K) | mg/l | 6.8 | 5.8 | 6.1 | 5.8 | 5.2 | 3.2 | 6.8 | 3.2 | 5.48 | 1.23 |
| 20 | Total Nitrogen# | mg/l | 3.9 | 4.1 | 4.2 | 3.8 | 3.6 | 3.7 | 4.2 | 3.6 | 3.88 | 0.23 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.17 | 0.16 | 0.17 | 0.15 | 0.14 | 0.15 | 0.17 | 0.14 | 0.16 | 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 6666

| | | | | | | | | | | | | |
|----|--|-----------|--------|--------|-------|-------|-------|-------|-------|-------|-------|----|
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 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 | ND |
| 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 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.001 | <0.001 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | 22 | 22 | 22 | 25 | 30 | 26 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | 2 | 2 | 2 | 4 | 7 | 5 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | ND | ND | <2 | ND | ND | ND | <2 | <2 | <2 | ND |

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

M. Rout
Authorized Signatory



Notes:

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Certificate No.-TC 6666

Report no. - CEMC/IREL/W10

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : Apr'2020 to Sept'2020
Sampling by : Mr. S.Pradhan & Mr. R Das
Sample Location : Upstream of Thorium Oxlate Pond
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| SL No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|-------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 7.08 | 7.34 | 7.06 | 7.24 | 7.06 | 7.34 | 7.34 | 7.06 | 7.19 | 0.14 |
| 2 | Temperature | °C | 30.2 | 31.1 | 30.8 | 29.8 | 30.8 | 31.1 | 31.1 | 29.8 | 30.63 | 0.52 |
| 3 | Turbidity | NTU | 10 | 6 | 11 | 12 | 11 | 8 | 12 | 6 | 9.67 | 2.25 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 118 | 120 | 110 | 114 | 116 | 120 | 120 | 110 | 116.33 | 3.88 |
| 6 | Total Dissolved Solids | mg/l | 386 | 342 | 388.6 | 410.4 | 390 | 342 | 410.4 | 342 | 376.50 | 28.10 |
| 7 | Total Suspended Solids | mg/l | 8.8 | <5 | 10.4 | 9.2 | 10.4 | <5 | 10.4 | 8.8 | 9.70 | 0.82 |
| 8 | Oil & Grease | mg/l | <1 | <1 | <1 | <5 | <1 | <1 | <5 | <5 | <5 | ND |
| 9 | Biochemical Oxygen Demand 3 days @ 27°C | mg/l | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10.00 | 0.00 |
| 11 | Dissolved Oxygen | mg/l | 4.8 | 5.1 | 4.5 | 4.4 | 4.5 | 5.1 | 5.1 | 4.4 | 4.73 | 0.31 |
| 12 | Chloride (as Cl) | mg/l | 30.2 | 24.4 | 31.4 | 33.9 | 31.4 | 24.4 | 33.9 | 24.4 | 29.28 | 3.97 |
| 13 | Sulphate (as SO ₄) | mg/l | 11.6 | 9.2 | 11.6 | 13.4 | 10.6 | 8.4 | 13.4 | 8.4 | 10.80 | 1.81 |
| 14 | Fluoride (as F) | mg/l | 0.1 | 0.07 | 0.1 | 0.11 | 0.1 | 0.07 | 0.11 | 0.07 | 0.09 | 0.02 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 120 | 112 | 114 | 116 | 114 | 112 | 120 | 112 | 114.67 | 3.01 |
| 16 | Calcium (as Ca) | mg/l | 30.66 | 28.46 | 28.86 | 29.66 | 28.86 | 28.06 | 30.66 | 28.06 | 29.09 | 0.93 |
| 17 | Magnesium (as Mg) | mg/l | 10.42 | 10.21 | 10.36 | 10.21 | 10.21 | 10.21 | 10.42 | 10.21 | 10.27 | 0.09 |
| 18 | Sodium (as Na) | mg/l | 30.8 | 27.2 | 36.4 | 38.4 | 36.4 | 27.2 | 38.4 | 27.2 | 32.73 | 4.98 |
| 19 | Potassium (as K) | mg/l | 6.2 | 5.4 | 7.4 | 8.1 | 7.4 | 5.4 | 8.1 | 5.4 | 6.65 | 1.14 |
| 20 | Total Nitrogen# | mg/l | 3 | 2 | 2.8 | 3.1 | 2.8 | 2 | 3.1 | 2 | 2.62 | 0.49 |
| 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 | 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.

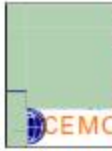
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Certificate No.-TC 6666

| | | | | | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 22 | Iron (as Fe) | mg/l | 0.24 | 0.19 | 0.22 | 0.23 | 0.22 | 0.19 | 0.24 | 0.19 | 0.22 | 0.02 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | ND |
| 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 | ND |
| 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 | ND |
| 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 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

MPout
Authorized Signatory

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



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Six Monthly Compliance Report (April 2020 to September 2020)



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Certificate No.-TC 6666

Report no. - CEMC/IREL/W11

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : Apr'2020 to Sept'2020
Sampling by : Mr. S.Pradhan & Mr. R Das
Sample Location : Downstream of Thorium Oxlate Pond
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| SL No | Parameter | Unit | Apr | May | June | July | Aug | Sep | Max | Min | Avg | SD |
|-------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 7.78 | 7.81 | 7.88 | 7.38 | 7.24 | 7.43 | 7.88 | 7.24 | 7.59 | 0.27 |
| 2 | Temperature | °C | 29.1 | 30.4 | 31.6 | 29.9 | 31 | 29.7 | 31.6 | 29.1 | 30.28 | 0.91 |
| 3 | Turbidity | NTU | 6 | 7 | 8 | 10 | 13 | 5 | 13 | 5 | 8.17 | 2.93 |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Alkalinity (as CaCO ₃) | mg/l | 110 | 102 | 106 | 122 | 118 | 130 | 130 | 102 | 114.67 | 10.56 |
| 6 | Total Dissolved Solids | mg/l | 318 | 218 | 230 | 432.4 | 412.6 | 388 | 432.4 | 218 | 333.17 | 93.06 |
| 7 | Total Suspended Solids | mg/l | 6.2 | 5.4 | 5.9 | 11.4 | 12.8 | <5 | 12.8 | 5.4 | 8.34 | 3.48 |
| 8 | Oil & Grease | mg/l | <5 | <5 | <1 | <5 | <1 | <1 | <5 | <5 | <5 | ND |
| 9 | Biochemical Oxygen Demand 3 days @ 27°C | mg/l | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 22 | 16 | 18 | 15 | 10 | 10 | 22 | 10 | 15.17 | 4.67 |
| 11 | Dissolved Oxygen | mg/l | 5.6 | 5.6 | 5.8 | 4.2 | 4.3 | 5 | 5.8 | 4.2 | 5.08 | 0.70 |
| 12 | Chloride (as Cl) | mg/l | 13.9 | 12.9 | 13.1 | 41.9 | 39.2 | 28.9 | 41.9 | 12.9 | 24.98 | 13.52 |
| 13 | Sulphate (as SO ₄) | mg/l | 7.8 | 9.6 | 9.8 | 21.4 | 19.4 | 9.6 | 21.4 | 7.8 | 12.93 | 5.86 |
| 14 | Fluoride (as F) | mg/l | 0.12 | 0.11 | 0.11 | 0.14 | 0.13 | 0.07 | 0.14 | 0.07 | 0.11 | 0.02 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 112 | 106 | 112 | 128 | 126 | 120 | 128 | 106 | 117.33 | 8.73 |
| 16 | Calcium (as Ca) | mg/l | 30.46 | 30.46 | 32.06 | 33.7 | 32.86 | 32.06 | 33.7 | 30.46 | 31.93 | 1.29 |
| 17 | Magnesium (as Mg) | mg/l | 8.75 | 7.78 | 7.78 | 10.69 | 9.72 | 9.72 | 10.69 | 7.78 | 9.07 | 1.17 |
| 18 | Sodium (as Na) | mg/l | 16.9 | 15.8 | 16.2 | 46.4 | 44.8 | 24.2 | 46.4 | 15.8 | 27.38 | 14.45 |
| 19 | Potassium (as K) | mg/l | 6.8 | 5.8 | 6.1 | 10.2 | 8.2 | 6.4 | 10.2 | 5.8 | 7.25 | 1.67 |
| 20 | Total Nitrogen# | mg/l | 3.9 | 4.1 | 4.2 | 3.6 | 3.4 | 2.8 | 4.2 | 2.8 | 3.67 | 0.52 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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 6666

| | | | | | | | | | | | | |
|----|--|-----------|--------|--------|-------|-------|-------|-------|-------|-------|-------|------|
| 22 | Iron (as Fe) | mg/l | 0.17 | 0.16 | 0.17 | 0.27 | 0.25 | 0.23 | 0.27 | 0.16 | 0.21 | 0.05 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.05 | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | ND |
| 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 | ND |
| 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 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.001 | <0.001 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | 22 | 22 | 22 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | 2 | 2 | 2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | ND | ND | <2 | <2 | <2 | <2 | <2 | <2 | <2 | ND |

N.B: ND-Not Detectable, MPN-Most Probable Number, NA- Not Applicable
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

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Certificate No.-TC 6666

Report no. - CEMC/IREL/W12

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Kanamana Village (W12)
Sample Quantity : 2.0 Ltrs

| Sl No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|-------|--|-------|-------|-------|-------|-------|--------|------------|
| 1 | pH Value @ 25°C | -- | 6.81 | 6.87 | 6.87 | 6.81 | 6.84 | 0.042 |
| 2 | Temperature | °C | 30.7 | 30.6 | 30.7 | 30.6 | 30.65 | 0.071 |
| 3 | Turbidity | NTU | <1 | <1 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 136 | 140 | 140 | 136 | 138 | 2.828 |
| 6 | Total Dissolved Solids | mg/l | 508.6 | 486.2 | 508.6 | 486.2 | 497.4 | 15.83 9 |
| 7 | Total Suspended Solids | mg/l | <5 | <5 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2.2 | 2.8 | 2.8 | 2.2 | 2.5 | 0.424 |
| 12 | Chloride (as Cl) | mg/l | 118.3 | 112.9 | 118.3 | 112.9 | 115.6 | 3.818 |
| 13 | Sulphate (as SO ₄) | mg/l | 44.2 | 42.4 | 44.2 | 42.4 | 43.3 | 1.273 |
| 14 | Fluoride (as F) | mg/l | 0.17 | 0.16 | 0.17 | 0.16 | 0.165 | 0.007 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 120 | 118 | 120 | 118 | 119 | 1.414 |
| 16 | Calcium (as Ca) | mg/l | 34.07 | 33.7 | 34.07 | 33.7 | 33.885 | 0.262 |
| 17 | Magnesium (as Mg) | mg/l | 8.5 | 8.26 | 8.5 | 8.26 | 8.38 | 0.170 |
| 18 | Sodium (as Na) | mg/l | 42.6 | 41.2 | 42.6 | 41.2 | 41.9 | 0.990 |
| 19 | Potassium (as K) | mg/l | 16.3 | 15.6 | 16.3 | 15.6 | 15.95 | 0.495 |
| 20 | Total Nitrogen# | mg/l | 1.1 | 1 | 1.1 | 1 | 1.05 | 0.071 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.28 | 0.27 | 0.28 | 0.27 | 0.275 | 0.007 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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.

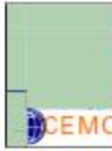
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Certificate No.-TC 6646

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 28 | Hexavalent Chromium (as Cr ⁺⁶) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

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Certificate No.-TC 6666

Report no. - CEMC/IREL/W13

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Bada Arjipally (W13)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|-------|--|-------|-------|-------|-------|-------|-------|--------|
| 1 | pH Value @ 25°C | -- | 6.76 | 6.82 | 6.82 | 6.76 | 6.79 | 0.042 |
| 2 | Temperature | °C | 30.5 | 30.4 | 30.5 | 30.4 | 30.45 | 0.071 |
| 3 | Turbidity | NTU | <1 | <1 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 98 | 96 | 98 | 96 | 97 | 1.414 |
| 6 | Total Dissolved Solids | mg/l | 263.8 | 248.4 | 263.8 | 248.4 | 256.1 | 10.889 |
| 7 | Total Suspended Solids | mg/l | <5 | <5 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2.4 | 2.3 | 2.4 | 2.3 | 2.35 | 0.071 |
| 12 | Chloride (as Cl) | mg/l | 62.6 | 60.4 | 62.6 | 60.4 | 61.5 | 1.556 |
| 13 | Sulphate (as SO ₄) | mg/l | 24.5 | 23.2 | 24.5 | 23.2 | 23.85 | 0.919 |
| 14 | Fluoride (as F) | mg/l | 0.11 | 0.1 | 0.11 | 0.1 | 0.105 | 0.007 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 92 | 90 | 92 | 90 | 91 | 1.414 |
| 16 | Calcium (as Ca) | mg/l | 26.05 | 25.65 | 26.05 | 25.65 | 25.85 | 0.283 |
| 17 | Magnesium (as Mg) | mg/l | 6.56 | 6.32 | 6.56 | 6.32 | 6.44 | 0.170 |
| 18 | Sodium (as Na) | mg/l | 24.2 | 23.6 | 24.2 | 23.6 | 23.9 | 0.424 |
| 19 | Potassium (as K) | mg/l | 9.1 | 8.4 | 9.1 | 8.4 | 8.75 | 0.495 |
| 20 | Total Nitrogen# | mg/l | 0.71 | 0.68 | 0.71 | 0.68 | 0.695 | 0.021 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.17 | 0.15 | 0.17 | 0.15 | 0.16 | 0.014 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |

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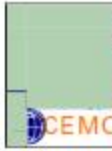
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Certificate No.-TC 6666

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 28 | Hexavalent Chromium (as Cr ^{VI}) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

Authorized Signatory



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Six Monthly Compliance Report (April 2020 to September 2020)



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Certificate No.-TC 6666

Report no. - CEMC/IREL/W14

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Sana Arjipally (W14)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|--------|--|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 6.91 | 6.88 | 6.91 | 6.88 | 6.895 | 0.021 |
| 2 | Temperature | °C | 30.7 | 30.5 | 30.7 | 30.5 | 30.6 | 0.141 |
| 3 | Turbidity | NTU | <1 | <1 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 92 | 90 | 92 | 90 | 91 | 1.414 |
| 6 | Total Dissolved Solids | mg/l | 372.4 | 364.2 | 372.4 | 364.2 | 368.3 | 5.798 |
| 7 | Total Suspended Solids | mg/l | <5 | <5 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2.2 | 2.4 | 2.4 | 2.2 | 2.3 | 0.141 |
| 12 | Chloride (as Cl) | mg/l | 74.9 | 73.6 | 74.9 | 73.6 | 74.25 | 0.919 |
| 13 | Sulphate (as SO ₄) | mg/l | 30.4 | 29.4 | 30.4 | 29.4 | 29.9 | 0.707 |
| 14 | Fluoride (as F) | mg/l | 0.1 | 0.09 | 0.1 | 0.09 | 0.095 | 0.007 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 100 | 96 | 100 | 96 | 98 | 2.828 |
| 16 | Calcium (as Ca) | mg/l | 28.06 | 27.25 | 28.06 | 27.25 | 27.655 | 0.573 |
| 17 | Magnesium (as Mg) | mg/l | 7.29 | 6.8 | 7.29 | 6.8 | 7.045 | 0.346 |
| 18 | Sodium (as Na) | mg/l | 32.7 | 31.6 | 32.7 | 31.6 | 32.15 | 0.778 |
| 19 | Potassium (as K) | mg/l | 10.8 | 10.4 | 10.8 | 10.4 | 10.6 | 0.283 |
| 20 | Total Nitrogen# | mg/l | 0.93 | 0.88 | 0.93 | 0.88 | 0.905 | 0.035 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.21 | 0.19 | 0.21 | 0.19 | 0.2 | 0.014 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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.

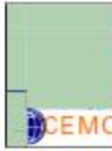
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Certificate No.-TC 6646

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 28 | Hexavalent Chromium (as Cr ⁺⁶) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

M. Prasad

Authorized Signatory

Notes:

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Report no. - CEMC/IREL/W15

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Upallu Putty (W15)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|--------|--|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 7.19 | 7.16 | 7.19 | 7.16 | 7.175 | 0.021 |
| 2 | Temperature | °C | 30.2 | 30.4 | 30.4 | 30.2 | 30.3 | 0.141 |
| 3 | Turbidity | NTU | <1 | 2 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 104 | 100 | 104 | 100 | 102 | 2.828 |
| 6 | Total Dissolved Solids | mg/l | 580.3 | 572.2 | 580.3 | 572.2 | 576.25 | 5.728 |
| 7 | Total Suspended Solids | mg/l | <5 | <5 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2.2 | 2.3 | 2.3 | 2.2 | 2.25 | 0.071 |
| 12 | Chloride (as Cl) | mg/l | 96.6 | 95.4 | 96.6 | 95.4 | 96 | 0.849 |
| 13 | Sulphate (as SO ₄) | mg/l | 14.8 | 14.2 | 14.8 | 14.2 | 14.5 | 0.424 |
| 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 | 98 | 96.4 | 98 | 96.4 | 97.2 | 1.131 |
| 16 | Calcium (as Ca) | mg/l | 26.05 | 25.65 | 26.05 | 25.65 | 25.85 | 0.283 |
| 17 | Magnesium (as Mg) | mg/l | 8.02 | 7.9 | 8.02 | 7.9 | 7.96 | 0.085 |
| 18 | Sodium (as Na) | mg/l | 30.1 | 29.4 | 30.1 | 29.4 | 29.75 | 0.495 |
| 19 | Potassium (as K) | mg/l | 7.4 | 6.8 | 7.4 | 6.8 | 7.1 | 0.424 |
| 20 | Total Nitrogen# | mg/l | 1.3 | 1.21 | 1.3 | 1.21 | 1.255 | 0.064 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.29 | 0.27 | 0.29 | 0.27 | 0.28 | 0.014 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 28 | Hexavalent Chromium (as Cr ⁺⁶) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

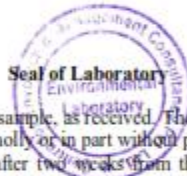
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M. Prasad

Authorized Signatory

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Report no. - CEMC/IREL/W16

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Bada Putty (W16)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|-------|--|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 6.92 | 7.02 | 7.02 | 6.92 | 6.97 | 0.071 |
| 2 | Temperature | °C | 29.9 | 30.3 | 30.3 | 29.9 | 30.1 | 0.283 |
| 3 | Turbidity | NTU | <1 | <1 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 76 | 76 | 76 | 76 | 76 | 0.000 |
| 6 | Total Dissolved Solids | mg/l | 424.1 | 412.4 | 424.1 | 412.4 | 418.25 | 8.273 |
| 7 | Total Suspended Solids | mg/l | <5 | <5 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2 | 2.1 | 2.1 | 2 | 2.05 | 0.071 |
| 12 | Chloride (as Cl) | mg/l | 76.3 | 74.8 | 76.3 | 74.8 | 75.55 | 1.061 |
| 13 | Sulphate (as SO ₄) | mg/l | 12.2 | 11.9 | 12.2 | 11.9 | 12.05 | 0.212 |
| 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 | 76 | 74 | 76 | 74 | 75 | 1.414 |
| 16 | Calcium (as Ca) | mg/l | 20.04 | 19.24 | 20.04 | 19.24 | 19.64 | 0.566 |
| 17 | Magnesium (as Mg) | mg/l | 6.32 | 6.32 | 6.32 | 6.32 | 6.32 | 0.000 |
| 18 | Sodium (as Na) | mg/l | 24.2 | 23.4 | 24.2 | 23.4 | 23.8 | 0.566 |
| 19 | Potassium (as K) | mg/l | 5.2 | 4.4 | 5.2 | 4.4 | 4.8 | 0.566 |
| 20 | Total Nitrogen# | mg/l | 0.7 | 0.64 | 0.7 | 0.64 | 0.67 | 0.042 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.22 | 0.21 | 0.22 | 0.21 | 0.215 | 0.007 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 28 | Hexavalent Chromium (as Cr ^{VI}) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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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| | | | | | | | | |
|----|-------------------------------------|-----------|-------|-------|-------|-------|-------|----|
| 29 | Phenolic Compounds (as C_6H_5OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

MPRout

Authorized Signatory

Notes:

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

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



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Certificate No.-TC 6666

Report no. - CEMC/IREL/W17

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Busan Putty (W17)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|--------|--|-------|-------|-------|-------|-------|--------|------------|
| 1 | pH Value @ 25°C | -- | 7.34 | 7.38 | 7.38 | 7.34 | 7.36 | 0.028 |
| 2 | Temperature | °C | 30.1 | 30.2 | 30.2 | 30.1 | 30.15 | 0.071 |
| 3 | Turbidity | NTU | 2 | 4 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | 6 | 5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 128 | 128 | 128 | 128 | 128 | 0.000 |
| 6 | Total Dissolved Solids | mg/l | 704.2 | 684.6 | 704.2 | 684.6 | 694.4 | 13.85 9 |
| 7 | Total Suspended Solids | mg/l | <5 | <5 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2.2 | 2 | 2.2 | 2 | 2.1 | 0.141 |
| 12 | Chloride (as Cl) | mg/l | 118.9 | 114.4 | 118.9 | 114.4 | 116.65 | 3.182 |
| 13 | Sulphate (as SO ₄) | mg/l | 24.6 | 23.1 | 24.6 | 23.1 | 23.85 | 1.061 |
| 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 | 124 | 120 | 124 | 120 | 122 | 2.828 |
| 16 | Calcium (as Ca) | mg/l | 36.07 | 35.27 | 36.07 | 35.27 | 35.67 | 0.566 |
| 17 | Magnesium (as Mg) | mg/l | 8.26 | 7.8 | 8.26 | 7.8 | 8.03 | 0.325 |
| 18 | Sodium (as Na) | mg/l | 46.8 | 45.4 | 46.8 | 45.4 | 46.1 | 0.990 |
| 19 | Potassium (as K) | mg/l | 11.6 | 10.5 | 11.6 | 10.5 | 11.05 | 0.778 |
| 20 | Total Nitrogen# | mg/l | 1.8 | 1.6 | 1.8 | 1.6 | 1.7 | 0.141 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.38 | 0.35 | 0.38 | 0.35 | 0.365 | 0.021 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 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.

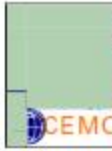
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E-mail: ccmc_consultancy@yahoo.co.in, ccmc122@gmail.com, website: www.ccmc.in, Landline: 0674-2360344.

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 (April 2020 to September 2020)



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Certificate No.-TC 6666

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 28 | Hexavalent Chromium (as Cr ^{VI}) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

M. K. Rout

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

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



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Report no. - CEMC/IREL/W18

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Takeriya Borewell (W18)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|--------|--|-------|-------|-------|-------|-------|--------|------------|
| 1 | pH Value @ 25°C | -- | 6.92 | 6.98 | 6.98 | 6.92 | 6.95 | 0.042 |
| 2 | Temperature | °C | 30.6 | 30.4 | 30.6 | 30.4 | 30.5 | 0.141 |
| 3 | Turbidity | NTU | 1 | <1 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 142 | 144 | 144 | 142 | 143 | 1.414 |
| 6 | Total Dissolved Solids | mg/l | 964 | 948 | 964 | 948 | 956 | 11.31 4 |
| 7 | Total Suspended Solids | mg/l | 9.3 | 8.8 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2.2 | 2 | 2.2 | 2 | 2.1 | 0.141 |
| 12 | Chloride (as Cl) | mg/l | 156.4 | 154.2 | 156.4 | 154.2 | 155.3 | 1.556 |
| 13 | Sulphate (as SO ₄) | mg/l | 62.9 | 62.2 | 62.9 | 62.2 | 62.55 | 0.495 |
| 14 | Fluoride (as F) | mg/l | 0.22 | 0.21 | 0.22 | 0.21 | 0.215 | 0.007 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 206 | 204 | 206 | 204 | 205 | 1.414 |
| 16 | Calcium (as Ca) | mg/l | 64.13 | 63.32 | 64.13 | 63.32 | 63.725 | 0.573 |
| 17 | Magnesium (as Mg) | mg/l | 11.18 | 11.18 | 11.18 | 11.18 | 11.18 | 0.000 |
| 18 | Sodium (as Na) | mg/l | 92.4 | 91.8 | 92.4 | 91.8 | 92.1 | 0.424 |
| 19 | Potassium (as K) | mg/l | 31.6 | 31.2 | 31.6 | 31.2 | 31.4 | 0.283 |
| 20 | Total Nitrogen# | mg/l | 5.2 | 5 | 5.2 | 5 | 5.1 | 0.141 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.41 | 0.4 | 0.41 | 0.4 | 0.405 | 0.007 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 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

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 28 | Hexavalent Chromium (as Cr ^{VI}) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

Authorized Signatory



Notes:

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Report no. - CEMC/IREL/W19

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Kandara Arjipalli (W19)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|--------|--|-------|-------|-------|-------|-------|--------|--------|
| 1 | pH Value @ 25°C | -- | 6.65 | 6.67 | 6.67 | 6.65 | 6.66 | 0.014 |
| 2 | Temperature | °C | 29.9 | 30.2 | 30.2 | 29.9 | 30.05 | 0.212 |
| 3 | Turbidity | NTU | <1 | <1 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 84 | 88 | 88 | 84 | 86 | 2.828 |
| 6 | Total Dissolved Solids | mg/l | 503 | 488 | 503 | 488 | 495.5 | 10.607 |
| 7 | Total Suspended Solids | mg/l | 7.7 | 7.2 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2.6 | 2.4 | 2.6 | 2.4 | 2.5 | 0.141 |
| 12 | Chloride (as Cl) | mg/l | 102.8 | 100.7 | 102.8 | 100.7 | 101.75 | 1.485 |
| 13 | Sulphate (as SO ₄) | mg/l | 38.2 | 37.4 | 38.2 | 37.4 | 37.8 | 0.566 |
| 14 | Fluoride (as F) | mg/l | 0.19 | 0.18 | 0.19 | 0.18 | 0.185 | 0.007 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 144 | 140 | 144 | 140 | 142 | 2.828 |
| 16 | Calcium (as Ca) | mg/l | 42.08 | 41.68 | 42.08 | 41.68 | 41.88 | 0.283 |
| 17 | Magnesium (as Mg) | mg/l | 9.48 | 8.75 | 9.48 | 8.75 | 9.115 | 0.516 |
| 18 | Sodium (as Na) | mg/l | 44.2 | 43.6 | 44.2 | 43.6 | 43.9 | 0.424 |
| 19 | Potassium (as K) | mg/l | 21.8 | 21.4 | 21.8 | 21.4 | 21.6 | 0.283 |
| 20 | Total Nitrogen# | mg/l | 3.1 | 2.9 | 3.1 | 2.9 | 3 | 0.141 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.32 | 0.31 | 0.32 | 0.31 | 0.315 | 0.007 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 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.

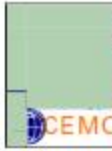
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Certificate No.-TC 6646

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 28 | Hexavalent Chromium (as Cr ^{VI}) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

M. K. Rout

Authorized Signatory

Notes:

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E-mail- ccmc_consultancy@yahoo.co.in, ccmc122@gmail.com, website: www.ccmc.in, Landline: 0674-2360344.

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

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



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Report no. - CEMC/IREL/W20

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Dredge Water (W20)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|--------|--|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 7.87 | 7.8 | 7.87 | 7.8 | 7.835 | 0.049 |
| 2 | Temperature | °C | 30.8 | 30.2 | 30.8 | 30.2 | 30.5 | 0.424 |
| 3 | Turbidity | NTU | <1 | <1 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 88 | 82 | 88 | 82 | 85 | 4.243 |
| 6 | Total Dissolved Solids | mg/l | 486 | 484 | 486 | 484 | 485 | 1.414 |
| 7 | Total Suspended Solids | mg/l | 5.2 | 5.2 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2.8 | 2.6 | 2.8 | 2.6 | 2.7 | 0.141 |
| 12 | Chloride (as Cl) | mg/l | 88.6 | 88.2 | 88.6 | 88.2 | 88.4 | 0.283 |
| 13 | Sulphate (as SO ₄) | mg/l | 29.4 | 29.2 | 29.4 | 29.2 | 29.3 | 0.141 |
| 14 | Fluoride (as F) | mg/l | 0.17 | 0.12 | 0.17 | 0.12 | 0.145 | 0.035 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 126 | 124 | 126 | 124 | 125 | 1.414 |
| 16 | Calcium (as Ca) | mg/l | 36.07 | 36.02 | 36.07 | 36.02 | 36.045 | 0.035 |
| 17 | Magnesium (as Mg) | mg/l | 8.75 | 8.72 | 8.75 | 8.72 | 8.735 | 0.021 |
| 18 | Sodium (as Na) | mg/l | 40.3 | 40.2 | 40.3 | 40.2 | 40.25 | 0.071 |
| 19 | Potassium (as K) | mg/l | 18.4 | 18.2 | 18.4 | 18.2 | 18.3 | 0.141 |
| 20 | Total Nitrogen# | mg/l | 2.7 | 2.6 | 2.7 | 2.6 | 2.65 | 0.071 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.24 | 0.22 | 0.24 | 0.22 | 0.23 | 0.014 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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.

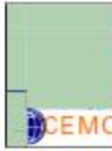
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Certificate No.-TC 6666

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 28 | Hexavalent Chromium (as Cr ⁺⁶) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

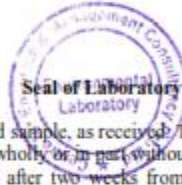
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M. Prasad

Authorized Signatory

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Report no. - CEMC/IREL/W21

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : SW Near Port (W21)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|--------|--|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 7.72 | 7.78 | 7.78 | 7.72 | 7.75 | 0.042 |
| 2 | Temperature | °C | 30.3 | 30.4 | 30.4 | 30.3 | 30.35 | 0.071 |
| 3 | Turbidity | NTU | <1 | 5 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 108 | 110 | 110 | 108 | 109 | 1.414 |
| 6 | Total Dissolved Solids | mg/l | 391.7 | 382.4 | 391.7 | 382.4 | 387.05 | 6.576 |
| 7 | Total Suspended Solids | mg/l | 4.4 | 8.7 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2 | 2.2 | 2.2 | 2 | 2.1 | 0.141 |
| 12 | Chloride (as Cl) | mg/l | 31.9 | 30.9 | 31.9 | 30.9 | 31.4 | 0.707 |
| 13 | Sulphate (as SO ₄) | mg/l | 17.8 | 17.1 | 17.8 | 17.1 | 17.45 | 0.495 |
| 14 | Fluoride (as F) | mg/l | 0.12 | 0.11 | 0.12 | 0.11 | 0.115 | 0.007 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 92 | 90 | 92 | 90 | 91 | 1.414 |
| 16 | Calcium (as Ca) | mg/l | 24.05 | 23.25 | 24.05 | 23.25 | 23.65 | 0.566 |
| 17 | Magnesium (as Mg) | mg/l | 7.78 | 7.8 | 7.8 | 7.78 | 7.79 | 0.014 |
| 18 | Sodium (as Na) | mg/l | 39.5 | 38.2 | 39.5 | 38.2 | 38.85 | 0.919 |
| 19 | Potassium (as K) | mg/l | 11.2 | 10.4 | 11.2 | 10.4 | 10.8 | 0.566 |
| 20 | Total Nitrogen# | mg/l | 1.1 | 0.98 | 1.1 | 0.98 | 1.04 | 0.085 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.31 | 0.28 | 0.31 | 0.28 | 0.295 | 0.021 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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 6666

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 28 | Hexavalent Chromium (as Cr ⁺⁶) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

MRout
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Report no. - CEMC/IREL/W22

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client

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

Work Order No.

: R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019

Sampling Period

: April'2020 to September' 2020

Sampling by

: Mr. S. Pradhan & Mr. R Das

Sample Description

: Kalibali Village (W22)

Sample Quantity

: 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|--------|--|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value @ 25°C | -- | 6.91 | 6.97 | 6.97 | 6.91 | 6.94 | 0.042 |
| 2 | Temperature | °C | 29.8 | 30.2 | 30.2 | 29.8 | 30 | 0.283 |
| 3 | Turbidity | NTU | 2 | 3 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 132 | 136 | 136 | 132 | 134 | 2.828 |
| 6 | Total Dissolved Solids | mg/l | 512.6 | 502.8 | 512.6 | 502.8 | 507.7 | 6.930 |
| 7 | Total Suspended Solids | mg/l | 6.8 | 7.2 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2 | 2.4 | 2.4 | 2 | 2.2 | 0.283 |
| 12 | Chloride (as Cl) | mg/l | 43.6 | 41.4 | 43.6 | 41.4 | 42.5 | 1.556 |
| 13 | Sulphate (as SO ₄) | mg/l | 26.3 | 25.7 | 26.3 | 25.7 | 26 | 0.424 |
| 14 | Fluoride (as F) | mg/l | 0.15 | 0.13 | 0.15 | 0.13 | 0.14 | 0.014 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 110 | 108.4 | 110 | 108.4 | 109.2 | 1.131 |
| 16 | Calcium (as Ca) | mg/l | 28.06 | 27.41 | 28.06 | 27.41 | 27.735 | 0.460 |
| 17 | Magnesium (as Mg) | mg/l | 9.72 | 9.72 | 9.72 | 9.72 | 9.72 | 0.000 |
| 18 | Sodium (as Na) | mg/l | 55.1 | 51.4 | 55.1 | 51.4 | 53.25 | 2.616 |
| 19 | Potassium (as K) | mg/l | 18.4 | 17.2 | 18.4 | 17.2 | 17.8 | 0.849 |
| 20 | Total Nitrogen# | mg/l | 1.7 | 1.5 | 1.7 | 1.5 | 1.6 | 0.141 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.41 | 0.38 | 0.41 | 0.38 | 0.395 | 0.021 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 28 | Hexavalent Chromium (as Cr ^{VI}) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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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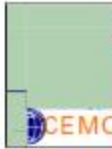
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Certificate No.-TC 6646

| | | | | | | | | |
|----|---|-----------|-------|-------|-------|-------|-------|----|
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063


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Certificate No.-TC 6666

Report no. - CEMC/IREL/W23

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Haripur (W23)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|--------|--|-------|-------|-------|-------|-------|--------|------------|
| 1 | pH Value @ 25°C | -- | 7.03 | 7.08 | 7.08 | 7.03 | 7.055 | 0.035 |
| 2 | Temperature | °C | 30.1 | 30.4 | 30.4 | 30.1 | 30.25 | 0.212 |
| 3 | Turbidity | NTU | 1 | 2 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | <5 | <5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 120 | 124 | 124 | 120 | 122 | 2.828 |
| 6 | Total Dissolved Solids | mg/l | 446.3 | 428.2 | 446.3 | 428.2 | 437.25 | 12.79 9 |
| 7 | Total Suspended Solids | mg/l | 5 | 6.9 | <5 | <5 | <5 | ND |
| 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 | ND |
| 10 | Chemical Oxygen Demand | mg/l | ND | ND | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 2.2 | 2.5 | 2.5 | 2.2 | 2.35 | 0.212 |
| 12 | Chloride (as Cl) | mg/l | 39.1 | 37.4 | 39.1 | 37.4 | 38.25 | 1.202 |
| 13 | Sulphate (as SO ₄) | mg/l | 21.3 | 20.8 | 21.3 | 20.8 | 21.05 | 0.354 |
| 14 | Fluoride (as F) | mg/l | 0.14 | 0.12 | 0.14 | 0.12 | 0.13 | 0.014 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 102 | 98 | 102 | 98 | 100 | 2.828 |
| 16 | Calcium (as Ca) | mg/l | 26.05 | 25.65 | 26.05 | 25.65 | 25.85 | 0.283 |
| 17 | Magnesium (as Mg) | mg/l | 8.99 | 8.26 | 8.99 | 8.26 | 8.625 | 0.516 |
| 18 | Sodium (as Na) | mg/l | 48.3 | 46.6 | 48.3 | 46.6 | 47.45 | 1.202 |
| 19 | Potassium (as K) | mg/l | 12.5 | 11.3 | 12.5 | 11.3 | 11.9 | 0.849 |
| 20 | Total Nitrogen# | mg/l | 1.4 | 1.1 | 1.4 | 1.1 | 1.25 | 0.212 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.37 | 0.35 | 0.37 | 0.35 | 0.36 | 0.014 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 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.

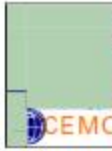
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Certificate No.-TC 6646

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 28 | Hexavalent Chromium (as Cr ^{VI}) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

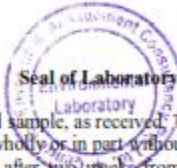
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Certificate No.-TC 6666

Report no. - CEMC/IREL/W24

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Tampara Lake (W24)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| SL No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|-------|--|-------|-------|-------|-------|-------|-------|-------|
| 1 | pH Value @ 25°C | -- | 7.81 | 7.8 | 7.81 | 7.8 | 7.805 | 0.007 |
| 2 | Temperature | °C | 30.9 | 30.2 | 30.9 | 30.2 | 30.55 | 0.495 |
| 3 | Turbidity | NTU | 34 | 32 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | 12 | 10 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 146 | 142 | 146 | 142 | 144 | 2.828 |
| 6 | Total Dissolved Solids | mg/l | 380.6 | 378 | 380.6 | 378 | 379.3 | 1.838 |
| 7 | Total Suspended Solids | mg/l | 11.3 | 11.1 | <5 | <5 | <5 | ND |
| 8 | Oil & Grease | mg/l | ND | ND | ND | ND | ND | ND |
| 9 | Biochemical Oxygen Demand 3 days@ 27°C | mg/l | 2.6 | 2.4 | <2 | <2 | <2 | ND |
| 10 | Chemical Oxygen Demand | mg/l | 14 | 12 | ND | ND | ND | ND |
| 11 | Dissolved Oxygen | mg/l | 5.8 | 5.6 | 5.8 | 5.6 | 5.7 | 0.141 |
| 12 | Chloride (as Cl) | mg/l | 53.9 | 53.6 | 53.9 | 53.6 | 53.75 | 0.212 |
| 13 | Sulphate (as SO ₄) | mg/l | 27.8 | 27.2 | 27.8 | 27.2 | 27.5 | 0.424 |
| 14 | Fluoride (as F) | mg/l | 0.21 | 0.2 | 0.21 | 0.2 | 0.205 | 0.007 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 134 | 130 | 134 | 130 | 132 | 2.828 |
| 16 | Calcium (as Ca) | mg/l | 42.08 | 42 | 42.08 | 42 | 42.04 | 0.057 |
| 17 | Magnesium (as Mg) | mg/l | 7.05 | 7.1 | 7.1 | 7.05 | 7.075 | 0.035 |
| 18 | Sodium (as Na) | mg/l | 48.5 | 49.2 | 49.2 | 48.5 | 48.85 | 0.495 |
| 19 | Potassium (as K) | mg/l | 11.2 | 12.4 | 12.4 | 11.2 | 11.8 | 0.849 |
| 20 | Total Nitrogen# | mg/l | 27.2 | 28.6 | 28.6 | 27.2 | 27.9 | 0.990 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.28 | 0.27 | 0.28 | 0.27 | 0.275 | 0.007 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.01 | <0.01 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 28 | Hexavalent Chromium (as Cr ⁺⁶) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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

| | | | | | | | | |
|----|---|-----------|-------|-------|-------|-------|-------|----|
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | 900 | 900 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | 26 | 22 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | 17 | 17 | <2 | <2 | <2 | ND |

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

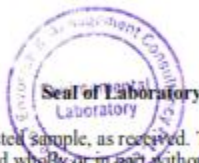
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M. Rout

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Report no. - CEMC/IREL/W25

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : Nolia Niuagoan (W25)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| Sl. No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|--------|---|-------|-------|-------|-------|-------|--------|-------|
| 1 | pH Value (at 25°C) | -- | 7.73 | 7.7 | 7.73 | 7.7 | 7.715 | 0.021 |
| 2 | Temperature | °C | 30.4 | 30.2 | 30.4 | 30.2 | 30.3 | 0.141 |
| 3 | Turbidity | NTU | 1 | 1 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | 5 | 5 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 138 | 132 | 138 | 132 | 135 | 4.243 |
| 6 | Total Dissolved Solids | mg/l | 352.1 | 351 | 352.1 | 351 | 351.55 | 0.778 |
| 7 | Total Suspended Solids | mg/l | 8 | 7 | 8 | 7 | 7.5 | 0.707 |
| 8 | Oil & Grease | mg/l | ND | ND | ND | ND | ND | ND |
| 9 | Biochemical Oxygen Demand 3 days(at 27°C) | mg/l | 2.2 | 2 | 2.2 | 2 | 2.1 | 0.141 |
| 10 | Chemical Oxygen Demand | mg/l | 10 | 8 | 10 | 8 | 9 | 1.414 |
| 11 | Dissolved Oxygen | mg/l | 2.4 | 2.2 | 2.4 | 2.2 | 2.3 | 0.141 |
| 12 | Chloride (as Cl) | mg/l | 50.6 | 50.2 | 50.6 | 50.2 | 50.4 | 0.283 |
| 13 | Sulphate (as SO ₄) | mg/l | 24.5 | 24.2 | 24.5 | 24.2 | 24.35 | 0.212 |
| 14 | Fluoride (as F) | mg/l | 0.19 | 0.14 | 0.19 | 0.14 | 0.165 | 0.035 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 118 | 112 | 118 | 112 | 115 | 4.243 |
| 16 | Calcium (as Ca) | mg/l | 36.1 | 35.6 | 36.1 | 35.6 | 35.85 | 0.354 |
| 17 | Magnesium (as Mg) | mg/l | 6.8 | 6.2 | 6.8 | 6.2 | 6.5 | 0.424 |
| 18 | Sodium (as Na) | mg/l | 44.6 | 45.4 | 45.4 | 44.6 | 45 | 0.566 |
| 19 | Potassium (as K) | mg/l | 9.8 | 10.8 | 10.8 | 9.8 | 10.3 | 0.707 |
| 20 | Total Nitrogen# | mg/l | 1.1 | 1.4 | 1.4 | 1.1 | 1.25 | 0.212 |
| 21 | Phosphorus (as PO ₄) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 0.32 | 0.34 | 0.34 | 0.32 | 0.33 | 0.014 |
| 23 | Copper (as Cu) | mg/l | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | <0.01 | <0.01 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | <0.05 | <0.05 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 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 6666

| | | | | | | | | |
|----|--|-----------|-------|-------|-------|-------|-------|----|
| 28 | Hexavalent Chromium (as Cr ⁺⁶) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | <2 | <2 | <2 | <2 | <2 | ND |

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

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Report no. - CEMC/IREL/W26

Date-20.11.2020

SURFACE/GROUND WATER QUALITY MONITORING TEST REPORT

Name & Address of the Client : M/s. IREL(India)Limited, Matikhalo,
Chatrapur, Ganjam, Odisha
Work Order No. : R-07/O/01692 3532A
OSCOM/SOP/07/O/01692 S.C.-1344,
Dated-12.09.2019
Sampling Period : April'2020 to September' 2020
Sampling by : Mr. S. Pradhan & Mr. R Das
Sample Description : IREL Sea Water (W26)
Sample Quantity : 2.0 Ltrs

ANALYSIS RESULT

| SL No | Parameter | Unit | Jun | Sept | Max | Min | Avg | SD |
|-------|--|-------|-------|-------|-------|-------|--------|------------|
| 1 | pH Value @ 25°C | -- | 8.09 | 7.94 | 8.09 | 7.94 | 8.015 | 0.106 |
| 2 | Temperature | °C | 30.6 | 30.2 | 30.6 | 30.2 | 30.4 | 0.283 |
| 3 | Turbidity | NTU | 8 | 6 | <1 | <1 | <1 | ND |
| 4 | Colour | Hazen | 11 | 10 | <5 | <5 | <5 | ND |
| 5 | Total Alkalinity (as CaCO ₃) | mg/l | 892 | 888 | 892 | 888 | 890 | 2.828 |
| 6 | Total Dissolved Solids | mg/l | 18094 | 18088 | 18094 | 18088 | 18091 | 4.243 |
| 7 | Total Suspended Solids | mg/l | 19.6 | 19.2 | 19.6 | 19.2 | 19.4 | 0.283 |
| 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 | 40 | 38 | 40 | 38 | 39 | 1.414 |
| 11 | Dissolved Oxygen | mg/l | 7 | 6 | 7 | 6 | 6.5 | 0.707 |
| 12 | Chloride (as Cl) | mg/l | 7942 | 7938 | 7942 | 7938 | 7940 | 2.828 |
| 13 | Sulphate (as SO ₄) | mg/l | 272.6 | 270.4 | 272.6 | 270.4 | 271.5 | 1.556 |
| 14 | Fluoride (as F) | mg/l | 1.36 | 1.3 | 1.36 | 1.3 | 1.33 | 0.042 |
| 15 | Total Hardness (as CaCO ₃) | mg/l | 2032 | 2028 | 2032 | 2028 | 2030 | 2.828 |
| 16 | Calcium (as Ca) | mg/l | 601 | 602 | 602 | 601 | 601.5 | 0.707 |
| 17 | Magnesium (as Mg) | mg/l | 129.3 | 128.8 | 129.3 | 128.8 | 129.05 | 0.354 |
| 18 | Sodium (as Na) | mg/l | 4508 | 4542 | 4542 | 4508 | 4525 | 24.04 2 |
| 19 | Potassium (as K) | mg/l | 164.8 | 172.6 | 172.6 | 164.8 | 168.7 | 5.515 |
| 20 | Total Nitrogen# | mg/l | 53.4 | 54.8 | 54.8 | 53.4 | 54.1 | 0.990 |
| 21 | Phosphorus (as PO ₄) | mg/l | 1.12 | 2.1 | <0.05 | <0.05 | <0.05 | ND |
| 22 | Iron (as Fe) | mg/l | 1.34 | 1.48 | 1.48 | 1.34 | 1.41 | 0.099 |
| 23 | Copper (as Cu) | mg/l | 0.65 | 0.72 | <0.03 | <0.03 | <0.03 | ND |
| 24 | Cadmium (as Cd) | mg/l | 0.04 | 0.03 | <0.01 | <0.01 | <0.01 | ND |
| 25 | Lead (as Pb) | mg/l | 0.31 | 0.29 | <0.1 | <0.1 | <0.1 | ND |
| 26 | Zinc (as Zn) | mg/l | 0.37 | 0.32 | <0.01 | <0.01 | <0.01 | ND |
| 27 | Total Chromium (as Cr) | mg/l | 0.08 | 0.09 | <0.05 | <0.05 | <0.05 | ND |

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E-mail: ccmc_consultancy@yahoo.co.in, ccmc122@gmail.com, website: www.ccmc.in, Landline: 0674-2360344.

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



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)

| CENTRE FOR ENVOTECH AND MANAGEMENT CONSULTANCY PVT. LTD. <small>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.</small> | | | | | | | | |
|---|--|-----------|-------|-------|-------|-------|-------|----|
| 28 | Hexavalent Chromium (as Cr ⁶⁺) | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | ND |
| 29 | Phenolic Compounds (as C ₆ H ₅ OH) | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND |
| 30 | Total Coliform | MPN/100ml | 920 | 920 | <2 | <2 | <2 | ND |
| 31 | Faecal Coliform | MPN/100ml | 350 | 350 | <2 | <2 | <2 | ND |
| 32 | E. Coli | MPN/100ml | 22 | 17 | <2 | <2 | <2 | ND |

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

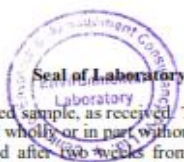
#- Analyzed by Eko Pro Engineers, Gaziabad, Certificate No.-TC-5063

M. Rout

Authorized Signatory

Notes:

- ☑ The result given above related to the tested sample, as received. The customer asked for the above test only.
- ☑ 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
E-mail: cemc_consultancy@yahoo.co.in, cemc122@gmail.com, website: www.cemc.in, Landline: 0674-2360344.

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



IREL(India)Limited, OSCOM

Six Monthly Compliance Report (April 2020 to September 2020)



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Six Monthly Compliance Report (April 2020 to September 2020)

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

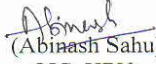
Ref : HPU/03(08)/ 380

Date : 17/11/2020

Water activity level monitored during
April 2020 to September 2020

| Sl.No | Location | Activity Levels(Bq/L) | |
|-------|-------------------------|-----------------------|---------------|
| | | Gross α | Gross β |
| 1 | Matikhalo | 0.1 | 0.21 |
| 2 | Bad putty | 0.07 | 0.23 |
| 3 | Basana putty | 0.08 | 0.14 |
| 4 | T Berhampur | 0.06 | 0.38 |
| 5 | K Arjipalli | 0.08 | 0.29 |
| 6 | Bada Arjipalli | 0.06 | 0.38 |
| 7 | Kanamana | 0.07 | 0.36 |
| 8 | Dredge Pond | - | - |
| 9 | Lily pond | 0.15 | 0.33 |
| 10 | OPHD | 0.04 | 0.12 |
| 11 | Pond-1 | 0.10 | 0.35 |
| 12 | RPP pit | 0.10 | 0.34 |
| 13 | Mopp-up | 0.76 | 0.77 |
| 14 | Mopp-dwn | 0.71 | 0.53 |
| 15 | Bore hole near platform | 0.36 | 0.99 |
| 16 | Composite msp | 0.13 | 0.24 |
| 17 | Sep-up | 0.64 | 0.76 |
| 18 | Sep-dwn | 0.46 | 0.85 |
| 19 | Swt-up | 0.23 | 0.44 |

TLV- Gross α = 0.1 Bq/L Gross β = 1.0 Bq/L


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Six Monthly Compliance Report (April 2020 to September 2020)

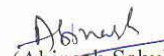
Government of India
Bhabha Atomic Research Centre
Health Physics Division,
Radiation Protection Section (NF)
(H.P. Unit, IREL(INDIA) LTD, OSCOM)

Ref : HPU/03(08)/ 380

Date : 17/11/2020

Ref: Analysis of Soil Samples collected during the period
April 2020 to September'2020

| Sl.No | Location | Period | Analysis Details | |
|-------|---------------------------------|-----------------------------|--------------------------|-------------------------|
| | | | Gross α , Bq/g | Gross β , Bq/g |
| 01 | Mining Area | Apr 2020 to Jun-2020 | - | - |
| 02 | Mined Out Area | | - | - |
| 03 | Matikhalo Village Area | | - | - |
| 04 | Kanamana Village | | - | - |
| 05 | Solid Waste Trench area | | - | - |
| 06 | SodiumNitrate Storage Pond area | | 1.28 | 2.55 |
| 01 | Mining area | July 2020 to Sep 2020 | 1.40 | 2.25 |
| 02 | Mined Out Area | | 0.06 | 0.36 |
| 03 | Matikhalo Village Area | | 3.15 | 2.63 |
| 04 | Kanamana Village | | 3.24 | 3.56 |
| 05 | Solid Waste Trench area | | 1.17 | 2.27 |
| 06 | SodiumNitrate Storage Pond area | | 6.51 | 4.39 |


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Six Monthly Compliance Report (April 2020 to September 2020)

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)/380

Date: 17/11/2020

Noise level monitored during the period
April 2020 to September 2020

| 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 | 73-78 | 8 hrs | |
| 02 | Dredge & Wet upgradation Plant (Other Area) | Control Room | 63-64 | 8 hrs | |
| 03 | Mineral Separation Plant (General Area) | Shift Office Room | 70-84 | 8 hrs | |
| 04 | Mineral Separation Plant (At 12 mtr, near IRMS) | Near IRMS | 78-96 | 8 hrs | |
| 05 | Mineral Separation Plant (Near Air Table) | General area | 80-86 | 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 | 84-96 | Occasional | Ear Muff/ Ear Plug |
| 08 | Compressor House REEP During venting | At REEP | - | Occasional | |
| 08 | Compressor House REEP (Operator Room) | At REEP | 74-77 | 8 hrs | |
| 09 | Attack Plant REEP (General Area) | Middle Area Of ProcessBuilding(GF) | 88-93 | Occasional | Ear Muff/ Ear Plug |
| 10 | Active Plant REEP (General Area) | Middle Area Of ProcessBuilding(GF) | 82-87 | 8 hrs | Ear Muff/ Ear Plug |
| 11 | Active Plant REEP (Scrubber Fan Area) | Near Scrubber Fan | 89-98 | Occasional | Ear Muff/ Ear Plug |
| 12 | Boiler House (General Area) | In Side Boiler House | 85-99 | 8 hrs | Ear Muff/ Ear Plug |
| 13 | Workshop (General Area) | Carpentry area in general | 66-74 | 8 hrs | |
| 14 | Autoshop (General Area) | Near Autopool Area | 71-78 | 8 hrs | |

TLV-85 dB(A)/ 8 hrs

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Six Monthly Compliance Report (April 2020 to September 2020)

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)/380

Date: 17/11/2020

Radiation level monitored during the period April 2020 to September 2020

| Sl.No | Location | Gamma Exposure Rate($\mu\text{Gy.h}^{-1}$) | |
|------------|-------------------------------------|--|------------|
| | | Contact | 1 mtr away |
| 1.1 | Mining Area (Before Mining) | - | 0.4-0.5 |
| 1.2 | Mined Out Area (After Mining) | - | 0.05-0.1 |
| 2.0 | MINERAL SEPARATION PLANT | | |
| 2.1 | Ground Floor (In General) | - | 0.3-0.5 |
| 2.2 | 4.5 mtr Level (In General) | 6-20 | 2-8 |
| 2.3 | 9.0 mtr Level (In General) | - | 2-18 |
| 2.4 | 12.0 mtr Level (In General) | - | 1-1.5 |
| 2.5 | 16.0 mtr Level (In General) | - | 0.8-1.2 |
| 2.6 | Monazite Trench | 50-130 | 10-25 |
| 2.7 | Reject Disposal Site | 7-8 | 0.5-0.8 |
| 3.0 | REEP | | |
| 3.1 | Monazite Stores | 80-130 | 35-75 |
| 3.2 | Feed Area | 30-40 | 10-15 |
| 3.3 | Attack Plant in general | 10-25 | 4-13 |
| 3.4 | Control room Attack Plant | - | 0.2-0.7 |
| 3.5 | RE Chloride Plant/Stores | - | 0.2-0.4 |
| 3.4 | Active Plant GF | - | 15-50 |
| 3.5 | Active Plant Top | - | 8-30 |
| 3.6 | Active Plant Control room | - | 0.5-2 |
| 3.7 | Uranium -thorium separation section | 1-4 | 1-2 |
| 3.8 | Uranium -Section | 1-4 | 1-2 |
| 3.9 | thorium section | - | 3-18 |
| 3.10 | Product Stores | 50-75 | 10-15 |
| 3.11 | Solid Waste Stacking Area(temp) | - | 4-11 |
| 3.12 | Solid Waste Trench | 2-26 | 0.5-12 |
| 3.13 | Sodium nitrate storage pond area | 70-150 | 30-40 |
| 3.14 | MoPP-Effluent treatment plant | - | 4-12 |
| 3.15 | MoPP Office Area | - | 0.2-0.7 |
| 4.0 | Boiler House | - | 0.2-0.5 |
| 5.0 | Workshop Area | - | 0.1-0.4 |

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Six Monthly Compliance Report (April 2020 to September 2020)

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

चिकित्सा विभाग / Medical Department

Ref: IREL/Med/581

Date: 30-05-2020

Disease Profile Analysis for the Year-2019

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 Patients | % | OHC | FHC | Total | Total Patient | % |
| 1 | DIARRHOEA & DYSENTRY | 287 | 563 | 850 | 11005 | 7.72 | 210 | 167 | 377 | 4648 | 8.11 |
| 2 | PARASITIC/ INFECTION | 44 | 50 | 94 | 11005 | 0.85 | 05 | 04 | 09 | 4648 | 0.19 |
| 3 | DYSPEZIA & FLATULENCE | 44 | 60 | 104 | 11005 | 0.94 | 31 | 14 | 45 | 4648 | 0.90 |
| 4 | A P D / HYPERACIDITY | 472 | 595 | 1067 | 11005 | 9.69 | 223 | 132 | 355 | 4648 | 7.63 |
| 5 | ENTERIC FEVER | 00 | 05 | 05 | 11005 | 0.04 | 00 | 00 | 00 | 4648 | 0.00 |
| 6 | MALARIA FEVER | 00 | 03 | 03 | 11005 | 0.02 | 00 | 01 | 01 | 4648 | 0.02 |
| 7 | OTHER FEVER CASES | 117 | 414 | 531 | 11005 | 4.82 | 123 | 181 | 304 | 4648 | 6.54 |
| 8 | COMMON COLD | 595 | 1385 | 1980 | 11005 | 17.99 | 589 | 468 | 1057 | 4648 | 22.74 |
| 9 | OTHER RESPIRATORY INFECTION | 277 | 894 | 1171 | 11005 | 10.64 | 110 | 211 | 321 | 4648 | 6.90 |
| 10 | URINARY TRACT INFECTION | 24 | 74 | 98 | 11005 | 0.89 | 08 | 09 | 17 | 4648 | 0.36 |
| 11 | BRONCHIAL ASTHMA | 35 | 77 | 112 | 11005 | 1.01 | 01 | 09 | 10 | 4648 | 0.21 |
| 12 | HYPERTENSION | 137 | 179 | 316 | 11005 | 2.87 | 22 | 38 | 60 | 4648 | 1.29 |
| 13 | HYPOTENSION | 26 | 34 | 60 | 11005 | 0.54 | 12 | 04 | 16 | 4648 | 0.34 |
| 14 | CARDIAC CASES | 18 | 09 | 27 | 11005 | 0.24 | 02 | 00 | 02 | 4648 | 0.04 |
| 15 | DIABETES MELLITUS | 09 | 303 | 312 | 11005 | 2.83 | 00 | 05 | 05 | 4648 | 0.10 |
| 16 | TUBERCULOSIS | 00 | 02 | 02 | 11005 | 0.01 | 00 | 00 | 00 | 4648 | 0.00 |
| 17 | HENSENS' DISEASES | 00 | 00 | 00 | 11005 | 0.00 | 00 | 00 | 00 | 4648 | 0.00 |
| 18 | SKIN DISEASES | 04 | 00 | 04 | 11005 | 0.03 | 02 | 00 | 02 | 4648 | 0.04 |
| | A. FUNGAL INFECTION | 145 | 245 | 390 | 11005 | 3.54 | 39 | 81 | 120 | 4648 | 2.58 |
| | B. SCABIES | 06 | 06 | 012 | 11005 | 0.10 | 01 | 01 | 02 | 4648 | 0.04 |
| | C. ECZEMA (ALLIED etc.) | 01 | 00 | 01 | 11005 | .009 | 01 | 00 | 01 | 4648 | 0.02 |
| | D. LEUCODERMA | 00 | 00 | 00 | 11005 | 0.00 | 00 | 00 | 00 | 4648 | 0.00 |
| 19 | PROTEIN CALORIE DEFICIENCY | 00 | 01 | 01 | 11005 | .009 | 00 | 00 | 00 | 4648 | 0.00 |
| 20 | VITAMIN DEFICIENCY | 115 | 363 | 478 | 11005 | 4.34 | 53 | 97 | 150 | 4648 | 3.22 |
| 21 | ANEMIA | 05 | 41 | 46 | 11005 | 0.41 | 01 | 17 | 18 | 4648 | 0.38 |
| 22 | HEPATITIS (JAUNDICE) | 01 | 00 | 01 | 11005 | .009 | 00 | 00 | 00 | 4648 | 0.00 |
| 23 | ALLERGIC DISEASES | 09 | 05 | 14 | 11005 | 0.12 | 07 | 01 | 08 | 4648 | 0.17 |
| | A. DRUG ALLERGIC | 04 | 03 | 07 | 11005 | 0.06 | 03 | 01 | 04 | 4648 | 0.08 |
| | B. URTICARIAS etc. | 148 | 134 | 282 | 11005 | 2.67 | 28 | 19 | 47 | 4648 | 1.01 |
| 24 | FILARIASIS | 04 | 00 | 04 | 11005 | 0.03 | 00 | 00 | 00 | 4648 | 0.00 |
| 25 | VENEREAL DISEASES | 00 | 00 | 00 | 11005 | 0.00 | 00 | 00 | 00 | 4648 | 0.00 |
| 26 | CHRONIC ARTHRITIS | 01 | 00 | 01 | 11005 | .009 | 00 | 00 | 00 | 4648 | 0.00 |
| | A. LIMB JOINTS | 159 | 564 | 723 | 11005 | 6.56 | 222 | 249 | 471 | 4648 | 10.13 |
| | B. VERTEBRAL JOINTS | 163 | 181 | 344 | 11005 | 3.12 | 137 | 18 | 155 | 4648 | 3.33 |
| 27 | PSYCHIATRIC CASES / EPILEPSY | 00 | 02 | 02 | 11005 | 0.01 | 00 | 00 | 00 | 4648 | 0.00 |
| 28 | EYE DISEASES | 03 | 00 | 03 | 11005 | 0.02 | 03 | 00 | 03 | 4648 | 0.06 |
| | A. EYE INFECTIONS | 106 | 160 | 266 | 11005 | 2.41 | 138 | 52 | 190 | 4648 | 4.08 |
| | B. EYE INJURY | 00 | 00 | 00 | 11005 | 0.00 | 02 | 00 | 02 | 4648 | 0.04 |
| | C. DEFECTIVE VISIONS | 16 | 00 | 16 | 11005 | 0.14 | 08 | 00 | 08 | 4648 | 0.17 |
| 29 | DENTAL INFECTIONS | 50 | 104 | 154 | 11005 | 1.39 | 10 | 19 | 29 | 4648 | 0.62 |
| 30 | EAR INFECTIONS (CSOM / ASOM) | 34 | 70 | 104 | 11005 | 0.94 | 11 | 19 | 30 | 4648 | 0.64 |
| 31 | PILES | 06 | 30 | 36 | 11005 | 0.32 | 00 | 04 | 04 | 4648 | 0.08 |
| 32 | MENSTRUAL DISORDERS | 02 | 40 | 42 | 11005 | 0.38 | 00 | 01 | 01 | 4648 | 0.02 |
| 33 | DISLOCATIONS & SPRAINS | 115 | 259 | 374 | 11005 | 3.39 | 102 | 97 | 199 | 4648 | 4.28 |
| 34 | BURNS & SCALDS | 07 | 20 | 27 | 11005 | 0.24 | 20 | 00 | 20 | 4648 | 0.43 |

Contd.....2/-

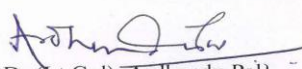


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DISEASE PROFILE ANALYSIS FOR THE YEAR-2019

| | | | | | | | | | | | |
|----|---------------------------|-----|------|------|-------|-------|-----|-----|-----|------|-------|
| 35 | INJURY INCIDENTS | 104 | 153 | 257 | 11005 | 2.33 | 201 | 104 | 305 | 4648 | 6.56 |
| 36 | NEUROLOGICAL DEFICIENCIES | 10 | 31 | 41 | 11005 | 0.37 | 01 | 00 | 01 | 4648 | 0.02 |
| 37 | MALIGNANCY | 00 | 00 | 00 | 11005 | 0.00 | 00 | 00 | 00 | 4648 | 0.00 |
| 38 | CONGENITAL ANOMALY | 00 | 00 | 00 | 11005 | 0.00 | 00 | 00 | 00 | 4648 | 0.00 |
| 39 | NOTIFIABLE DISEASES | 00 | 00 | 00 | 11005 | 0.00 | 00 | 00 | 00 | 4648 | 0.00 |
| 40 | MISC CASES | 465 | 1028 | 1493 | 11005 | 13.56 | 407 | 269 | 676 | 4648 | 14.54 |

2. The above is for your information please.


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

✓ To,
In-Charge (Tech Service)



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 | 56600 |



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

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

| Sl.No. | <i>Description</i> | | <i>During April 2020 to September 2020</i> |
|----------|---------------------------------|--|--|
| 1 | Mining | | |
| 1.1 | Raw sand, t | (for production of upgraded heavy minerals consisting of ilmenite, rutile, zircon, monazite sillimanite & garnet.) | 20,03,198 |
| 2 | MSP | | |
| 2.1 | Furnace oil, KL | (for production of ilmenite, rutile, zircon, monazite sillimanite & garnet.)- | 2543.199 |
| 2.2 | Sodium chloride, Kg | (for production of sillimanite) | 17900 |
| 2.3 | Soda ash, Kg | -do- | 4695 |
| 2.4 | Sodium silicate, Kg | -do- | 5200 |
| 2.5 | Oleic acid, Kg | -do- | 6835 |
| 3 | REEP & Boiler | | |
| 3.1 | Monazite | For processing & production total products in REEP | 1765 |
| 3.2 | Hydrochloric acid (~30% w/w), t | For production of Rare earths chloride etc. | 2846.9 |
| 3.3 | Barium chloride, Kg | For production of Rare earths (RE) chloride. | 27000 |
| 3.4 | Sodium sulphide, Kg | | 31750 |
| 3.5 | Magnesium Sulphate, Kg | | 25000 |
| 3.6 | Iron powder, Kg | | 8375 |
| 3.7 | Sodium sulphate, Kg | For TSP production | 8500 |
| 3.8 | Caustic lye, t | For production Thorium nitrate, Rare earths chloride, Tri-sodium Phosphate etc. | 2930.7 |
| 3.9 | Thorium oxalate, t | For production of Thorium nitrate | 16 |
| 3.10 | Nitric acid, t | | 70.3 |
| 3.11 | Soda ash, t | | 54.55 |



| | | | |
|------|-------------------------------------|---|----------------|
| 3.12 | Hydrogen peroxide, Kg | For production of Thorium nitrate | 30 |
| 3.13 | Alamine, Kg/L | For production of Nuclear Grade Ammonium Diuranate(NGADU) | 160 |
| 3.14 | Oxalic acid, t | For production of Thorium Oxalate | 111.5 |
| 3.15 | Flocculants, Kg (Flomine & Kemfloc) | For RE Chloride & Thorium Oxalate production | 800 kg & 25 kg |
| 3.16 | Tri-n-butyl phosphate(TBP), Kg | For production of NG Ammonium Diuranate & Thorium nitrate | 200 |
| 3.17 | Petrofin, Kg | | 2690 |
| 3.18 | Isodecanol, Kg | | 175 |
| 3.19 | Ammonia, Kg | For production of NG Ammonium Diuranate | 560 |
| 3.20 | EDTA, Kg | | Nil |
| 3.21 | DTPA, Kg | | Nil |
| 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 | 8246 |

B. Production

(During the period April 2020 to September 2020):

| Sl.No | Description | Quantity | | | | | | |
|--------|--|----------|--------|---------|---------|--------|---------|--------|
| OSCOM | | | | | | | | |
| MINING | | April-20 | May-20 | June-20 | July-20 | Aug-20 | Sept-20 | TOTAL |
| 1. | Heavy Mineral Output, t | 4283 | 39885 | 65246 | 64643 | 68706 | 74898 | 317661 |
| MSP | | | | | | | | |
| 1 | Ilmenite, t | 19524 | 25120 | 23027 | 19954 | 18716 | 20003 | 126344 |
| 2 | Rutile, t | 604 | 1030 | 890 | 849 | 759 | 879 | 5011 |
| 3 | Sillimanite, t | 1630 | 3038 | 3000 | 2739 | 2611 | 2576 | 15594 |
| 4 | Zircon, t | 373 | 737 | 759 | 663 | 375 | 501 | 3408 |
| 5 | Monazite, t | 0 | 120 | 311 | 100 | 37 | 135 | 703 |
| 6 | Garnet, t | 2587 | 6022 | 6783 | 7079 | 7218 | 6411 | 36100 |
| REEP | | | | | | | | |
| 1 | Thorium Nitrate, t | 0 | 0 | 0 | 2.2 | 2 | 3.3 | 7.5 |
| 2. | Thorium Oxide, t | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3. | Thorium Oxalate, t | 0 | 35 | 96 | 66 | 85 | 96 | 378 |
| 4. | Trisodium Phosphate, t | 0 | 201 | 403 | 380 | 515 | 547 | 2046 |
| 5. | Rare Earths Chloride, t | 0 | 138 | 280 | 327 | 424 | 502 | 1671 |
| 6. | Nuclear grade Ammonium Di-Uranate as U3O8, t | 0.05 | 0.16 | 0.44 | 0.5 | 0.5 | 0.63 | 2.28 |



C. Solid Waste & Radioactive Waste generation:

(During the period April 2020 to September 2020):

| 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:12492 t HUS: 53007 t | MSP tailings are stockpiled in mined out area for future use. |
| REEP & Boiler | | | |
| 1. | ETP cake, t | 17.8 | Stored in RCC trenches as per AERB norms |
| 2. | Iron Carbonate cake, t | 68.93 | |
| 3. | Lead Barium cake, t | 183 | |
| 4. | Insoluble Muck cake, t | 341.56 | |
| 5. | Ash from Boiler, t | 3298 | Stored in low-lying areas |

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

D. Liquid Waste generation:

(During the period April 2020 to September 2020):

| Sl. No | Description | Quantity | Disposal activity |
|--------------------------|--------------------------------------|-------------------------|---|
| OSCOM | | | |
| MSP | Waste water, m ³ | 2,08,298 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 | 1450 m ³ | |
| 2. | Nitrate Effluent, m ³ | 25 m ³ | |