-	आईआरईएल (इंडिया) लिमिटेड	फोन Tel		
	IREL (India) Limited	101.	· 04651-237255 04651-237256 04651-237257	
VE/	(Formerly Indian Rare Earths Limited)	फैक्स	45651-237258	
अपर्दे भगर ई प्ल IREL	(भारत सरकार का उपक्रम)	Fax	: 04651-237220	
	(A Govt. of India Undertaking)			
	मणवालकुरिच्चि, कन्याकुमारी जिला, तमिलनाडु - 629 252	2		
Manavalakurichi, Kanyakumari Dist. Tamil Nadu - 629 252				
	CIN: U15100MH1950GOI008187 Website: www.irel.co.in	_		

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

IRELMK/ENV-15/2019/

20.05.2019

The Additional Principal Chief Conservator of Forests Ministry of Environment, Forest and Climate Change Regional Office (South-Eastern Zone) 1st and 2nd Floor, Handloom Export Promotion Council 34, Cathedral Garden Road Nungambakkam, CHENNAI - 600034

Sub: Half yearly progress report for the period from October-2018 to March-2019 for ML area of 141.2269 hectares of M/s Indian Rare Earths Limited located at Manavalakurichi, Lakshmipuram & Colachel villages, Kalkulam taluk, Kanyakumari District, Tamilnadu Ref: MoEF&CC letter no. J-11015/387/2010-IA.II (M) dated 06.04.2018

Sir,

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With reference to above, point wise compliance report for the period from October-2018 to March-2019 is enclosed as Annexure-I. Relevant monitoring reports are enclosed as Annexure-II.

This is for your kind information please.

Yours truly, For IREL (India) Limited

Head, MK

Encl: i. Compliance report (Annexure – I) ii. Monitoring reports (Annexure – II)

Copy to;

The Adviser Environmental Impact Assessment Division(IA) Government of India Ministry of Environment, Forests & Climate Change Indira Paryavaran Bhawan Aliganj, Jorbagh Road New Delhi-110003

The Member Secretary Tamil Nadu Pollution Control Board 76, Mount Salai, Guindy, Chennai-600032

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

.

HALF YEARLY COMPLIANCE REPORT

(FROM OCTOBER 2018 TO MARCH 2019)

MINING LEASE: G.O.Ms. No.1114 DATED: 12.08.1981; AREA:141.2269 HECTS

ENVIRONMENTAL CLEARANCE ORDER: J-11015/387/2010-IA.II DATED 06.04.2018

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Sl.	Conditions	Compliance	
A	Specific Conditions		
1	This Environmental clearance is granted subject to outcome of Hon'ble Supreme Court of India, Hon'ble High Court of Tamilnadu, Hon'ble NGT or any other Court of Law, if any, as may be applicable to this project.	Directions of Hon'ble Supreme Court of India, Hon'ble High Court of Tamilnadu, Hon'ble NGT or any other Court of Law, if applicable to this project, will be implemented.	
2	In Inter-tidal zone, only manual mining operations shall be carried out deploying persons using baskets and hand spades for collection of ore or minerals as per the approved mining plan.	Only manual mining is being carried out in the inter-tidal zone as per approved mining plan by deploying persons using baskets and hand spades.	
3	No mining activities will be allowed in forest area, if any, for which the Forest Clearance is not available.	Forest lands are not available within mining lease hold area.	
4	The Environmental Clearance is subject to obtaining requisite NBWL Clearance, if any, from the Standing Committee of National Board for Wildlife for Mining project.	Not applicable	
5	The project Proponent shall obtain Consent to Operate from the State Pollution Control Board, Tamilnadu and effectively implement all the conditions stipulated therein.	Consent to operate for the production of beach sand minerals viz. Ilmenite, Rutile, Zircon, Monazite and Garnet has been obtained from TNPCB and the stipulated conditions are implemented.	
6	The recommendations of the Tamilnadu State Coastal Zonè Management Authority (TNSCZMA) forwarded vide their letter dated 08.01.2018 shall be implemented. The recommendations, inter-alia, are (i) The Project Proponent shall not use any explosives for the mining. No blasting or drilling for mining shall be carried out. (ii) PP shall ensure that the mining activity does not lead to beach erosion. Adequate measures shall be undertaken to avoid least disturbance in the inter-tidal zone. (iii) The unit shall ensure that the mined area is refilled with the tailings. The aesthetic appeal of the beaches should be retained by avoiding artificial sand dunes of greater heights. (iv) The beach profile shall be monitored periodically with the maintenance of relevant records / measurements / details so as to take appropriate	The recommendations of TNSCZMA vide letter dated: 8.1.2018 are being implemented. (i) The method of mining adopted by IREL, Manavalakurichi does not require any blasting or drilling activities. Hence, no explosives are used in the mining operations. (ii) The inland mining operations undertaken by IREL, Manavalakurichi within the mining lease hold areas are away from the beach where simultaneous backfilling over the mined out area is carried out in order to restore the topography. Manual mining in the inter-tidal zone is undertaken in a sustainable manner where replenishment of beach sand minerals has been occurring due to littoral action.	

Conditions Compliance SI. remedial action on the event of any adverse All the mining operations are impacts. (v) There should not be any sea water undertaken as per approved mining intrusion due to the project activities and plan. (Iii) The mined out area is refilled with periodical water quality monitoring shall be conducted and (vi) The unit shall not establish tailings and original landscape is maintained. new mineral separation plant/processing unit within CRZ areas and also there should not be (iv) The beach profile monitoring is any expansion of existing mineral separation carried out and the relevant records are plant/ processing unit. maintained. (v) There is no chance of any sea water intrusion due to IREL mining activities. Periodical water quality monitoring is being conducted. (vi) IREL, Manvalakurichi will not establish any new mineral separation plant/processing unit within CRZ areas. There will not be any expansion of the existing mineral separation plant/processing unit. Mining operations over the private patta 7 The private patta lands which are not owned by M/s. IREL, mining will be carried out only lands not owned by IREL is carried out only after obtaining the consents from after obtaining the consents from the concerned land owners as per the provisions of the Atomic the concerned land owners and executing the agreement as per the Mineral Concession Rules, 2016 and MMDR provisions Mineral Act, 1957. Atomic of Concession Rules, 2016 and MMDR Act, 1957 During mining operations, the village During mining operations, the village built up 8 built up areas, roads, human settlement areas, roads, human settlement areas shall not area are not disturbed. be disturbed. The tailing is used only for backfilling 9 The tailing will be backfilled only in the mined out area. of mined out area Necessary AERB clearance shall be obtained AERB clearance has been obtained 10 Atomic Energy (Radiation under the Atomic Energy (Radiation under Protection) Rules, 2004 for operation of Protection) Rules, 2004 for operation of BSM Beach Sand Minerals facility. Present (Beach Sand Minerals) facility. valid AERB clearance is upto 19.08.2019. Occupational health and safety measures, Medical check up is carried out for 11 radiation workers once in six months. especially concerning radiation to be enhanced for workers who are having some ailments like hypertension, diabetes etc. They should have health checkup once in six months. Project Proponent shall run an awareness Awareness campaign on sanitation for 12 campaign on sanitation for women and women and utilization of Sanitary utilization of Sanitary napkin and also to Napkins has been carried out during November 2018 and December 2018 distribute the Sanitary Napkin/pads to the Chinavilai & Periavilai, women and provide the training for proper at Manavalakurichi villages. We have disposal. distributed sanitary napkin/pads to 200 women during awareness campaign.

	3	
Sl.	Conditions	Compliance
		Training for proper disposal of used napkins/pads was imparted. An amount ofRs.43,000/- was incurred towards conducting the above programme
3	Identification of sand dunes shall be done prior to undertaking mining activities and their conservation shall as per MoEF guidelines from time to time. No flattering of sand dunes shall be carried out. Dressing or altering the sand dunes, hills, natural features including landscape changes shall not carried out for beautification/ recreational purposes. Precautions shall be taken to prevent intrusion of sea water into hinterland to avoid problem of submersion/flooding.	No sand dunes are available in the mining lease area. IREL, Manavalakurichi does not carry out altering of natural features including landscape changes for beautification/ recreational purposes. The method of mining adopted by IREL, Manavalakurichi is environment friendly and there is no chance of intrusion of sea water into hinterland during mining operations. However, necessary precautions shall be taken to avoid the problems of submersion/ flaading
ł	Tailings and rejects shall be filled back systematically after separating the heavy/rare minerals. Sand tailing shall be put back at the mined area on completion of extraction of rare minerals. Afforestation shall be taken up with suitable species on mined out areas to prevent erosion of shoreline. Under no circumstance, the tailings will be dumped in agricultural lands, wet lands, paddy field, canals and the backfilling will be carried out only in the inland	Mining operations & back filling with tailings are carried out systematically in a sustainable manner as per the approved mining plan. Afforestation is carried out over mined out areas with native species. The tailing generated after separation of atomic minerals (beach sand minerals) are used for backfilling the mined out areas and under no circumstance, these tailing will

nds, wet lands, paddy field and canals. The mining activities shall be regulated in such Mining operations do not affect any a way that there will be minimum disturbance fauna during spawning & breeding to the fauna during spawning and breeding period. period i.e. from November to March.

16 Mining shall be carried out in phases only. Mining operations are carried out in Simultaneous opening of entire beach front is phases only. A number of permanent not permissible. There shall be uninterrupted approach roads to seafront are already access to the seafront. Minimum 20m width of available. Also, temporary approach approach roads shall be provided where roads with adequate width are provided necessary. wherever necessary. 17 Mining shall be carried out by permitted Mining is carried out by permitted methods without the use of any forms of methods as per approved mining plan. blasting. Use of explosives for blasting is No explosives are used. The mining prohibited. The mining should be stated near operations are progressed in parallel to sea side and mining should be progressed sea coast and manual mining operations parallel to sea coast so that inland water table is are carried out as per the approved not disturbed. mining plan in the intertidal zones. The inland water table is not disturbed due to IREL mining operations. 18 Radiation survey shall be carried out as In order to ascertain the effects of

stipulated by the Atomic Minerals Directorate radioactive minerals, radiation survey is for Exploration and Research, Department of carried out at regular intervals by Health

<u>SI.</u>	Conditions	
	Atomic Energy, Government of India to	Physics Unit (HPU), an independent
	ascertain the effects of radioactive minerals.	organisation under Department of
		Atomic Energy. (Annexure-II, SI.
		No.1)
19	Regular monitoring of water quality upstream	Regular monitoring of water quality is
	and downstream of adjoining water bodies shall	being carried out. The record of the
	be carried out and record of monitoring data	monitoring data are being submitted to
	should be maintained and submitted to Ministry	MoEF&CC, its Regional Office,
	of Environment, Forest & Climate Change, its	Chennai, Central Groundwater
	Regional Office, Chennai, Central	Authority, Regional Director, Central
	Groundwater Authority, Regional Director,	Groundwater Board, State Pollution
	Central Groundwater Board, State Pollution	Control Board and Central Pollution
	Control Board and Central Pollution Control	Control Board at regular intervals.
	Board.	(Annexure-II, Sl.No.1)
	Dourd.	<u> </u>
20	A Final Mine Closure Plan along with details	Final Mine Closure Plan along with
20	of Corpus Fund shall be submitted to the	details of Corpus Fund will be
	Ministry of Environment. Forest and Climate	submitted to MoEF&CC 5 years in
	Change 5 years in advance of final mine	advance, while seeking approval for
	closure for approval.	final mine closure.
B	Standard Conditions	
<u>7</u>	No change in mining technology and scope of	Mining technology and scope of
1	working should be made without prior approval	working will be not changed without
	of the Ministry of Environment. Forest and	prior approval of MoEF&CC
	Climate Change	1
2	No change in the calendar plan including	Will be adhered to.
2	every ation quantum of beach sand mineral i.e.	
	Ilmenite Rutile Zircon Monazite Sillimanite	
	and Garnet and waste should be made	
3	The project proponent shall obtain necessary	As such there is no requirement of
2	prior permission of the competent authorities	water for mining operations. However,
	for drawl of requisite quantity of water (surface	process water is required for Mineral
	water and ground water) for the project.	Beneficiation activities at IREL,
	water and ground water) for the project.	Manyalakurichi. In this connection,
		IREL has obtained the permission from
		Govt. of Tamilnadu. IREL remits the
		water charges regularly in advance to
		Govt. of Tamilnadu for drawl of water
		from the Vallivar River.
1	Mining shall be carried out as per the	Mining operations are carried out as per
4	revisions outlined in mining plan approved by	mining plan approved by AMD and the
	AMD as well as by shiding to the guidelines of	guidelines of DGMS.
	Directorate General Mines Safety (DGMS)	
<i>E</i>	The lands which are not owned by Proponent	Mining operations over the private patta
``	Ine lands which are not owned by Proponent,	lands not owned by IREL is carried out
5	mining will be carried out only after obtaining	only after obtaining the consents from
5	11 the some line of the someoned land	in the second se
5	the consents from all the concerned land	the concerned land owners and
J	the consents from all the concerned land owners as per the provisions of the Atomic	the concerned land owners and
5	the consents from all the concerned land owners as per the provisions of the Atomic Mineral Concession Rules, 1960 and MMDR	the concerned land owners and executing the agreement as per the provisions of AMCR 2016 and MMDR
5	the consents from all the concerned land owners as per the provisions of the Atomic Mineral Concession Rules, 1960 and MMDR Act, 1957.	the concerned land owners and executing the agreement as per the provisions of AMCR, 2016 and MMDR
5	the consents from all the concerned land owners as per the provisions of the Atomic Mineral Concession Rules, 1960 and MMDR Act, 1957.	the concerned land owners and executing the agreement as per the provisions of AMCR, 2016 and MMDR Act, 1957.
6	the consents from all the concerned land owners as per the provisions of the Atomic Mineral Concession Rules, 1960 and MMDR Act, 1957.	the concerned land owners and executing the agreement as per the provisions of AMCR, 2016 and MMDR Act, 1957. Digital processing of the entire lease area using remote sensing technique
6	the consents from all the concerned land owners as per the provisions of the Atomic Mineral Concession Rules, 1960 and MMDR Act, 1957. Digital processing of the entire lease area using remote sensing technique shall be carried out	the concerned land owners and executing the agreement as per the provisions of AMCR, 2016 and MMDR Act, 1957. Digital processing of the entire lease area using remote sensing technique will be carried out regularly once in

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SI.	Conditions	Compliance
	to Ministry of Environment, Forest and Climate Change and its Regional Office.	three years and will be submitted to MoEF&CC and its Regional Office.
7	The critical parameters as per the Notification 2009 such as PM ₁₀ , PM _{2.5} , NOx, and SOx, etc. in the ambient air within impact zone, peak particle velocity at 300 m distance or within the nearest habitation, whichever is closer shall be monitored periodically. Further, quality of discharged water shall be monitored [(TDS, DO, PH and Total Suspended Solids (TSS)]. The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the Company in public domain. The circular No. J-20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change shall also be referred in this regard for its compliance.	The ambient air qualities, Stack emission & Sewage water are monitored periodically by TNPCB approved Agency. However, there is no discharge of water due to mining operations. The process water in the Mineral Beneficiation activities is recycled and there is no direct discharge of water into the environment at IREL, Manavalakurichi. The monitored data is displayed on a display board at the plant site near the main gate of IREL, Manavalakurichi company in public domain. The monitored datas will be uploaded on IREL website along with half yearly EC compliance report. Provisions under the circular No. J- 20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change will be complied. (Annexure- II al near 2 3 % d)
8	Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of PM_{10} and $PM_{2.5}$ such as haul road, loading point and transfer points. Fugitive dust emissions from all the sources shall be controlled regularly. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Board in this regard. Monitoring of Ambient Air Quality is to be carried out based on the notification 2009, as amended from time to time by the Central Pollution Control Board.	Regular water sprinkling and cleaning of the haul roads is carried out to control air pollution and dust suppression. Fugitive dust emissions from all the sources are controlled. Monitoring of ambient air qualities are carried out as per the norms. The parameters of Ambient Air Quality are well within in the limit prescribed by the Central Pollution Control Board.
9	Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The project proponent shall ensure that no natural water course and / or water resources shall be obstructed due to any mining operations. The monitoring shall be carried out four times in a year pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment, Forest and Climate change and its Regional Office. Central Ground Water	Regular monitoring of ground water level and quality in four seasons is carried out in and around the mining lease area. Natural water courses or water resources are not obstructed due to IREL Mining operations. The monitoring data will be sent regularly to MoEF&CC, its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board.

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-	Conditions	Compliance
	Authority and Regional Director, Central	
10	Ground Water Board.	
10	Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintain. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the project proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug wall located in village should be incorporated to ascertain the impact	No springs and nallahs are flowing in and around the ML area. Natural water bodies or streams which are flowing in and around the village are not disturbed due to mining operations. There is no obstruction of ground water due to IREL mining operations. However, as desired, regular monitoring of water table in open dug wells located in the villages is carried out.
11	ot mining over ground water table.	
11	Regular monitoring of water quality upstream and downstream of water bodies shall be carried out and record of monitoring data should be maintained and submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Board.	Regular monitoring of water quality is carried out and the record of monitoring data will be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Board.
12	The Illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/masks away from the villagers and keeping the noise levels well within the prescribed limits for day light/night hours.	The Biological clock of the villagers will not be disturbed due to the Mining operations of IREL. Illumination is provided only in the work site. Noise levels are regularly monitored &maintained well within the prescribed limits. (Annexure-II, sl. no.5)
13	Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. The material transfer points should invariably be provided with Bag filters and or dry fogging system. In case of Belt-conveyor facilities, the system should be fully covered to avoid air borne dust; Use of effective sprinkler system to suppress fugitive dust on haul roads and other transport roads shall be ensured.	Haul roads are regularly wetted with water sprinklers.
14	Sufficient number of Gullies to be provided for better management of water. Regular Monitoring of pH shall be included in the monitoring plan and report shall be submitted	Regular monitoring of water quality including pH is carried out. The reports will be submitted to the Ministry of Environment Forest and Climate

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Conditions limate Change and its Regional Office on six onthly basis. here shall be planning, developing and plementing facility of rainwater harvesting easures on long term basis and	Compliance monthly basis. (Annexure-II, sl. no.6)
imate Change and its Regional Office on six onthly basis. here shall be planning, developing and plementing facility of rainwater harvesting easures on long term basis and	monthly basis. (Annexure-II, sl. no.6)
nere shall be planning, developing and plementing facility of rainwater harvesting easures on long term basis and	
aplementation of conservation measures to gment ground water resources in the area in nsultation with Central Ground Water Board.	The mining and mineral separation plant operations are carried out very near to shore. Rain water harvesting system is implemented at IREL, Manavalakurichi where all the rooftop rain water collected from plant area is stored in a harvesting pond.
he reclamation at waste dump sites shall be ologically sustainable. Scientific reclamation all be followed. The local species may be couraged and species are so chosen that the ope, bottom of the dumps and top of the mps are able to sustain these species. The pect of the dump is also a factor which gulates some climate parameters and allows ly species adopted to that micro climate.	Mining and simultaneous backfilling of the mined out pits are followed systematically at IREL, Manavalakurichi. Scientific reclamation & systematic afforestation are practised in order to generate greenery. The tailings dumps are made to restore the natural topography over the mined out areas. Native species, viz Casuarina, Coconut, etc. are planted over the backfilled areas.
he top soil, if any, shall temporarily be stored earmarked site(s) only and it should not be pt unutilized for long. The top soil shall be ed for land reclamation and plantation. The er burden (OB) generated during the mining erations shall be stacked at earmarked dump e(s) only and it should not be kept active for ong period of time. The OB dumps should be ientifically vegetated with suitable native eccies to prevent erosion and surface run off. critical areas, use of geo textiles shall be dertaken for stabilization of the dump. The tire excavated area shall be backfilled and forested. Monitoring and management of nabilitated areas should continue until the getation becomes self-sustaining. ompliance status shall be submitted to the inistry of Environment, Forest and Climate hange and its Regional Office on six monthly sis.	There is no top soil. No overburden is generated during mining operations at IREL, Manavalakurichi. Mineralisation occurs right from surface of the deposit. Mined out areas are backfilled with tailings generated from Mineral beneficiation operations followed by systematic plantation to restore the natural topography. The compliance status will be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.
antation shall be raised in a 7.5 m wide green It in the safety zone around the mining lease, ckfilled and reclaimed area, around water dy, along the roads etc. by planting the tive species in consultation with the local FO/Agriculture Department and as per CPCB tidlines. The density of the trees should be bund 2500 plants per ha. Greenbelt shall be veloped all along the mine lease area in a ased manner and shall be completed within st five years.	The density of plants over the backfilled areas is maintained around 2500 plants per hectare. Green belt has been developed over the mined out and backfilled areas within the ML area. The mining lease area is just adjacent to the Arabian Sea. The seaside area of the mining lease boundary is a replenishable zone where plantation cannot developed due to littoral action. However, other side of the ML boundary, greenbelt is being developed in phased manner.
ti ni	by planning the rotats etc. by planning the ive species in consultation with the local O/Agriculture Department and as per CPCB adlines. The density of the trees should be und 2500 plants per ha. Greenbelt shall be reloped all along the mine lease area in a sed manner and shall be completed within t five years.

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SI.	Conditions	Compliance
		(Annexure-II, sl. no. 7)
19	Project proponent shall follow the mitigation measures provided in Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014 titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease or Habitations and villages are surrounded by the mine lease area", if any, applicable to the project.	IREL, Manavalakurichi will follow the guidelines issued by MoEF&CC vide OM No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014. As such it is intimated that the village built up areas, habitation, roads existing within the ML area will not be disturbed due to mining operations.
20	The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna, if any, spotted in the study area. Action plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Department. A copy of action plan shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office.	No endangered fauna is available in the study area.
21	At least 2.5% of the total cost of the project shall be earmarked towards the Enterprise Social Commitment (ESC) based on local needs and action plan with financial and physical breakup/details shall be prepared and submitted to the Ministry's Regional Office located at Chennai. Implementation of such program shall be ensured accordingly in a time bound manner.	Mining operations at IREL, Manavalakurichi are continuing since 1970. Corporate Social Responsibility activities are carried out as per the provisions under Companies Act, 2013 and CSR rules, 2014. CSR fund is always allocated more than 2 % of the net profit of the company. Although IREL, Manavalakurichi incurred loss in the 2017-18, Rs.25.70 lakh is allocated towards implementation of CSR schemes. The CSR is a regular activity and the action plan towards meeting the local needs will be implemented in time bound manner.
22	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.	141.2269 hectares Mining Lease area of IREL is existing at Manavalakurichi since 1984 and it is not a new project. Hence, not applicable
23	Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.	Noise levels are maintained below 85 dBA. All persons engaged in HEMM operations are provided with ear plugs/muffs. (Annexure-II, sl. no. 8)
24	Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated	No industrial waste water is generated during Beach Mineral Sand mining operations.

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Sl.	Conditions	Compliance
	19th May, 1993 and 31st December, 1993 or as	
	amended from time to time. Oil and grease	
	traps should be installed before discharge of	
25	Workshop effluents.	
25	protective respiratory devices and they should wear also be provided with adequate training and information on safety and health aspects.	All persons employed in mines are imparted with training as per Mines Vocational Training Rules, 1966. Personnel working in dusty area are provided with Protective respiratory masks.
26	A separate environmental management cell with suitable qualified personnel should be set- up under the control of a Senior Executive, who will report directly to the Head of the Organization	Environment Management cell is constituted at IREL, Manvalakurichi and effectively functioning. Unit head is the Chairmen of the Cell. Once in every three months, the environmental parameters of the mines and mineral
		Environment Management Cell
27	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.	The funds earmarked for environmental protection measures will not be diverted to other purpose. Year wise expenditure towards environmental protection measures (expenditure towards Air sampling, Water sampling, Water sprinkling, Afforestation, PPEs, Bag filters etc.) is enclosed. (Annexure-II. sl. no. 9)
28	The project authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	This project already exists since 1984. Hence not applicable.
29	The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment, Forest and Climate Change, its Regional Office, Central Pollution Control Board and State Pollution Control Board.	Six monthly reports on the status of implementation of the stipulated environmental safeguards in hard copy is submitted to Ministry of Environment, Forest and Climate Change, its Regional Office, Central Pollution Control Board and State Pollution Control Board.
30	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 reports.	IREL, Manavalakurichi will extend full cooperation to the Officers of MoEF&CC in the event of monitoring the compliances of the stipulated conditions.
31	A copy of clearance letter will be marked to concerned Panchayat/ local NGO, if any, from whom suggestion / representation has been received while processing the proposal	A copy of Clearance letter has been sent to Panchayat.
32	State Pollution Control Board should display a	Complied.
	I ama at the standard taken as the Product	

SI.	Conditions	Compliance
	Office, District Industry Centre and Collector's office/ Tehsildar's office for 30 days.	L.C
33	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, Forest and Climate Change at <u>www.environmentclearance.nic.in</u> and a copy of the same should be forwarded to the Regional Office.	Information on Environment Clearance for 141.2269 hects ML area of IREL was published in two local newspapers Dinamani and The New Indian Express on 11.04.2018 and the same was forwarded to the Regional office.

A20/5/19 Arenn

प्रयाम, एमके / Head MK जार्मसार्यपत्न (इंग्रिया) शिमिटेड / IREL (India) Limited (Formerty Indian Rare Earths Limited) (पारत सरकार पा उपक्रम) / (A Govt of India Undertaking) मणवासमुदीस्य - 629 252 कन्याकुमारी जिला MANAVALAKURICHI - 629 252, Kanyakumari District

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IREL (India) Limited Formerly Indian Rare Earths Limited Manavalakurichi

Monitoring Report (From October 2018 to March 2019)

SI.	Description	Annexure	Page No
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1	Radio activity monitoring in Air and water		1-29
2	Ambient Air Quality Monitoring report	2	30-50
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9	Fund allocation for environmental protection/ CSR activities	9	81

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भारतसरकार / Government of India भाभापरमाणुअनुसंधानकेंद्र / BHABHA ATOMIC RESEARCH CENTRE स्वास्थ्यभौतिकीप्रभाग / Health Physics Division विकिरणसुरक्षाअनुभाग (परमाणुईंधन) / Radiation Protection Section (Nuclear Fuels) स्वास्थ्यभौतिकीइकाई / Health Physics Unit फैक्स / Fax : 04651-237220 आईआरईएल(इंडिया)लिमिटेड / IREL(India)Limited फ़ोन / Tel : 04651-237255-58 मणवालकुरिच्ची /Manavalakurichi- 629252 ईमेल/ e.mail : oic.hpu-mk@irel.co.in</u>तमिलनाडु ,इंडिया /Tamil Nadu,India दिनांक Date: 24-04-2019

1

Dear Sir/Madam,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of March-2019 for your kind information and necessary action.

Regards

Yours Sincerely

K.Sreekumar Officer in Charge,HPU, IREL, MK

Dr.SujataRadhakrishnan Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Head, IREL, MK

RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (MARCH-2019)

1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of MARCH, 2019 are presented in Table 1. Background radiation field at Guest House ranged from 0.15 to 2.75μ Gyh⁻¹. Radiation field at the MK beach area is in the range $0.15 - 1.00\mu$ Gyh⁻¹. The background radiation field inside the Minerals Separation Plant varied from 1.20 to 65.0 μ Gyh⁻¹. The maximum fields were at the Monazite section, Rutile section, Zircon section, Garnet section and Monazite Exolon section. Dry mill tailings area showed radiation field ranging from 30.0 to37.0 μ Gyh⁻¹. Table 2 gives the radiation field in the plant premises.

2 Air monitoring:

The results of analysis of airborne dust, ²³²Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.13 to 3.60 mgm⁻³ (mean 1.61±0.99) (respirable = 25%; TLV= 4 mg.m⁻³). The higher dust levels were observed at GarnetSection, Zircon(Old) Ground floor,Zircon(New)platform and Monazite Section .The air activity due to ²³²Th varied from 0.001to 0.137Bq.m⁻³ (mean= 0.031±0.042Bq.m⁻³). The average dust levelsand air activities arehigherthan that of previous month. Higher concentrations of airborne thorium were observed at Monazite section,Zircon (old) groundfloor, Zircon [new] platform and Garnetground floor(average 39.09 % DAC). The average thoron daughter concentrations were higher than that of the previous month and varied from 0.37to 11.26 (mean = 2.70±2.96mWL).

3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. ²³²Th activity in the samples ranged from 1to 10mBqm⁻³. These values are comparable with the ambient activity levels in natural high background radiation areas. Quarterly analysis of environmental air samples collected from a radial distance of 1 Km around the plant is provided in Table 5.

4. Analysis of liquid Effluents:

The radioactivity levels in the Valliyar River water and Well water collected from a radial distance of one kilometer are given in Table 6. The levels are comparable with the natural concentration encountered at the high background radiation areas.

5. Analysis of Solid Wastes:

Results of the analysis of tailings from HUP and ETP (ZOP) solid waste are presented in Table7. The levels are comparable with natural concentration prevailing in this area.

Recommendation:

- (1) Continuous operation of MUP exhaust fans to be ensured to reduce air activity.
- (2) Spillage and accumulation of Monazite rich fraction in MSP is high. It may be controlled.

Table: 1 Results of the radiation survey of the plant area (March -2019) Radiation field (µGy/h)

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	3.00	50.0	Temporary drymill storage
2.	HUP ground floor	0.50	2.60	
3.	HUP first floor	0.50	0.90	
4.	HUP concentrate	8.00	17.0	
5.	HUP tailings Area	0.10	0.20	
6.	Conc.sandgodown	6.00	30.0	

3				
7.	F.B.drier area	2.00	8.00	Sand Accumulation
8.	Weighing room	0.90	1.30	
9.	Vibrating screen Section	1.80	7.50	Sand Accumulation
10.	Rutile section	2.00	22.0	Sand Accumulation
11.	H.T.Plant Section	1.20	17.0	Sand Accumulation
12.	Ilmenite / Rutile readings	2.00	7.00	
13.	Zircon section	4.00	35.0	Sand Accumulation
14.	Monazite exolons Section	8.00	20.0	Sand Accumulation
15.	Monazite Section	5.00	65.0	Sand Accumulation
16.	Garnet section	4.00	22.0	Sand Accumulation
17.	Ilmenite section	2.50	15.0	Sand Accumulation
18.	Monazite silos (ground floor)	6.00	10.0	
19.	Road infront of godown	2.00	2.50	
20.	Monazite stores near ETP outside	80.0	85.0	
21.	New monazite store(outside walls)	20.0	25.0	
22.	Road out side	2.00	6.00	
23.	Monazite pumping area	7.00	10.0	

Table: 2 Radiation Survey results of the plant premises (March -2019) Radiation field - ($\mu Gy/hr)$

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	1.20	1.70	
2	Dry Mill waste area	30.0	37.0	
3	Con A yard	8.00	17.0	
4	Guest House area	0.15	2.75	
5	MK Beach	0.15	1.00	
6	Main Gate	0.40	1.40	
7	In front of Lab	0.70	1.30	
8	In front of Dry mill	1.50	4.00	
9	In front ZOP	2.00	5.50	
10	In front stores	1.20	1.50	
11	In front m/w/shop	1.50	1.80	
12	In front of Electrical w/s	1.50	1.80	
13	In front of civil section	1.80	3.00	
14	In front of canteen	1.40	3.20	
15	ETP area	10.0	35.0	Semi processed minerals stored
16	Raw sand dump (HUP)	0.60	32.0	Drymill waste for processing

S No.	Location	Dust conc	Thorn daughters	²³² Th
3. NO	Location	(mgm-3)	(mWL)	(Bq m ⁻³)
1	Vibratory screens platform	0.13	0.37	0.001
2	Vibratory screens Ground floor	0.67	0.61	0.001
3	Weighing room	1.07	2.60	0.008
4	H.T.Platform East	1.33	0.75	0.004
5	H T Ground floor East	1.33	1.04	0.008
6	H.T.Platform West	2.00	0.59	0.004
7	H.T Ground floor West	0.13	0.43	0.001
8	Rutile Platform	1.87	1.30	0.011
9	Rutile Ground floor	0.40	2.56	0.021
10	Garnet Platform	2.13	1.10	0.018
11	Garnet ground floor	3.60	1.99	0.048
12	Zircon section (old) Platform	1.07	2.21	0.001
13	Zircon Section (Old) ground floor	2.40	2.93	0.041
14	Zircon section (New) Platform	3.20	4.35	0.087
15	Zircon Section (New) ground floor	0.53	3.01	0.006
16	Zircon air tables	1.20	0.43	0.006
17	Monazite ground floor	2.80	8.03	0.089
18	Monazite IRMS	2.20	7.44	0.114
19	Monazite RCBMS	2.40	11.26	0.137
20	Ilmenite Section	1.73	1.00	0.013
	Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22
	No of Samples = 2	29		

Table: 3 Air monitoring, Manavalakurichi Plant (March-2019)

Average dust conc. = 1.61 ± 0.99 mg m⁻³

Average air activity (232 Th) = 0.031± 0.042Bq m⁻³

Average air activity (Thoron daughters) = 2.70±2.96mWL

Table 4: Air monitoring, plant premises - (March-2019)

S. No	LOCATION	Dust mg/m ³	Th(B)Mwl	²³² ThBqm ⁻³
1	In front of Lab	0.53	0.16	0.002
2	In front of ZOP	0.13	0.14	0.002
3	In front of Dry mill	1.07	0.61	0.007
4	In front of Stores	0.53	0.41	0.001
5	In front of E/W shop	1.87	0.55	0.010
6	In front of canteen	0.27	0.33	0.001

Table 5: Quarterly air activity-Environmental samples (January-March, 2019)

S.No	Location	Dust.con (mg m ⁻³)	Th (B) (mWL)	²³² Th (Bq m ⁻³)
1	Guest House Area	0.27	0.22	0.002
2	Pillayar coil junction	0.80	0.35	0.001
3	Periavilai	0.13	0.14	0.001
4	HUP Tails Area	0.67	0.33	0.002

5 Table 6: Quarterly Analysis of Water samples (January-March, 2019)

S. No	Location	Gross aBql-1	Gross βBql ⁻¹
1.	Pillayarcoil junction well	0.011	0.068
2.	Valliyar river water	0.010	0.046
3.	Guest House new well	0.016	0.060
4.	HUP Tails water	0.009	0.026

Table7: Analyses of Solid Tailings (February-2019)

S.No	Location	²³² Th (Bqg ⁻¹)	MDL(Bqg ⁻¹)	Regulatory limit (Bqg ⁻¹)
1	HUP Tailings	0.043	0.022	1.0

Government of India BHABHA ATOMIC RESEARCH CENTRE Health Physics Division Radiation Protection Section (Nuclear Fuel) Health Physics Unit

Fax :04651-237220 Tel :04651-238117 e.mail :oic.hpu-mk@irel.co.in Indian Rare Earths Ltd Manavalakurichy- 629252 Tamil Nadu, India

Date: 18-03-2019

Dear Sir/Madam,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of February-2019 for your kind information and necessary action.

The non-radiological measurement of Respirable dust (PM₁₀) and TDS/Chloride are now done by different agencies of IREL and same are not included in this report.

Regards

Yours Sincerely

K.Sreekumar Officer in Charge,HPU, IREL, MK

Dr.SujataRadhakrishnan Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Head, IREL, MK

RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (FEBRUARY-2019)

1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of February, 2019 are presented in Table 1. Background radiation field at Guest House ranged from 0.20 to 2.75μ Gyh⁻¹. Radiation field at the MK beach area is in the range 0.20 –0.80 μ Gyh⁻¹. The background radiation field inside the Minerals Separation Plant varied from 1.00 to 80.0 μ Gyh⁻¹. The maximum fields were at the Monazite section, Ilmenite section, Rutile section, Zircon section and Monazite Exolon section. Dry mill tailings area showed radiation field ranging from 28.0 to40.0 μ Gyh⁻¹. Table 2 gives the radiation field in the plant premises.

2 Air monitoring:

The results of analysis of airborne dust, ²³²Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.13 to 3.73 mgm⁻³ (mean 0.92±0.80) (respirable = 25%; TLV= 4 mg.m⁻³). The higher dust levels were observed at HT platform East and Monazite IRMS .The air activity due to ²³²Th varied from 0.001to 0.122Bq.m⁻³ (mean = 0.025±0.032Bq.m⁻³). The average dust levelsand air activities arelowerthan that of previous month. Higher concentrations of airborne thorium were observed at Monazite section,Zircon(old) groundfloor, Zircon [new] platform, H.T Section East and Rutile Platform(average 22.67 % DAC). The average thoron daughter concentrations were lower than that of the previous month and varied from 0.22to 8.08 (mean = 1.99±2.02mWL).

3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. ²³²Th activity in the samples ranged from 1to 6mBqm⁻³. These values are comparable with the ambient activity levels in natural high background radiation areas.

4. Analysis of Solid Wastes:

Results of the analysis of tailings from HUP and ETP (ZOP) solid waste are presented in Table5. The levels are comparable with natural concentration prevailing in this area.

Recommendation:

- (1) Continuous operation of MUP exhaust fans to be ensured to reduce air activity.
- (2) Spillage and accumulation of Monazite rich fraction in MSP is high. It may be controlled.

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	1.00	50.0	Temporary drymill storage
2.	HUP ground floor	0.50	6.00	
3.	HUP first floor	0.50	0.70	
4.	HUP concentrate	15.0	20.0	
5.	HUP tailings Area	0.10	0.20	
6.	Conc.sandgodown	6.00	32.0	
7.	F.B.drier area	1.50	9.00	Sand Accumulation

Table: 1 Results of the radiation survey of the plant area (February 2019) Radiation field (μ Gy/ h)

8.	Weighing room	0.80	1.30	
9.	Vibrating screen Section	1.50	4.00	
10.	Rutile section	2.00	26.0	Sand Accumulation
11.	H.T.Plant Section	1.20	16.0	Sand Accumulation
12.	Ilmenite / Rutile readings	2.00	9.00	
13.	Zircon section	1.00	38.0	Sand Accumulation
14.	Monazite exolons Section	8.00	20.0	Sand Accumulation
15.	Monazite Section	8.00	80.0	Sand Accumulation
16.	Garnet section	6.00	12.0	Sand Accumulation
17.	Ilmenite section	2.50	20.0	Sand Accumulation
18.	Monazite silos (ground floor)	6.00	10.0	
19.	Road infront of godown	1.90	2.50	
20.	Monazite stores near ETP outside	90.0	100.0	
21.	New monazite store(outside walls)	20.0	25.0	
22.	Road out side	3.00	5.00	
23.	Monazite pumping area	9.00	10.0	

Table: 2 Radiation Surve	y results of the plant	premises (February	2019) Radiation	ı field - (µGy/hr)
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S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	1.00	1.20	
2	Dry Mill waste area	28.0	40.0	
3	Con A yard	15.0	20.0	
4	Guest House area	0.20	2.75	
5	MK Beach	0.20	0.80	
6	Main Gate	0.50	1.40	
7	In front of Lab	0.80	0.90	
8	In front of Dry mill	1.00	4.00	
9	In front ZOP	2.00	5.50	
10	In front stores	1.30	1.50	
11	In front m/w/shop	1.50	1.60	
12	In front of Electrical w/s	1.50	1.60	
13	In front of civil section	2.00	3.00	
14	In front of canteen	2.00	3.00	
15	ETP area	15.0	30.0	Semi processed minerals stored
16	Raw sand dump (HUP)	0.80	44.0	Drymill waste

Location	Dust conc	Thorn daughters	²³² Th
Location	(mgm-3)	(mWL)	(Bq m ⁻³)
Vibratory screens platform	0.40	0.43	0.001
Vibratory screens Ground floor	0.13	0.28	0.001
Weighing room	1.33	2.60	0.013
H.T.Platform East	3.73	1.79	0.032
H T Ground floor East	1.20	1.20	0.029
H.T.Platform West	0.67	0.85	0.018
H.T Ground floor West	0.13	0.28	0.001
Rutile Platform	1.07	1.28	0.025
Rutile Ground floor	0.80	1.77	0.016
Garnet Platform	0.67	1.44	0.002
Garnet ground floor	0.80	0.75	0.005
Zircon section (old) Platform	1.07	1.34	0.016
Zircon Section (Old) ground floor	0.67	1.46	0.023
Zircon section (New) Platform	0.40	1.87	0.022
Zircon Section (New) ground floor	0.80	3.19	0.013
Zircon air tables	0.40	0.22	0.001
Monazite ground floor	0.87	4.37	0.045
Monazite IRMS	1.94	8.08	0.122
Monazite RCBMS	1.27	5.83	0.101
Ilmenite Section	0.13	0.73	0.004
Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22
	Location Location Vibratory screens platform Vibratory screens Ground floor Weighing room H.T.Platform East H T Ground floor East H.T.Platform West H.T.Ground floor West Rutile Platform Garnet Platform Garnet ground floor Zircon section (old) Platform Zircon Section (New) Platform Zircon air tables Monazite RCBMS Imenite Section	LocationDust conc (mgm-3)Vibratory screens platform0.40Vibratory screens Ground floor0.13Weighing room1.33H.T.Platform East3.73H T Ground floor East1.20H.T.Platform West0.67H.T Ground floor West0.13Rutile Platform1.07Rutile Ground floor0.80Garnet Platform0.67Jircon section (old) Platform1.07Zircon Section (New) Platform0.40Zircon air tables0.40Monazite IRMS1.94Monazite RCBMS1.27Ilmenite Section0.13LimitsTLY: 4.00	LocationDust conc (mgm-3)Thorn daughters (mWL)Vibratory screens platform0.400.43Vibratory screens Ground floor0.130.28Weighing room1.332.60H.T.Platform East3.731.79H T Ground floor East1.201.20H.T.Platform West0.670.85H.T Ground floor West0.130.28Rutile Platform1.071.28Rutile Ground floor0.801.77Garnet Platform0.671.44Garnet ground floor0.671.34Zircon section (old) Platform0.671.46Zircon Section (New) Platform0.671.46Zircon air tables0.400.22Monazite ground floor0.874.37Monazite RCBMS1.275.83Imenite Section0.130.73ImitsTLV: 4.00DAC: 1WL

Table: 3 Air monitoring, Manavalakurichi Plant (February-2019)

No of Samples=29Average dust conc.= 0.92 ± 0.80 mg m-3Average air activity (232Th)= 0.025 ± 0.032 Bq m-3

Average air activity (Thoron daughters) = 1.99 ± 2.02 mWL

S. No	LOCATION	Dust mg/m ³	Th(B)Mwl	²³² ThBqm ⁻³
1	In front of Lab	0.27	0.12	0.001
2	In front of ZOP	0.27	0.28	0.003
3	In front of Dry mill	0.27	0.85	0.006
4	In front of Stores	0.13	0.10	0.001
5	In front of E/W shop	0.27	0.43	0.003
6	In front of canteen	0.40	0.20	0.001

Table5: Analyses of Solid Tailings (January-2019)

S.No	Location	²³² Th (Bqg ⁻¹) MDL(Bqg ⁻¹)		Regulatory limit (Bqg-	
1	1 HUP Tailings 0.34 0.022		1.0		
2	ZOP solid waste (Plant S.D)	Nil	Nil	Nil	

Government of India BHABHA ATOMIC RESEARCH CENTRE Health Physics Division Radiation Protection Section (Nuclear Fuel) Health Physics Unit

Fax :04651-237220 Tel :04651-238117 e.mail :hpuiremk@gmail.com Indian Rare Earths Ltd Manavalakurichy- 629252 Tamil Nadu, India

Date: 20-02-2019

Dear Sir/Madam,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of January-2019 for your kind information and necessary action.

Regards

Yours Sincerely

K.Sreekumar Officer in Charge,HPU, IREL, MK

Dr.SujataRadhakrishnan Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Head, IREL, MK

RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (JANUARY-2019)

1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of January, 2019 are presented in Table 1. Background radiation field at Guest House ranged from 0.10 to 2.20 μ Gyh⁻¹. Radiation field at the MK beach area is in the range 0.20 –0.80 μ Gyh⁻¹. The background radiation field inside the Minerals Separation Plant varied from 1.00 to 60.0 μ Gyh⁻¹. The maximum fields were at the Monazite section, Garnet section, Rutile section, Zircon section and Monazite Exolon section. Dry mill tailings area showed radiation field ranging from 30.0 to47.0 μ Gyh⁻¹. Table 2 gives the radiation field in the plant premises.

2 Air monitoring:

The results of analysis of airborne dust, ²³²Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.13 to 3.94 mgm⁻³ (mean 1.26 \pm 0.86) (respirable = 25%; TLV= 4 mg.m⁻³). The higher dust levels were observed at Monazite ground floor Monazite IRMS and Zircon [New] ground floor. The air activity due to ²³²Th varied from 0.002 to 0.166 Bq.m⁻³ (mean= 0.036 \pm 0.043Bq.m⁻³). The average dust levelsand air activities are higherthan that of previous month. Higher concentrations of airborne thorium were observed at Monazite section,Zircon(New) groundfloor , Zircon [old] section, H.T Platform west and Zircon Airtables (average 33 % DAC). The average thoron daughter concentrations were equal to that of the previous month and varied from 0.37to 8.68 (mean = 2.78 \pm 2.49mWL).

3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. ²³²Th activity in the samples ranged from 1to 11mBqm⁻³. These values are comparable with the ambient activity levels in natural high background radiation areas.

The result of the air samples collected using High volume air sampler (Environ Tech) from various representative locations in the plant premises are provided in Table 5. The sampling duration was 5 hours, continuous. The SPM & RPM varied from 105.29 to 176.21 and 39.95 to 93.62μ gm⁻³, respectively. ²³²Th activities are varied from 0.1 to 0.3mBq m⁻³.

4. Analysis of Solid Wastes:

Results of the analysis of tailings from HUP and ETP (ZOP) solid waste are presented in Table 6. The levels are comparable with natural concentration prevailing in this area.

5. Water quality Analysis:

Water samples were collected from within and outside the plant premises. The details are provided in Table 7.

Recommendation:

- (1) Continuous operation of MUP exhaust fans to be ensured to reduce air activity.
- (2) Spillage and accumulation of Monazite rich fraction in MSP is high. It may be controlled.

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	1.00	70.0	Temporary drymill storage
2.	HUP ground floor	1.00	2.00	
3.	HUP first floor	0.50	0.75	
4.	HUP concentrate	10.0	14.0	
5.	HUP tailings Area	0.10	0.30	
6.	Conc.sandgodown	6.00	30.0	

Table: 1 Results of the radiation survey of the plant area (January 2019) Radiation field (µGy/h)

7.	F.B.drier area	3.00	8.00	Sand Accumulation
8.	Weighing room	1.30	1.50	
9.	Vibrating screen Section	2.00	8.00	Sand Accumulation
10.	Rutile section	3.00	22.0	Sand Accumulation
11.	H.T.Plant Section	1.50	18.0	Sand Accumulation
12.	Ilmenite / Rutile readings	4.00	16.0	Sand Accumulation
13.	Zircon section	1.00	45.0	Sand Accumulation
14.	Monazite exolons Section	10.0	20.0	Sand Accumulation
15.	Monazite Section	6.00	60.0	Sand Accumulation
16.	Garnet section	5.00	24.0	Sand Accumulation
17.	Ilmenite section	3.00	18.0	Sand Accumulation
18.	Monazite silos (ground floor)	8.00	10.0	
19.	Road infront of godown	1.50	2.00	
20.	Monazite stores near ETP outside	100.0	110.0	
21.	New monazite store (outside walls)	20.0	25.0	
22.	Road out side	3.00	5.00	
23.	Monazite pumping area	9.00	11.0	

Table: 2 Radiation Survey results of the plant premises (January 2019) Radiation field - (μ Gy/hr)

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	0.80	1.20	
2	Dry Mill waste area	30.0	47.0	
3	Con A yard	10.0	14.0	
4	Guest House area	0.10	2.20	
5	MK Beach	0.20	0.80	
6	Main Gate	1.00	1.30	
7	In front of Lab	1.20	1.50	
8	In front of Dry mill	2.00	3.00	
9	In front ZOP	2.00	5.00	
10	In front stores	1.60	1.80	
11	In front m/w/shop	1.50	1.80	
12	In front of Electrical w/s	1.50	1.80	
13	In front of civil section	1.80	2.50	
14	In front of canteen	2.00	2.50	
15	ETP area	6.00	35.0	Semi processed minerals stored
16	Raw sand dump (HUP)	1.00	21.0	

	Location	Dust conc	Thorn daughters	²³² Th		
5. NO	Location	(mgm-3)	(mWL)	(Bq m ⁻³)		
1	Vibratory screens platform	0.80	0.57	0.004		
2	Vibratory screens Ground floor	0.13	0.53	0.002		
3	Weighing room	0.67	1.99	0.013		
4	H.T.Platform East	1.33	2.50	0.016		
5	H T Ground floor East	1.47	1.04	0.005		
6	H.T.Platform West	1.33	4.19	0.036		
7	H.T Ground floor West	0.13	0.37	0.004		
8	Rutile Platform	1.60	2.99	0.015		
9	Rutile Ground floor	0.40	0.93	0.012		
10	Garnet Platform	1.73	0.96	0.016		
11	Garnet ground floor	1.20	0.93	0.018		
12	Zircon section (old) Platform	0.67	2.80	0.052		
13	Zircon Section (Old) ground floor	0.53	2.47	0.041		
14	Zircon section (New) Platform	1.47	1.56	0.024		
15	Zircon Section (New) ground floor	2.00	4.23	0.035		
16	Zircon air tables	1.47	1.79	0.038		
17	Monazite ground floor	3.94	8.68	0.129		
18	Monazite IRMS	2.27	8.55	0.166		
19	Monazite RCBMS	1.34	6.33	0.076		
20	Ilmenite Section	0.80	2.24	0.015		
	Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22		
	No of Samples = 29					

Table: 3 Air monitoring, Manavalakurichi Plant (January-2019)

Average dust conc.= $1.26 \pm 0.86 \text{ mg m}^{-3}$ Average air activity (232Th)= $0.036 \pm 0.043 \text{Bq m}^{-3}$

Average air activity (Thoron daughters) = 2.78±2.49mWL

Table 4: Air monitoring, plant premises - (January-2019)

S. No	LOCATION	Dust mg/m ³	Th(B)Mwl	²³² ThBqm ⁻³	
1	In front of Lab	0.13	0.47	0.001	
2	In front of ZOP	0.27	0.35	0.004	
3	In front of Dry mill	1.07	1.18	0.011	
4	In front of Stores	0.40	0.41	0.004	
5	In front of E/W shop	0.13	0.41	0.005	
6	In front of canteen	0.27	0.35	0.003	

Table 5: Air monitoring, Plant premises, using high volume air sample (5hr duration) (December-2018)

S.No	Date	Location	SPM µqm m ⁻³	RPM µgm m ⁻³	²³² Th Bg m ⁻³
1	29-01-2019	Top of Canteen	121.02	39.95	0.0001
2	25-01-2019	Top of R&D	173.19	93.62	0.0001
3	11-01-2019	Top of Rest shed	130.69	89.95	0.0002
4	31-01-2019	Top of Civil	105.29	62.96	0.0003
5	02-01-2019	Top of Dispensary	176.21	51.21	0.0002

Table 6: Analyses of Solid Tailings (December-2018)

S.No	Location	²³² Th (Bqg ⁻¹)	MDL(Bqg ⁻¹)	Regulatory limit (Bqg ⁻¹
1	HUP Tailings	0.41	0.022	1.0
2	ZOP solid waste (Plant S.D)	Nil	Nil	Nil

Table: 7 Water Quality parameters of Environmental Water Samples (January-2018)

SI. No	Location	PH	TDS	T.Chlorides	T.Hardness
			Ppm	Ppm	Ppm
1	Office new well ,IREL, MK	7.60	334	91.12	251
2	Office old well, IREL, MK	7.30	316	99.56	290
3	Canteen well, IREL, MK	7.90	358	95.34	241
4	Zirconium Oxide Plant, IREL, MK	7.70	220	120	220
5	Valliyar river,N8º08′40.0″E77º18′31.0″	6.90	90	88.44	120
6	Muttom,N8°07′38.6″E77°19′03.7″	6.90	342	155	210
7	Tank Near Laboratory, IREL, MK	7.70	420	156	240
8	Guest house out west well, IREL, MK	7.60	140	150	261
9	Guest house new well, IREL, MK	7.80	400	168	340
10	Pillaiyarcoil JunctionN8º09′12.8″E77º18′02.5″	7.20	223	99.34	180
11	Kootumangalam,N8º09′24.0″E77º17′25.6″	7.00	297	142	161
12	Sea water, IREL, MK	7.80	22650	25150	10997
13	Colachel,N8º10'02.9"E77º16'07.0"	6.80	88	90.54	80.28
14	IRE Drinking Water, IREL, MK	7.20	276	121	162
15	Esanthangu N 8º.13′24.93″ E 77º.32′90.87″	6.90	590	398	211
16	Kadiapattinam N8º08′11.3″E77º18′19.0″	8.00	332	312	322
17	Ammandivilai	7.20	53	68.54	80.54

Government of India BHABHA ATOMIC RESEARCH CENTRE Health Physics Division Radiation Protection Section (Nuclear Fuel) Health Physics Unit

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Indian Rare Earths Ltd Manavalakurichy- 629252 Tamil Nadu, India

Date: 16-01-2019

Dear Sir/Madam,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of December-2018 for your kind information and necessary action.

Regards

Yours Sincerely

Se -

K.Sreekumar Officer in Charge,HPU, IREL, MK

Dr.SujataRadhakrishnan Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Head, IREL, MK

RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (DECEMBER-2018)

1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of December, 2018, are presented in Table 1. Background radiation field at Guest House ranged from 0.50 to 2.50μ Gyh⁻¹. Radiation field at the MK beach area is in the range $0.60 - 1.00\mu$ Gyh⁻¹. The background radiation field inside the Minerals Separation Plant varied from 1.00 to 100.0 μ Gyh⁻¹. The maximum fields were at the Monazite section. Dry mill tailings area showed radiation field ranging from 28.0 to 35.0 μ Gyh⁻¹. Table 2 gives the radiation field in the plant premises.

2 Air monitoring:

The results of analysis of airborne dust, 232 Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.13 to 2.13 mgm⁻³ (mean 0.96±0.55) (respirable = 25%; TLV= 4 mg.m⁻³). The higher dust levels were observed at Zircon Airtables. The air activity due to 232 Th varied from 0.001to 0.136 Bq.m⁻³ (mean= 0.025±0.038 Bq.m⁻³). The average dust levels and air activities are higherthan that of previous month. Higher concentrations of airborne thorium were observed at Monazite section,Zircon(New) groundfloor and Zircon Airtables (average 34 % DAC). The average thoron daughter concentrations were higher than that of the previous month and varied from 0.28 to 7.20 (mean = 2.81 ±1.88mWL).

3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. ²³²Th activity in the samples ranged from 3 to 7 mBqm⁻³. These values are comparable with the ambient activity levels in natural high background radiation areas.

The result of the air samples collected using High volume air sampler (Environ Tech) from various representative locations in the plant premises are provided in Table 5. The sampling duration was 5 hours, continuous. The SPM & RPM varied from 127.76 to 194.92 and 46.82 to 95.87 μ gm⁻³, respectively. ²³²Th activities are varied from 0.1 to 0.3mBg m⁻³.

Quarterly analysis of environmental air samples collected from a radial distance of 1 Km around the plant is provided in Table 6.

4. Analysis of liquid Effluents:

The radioactivity levels in the Valliyar River water and Well water collected from a radial distance of one kilometer are given in Table 7. The levels are comparable with the natural concentration encountered at the high background radiation areas.

5. Analysis of Solid Wastes:

Results of the analysis of tailings from HUP and ETP (ZOP) solid waste are presented in Table8. The levels are comparable with natural concentration prevailing in this area.

6. Water quality Analysis:

Water samples were collected from within and outside the plant premises. The details are provided in Table 9.

Recommendation:

- (1) Continuous operation of MUP exhaust fans to be ensured to reduce air activity.
- (2) Spillage and accumulation of Monazite rich fraction in MSP is high. It may be controlled.

Table: 1 Results of the radiation survey of the plant area (December-2018) Radiation field (μ Gy/ h)

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	1.00	70.0	Temporarily Drymill stored
2.	HUP ground floor	1.00	2.30	
3.	HUP first floor	0.40	0.60	
4.	HUP concentrate	6.00	20.0	
5.	HUP tailings Area	0.10	0.20	
6.	Conc.sandgodown	7.00	12.0	
7.	F.B.drier area	3.00	10.0	Sand Accumulation
8.	Weighing room	1.50	1.80	
9.	Vibrating screen Section	3.00	9.00	Sand Accumulation
10.	Rutile section	3.00	23.0	Sand Accumulation
11.	H.T.Plant Section	1.50	16.0	Sand Accumulation
12.	Ilmenite / Rutile readings	2.80	10.0	Sand Accumulation
13.	Zircon section	1.00	45.0	Sand Accumulation
14.	Monazite exolons Section	10.0	30.0	Sand Accumulation
15.	Monazite Section	8.00	100.0	Sand Accumulation
16.	Garnet section	5.00	16.0	
17.	Ilmenite section	3.00	25.0	Sand Accumulation
18.	Monazite silos (ground floor)	8.00	10.0	
19.	Road infront of godown	2.50	3.00	
20.	Monazite stores near ETP outside	90.0	100.0	
21.	New monazite store(outside walls)	20.0	25.0	
22.	Road out side	2.00	7.00	
23.	Monazite pumping area	9.00	11.0	

Table: 2 Radiation Survey results of the plant premises (December-2018) Radiation field - (μ Gy/hr)

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	1.00	1.60	
2	Dry Mill waste area	28.0	35.0	
3	Con A yard	6.00	20.0	
4	Guest House area	0.50	2.50	
5	MK Beach	0.60	1.00	
6	Main Gate	1.00	1.20	
7	In front of Lab	1.00	1.40	
8	In front of Dry mill	2.00	3.00	
9	In front ZOP	2.20	5.00	
10	In front stores	1.50	1.80	
11	In front m/w/shop	1.80	2.00	
12	In front of Electrical w/s	1.80	2.20	
13	In front of civil section	2.00	2.50	
14	In front of canteen	2.00	3.00	
15	ETP area	10.0	25.0	Semi processed mineral stored
16	Raw sand dump (HUP)	0.60	18.0	

C N-	Location	Dust conc	Thorn daughters	²³² Th		
5. NO	Location	(mgm ⁻³)	(mWL)	(Bq m ⁻³)		
1	Vibratory screens platform	0.27	0.28	0.001		
2	Vibratory screens Ground floor	0.13	0.28	0.002		
3	Weighing room	0.67	2.95	0.004		
4	H.T.Platform East	0.67	1.99	0.003		
5	H T Ground floor East	0.53	2.24	0.001		
6	H.T.Platform West	0.93	3.78	0.010		
7	H.T Ground floor West	1.60	1.48	0.013		
8	Rutile Platform	1.07	3.68	0.007		
9	Rutile Ground floor	1.07	2.70	0.007		
10	Garnet Platform	1.20	2.66	0.016		
11	Garnet ground floor	1.47	1.32	0.008		
12	Zircon section (old) Platform	0.27	1.24	0.004		
13	Zircon Section (Old) ground floor	1.07	2.74	0.023		
14	Zircon section (New) Platform	0.40	2.84	0.013		
15	Zircon Section (New) ground floor	0.93	5.06	0.030		
16	Zircon air tables	2.13	2.72	0.038		
17	Monazite ground floor	1.00	2.85	0.048		
18	Monazite IRMS	1.40	7.05	0.120		
19	Monazite RCBMS	1.87	7.20	0.136		
20	Ilmenite Section	0.53	1.12	0.013		
	Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22		
No of Samples = 29						

Table: 3 Air monitoring, Manavalakurichi Plant (December-2018)

No of samples=29Average dust conc.= $0.96 \pm 0.55 \text{mg m}^{-3}$ Average air activity (232Th)= $0.025 \pm 0.038 \text{ Bq m}^{-3}$

Average air activity (Thoron daughters) = 2.81 ± 1.88 mWL

Table 4: Air monitoring, plant premises - (December- 2018)

S. No	LOCATION	Dust mg/m ³	Th(B)Mwl	²³² ThBqm ⁻³
1	In front of Lab	0.53	0.43	0.004
2	In front of ZOP	0.93	0.41	0.003
3	In front of Dry mill	1.20	1.04	0.004
4	In front of Stores	0.13	0.45	0.004
5	In front of E/W shop	0.27	0.45	0.007
6	In front of canteen	0.13	0.20	0.004

Table 5: Air monitoring, Plant premises, using high volume air sample (5hr duration) (December-2018)

S.No	Date	Location	SPM µgm m ⁻³	RPM µqm m ⁻³	²³² Th Bg m ⁻³
1	22-12-2018	Top of Canteen	180.63	88.25	0.0001
2	26-12-2018	Top of R&D	127.76	46.82	0.0002
3	27-12-2018	Top of Rest shed	147.62	59.37	0.0001
4	24-12-2018	Top of Civil	177.46	85.08	0.0002
5	28-12-2018	Top of Dispensary	194.92	95.87	0.0003

S.No	Location	Dust.con	Th (B)	²³² Th
1	Guest House Area	0.40	0.79	0.002
2	Pillayar coil junction	0.27	0.51	0.002
3	Periavilai	0.13	0.46	0.002
4	HUP Tails Area	0.13	0.65	0.004

 Table 6: Quarterly air activity-Environmental samples
 (October-December, 2018)

Table 7: Quarterly Analysis of Water samples (October-December, 2018)

S. No	Location	Gross a Bql-1	Gross β Bql-1
1.	Pillayarcoil junction well	0.003	0.009
2.	Valliyar river water	0.001	0.004
3.	Guest House new well	0.006	0.011
4.	HUP Tails water	0.009	0.016

Table8: Analyses of Solid Tailings (November-2018)

S.No	Location	²³² Th (Bqg ⁻¹)	MDL(Bqg ⁻¹)	Regulatory limit (Bqg ⁻¹
1	HUP Tailings	0.45	0.022	1.0
2	ZOP solid waste (Plant S.D)	Nil	Nil	Nil

Table: 9 Water Quality parameters of Environmental Water Samples (December-2018)

SI. No	Location	PH	TDS	T.Chlorides	T.Hardness
			Ppm	Ppm	Ppm
1	Office new well ,IREL, MK	7.2	310	85.34	241
2	Office old well, IREL, MK	7.3	282	71.12	241
3	Canteen well, IREL, MK	7.6	340	88	263
4	Zirconium Oxide Plant, IREL, MK	7.7	199	113	201
5	Valliyar river,N8º08′40.0″E77º18′31.0″	6.7	86	80.54	120
6	Muttom,N8°07′38.6″E77°19′03.7″	7.1	340	142	201
7	Tank Near Laboratory, IREL, MK	7.5	420	156	220
8	Guest house out west well, IREL, MK	7.3	130	142	241
9	Guest house new well, IREL, MK	7.6	360	128	322
10	Pillaiyarcoil JunctionN8º09′12.8″E77º18′02.5″	7.0	215	99.56	161
11	Kootumangalam,N8º09'24.0"E77º17'25.6"	7.0	272	113	161
12	Sea water, IREL, MK	7.8	22500	25803	11096
13	Colachel,N8º10'02.9"E77º16'07.0"	6.7	86	99.6	80
14	IRE Drinking Water, IREL, MK	7.1	252	113	140
15	Esanthangu	6.7	155	298	241
16	Kadiapattinam N8º08′11.3″E77º18′19.0″	7.6	318	312	362
17	Ammandivilai	7.5	57	80.54	80

Government of India BHABHA ATOMIC RESEARCH CENTRE Health Physics Division Radiation Protection Section (Nuclear Fuel) Health Physics Unit

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Indian Rare Earths Ltd Manavalakurichy- 629252 Tamil Nadu, India

Date: 17-12-2018

Dear Sir/Madam,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of November-2018 for your kind information and necessary action.

Regards

Yours Sincerely

~

K.Sreekumar Officer in Charge,HPU, IREL, MK

Dr. SujataRadhakrishnan Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Head, IREL, MK

RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (NOVEMBER-2018)

1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of November, 2018, are presented in Table 1. Background radiation field at Guest House ranged from 1.00 to 3.00 μ Gyh⁻¹. Radiation field at the MK beach area is in the range 0.60 -1.40 μ Gyh⁻¹. The background radiation field inside the Minerals Separation Plant varied from 1.00 to 100.0 μ Gyh⁻¹. The maximum fields were at the Monazitesection and Zircon section. Dry mill tailings area showed radiation field ranging from 30.0 to 35.0 μ Gyh⁻¹. Table 2 gives the radiation field in the plant premises.

2 Air monitoring:

The results of analysis of airborne dust, ²³²Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.13 to 2.40 mgm⁻³ (mean 0.74±0.63) (respirable = 25%; TLV= 4 mg.m⁻³). The higher dust levels were observed at Monazite ground floorandRutile groundfloor. The air activity due to ²³²Th varied from 0.001to 0.119Bq.m⁻³ (mean = 0.020±0.034Bq.m⁻³). The average dust levels are lower than that of previous month and air activities are higherthan that of previous month. Higher concentrations of airborne thorium were observed at Monazite Section and Rutile Platform (average 35 % DAC). The average thoron daughter concentrations were lowthan that of the previous month and varied from 0.22to 4.72(mean = 1.50 ±1.26mWL).

3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. ²³²Th activity in the samples ranged from 1to 4mBqm⁻³. These values are comparable with the ambient activity levels in natural high background radiation areas.

The result of the air samples collected using High volume air sampler (Environ Tech) from various representative locations in the plant premises are provided in Table 5. The sampling duration was 8 hours, continuous. The SPM & RPM varied from 52.12 to 198.81 and 27.51 to 94.05μ gm⁻³, respectively. ²³²Th activityis 0.1mBq m ⁻³.

4. Analysis of Solid Wastes:

Results of the analysis of tailings from HUP and ETP (ZOP) solid waste are presented in Table6. The levels are comparable with natural concentration prevailing in this area.

5. Water quality Analysis:

Water samples were collected from within and outside the plant premises. The details are provided in Table 7.

Recommendation:

(1) Spillage and accumulation of Monazite rich fraction in MSP is high and contributed higher radiation exposure. It may be controlled immediately.

Table: 1 Results of the radiation survey of the plant area (November-2018) Radiation field (μ Gy/ h)

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	1.00	70.0	Drymill temporary strorage
2.	HUP ground floor	0.60	1.00	
3.	HUP first floor	0.60	0.80	
4.	HUP concentrate	6.00	10.0	
5.	HUP tailings Area	0.10	0.20	
6.	Conc.sandgodown	4.00	20.0	

	22				
7.	F.B.drier area	3.00	9.00		
8.	Weighing room	0.90	1.30		
9.	Vibrating screen Section	2.00	7.00	Sand Accumulation	
10.	Rutile section	3.00	20.0	Sand Accumulation	
11.	H.T.Plant Section	1.20	15.0	Sand Accumulation	
12.	Ilmenite / Rutile readings	3.00	16.0	Sand Accumulation	
13.	Zircon section	1.00	35.0	Sand Accumulation	
14.	Monazite exolons Section	10.0	22.0	Sand Accumulation	
15.	Monazite Section	9.00	100.0	Sand Accumulation	
16.	Garnet section	8.00	16.0	Sand Accumulation	
17.	Ilmenite section	4.00	20.0	Sand Accumulation	
18.	Monazite silos (ground floor)	8.00	11.0		
19.	Road infront of godown	2.00	2.50		
20.	Monazite stores near ETP outside	100.0	120.0		
21.	New monazite store (outside walls)	20.0	25.0		
22.	Road out side	2.00	7.00		
23.	Monazite pumping area	9.00	12.0		

Table: 2 Radiation Survey results of the plant premises (November-2018) Radiation field - (μ Gy/hr)

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	0.80	1.00	
2	Dry Mill waste area	30.0	35.0	
3	Con A yard	6.00	10.0	
4	Guest House area	1.00	3.00	
5	MK Beach	0.60	1.40	
6	Main Gate	1.00	1.30	
7	In front of Lab	0.80	1.20	
8	In front of Dry mill	2.00	3.00	
9	In front ZOP	3.00	4.00	
10	In front stores	1.50	1.80	
11	In front m/w/shop	1.70	2.00	
12	In front of Electrical w/s	1.70	2.00	
13	In front of civil section	2.00	2.50	
14	In front of canteen	2.00	2.50	
15	ETP area	10.0	25.0	
16	Raw sand dump (HUP)	1.40	15.0	Drymill tailings

00		
	22	
1.5	1.5	
-0	-0	

C No	Location	Dust conc	Thorn daughters	²³² Th
5. INO	Location	(mgm ⁻³)	(mWL)	(Bq m ⁻³)
1	Vibratory screens platform	0.13	0.26	0.001
2	Vibratory screens Ground floor	0.53	0.47	0.001
3	Weighing room	0.27	1.85	0.004
4	H.T.Platform East	0.80	1.34	0.008
5	H T Ground floor East	1.07	1.67	0.016
6	H.T.Platform West	0.53	0.98	0.003
7	H.T Ground floor West	0.40	0.22	0.001
8	Rutile Platform	2.40	1.36	0.029
9	Rutile Ground floor	0.27	1.97	0.002
10	Garnet Platform	0.13	0.39	0.010
11	Garnet ground floor	1.07	1.40	0.013
12	Zircon section (old) Platform	0.67	0.85	0.007
13	Zircon Section (Old) ground floor	0.53	2.07	0.022
14	Zircon section (New) Platform	0.40	0.69	0.001
15	Zircon Section (New) ground floor	0.13	0.77	0.001
16	Zircon air tables	0.13	0.55	0.002
17	Monazite ground floor	1.94	3.53	0.061
18	Monazite IRMS	1.07	3.96	0.103
19	Monazite RCBMS	1.60	4.72	0.119
20	Ilmenite Section	0.67	0.87	0.004
	Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22
	No of Samples =	29		
	Average dust conc. =	0.74±0.63 mg	m-3	

Table: 3 Air monitoring, Manavalakurichi Plant (November-2018)

Average air activity $(^{232}Th) = 0.020\pm0.034Bq m^{-3}$

Average air activity (Thoron daughters) = 1.50 ± 1.26 mWL

Toble 1. Air	monitoring	plant	promisor	(Novombor	2010
Table 4: All	monitoina.	Diant	Diemses -	uvovenibei-	20101
				(

S. No	LOCATION	Dust mg/m ³	Th(B)Mwl	²³² ThBqm ⁻³
1	In front of Lab	0.13	0.08	0.002
2	In front of ZOP	0.27	0.22	0.003
3	In front of Dry mill	0.67	0.53	0.004
4	In front of Stores	0.80	0.16	0.001
5	In front of E/W shop	0.53	0.12	0.002
6	In front of canteen	0.27	0.08	0.001

```
Table 5: Air monitoring, Plant premises, using high volume air sample (8 hr duration) (November-2018)
```

S.No	Date	Location	SPM µgm m ⁻³	RPM µgm m ⁻³	²³² Th Bq m ⁻³
1	28-11-2018	Top of Canteen	198.81	94.05	0.0001
2	20-11-2018	Top of R&D	135.18	73.58	0.0001
3	23-11-2018	Top of Rest shed	129.50	30.65	0.0001
4	27-11-2018	Top of civil	134.59	90.82	0.0001
5	22-11-2018	Top of Dispensary	52.12	27.51	0.0001

24 Table6: Analyses of Solid Tailings (October-2018)

S.No	S.No Location		MDL(Bqg ⁻¹)	Regulatory limit (Bqg ⁻¹
1	HUP Tailings	0.048	0.022	1.0
2	ZOP solid waste (Plant S.D)	Nil	Nil	Nil

Table: 7 Water Quality parameters of Environmental Water Samples (November-2018)

SI. No	SI. No Location		TDS	T.Chlorides	T.Hardness
			Ppm	Ppm	Ppm
1	Office new well ,IREL, MK	7.2	300	71.1	281
2	Office old well, IREL, MK	7.1	341	99.6	241
3	Canteen well, IREL, MK	7.4	370	128	241
4	Zirconium Oxide Plant, IREL, MK	7.6	370	142	161
5	Valliyar river,N8º08'40.0" E77º18'31.0"	6.0	105	42.6	80
6	Muttom,N8°07′38.6″E77°19′03.7″	6.3	370	128	201
7	Tank Near Laboratory, IREL, MK	7.0	90	71.1	161
8	Guest house out west well, IREL, MK	7.3	250	156	241
9	Guest house new well, IREL, MK	7.5	340	142	222
10	Pillaiyarcoil JunctionN8º09′12.8″E77º18′02.5″	6.9	295	85.3	120
11	Kootumangalam,N8º09'24.0" E77º17'25.6"	6.7	276	99.6	161
12	Sea Water	7.5	28400	23144	10068
13	Colachel,N8º10′02.9″E77º16′07.0″	6.0	210	99.6	201
14	IRE Drinking Water, IREL, MK	7.0	200	113	120
15	Esanthangu,N8º07′54.9″E77º19′43.8″	6.7	350	298	201
16	Kadiapattinam N8º08′11.3″E77º18′19.0″	7.4	320	298	322
17	Ammandivilai	6.9	86	42.7	161


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 e.mail
 :hpuiremk@ gmail.com

Indian Rare Earths Ltd Manavalakurichy- 629252 Tamil Nadu, India

Date: 19-11-2018

Dear Sir/Madam,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month ofOctober-2018 for your kind information and necessary action.

Regards

Yours Sincerely

K.Sreekumar Officer in Charge,HPU, IREL, MK

Dr. SujataRadhakrishnan Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Head, IREL, MK

RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (OCTOBER-2018)

1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of October, 2018, are presented in Table 1. Background radiation field at Guest House ranged from 1.00 to 3.00 μ Gyh⁻¹. Radiation field at the MK beach area is in the range 0.50 –1.20 μ Gyh⁻¹. The background radiation field inside the Minerals Separation Plant varied from 1.00 to 120.0 μ Gyh⁻¹. The maximum fields were at the Monazitesection, Monazite Exolon section and Zircon section. Dry mill tailings area showed radiation field ranging from 30.0 to 35.0 μ Gyh⁻¹. Table 2 gives the radiation field in the plant premises.

2 Air monitoring:

The results of analysis of airborne dust, ²³²Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.27 to 3.54 mgm⁻³ (mean1.05 \pm 0.81) (respirable = 25%; TLV= 4 mg.m⁻³). The higher dust levels were observed at Monazite RCBMS, Monazite IRMS andRutile Platform. The air activity due to ²³²Th varied from 0.001to 0.081Bq.m⁻³ (mean= 0.012 \pm 0.018 Bq.m⁻³). The average dust levels are higher than that of previous month and air activities are slightly higherthan that of previous month. Higher concentrations of airborne thorium were observed at Monazite RCBMS, Zircon [Old] Platform and Garnet Platform (average 20 % DAC). The average thoron daughter concentrations were higher than that of the previous month and varied from 0.28 to 8.33(mean = 2.30 \pm 2.27mWL).

3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. ²³²Th activity in the samples ranged from 1 to 4mBqm⁻³. These values are comparable with the ambient activity levels in natural high background radiation areas.

The result of the air samples collected using High volume air sampler (Environ Tech) from various representative locations in the plant premises are provided in Table 5. The sampling duration was 8 hours, continuous. The SPM & RPM varied from 87.55 to 187.72 and 16.67 to 97.24µgm⁻³, respectively. ²³²Th activities are varied from 0.1 to 0.4mBq m⁻³.

4. Analysis of Solid Wastes:

Results of the analysis of tailings from HUP and ETP (ZOP) solid waste are presented in Table6. The levels are comparable with natural concentration prevailing in this area.

5. Water quality Analysis:

Water samples were collected from within and outside the plant premises. The details are provided in Table 7.

Recommendation:

- (1) Continuous operation of MUP exhaust fans to be ensured to reduce air activity.
- (2) Spillage and accumulation of Monazite rich fraction in MSP is high. It may be controlled.

Table: 1 Results of the radiation survey of the plant area (October-2018) Radiation field (µGy/h)

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	3.00	40.0	Drymill waste storage
2.	HUP ground floor	1.00	2.00	
3.	HUP first floor	0.50	0.70	
4.	HUP concentrate	5.00	8.00	
5.	HUP tailings Area	0.20	0.30	

6.	Conc.sandgodown	6.00	30.0	
7.	F.B.drier area	3.00	9.00	Sand Accumulation
8.	Weighing room	0.90	1.30	
9.	Vibrating screen Section	1.60	8.00	Sand Accumulation
10.	Rutile section	2.00	20.0	Sand Accumulation
11.	H.T.Plant Section	1.20	15.0	Sand Accumulation
12.	Ilmenite / Rutile readings	3.00	16.0	Sand Accumulation
13.	Zircon section	2.00	50.0	Sand Accumulation
14.	Monazite exolons Section	9.00	40.0	Sand Accumulation
15.	Monazite Section	6.00	120.0	Sand Accumulation
16.	Garnet section	4.00	12.0	Sand Accumulation
17.	Ilmenite section	3.00	13.0	Sand Accumulation
18.	Monazite silos (ground floor)	8.00	10.0	
19.	Road infront of godown	2.00	2.50	
20.	Monazite stores near ETP outside	80.0	120.0	
21.	New monazite store (outside walls)	20.0	25.0	
22.	Road out side	2.00	6.00	
23.	Monazite pumping area	8.00	10.0	

Table: 2 Radiation Survey results of the plant premises (October-2018) Radiation field - (μ Gy/hr)

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	1.20	1.50	
2	Dry Mill waste area	30.0	35.0	
3	Con A yard	5.00	8.00	
4	Guest House area	1.00	3.00	
5	MK Beach	0.50	1.20	
6	Main Gate	0.80	1.60	
7	In front of Lab	0.60	0.80	
8	In front of Dry mill	1.00	3.00	
9	In front ZOP	2.00	5.00	
10	In front stores	1.40	1.60	
11	In front m/w/shop	1.50	1.70	
12	In front of Electrical w/s	1.40	1.60	
13	In front of civil section	2.00	3.00	
14	In front of canteen	2.00	2.50	
15	ETP area	15.0	30.0	Semi processed mineral stored
16	Raw sand dump (HUP)	0.50	2.50	

C . N.I	Location	Dust conc	Thorn daughters	²³² Th
5. NO	Location	(mgm ⁻³)	(mWL)	(Bq m ⁻³)
1	Vibratory screens platform	0.40	0.49	0.001
2	Vibratory screens Ground floor	0.53	0.28	0.003
3	Weighing room	0.27	2.32	0.001
4	H.T.Platform East	1.07	0.89	0.003
5	H T Ground floor East	1.33	1.06	0.004
6	H.T.Platform West	0.80	1.65	0.006
7	H.T Ground floor West	0.27	0.69	0.003
8	Rutile Platform	2.00	0.85	0.004
9	Rutile Ground floor	0.67	0.98	0.003
10	Garnet Platform	0.53	4.19	0.024
11	Garnet ground floor	0.93	3.62	0.010
12	Zircon section (old) Platform	1.60	1.46	0.024
13	Zircon Section (Old) ground floor	0.80	1.87	0.012
14	Zircon section (New) Platform	0.80	3.09	0.009
15	Zircon Section (New) ground floor	0.80	2.28	0.009
16	Zircon air tables	1.07	0.53	0.013
17	Monazite ground floor	0.87	2.97	0.019
18	Monazite IRMS	2.40	7.80	0.010
19	Monazite RCBMS	3.54	8.33	0.081
20	Ilmenite Section	0.40	0.55	0.003
	Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22
	No of Samples =	29		

Table: 3 Air monitoring,	Manavalakurichi Plant	(October-2018)

Average dust conc.= $1.05 \pm 0.81 \text{ mg m}^{-3}$ Average air activity (232Th)= $0.012 \pm 0.018 \text{ Bg m}^{-3}$

Average air activity (Thoron daughters) = 2.30±2.27 mWL

Table 1: Air monitoring	nlant premises -	(October - 2018)
TUDIE 4. All Monitoling,	piurii premises - i	

S. No	LOCATION	Dust mg/m ³	Th(B)Mwl	²³² ThBqm ⁻³
1	In front of Lab	0.13	0.28	0.001
2	In front of ZOP	0.13	0.33	0.001
3	In front of Dry mill	0.13	0.98	0.001
4	In front of Stores	1.47	0.33	0.001
5	In front of E/W shop	0.27	0.20	0.004
6	In front of canteen	0.27	0.16	0.001

Table 5: Air monitoring, Plant premises, using high volume air sample (8 hr duration) (October-2018)

S.No	Date	Location	SPM µgm m ⁻³	RPM µgm m ⁻³	²³² Th Bg m ⁻³
1	25-10-2018	Top of Canteen	133.11	60.09	0.0003
2	27-10-2018	Top of R&D	124.56	63.45	0.0001
3	23-10-2018	Top of Rest shed	187.72	16.67	0.0001
4	26-10-2018	Top of civil	183.21	97.24	0.0004
5	24-10-2018	Top of Dispensary	87.55	49.81	0.0001

S.No	Location	²³² Th (Bqg ⁻¹)	MDL(Bqg ⁻¹)	Regulatory limit (Bqg ⁻¹
1	HUP Tailings	0.036	0.022	1.0
2	ZOP solid waste (Plant S.D)	Nil	Nil	Nil

Table6: Analyses of Solid Tailings (September-2018)

Table: 7 Water Quality parameters of Environmental Water Samples (October-2018)

SI. No	Location	РН	TDS	T.Chlorides	T.Hardness
			Ppm	Ppm	Ppm
1	Office new well ,IREL, MK	7.3	290	85	201
2	Office old well, IREL, MK	7.7	350	114	201
3	Canteen well, IREL, MK	7.4	300	142	281
4	Zirconium Oxide Plant, IREL, MK	7.6	210	100	161
5	Valliyar river,N8º08'40.0''E77º18'31.0''	6.5	110	43	120
6	Muttom,N8º07'38.6"E77º19'03.7"	6.8	280	113	280
7	Tank Near Laboratory, IREL, MK	6.5	157	81	160
8	Guest house out west well, IREL, MK	7.0	390	170	161
9	Guest house new well, IREL, MK	7.4	406	156	201
10	Pillaiyarcoil JunctionN8º09'12.8"E77º18'02.5"	7.2	195	113	241
11	Kootumangalam,N8º09'24.0''E77º17'25.6''	6.8	263	85	120
12	Sea water, IREL, MK	7.5	22500	21336	9061
13	Colachel,N8º10'02.9''E77º16'07.0''	6.8	106	57	80
14	IRE Drinking Water, IREL, MK	7.4	365	100	211
15	Esanthangu,N8º07'54.9''E77º19'43.8''	6.3	486	298	281
16	Kadiapattinam N8º08'11.3"E77º18'19.0"	7.8	710	284	241
17	Ammandivilai	6.9	65	28	120



TEST REPORT

AMBIENT AIR QUALITY SURVEY

Repor	tNo:	ECI-NN-AAQ	-143/03/20	19' ·	Report D	ate	20.03.2019	· ·
Custo & Adc	imer Name Iress	M/s. Indian f (A Governme Manavalakur Kanyakumari	Rare Earths ent Of India ichi-629252 i District, Ta	s Limited Undertaki 2 amil Nadu	ng)		-	. '
Custo	mer Reference :	MW-26/1819	Dt: 10/11/2	2018	Sample F	eference No :	ECI-NN-AAQ	-143/03/2019
Samp	le Drawn By :	ECI .			Sample F	eceived On :	16.03.2019	
Sâmp	le Collected Date :	15.03.2019		· ·	Test Con	imenced Cn :	16.03.2019	
Qty of	Sample Received :	Filter Paper &	& 25ml Solu	ition	Test Con	ipleted On :	19.03.2019	
Samp	le Description :	Ambient Air			Sampling	Method :	IS 5182:P14	· · · · · · · · · · · · · · · · · · ·
Samp	le Mark:	Top of Labora	atory				l	
S.No	PARAMETEI	ξ	UNITS	i RES	ULTS	TEST MET	HOD	Permissible limits of NAAOs (Industrial, Residential)
1.	Ammonia (as NH3)		µg/m ³	<	1.0	IS 11255:Pa	art 0 6	400
2.	Arsenic (as As)		ng/m ³	< (0.1 ·	IS 5182: Pa	irt 22	6.0
3.	Benzene (C ₆ H ₆)		µg/m ³	· <;	1.0	IS 5182:Pa	irt 11	5.0
4.	Benzo-a-Pyrine (BaP)		ng/m ³	· - ·	1.0	IS 5182:Pa	rt 12 ·	1.0
5.	Carbon Monoxide (as C	0)	mg/m ³	< -	1.2	ECI-SOP-SA	AM-08	2.0
6.	Lead (as Pb)		µg/m³*	<	0.1	IS 5182:Pa	rt 22	1.0
7.	Nickel (as Ni)	· · ·	ng/m ³	< (0.1	IS 5182:Pa	rt 22	20
8.	Nitrogen dioxide (as NC	2)	μg/m ³	14	1.8	IS 5182:Pa	rt 06	80
9.	Ozone (as O3)		µg/m³	< {	9,8	IS 5182:Pa	rt 09	180
1 0 .	Particulate Matter (PM 2	.5)	µg/m ³	25	5.1	EPA 40 CFR Part 5	0 Appendix L	60
1 1 .	Respirable Particulate M	latter (PM10)	µg/m ^a	49	9.7	IS 5182:Pa	rt 23	100
12.	Sulphur Dioxide (as SO)	2)	µg/m ^a	7	.1	IS 5182:Pa	rt 02	80
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			CHENI Mobile : e-mail :	NAI Tel : +91 (9944938637 ecichennai@er	(44) 42867084 wirocureindia.c	MADURAI Tel : +91 (Mobile : 82200 5870 om e-mail : lab@envirocare	452) 4355103 CO Mob sindia.com e-ma	IMBATORE Tel : +91 (422) 42 ile : 8056766966 ill : ecicbe@envirocareindia.cor
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TEST REPORT

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Enviro Care INDIA PRIVATE LIMITED ISO 8001: 2004 Certilised Company ISO 40001: 2004 Certilised Company OHSAS: 13001: 2007 Gertilised Company

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AMBIENT AIR QUALITY SURVEY

Legiont No. ECHNN-AQC-14203/2019 Regiont Date 20.03.2019 Austomer Name MS. Indian Rare Earths Limited Government Of India Undersking) MM-201919 Dt 10/11/2018 Sample/Reference Mo.: ECI-NIN-AAQC-14203/2019 aimple Developing System ECI Sample/Reference Mo.: ECI-NIN-AAQC-14203/2019 aimple Code My System ECI Sample/Reference Mo.: ECI-NIN-AAQC-14203/2019 aimple Code My System ECI Sample/Reference Mo.: ECI-NIN-AAQC-14203/2019 aimple Code My System TSS MM-201910 Dt 10/11/2018 Sample/Reference Mo.: ECI-NIN-AAQC-14203/2019 aimple My System ECI Sample/Reference Mo.: ECI-NIN-AAQC-14203/2019 aimple My System TSS Sample/Reference Mo.: IS 5182.214 aimple Market H IT for of Administrative Building TSS METHOD FRAME 1. Ammonia (as NHa) µg/m³ <1.0 IS 5182.Part 12 0.0 2. Arasnic (as As) ng/m³ <1.0 IS 5182.Part 12 1.0 3. Benzene (CaHa) µg/m³ <1.0 IS 5182.Part 12 1.0									
Ms. Indian Rare Earths Limited Address Ms. Indian Rare Earths Limited (Rovernment Of India Understang) Manavalakurichi 629252 Kanyskurare 105146, Zentski, Tamili Nadu Ustomer Reference [] MV-26/1819 Dt 10/112018 Sahptle/Réseived (M) [] [] [10.03.2019 ample Diffected Date [] [6.03.2019 Test Commenced Op [] [] [] 10.03.2019 ample Diffected Date [] [] 10.03.2019 Test Commenced Op [] [] [] 10.03.2019 ample Objected Date [] [] 10 of Administrative Building [] 10 of Administrative Building PARAMETERS NNTS NNTS RESULTS TEST METHOD 1. Armonia (ea NHs) µg/m ³ 2. Arsenic (as AS) ng/m ³ 3. Benzee (CAH) µg/m ³ 4. Benzo-a-Pyrine (3a P) ng/m ³ 9. Dizone (as 0A) ng/m ³	eport No :	ECI-NN-AAQ	-142/03/201	9	Report D	ate:	20.03.2019		
ustomer Reference MW-26/1819 Dt: 10/11/2018 Sample Reference No::::::::::::::::::::::::::::::::::::	ustomer Name Address	M/s. Indian F (A Governme Manavalakuri Kanvakumari	lare Earths nt Of India L ichi-629252 District, Tar	Limited Jndertaki nil Nadu	ng)				
ample Drawn By :: EC1 Sample Received On :: 15.03.2019 ample Collected Date :: 15.03.2019 Test Commenced On :: 18.03.2019 y of Sample Received :: Filter Paper & 25ml Solution Test Commenced On :: 19.03.2019 ample Description ::::::: Implement Air Sample Received :: 19.03.2019 ample Mark ::::::::::::::::::::::::::::::::::::	ustomer Reference :	MW-26/1819	Dt: 10/11/20)18 .	Sample	Reference No :	ECI-NN-AAQ	-142/03/2019	
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vg of Sample Received () Filter Paper & 25ml Solution T 5 f Completed On () 19.03.2019 ample Description ::::::::::::::::::::::::::::::::::::	ample Collected Date :	15.03.2019		· · · ·	Test Con	nmenced On :	16.03.2019		
Amble Description Amblent Air SampLing Method Is 5182:P14 Imple Mark: Top of Administrative Building TEST METHOD Permissible Imble on NAAGE Industrial, Permissible Imble on Industrial, Permissible Industrindustrindustrial, Permissible Industrial, Permissible Industria	ty of Sample Received :	Filter Paper 8	25ml Soluti	ion	Test Con	npleted On	19.03.2019		
ample Mark Top of Administrative Building Exco PARAMETERS UNITS REBUILTS ITEST METHOD MARAGE Industrial MARAGE INDUSTRIAL	ample Description :	Ambient Air	·		Samolin	Method	IS 5182:P14		
No PARAMETERS UNITS RESULTS TEST METHOD Result (Stress) 1. Armonia (as NH2) µg/m³ < 1.0	ample Mark:	Top of Admin	istrative Buil	dina				···.	
1. Armonia (as NH-5) µg/m ³ < 1.0	PARAMETE	RS	UNITS	RES	ULTS	TESTMET	HOD	Permissible limits of NAAQs (Industrial Residential)	
2. Arsenic (as As) ng/m³ < 0.1	1. Ammonia (as NH ₃)	ungdalara dilang di majarta di	ua/m ³		1.0	IS 11255:Pa	ent 06	400	
3. Benzone (C ₆ H ₆) µg/m ³ < 1.0	<td>2. Arsenic (as As)</td> <td></td> <td>ng/m³</td> <td>- 1</td> <td>0.1</td> <td>IS 5182:Pa</td> <td>rt 22</td> <td>6.0</td>	2. Arsenic (as As)		ng/m ³	- 1	0.1	IS 5182:Pa	rt 22	6.0
4. Benzo-a-Pyrine (BaP) ng/m³ < 1.0	3. Benzene (C ₆ H ₆)		μg/m ³	<	1.0	IS 5182:Pa	rt 11	5.0	
5. Carbon Monoxide (as CO) mg/m³ < 1.2	4. Benzo-a-Pyrine (BaP)		ng/m ³	• <	1.0	IS 5182:Pa	rt 12	1.0	
6. Lead (as Pb) µg/m³ < 0.1	5. Carbon Monoxide (as C	:0)	mg/m ³	<	1.2	ECI-SOP-SA	M-08	2.0	
7. Nickel (as Ni) ng/m ³ < 0.1	6. Lead (as Pb)	-	µg/m ³	<	0.1	IS 5182:Pa	rt 22	1.0	
8. Nitrogen dioxide (as NO2) µg/m ³ 13.2 IS 5182:Part 06 80 9. Ozone (as C ₃) µg/m ³ < 9.8	<td>7. Nickel (as Ni)</td> <td></td> <td>ng/m³</td> <td><</td> <td>0.1</td> <td>IS 5182:Pa</td> <td>rt 22</td> <td>· 20</td>	7. Nickel (as Ni)		ng/m ³	<	0.1	IS 5182:Pa	rt 22	· 20
9. Ozone (as C ₃)· µg/m ³ < 9.8	8. Nitrogen dioxide (as NC) ₂)	μ g /m ⁸	1	3.2	IS 5182:Pa	rt 06	80	
10. Particulate Matter (PM 2.6) µg/m³ 22.7 EPA 40 CFR Part 50 Appendix L 50 11. Respirable Particulate Matter (PM 10) µg/m³ 45.3 IS 5182:Part 23 100 12. Sulphur Dioxide (as SO2) µg/m³ 6.5 IS 5182:Part 02 80 2.rified By : For ENVIRO CARE INDIA PRIVATE LIMITED (Laboratory Division) emarks : For ENVIRO CARE INDIA PRIVATE LIMITED (Laboratory Division)	9. Ozone (as O ₃).		µg/m ⁸	. <	9,8	IS 5182:Pa	řt 09	180	
11. Respirable Particulate Matter (PMto) µg/m³ 45.3 IS 5182:Part 23 100 12. Sulphur Dioxide (as SO2) µg/m³ 6.5 IS 5182:Part 02 80 2-rified By : For ENVIRO CARE INDIA PRIVATE LIMITED (Laboratory Division) emarks : For ENVIRO CARE INDIA PRIVATE LIMITED (Laboratory Division)	10. Particulate Matter (PM :	2.5)	µg/m³	2	2.7	EPA 40 CFR Part 5	0 Appendix L	50 ·	
12. Sulphur Dioxide (as SO2) µg/m³ 6.5 IS 5182:Part 02 80 2rified By : B. MA 80 emarks :	11. Respirable Particulate N	vlatter (PM10)	µ g/ m ³	4	5.3	IS 5182:Pa	rt 23	100	
End of Report> For ENVIRO CARE INDIA PRIVATE LIMITED (Laboratory Division) (LAB (LAB (LAB (DIVISION) (LAB (DIVISION) (LAB (DIVISION) <td>12. Sulphur Dioxide (as SO</td> <td>¹2)</td> <td>µg/m³</td> <td>e</td> <td>3,5 .</td> <td>IS 5182:Pa</td> <td>rt 02</td> <td>80</td>	12. Sulphur Dioxide (as SO	¹ 2)	µg/m ³	e	3,5 .	IS 5182:Pa	rt 02	80	
Image: Product of the second state	•		 	- End of	Report -	>		<u> </u>	
emarks : For ENVIRO CARE INDIA PRIVATE LIMITED (Laboratory Division) Authorized Signatory Authorized Signatory CHENNAITE: +91 (44) 42867084 Mobile: 9944938637 e-mail: ecichemai@envirocareindia.com MADURAITE: +91 (45) 4355103 COMBATORETel: +91 (42) 4 Mobile: 8056766966 e-mail: ecichemai@envirocareindia.com CHENNAITE: +91 (44) 42867084 Mobile: 9944938637 e-mail: ecichemai@envirocareindia.com COMBATORETel: +91 (42) 4 Mobile: 8056766766 e-mail: ecichemai@envirocareindia.com COMBATORETel: +91 (42) 4 Mobile: 805676676 e-mail: ecichemai@envirocareindia.com COMBATORETel: +91 (42) 4 Holie: 805676676 e-mail: ecichemai@envirocareindia.com COMBATORETel: +91 (42) 4 Holie	rified By : B way	7 .				•			
CHENNAI Tel : +91 (44) 42867084 Mobile : 9944938637 e-mail : ecichernai@envirocareindia.com MADURAI Tel : +91 (452) 4355103 Mobile : 8220015870 e-mail : ecichernai@envirocareindia.com MADURAI Tel : +91 (452) 4355103 COIMBATORE Tel : +91 (422) 4 Mobile : 8056766966 e-mail : kb@envirocareindia.com MADURAI Tel : +91 (452) 4355103 COIMBATORE Tel : +91 (422) 4 Mobile : 8056766966 e-mail : kb@envirocareindia.com MADURAI Tel : +91 (452) 4355103 Mobile : 8056766966 e-mail : kb@envirocareindia.com					For	ENVIRO CARE IN	NDIA PRIVA	ATE LIMITED	
CHENNAITEI:+91 (44) 42867084 Mobile:9944938637 e-mail:ecichennai@envirocareindia.com MADURAITel:+91 (452) 4355103 MADURAITel:+91 (452) 4355103 Mobile:8020015870 e-mail:eb@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com Mobile:8026766966 e-mail:ecicbe@envirocareindia.com e-mail:ecicbe@envirocareindia	emarks :			AL INDIA	PRIVAN	(Laborati Authorize	ory Division) ۱ محکک d Signator	~~ v	
CHENNAITEL: +91 (44) 42867084 Mobile : 9944938637 e-mail : ecichennai@envirocareindia.com Mobile : 8220015870 e-mail : ebb@envirocareindia.com Mobile : 8056766966 e-mail : ebb@envirocareindia.com e-mail : ecicbe@envirocareindia.com Mobile : 8056766966 e-mail : ecicbe@envirocareindia.com e-mail : ecicbe@envirocareindia.com e-mail : ecicbe@envirocareindia.com e-mail : ecicbe@envirocareindia.com e-mail : ecicbe@envirocareindia.com	emarks:			ALINDIA LA	PRILA	(Laborati Authorize	ory Division)	∽~√ ¥	
CHENNAITel:+91 (44) 42867084 Mobile:9944938637 e-mail:eclchennal@envirocareindia.com Mobile:8220015870 e-mail:bb@envirocareindia.com Mobile:8056766966 e-mail:eclcbe@envirocareindia.com Mobile:805676696 e-mail:eclcbe@envirocareindia.com Hold Hold Hold Hold Hold Hold Hold Hold	emarks :		2 Daire		PRINTING	(Laborati Authorize	ory Division)) y	
CHENNAITel:+91 (44) 42867084 Mobile: 9944938637 e-mail: ecichennai@envirocareindia.com MADURAITel:+91 (452) 4355103 Mobile: 80250015870 e-mail: ab@envirocareindia.com e-mail: ab@enviro	emarks :			LA DIVIS	PRILE IMAGE	(Laborati Authorize	ory Division)	γγγ γ	
	emarks :		- UBIT		PRIVER UMITED	(Laborati Authorize	ory Division)	• •	
	emarks :		CHENN Motile : 9 e-mail : ec	AI Tel: +91 94493637 :tchennai@er	PAN B BION DURAL 441 42867084	(Laborati Authorize	452) 4355103 COl Mab	MBATORE Tel : +91 (422) 4 ile : BDS6766966 Il : ecicbe@envirocareindia.co	
	emarks :		CHENN Mobile : 9 e-mail : ec	AI Tel: +91 of 944938637 tichennai@er	P.R. B. SION JURAN * 44) 42867084 wirocareindia.	(Laborati Authorize Authorize MADURAITel :+91 (Mobile : 8220015870 e-mail : kb@envirocare	ery Division) ed Signator (452) 4355103 COI Mob india.com e-ma	MBATORE Tel :+91 (422) 4 ile : 8056766966 ill : ecicbe@envirocarcindia.co	



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TEST REPORT

AMBIENT AIR QUALITY SURVEY

Repo	rt No :	ECI-NN-AAQ	-144/03/20	19 Re	port Date :	20.03.2019
Custo & Ado	omer Name dress	M/s. Indian F (A Governme Manavalakur Kanyakumari	Rare Earth: India Ichi-629252 District, Ta	s Limited Undertaking) mil Nadu		
Custo	omer Reference :	MW-26/1819	Dt: 10/11/2	018 Sa	mple Reference No :	ECI-NN-AAQ-144/03/2019
Samp	ole Drawn By :	ECI		Sa	mple Received On :	16.03.2019
Samp	e Collected Date :	15.03.2 019		Ţe	st Commenced On :	16.03.2019
Qty o	f Sample Received : 👘	Filter Paper 8	25mi Solu	tion Te	st Completed On :	19.03.2019
Samp	le.Description :	Ambient Air		Sa	mpling Method	S 5182:P14
Samp	ie Mark:	Top of Civil V	Vorkshop B	uilding	······································	· · · · · · · · · · · · · · · · · · ·
S,No	PARAMETEI		UNITS	RESULT	S -	DD Permissible limits of NAAQs (Industrial, Residential)
1.	Ammonia (as NH3)		µg/m ³	< 1.0	IS 11255:Par	106 400
2,	Arsenic (as As)		ng/m ³	< 0.1	IS 5182:Part	22 6.0
3.	Benzene (C ₆ H ₆)	•	µg/m ³	< 1.0	IS 5182:Part	11 5.0
4.	Benzo-a-Pyrine (BaP)		ng/m ³	< 1.0	IS 5182:Part	12 1.0
5.	Carbon Monoxide (as C	0)	mg/m ³	< 1.2	ECI-SOP-SAM	A-08 2.0
6.	Lead (as Pb)		µg/m ³	< 0.1	IS 5182:Part	22 1.0
7.	Nickel (as Ni)		ng/m ³	< 0.1	IS 5182:Part	22 20
8.	Nitrogen dioxide (as NO	2)	µg/m ^a	14.5	IS 5182:Part	06 80
9.	Ozone (as O ₃)		µg/m ^a	< 9.8	IS 5182:Part	09 . 180
10.	Particulate Matter (PM 2	5)	µg/m ³	25.5	EPA 40 CFR Part 50	Appendix L 60
1 1.	Respirable Particulate M	atter (PM ₁₀)	µg/m ^s	49.1	IS 5182:Part	23 100
12.	Sulphur Dioxide (as SO ₂)	µg/m³	· 6.7	IS 5182:Part	02 B0 ·
 _erif			<	End of Re	port>	· · · · · · · · · · · · · · · · · · ·
lema	arks :		•		For ENVIRO CARE IN (Laborato	D IA PRIVATE LIMITED ry Division)
	•			RALINDIA	Authorize	d Signatory
					ION III	
			CHENI Mobile : e-mail : 1	NAI Tel : + 91 (44) 4 9944938637 ecichennai@enviroo	2867084 MADURAITel;+91 (4) Mobile:8220015870 arteiodia.com e-mail:lab@envirocareii	52) 4355103 COIMBATORETel : +91 (422) 4 Mobile : 8055766966 via com e mail : +riche@envirocareladia.cc





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TEST REPORT

AMBIENT AIR QUALITY SURVEY

Report No		ECI-NN-AAQ	-145/03/20	19	Report D	ate:	20.03.2019	
Sustomer I Address	Name	M/s. Indian F (A Governme Manavalakuri Kanyakumari	are Earths nt Of India chi-629252 District, Ta	s Limited Undertaki ! mìl Nadu	ng)	•		
ustomer l	Reference :	MW-26/1819	Dt: 10/11/2	018 · ·	Sample F	Reference No	ECI-NN-AAQ	-145/03/2019
ample Dra	awn By :	ECI	· ·		Sample F	Received On :	16.03.2019	
ample Co	lected Date :	15.03.2019			Test Con	menced On	16.03.2019	····
ty of Sam	ple Received	Filter Paper 8	25ml Solu	tion	Test Con	pleted On t	19.03.2019	
ample De	scription :	Ambient Air	_	•	Sampling	Method s	IS 5182:P14	<u> </u>
ampte Ma	rk (si de si d	Top of Canter	en Building		A SPACE CONSIST OF	n de orde de la finie de la contrar an antara		
No	PARAMETER	is i li	UNITS	: RES		TEST MET	HOD	Permissible limits of NAAQs (Industrial, Residential)
1. Amm	ionia (as NH3)		µg/m ³	< '	1.0	IS 11255:Pa	art 06	400
2. Arse	nic (as As)		ng/m ³	< ().1	IS 5182:Pa	rt 22	6.0
3. Benz	ene (C ₅ H ₆)	×	µg/m ³	< ۲	1.0	IS 5182:Pa	rt 11	5.0
4. Benz	o-a-Pyrine (BaP)		ng/m ³	< .	1.0	IS 5182:Pa	rt 12	1.0
5. Carb	on Monoxide (as C	0)	mg/m ³	<, ·	1.2	ECI-SOP-SA	M-08	· 2.0
3. Lead	l (as Pb)	<u> </u>	µg/m ³	< ().1	IS 5182:Pa	rt 22	1.0
7. Nicke	el (as Ni)		ng/m ⁸	. < ().1	IS 5182:Pa	rt 22	20
3. Nitro	gen dioxide (as NO	2)	µg/m ³	16	j.3	IS 5182:Pa	rt 06	80
9. Ozor	ie (as O ₃)		µg/m ³	< (9.8	IS 5182:Pa	rt 09	180
0. Parti	culate Matter (PM 2	5)	µg/m ³	28	J.1 ·	EPA 40 CFR Part 5	0 Appendix L	60
1. Resp	virable Particulate N	latter (PM10)	µg/m ³		5.6	IS 5182:Pa	rt 23	100
2. Sulpi	hur Dioxide (as SO ₂) ·	μg/m ³	8	.1	IS 5182:Pa	rt 02	80
erified B	By: B.via/2	,		End of	Report	>		
emarks	:				. For	ENVIRO CARE IN (Laborate	ory Division)	ATE LIMITED
				SE MUL	RIV	LAT	$\cdot \cdot \cdot \bullet$	\sim
	<u> </u>		/	S/		Authorize	ed Signator	γ
					ION S			
			CHENN Mobile : e-mail : e	VAI Tel : +91 (9944938637 scichennai@en	44) 42867084 virocareindia.c	MADURAITel : +91 (+ Mobila : 82200 5870 om e-mail : lab@envirocare	152) 4355103 СО Моb india.com е-та	MBATORE Tel : +9] (422) 4/ ile : 8056766966 ill : ecicbe@envirocareindia.co
la o La suite La suite La suite La suite La suite La suite La suite La suite	1. C. S. S. B. S. M. S. S. S. S. L. S. S. S. S. S. S. S. S. R. Hyff Andel S. S. S. S. S. S. S. S. Bolinik and S. S. S. S. S. S. M. S.	nto a lo product 11 of no product 12 of no production 10 of 200 at 200 10 of 200 at 200 200 200 at 200 200 at 200 200 200 200 200 200 200 200 200 200	hi a pati hi a pati wange pika gandung pika		900 - 1000 11 - 1000 11 - 1000	ha valanut tär nyturikse ht valanut tär nyturikse ht lå stav, data di 17 te	wasi (hyiliji) Sani al (Sani	



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TEST REPORT

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AMBIENT AIR QUALITY SURVEY

Report	Notes	ECI-NN-AAQ	44/03/2019	Э	Report Da	te :	05.03.2019	
Custor & Addi	ner Name ress	M/s. Indian R (A Governme Manavalakuri Kanyakumari	lare Earths nt Of India chi-629252 District, Ta	: Limited Undertakii mil Nadu	ng)			
Custor	ner Reference :	MW-26/1819	Dt: 10/11/2	.018	Sample R	eference No	ECI-NN-AAQ	-44/03/2019
Sampl	e Drawn By :	ECI	•		Sample R	eceived On :	28.02.2019	<u> </u>
Sampl	e Collected Date :	27.02.2019			TestCom	menced On :	28.02.2019	
Oty of	Sample Received :	Filter Paper 8	25ml Solu	ition	Test Com	pleted On :	04.03.2019	
Samol	e Description :	Ambient Air			Sampling	Method :	IS 5182:P14	
Sampl	e Mark:	Top of Admin	istrative Bu	uilding				
S.No	PARAMETE	3 8	UNITS	RES	JLTS	TESTMET	HOD	Permissible limits of NAAQs (Industrial, Residential)
<u>一部新生之中</u> 1.	Ammonia (as NH3)	e portant it in a vie <u>nz</u> e	µg/m³	< '	1. 0	IS 11255:P	art 06	400
2	Arsenic (as As)		ng/m ^a	<(0.1	IS 5182:Pa	rt 22	6.0
3	Benzene (CeHa)	······	µg/m ³	< '	1.0	IS 5182:Pa	art 11	5.0
4	Benzo-a-Pvrine (BaP)		ng/m ³	<	1.0	IS 5182:Pa	art 12	1.0
5	Carbon Monoxide (as C	0)'	mg/m ³	<	1.2	ECI-SOP-S/	AM-08	2.0
6	Lead (as Pb)	· · · · · · · · · · · · · · · · · · ·	 μg/m³	<	0.1	IS 5182: Pa	art 22	1.0
7.	Nickel (as Ni)		ng/m ³	<	0.1	IS 5182:Pa	art 22 🔅	20
8	Nitrogen dioxide (as NC		µg/m ³	12	2.8	IS 5182:Pa	art 06	80
<u>.</u>	Ozone (as O ₂)	····	ug/m ³	• < 9	9.8	IS 5182:Part 09		180
10	Particulate Matter (PM	s)	µg/m ³	· 2'	1.4	EPA 40 CFR Part 8	50 Appendix L	60
10.	Resoirable Particulate	Matter (PM10)	ug/m ³	3	9.5	IS 5182:Pa	art 23	100
12	Sulphur Dioxide (as SO	2)	⊔g/m ³	6	.2	IS 5182:Pa	art 02	80
erif	ied By: Build	~	<-	End of	Report -			
Rema	arks:				For	(Labora	tory Division)
				PE INDIA	PRIL	لیکی Authoriz	— १ र्स्झ्रे ed Signato	ν~-γ! ry
• • •		• •	ANRO	LAE DIVISI * MADUR	ON			
			CHE Mobile e-mail	NNAl Tel : +9 e : 994493863 i : ecichennai@	1 (44) 4286708 7 Jenviro carein di	4 MADURAI Tel : +9 Mobile : 822001 5874 a.com e-maii : lab@enviroo	(452) 4355103 년) M. pareindia.com e-	O(MBATORE Tel : +91 (422) 42 obite : 8056766966 mail : ecicbe@envirocareindia.cou
	्ताः स्टब्स् २०३१ विद्यालय स्टब्स् इत्या स्टब्स् स्वर्थना स्टब्स् इत्या स्टब्स् स्वर्थना स्टब्स् इत्या स्टब्स् स्टब्स् स्टब्स् इत्या स्टब्स् स्टब्स् स्टब्स् इत्या स्टब्स् स्टब्स् स्टब्स्	an an an an an an Shira an an Shira an an an Shira an an an an an Shira an an an an Shira an an an an Shira an an an an an	ntalia a a Generalia Generalia Gunaica Gunaica Currina	i 6 dil a constitue i 1 a constatione 2 - Armiso dalla 1 Al constatione 1 Al constatione	n san g Harann (Ar JC 107 (non i contra contra Contra contra contra Contra contra contra Contra contra	કારાયા છે. વિદ્યદ્વદિ હો વિસ્કૃત	



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AMBIENT AIR QUALITY SURVEY

eport	Not	ECI-NN-AAQ-	45/03/201	9.	Report Da		15.03.2018	· · · · · · · · · · · · · · · · · · ·			
ustor Add	ner Name ress	M/s. Indian Ra (A Governmen Manavalakurio Kanyakumari I	are Earths It Of India Ini-629252 District, Ta	s Limited Undertakii 2 amil Nadu	mited dertaking) Nadu						
usto	ner Reference :	MW-26/1819 [Dt: 10/11/2	2018	Sample Reference No ECI-NN-AAQ-45/03/2019						
amol	e Drawn By t	ECI	<u>.</u>		Sample R	eceived On :	28.02.2019				
ampl	e Collected Date	27.02.2019			Test Com	menced On :	28.02.2019				
tty of	Sample Received :	Filter Paper &	25ml Solu	ution	Test Con	pleted On :	04.03.2019				
ampl	e Description	Ambient Air			Sampling	Method :	IS 5182:P14				
amo	e Mark:	Top of Labora	tory								
s.No	PARAMETE	RS	UNITS	RES	JLTS	TEST METH	OD	Permissible limits of NAAOS (Industrial, Residential)			
4	one and the NHa)	<u>19979 (1997) 1 1977 (19</u> 71)	ua/m ³	<u> </u>	1.0	IS 11255:Pa	rt 0 6	400			
<u>''</u>	Areenic (as As)		ng/m ³	<	0.1	IS 5182:Par	t 22	6.0			
2.	Banzene (CeHe)		µ g/m³	<	1.0	IS 5182:Par	11	. 5.0			
<u>э.</u> И	Benzova-Purine (RaP)		na/m ³	. <	1.0	IS 5182:Par	t 12	<u> </u>			
<u>4.</u> 5	Carbon Monovide (as (:0)	ma/m ³	<	1.2	ECI-SOP-SA	M-08	2.0			
<u>р.</u>			µa/m ³	<	0,1	IS 5182:Pa	t 22	1.0			
0 . 7	Leau (as Fu) Nickol (as Nii)		na/m ³	<	0.1	IS 5182:Part 22 🚓		20			
<u></u>	Nitragon diovide (as Ní	<u></u>	uo/m ³	1.	4.3	IS 5182:Part 06		60			
0.			ua/m ⁸	<	9.8	IS 5182:Part 09		180			
9. 10	Daticulate Matter (PM	26)	ua/m ³	2	4.8	EPA 40 CFR Part 5) Appendix L	60			
10.	Particulate Matter (1 M	2.5) Matter (PM ₁₀)	uơ/m³	4	6.2	IS 5182:Pa	rt 23	100			
40	Respirable Falucolate		ua/m ³		3.9	IS 5182:Pa	rt 02	80			
12.		·2/		<u> </u>	Poport -						
<u>erif</u> Rem	<u>آed By : کې په تونې م</u> arks :	7' <u>,</u>		(E INO)	For	ENVIRO CARE II (Laborat	NDIA PRIV ory Division こでのかう ed Signato	ATE LIMITED			
		<u> </u>	(IB SION S			- -			
			CHI Mob e-mi	ENNALTel : + 4 ile : 994493863 ail : ecichennai@	91 (44) 428670 7 Denvirocareind	84 MADURAITel : +91 Mobile : 82200 5870 ia.com e-maii : lab@enviroca	(452) 4355103 ⊂ M reindia.com &	COIMBATORE Tel : +91 (422 lobile : 80567665866 maîl : ecicbe@envirocareiodi			
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	 State of the second seco	alista on a sec parti da techni politica participation politica participation politica participation	s Sector Jack Sector Sector Sector Sector	ef. III milli Vidd Reury	ilie am li 11 ier more	איר באינייט איז	មសាល់ដែន ២ ភ្លៀមរាប់រាប់ទៅ				



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TEST REPORT

AMBIENT AIR QUALITY SURVEY

Repor	t No:	ECI-NN-AAQ	-46/03/2019	•	Report D	ate : 05.03.2019	
usto Add	mer Name ress	M/s. Indian F (A Governme Manavalakur Kanyakumari	Rare Earths ent Of India L ichi-629252 i District, Tar	Limited Undertaki mil Nadu	ng)	·	
Susto	mer Reference :	MW-26/1819	Dt: 10/11/20	D18	Sample R	eference No ECI-NN-AAQ	-46/03/2019
Samp	le Drawn By :	EC1			Sample F	eceived On 28.02.2019	
Samo	e Collected Date :	27.02.2019			Test Com	menced On 1 28.02.2019	
orv of	Sample Received	Filter Paper &	25ml Solut	ion	Test Com	pleted On : 04.03.2019	
Samo	e Description :	Ambient Air	•	· .	Sampling	Method IS 5182:P14	
Samo	e Mark:	Top of Civil V	Vork Shop B	uilding	F : F Marchael		
S.No	PARAMETER		UNITS	RES	ULTS	TEST METHOD	Permissible limits of NAACs (industrial, Residential)
<u></u> 1	Ammonia (as NHa)	2.49.1.1 <u>4.1.4</u> .1.7 () 4.1 4	La/m ³	<	1.0	IS 11255:Parl 06	400
2.	Arsenic (as As)		ng/m ³	<	0.1	IS 5182:Part 22	6.0
3.	Benzene (CeHe)		µg/m³	<	1.0	IS 5182:Part 11	5.0
4.	Benzo-a-Pvrine (BaP)		ng/m ³	<	1.0	IS 5182:Part 12	1.0
5.	Carbon Monoxide (as C	D) ·	mg/m ³	<	1.2 .	ECI-SOP-SAM-08	2.0
6.	Lead (as Pb)	<u></u>	ug/m ³	<	0.1	IS 5182:Part 22	1.0
7.	Nickel (as Ni)		ng/m ³	<	0.1	IS 5182:Part 22 🖑	20
8.	Nitrogen dioxide (as NO	2)	μα/m ⁸	13.1		IS 5182:Part 06	80
9.	Ozone (as O ₃)		µg/m ⁸	< 9.8		IS 5182:Part 09	180
10	Particulate Matter (PM 2	ડો	ug/m ³	23.2		EPA 40 CFR Part 50 Appendix L	60
11	Respirable Particulate M	atter (PMin)	ua/m ³	41.7		IS 5182:Part 23	1 0 0
12	Suthbur Dioxide (as SO)	uo/m ³	· · ·	5.5	IS 5182:Part 02	80
	ied By: B_viar	>	<	- End of	Report -	>	
Rema	arks :		•		For	(Laboratory Division)	
	•		1	1 CANDIA	PHIN	Authorized Signator	y
			WIND C		DN NOT		<u>.</u>
			CHEN Mobile : e-mail : 1	NAJ Tel : +91 9944938637 acichennai@	(44) م28670B envirocareindia	MADURALTeL:+91 (452) 4355103 CC Mobile: 822001 5870 Mo .com e-mail: lab@envirocaraindla.com e-m	DIMBATORE Tel : +91 (422) bite : 8056766966 nail : ecicbe@envirocareindiaa
	a service de la service à mais de la service de la service service de la service de la service delle relation d'article de la service de la service de la service desta de la service de	an a	i provinsi Sectorem I negati politi g thourant g thourant g thourant g thourant g thourant g thourant g thourant g thousant g thousa	l (m) no a michaels amaint annas an	n : : : : : : : : : : : : : : : : : : :	ອາຍາດອອກສາຍອອກອອກອາດອີດອີດອີດອີດອີດອີດອີດອີດອີດອີດອີດອີດອີດ	



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TEST REPORT

AMBIENT AIR QUALITY SURVEY

Repo	rt No ::	ECI-NN-AAC	2-47/03/2019)	Report D	ite:	05.03.2019	· _ · · · · · · · · · · · · · · · · · ·
usto Ado	omer Name iress	M/s. Indian I (A Governma Manavalakur Kanyakumar	Rare Earths ent Of India ichi-629252 i District, Tai	Limited Undertak mil Nadu	ng)			· . ·
usto	mer Reference :	MW-26/1819	Dt: 10/11/2	018	Sample F	eference No	ECI-NN-AA	Q-47/03/2019
amp	le Drawn By :	ECI			Sample R	eceived On	28.02.2019	
amp	le Collected Date	27.02.2019			Test Com	menced On :	28.2.2019	
tý ö	Sample Received :	Filter Paper &	& 25mi Solut	bon	Test Com	pleted On :	04.03.2019	
amp	le Description !	Ambient Air		•	Sampline	Method :	IS 5182:P14	f
amp	le Marki	Top of Cante	en Building		<u>100 10 90 00 00 00 00 00 00 00 00 00 00 00 00</u>	ang na galang na ng na ng na n		
5.No	PARAMETER	8	UNITS	RES	ULTS -	JEST MET	HOD	Permissible limits of NAAQS (Industrial) Residential)
1.	Ammonia (as NH₃)		µg/m ³	<	1 .0	IS 11255:P	art 06	400
2.	Arsenic (as As)		ng/m ³	<	0. 1	IS 5182:Pa	nt 22	6.0
3. ·	Benzene (C ₆ H ₆)		-µg/m ³	<	1.0	IS 5182:Pa	irt 11	5.0
4.	Benzo-a-Pyrine (8aP)		ng/m ³	<	1.0	IS 5182:Pa	irt 12	1.0
5.	Carbon Monoxide (as C	0)	mg/m ³	· <	1.2	ECI-SOP-S/	AM-08	2.0
6,	Lead (as Pb)		µ g/ m³	<	0.1	IS 5182:Pa	nt 22 ·	1.0
7.	Nickel (as Ni)		ng/m ^s .	<	0.1	IS 5182:Part 22 🕅		20
8.	Nitrogen dioxide (as NO	2)	µg/m³	15.6		IS 5182:Part 06		80
9.	Ozone (as O3)		µg/m ³	< 9.8		IS 5182:Part 09		180
10.	Particulate Matter (PM 2	5)	µg/m³	27.3		EPA 40 CFR Part 5	0 Appendix L	60
1 1.	Respirable Particulate M	latter (PM ₁₀)	µg/m ^a	· 5	ô.2	IS 5182:Pa	irt 23	100
12.	Sulphur Dioxide (as SO ₂)	µg/m ³	7	.9	IS 5182:Pa	irt 02	80
rif	ied By : いっぷックン		<	- End of	Report	-> ,		
ēma	arks :			(s. s. 1. 4. S.	For	ENVIRO CARE II (Laborat	NDIA PRIV ory Division - `\ स्ट्री` ed Signato	ATE LIMITED
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			CHÈNN Mobile : e-mail : e	1AI Tel : +91 9944938637 :cichennai@e	(44) 42867084 nvirocareindia.	MADURAI Tel : +91 Mobile : 8220015870 com e-mail : lab@enviroca	(452) 4355103 ⊂ M reindia.com e-	OIMBATORE Tel : +9 i (422) 4 obile : 8056766966 maß : ecicbe@envirocareindia.c
	Lasaghi is kittaan ar Shiri is kataa Kaasa Andina UG Spino Units Shi sanciliy (SURT nisati) Rija (Ny SPino Nisati) Rija	in the tig in the tig	ni din operat alexanisten di alexanisten di alexaniste activity alexaniste activity	lean na na lean na na arg Inteni ara Data	e	a t Muntania charac n t Muntania n s d <u>AN</u> Monacle (ទះញាល់ព្រំសំ ៤៤៦ ស្ថិត្រឡា(ភូ ខ្ញុំស្រុន)	oracia Jepon



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TEST REPORT

AMBIENT AIR QUALITY SURVEY

Зерог	ENo:	ECI-NN-AAQ-	218/01/2019	Report D	ate : 112.01.2019	· · · · · · · · · · · · · · · · · · ·				
usto Add	mer Name ress	M/s. Indian R (A Govemmer Manavalakuri Kanyakumari	are Earths I nt Of India U chi-629252 District, Tan	Limited Indertaking) nil Nadu	ăng)					
ústo	mer Reference :	MW-26/1819	Dt: 10/11/20	18 Sample F	Reference No ECI-NN-AAQ	218/01/2019				
amo	e Drawn By	ECI		Sample	Received On: 216 09.01.2019					
amp	e Collected Date	08.01.2019		Test Con	imenced On 2 09.01.2019					
tv of	Sample Received	Filter Paper &	25ml Soluti	on Test Con	pleted On 12.01.2019					
amb	e Description	Ambient Air		Sampling	Method 3 IS 5182:P14					
amb	le Mark r	Top of the Ad	ministrative	Building						
S.No	PARAMETE	R S	UNITS	RESULTS	TEST METHOD	Permissible limits of NAACs (Industrial, Residential)				
1.	Ammonia (as NH3)	16(12/9) V Mar 19 S (8/2/	µg/m³	< 1.0	IS 11255:Part 06	400				
2	Arsenic (as As)		ng/m ⁹	< 0.1	IS 5182:Part 22	6.0				
3.	Benzene (CaHa)		µg/m ³	< 1.0	IS 5182:Part 11	5.0				
4	Benzo-a-Pyrine (BaP)		ng/m ³	< 1.0	IS 5182:Part 12	1.0				
5	Carbon Monoxide (as C	:0)	mg/m ³	< 1.2	ECI-SOP-SAM-08	2.0				
6.	Lead (as Pb)		µg/m ³	< 0.1	IS 5182:Part 22	1.0				
7.	Nickel (as Ni)		ng/m ³	< 0.1	IS 5182:Part 22	20				
8.	Nitrogen dioxide (as NO	D ₂)	ug/m ³	13.1	IS 5182:Part 06	80				
9	Ozone (as O ₃)		µg/m ³	< 9.8	IS 5182:Part 09	180				
10.	Particulate Matter (PM	25)	µg/m ⁸	22.1	EPA 40 CFR Part 50 Appendix L	60				
11.	Respirable Particulate I	Matter (PM ₁₀)	µg/m ³	45.6	IS 5182:Part 23	100				
12	Sulphur Dioxide (as SC	(4	ug/m ⁸	6.5	IS 5182:Part 02	80				
rif	ied By : N. Jare	ush.	<	- End of Report -						
Rem	arks :			- NDIA PA						
				AN ALL	Authorized Signator	r v				
				DIVISION * MADURAN *						
			CHENN Mobile : 5 e-mail : et	1A] Tel : +9! (44) 42867084 9944938637 cichennal@envirocareIndia.	MADURA17el :+91 (452) 4355103 CO Mobile : 82200 15870 Mob com e-mail : lab@envirocareIndia.com e-m	IMBATORE Tel : +91 (422) 4 vile : 8056766966 all : ecicbe@envirocareIndia.c				
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AMBIENT AIR QUALITY SURVEY

TEST REPORT

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Repo	xt No:	ECI-NN-AAC	1-219/01/2	019	Report E	late:	12.01.2019	
Cust & Ad	omer Name dress	M/s. Indian I (A Governma Manavalakur Kanyakumar	Rare Earti ent Of India richi-62925 i District, T	hs Limited a Undertaki 52 Tamìl Nadu	ng)	,	<u>-</u>	
Cust	omer Reference :	MW-26/1819	Dt: 10/11/	/2018	Sample I	Reference No	ECI-NN-AAQ	-219/01/2019
Sam	ole Drawn By *	ECI			Sample	Received On	09.01.2019	
Sam	ole Collected Date	08.01.2019			Test Con	nmenced On s	09.01.2019	
Qfy c	f Sample Received	Filter Paper &	& 25ml Sol	ution	Test Con	noleted On-	12.01.2019	
Sam	ole Description	Ambient Air	·····		Samplin	Method	IS 5182:P14	
Samj	ole Mark:	Top of the La	aboratory E	Building	of the second			······································
S.Nc	PARAMETER	ιs.	UNITS	RESU	ILTS I	TEST MET	100	Permissible limits o NAACs (industrial, Residential)
1.	Ammonia (as NH ₃)	a una billi dante ll'una (n' burbillita)	μ g/m³	<u>< 1</u>	<u>.0</u>	IS 11255:Pa	art 06	400
2.	Arsenic (as As)		ng/m ³	< 0	.1	IS 5182:Pa	rt 22	6.0
3.	Benzene (C ₆ H ₆)		µg/m ³	< 1	.0	IS 5182:Pa	rt 1 1	5.0
4.	Benzo-a-Pyrine (BaP)		ng/m ³	< 1	.0	IS 5182:Pa	rt 12	1_0
5.	Carbon Monoxide (as C	0)	mg/m ³	< 1	.2	ECI-SOP-SAM-08		2.0
6.	Lead (as Pb)		µg/m ⁸	< 0	.1	IS 5182:Part 22		1.0
7.	Nickel (as Ni)		ng/m ³	< 0.1		IS 5182:Pa	20	
8.	Nitrogen dioxide (as NO;	2)	µ g /m ³	12.7		IS 5182:Pa	rt 06	80
9.	Ozone (as O3)		µg/m ³	< 9.8		IS 5182:Par	rt 09	180
10.	Particulate Matter (PM 2.	5)	µg/m ³	21.	5	EPA 40 CFR Part 50	Appendix L	60
11.	Respirable Particulate M	atter (PM ₁₀)	µg/m ³	40.	6 IS 5182:Part 23		rt 23	100
12.	Sulphur Dioxide (as SO ₂)	µg/m ³	6.9)	IS 5182:Pa	t 02	80
jerif lema	ied By: N. Southers	× ,	<-	End of	Report For	>		
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					ISION			
			CHENN Mobile : e-mail : e	IAI Tel : +91 (44 9944938637 cichennai@envir) 42867084 ocureindia.com	• MADURAI Tel :+91 (45) Mobile : 8220015870 n e-mail : lab@envirocareine	2) 4355103 COIMI Mobile dia.com e-mail :	3ATORE Tol : +91 (422) 42 8056766966 ecicbe@envirocareindia.con





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AMBIENT AIR QUALITY SURVEY

TEST REPORT

Report No :	ECI-NN-AAC	-220/01/201	9	Report I	>ăte State ∎aistat	12.01.2019	
Customer Name & Address	M/s. Indian I (A Governme Manavalakur Kanyakumar	Rare Earths ent Of India I ichi-629252	Limited Undertaki mil Nadu	ng)	1	•	
Customer Reference	MW-26/1810	Dt- 10/11/2	1118	CLEME			
SampleiDrawn By	ECI	<u></u>	10	Samue		ECI-NN-AAC	-220/01/2019
	08.01.2010	·		Santae		09.01.2019	<u> </u>
	Ciltor Denos (06-10-1-4			nmenced Op: 14.14	09.01.2019	
	Ambient Air	25mi Soluti	ion	lest Cor	npleted On State of the	12.01.2019	
		4141-4-01		Samplin	g Method 2	IS 5182:P14	
		VII VVOR Sho	p Buildin	9			
INC PARAMETER	S.	UNITS	RES	ULTS :	TEST MET	НОД	Permissible limits of NAAOs (Industria). Residentia l
1. Ammonia (as NH ₃)		µg/m ⁸	<	1.0	IS 11255:Pa	art 06	40 0
2. Arsenic (as As)		ng/m ³	<	0.1	IS 5182:Pa	rt 22	6.0
3. Benzene (C ₆ H ₆)		μg/m ³	<	1.0	IS 5182:Pa	rt 11	5.0
4. Benzo-a-Pyrine (BaP)		ng/m ^a	< 1	1.0	IS 5182:Pa	rl 12	1.0
5. Carbon Monoxide (as CC))	mg/m ^a	<	1.2	ECI-SOP-SA	M-08	2.0
6. Lead (as Pb)		µg/m³	< (0.1	IS 5182:Pa	rt 22	1.0
7. Nickel (as Ni)		ng/m ³		0.1	IS 5182:Pa	t 2 2	20
8. Nitrogen dioxide (as NO2)	µg/m ³	. 16	5.5	IS 5182:Pa	t 06	80
9. Ozone (as O ₃)		µg/m ³	< (9.8	IS 5182:Pa	rt 09	180
0. Particulate Matter (PM 2.5)	µg/m ³	28	.6	EPA 40 CFR Part 50) Appendix L	60
1. Respirable Particulate Ma	atter (PM ₁₀)	µg/m ^a	54	.3	IS 5182:Par	t 23	100
2. Sulphur Dioxide (as SO ₂)		µg/m ³	. 7.	8	. IS 5182:Par	t 02	80
enified By: N . Actuals emarks:	× . 	<	End of I	Report For	> ENVIRO CARE IN (Laborato	DIA PRIVA	TE LIMITED
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-		NIRO	DIVIS				
		CHENNA Mobile : 994 e-mail : ecic	ITel:+91 (4 44938637 thenoal@envi	+) 42867084 rocareindia.co	MADURA Tei :+91 (4) Mobile : 82200 5870 m e-mail : lab@envirocareir	i2) 4355103 COIP Mobile Idia.com e-mail	1BATORETel : +91 (422) 42 e : 8056766966 : ecicbe@envirocareindia.com
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REPORT TEST

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AMBIENT AIR QUALITY SURVEY

	ECI-NN-AAQ-221	/01/2019	Report D	ate :	12.01.2019	· · · · · · · · · · · · · · · · · · ·
Sustamar Name	M/s. Indian Rare	Earths Limited				<u>.</u>
Address	A Government Of Manavalakurichi-E	плоја Undertak 29252	ing)	r		
	Kanyakumari Distr	ict, Tamil Nadu				
ustomer Reference:	/W-26/1819 Dt: 1	0/11/2018	Sample F	teference No :	ECI-NN-AAQ	-221/01/2019
ample Drawn By :	ECI		Sample F	ecelved:On 🖓 👘	09.01.2019	
ample Collected Date : 1000)8.01.2019		Test Con	menced On a difference	09.01.2019	
liv of Sample Received : F	ilter Paper & 25m	al Solution	Test Con	pleted On 🔄 🕬 👘	12.01.2019	
ample Description : 📰 🗸	Ambient Air		Sampling	Method	IS 5182:P14	
ample Mark:	op of the Canteer	n Building				······································
						Permissible limits o
NO PARAMETER	S I I I I I I I I I I I I I I I I I I I	IITS RES	JULTS	F TEST MET	HQD	NAAQs (Industria)
1. Ammonia (as NH ₃)		<u>//m³ </u>	10	11265-D	ad OS	Kesidemial)
2. Arsenic (as As)		u/m ³ <	0.1	IS 5182/Da	n 22	<u>+00</u>
3. Benzene (CsHa)		/m ³ <	1.0	IS 5192.Fa	n 22 n 11	6.0
4. Benzo-a-Pyrine (BaP)	Ps	/m ³ ~	10	IQ 5102.F8	nt 12	3.0
5. Carbon Monoxide (as CO		1/m ³	12	FCLSOD S	M-08	. 7.0
6. Lead (as Pb)		/m ³ 2	01	IS 5182-DA	rt 22	2.0
7. Nickel (as Ni)		/m ³ ~		15 5182 Part 22		1.0
8. Nitrogen dioxide (as NO ₂)	11g	/m ³ 1	3.6	IS 5182:Part 06		20
9. Ozone (as O3)		/m ³ <	9.0 9.8	IS 5182:Part 09		190
0. Particulate Matter (PM 25)	µg	/m ³ 2	5 1	FPA 40 CER Part 5) Appendix I	60
1. Respirable Particulate Ma	(ter (PM ₁₀) ua	/m ³ 4	8.6	IS 6182 Pa		100
2. Suiphur Dioxide (as SO2)	ua	/m ³ 7	1	IS 5182 Pa	t 02	80
rified By : N. Journ	Α.		Report	·>		
emarks •			For J			
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		AND CAN DIVIS	A PRILE		ory Division) או אסריע d Signator	
		DIVIS	A PRILE		ory Division) און אסריי d Signator	
		UIVIS DIVIS	A PRILE		ory Division) או אסריע d Signator	
		ON DIVIS	A P.P. B 10N RAN H) 42867084		sz) 4355103 COI	1E LIMITED
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		CHENNAJ Tel :+9! (dobie :9944938637 -mail : ecichennai@en	A P.P. B 10N R AN 44) 42857084 //rocareiodia.co	Authorize MADURAITel :+91 (4 Mobile : 822001 5870 m e-mail : lab@envirocare	52) 4355103 COll Mobil rdia.com e-mai	1BATORE Tel :+91 (422) 4 : : 8056766966 : ecicbe@envirocarcindia.co
		CHENNAI Tel:+9! (Abile:994938637 -mail:ecichennai@en	A P. 8 10N RAVX 44) 42857084 virocareindía.co	Authorize MADURAITel : +91 (4 Mobile : 822001 5870 m e-mail : lab@envirocare	52) 4355103 COII India.com e-mai	1BATORE Tel :+91 (422) 4 : 8055766966 : ecicbe@envirocareindia.co
		CHENNAI Tel:+9! (Tobie:994938637 Hmail:ecichennai@en	A P.P. B 10N RAN H) 42867084 Virocareiodia.co	Authorize	52) 4355103 COll ndia.com e-mai	1BATORE Tel :+91 (422) 4 =: 8056766956 : ecicbe@envirocarcindia.cc
		CHENNAI Tel :+9! (Tobile :9944938637 Hmail : edichennai@en 279m- Maful : 2116 ::	A P. 8 10N RAV* 14) 42857084 virocareindia.co	Authorize Authorize	52) 4355103 COll Mobil India.com e-mai	1BATORE Tel :+91 (422) 4 : 8055766956 : ecicbe@envirocarcindia.co
		CHENNAITel:+91 (dobie:9944938637 -mail:ecichennai@en 2759n- Infil:1016 I	A P.P. B 10N RAVX 44) 42857084 virocareindia.co	MADURAITel :+91 (4 Mobile : 8220015870 m e-mail : lab@envirocare	52) 4355103 COII mdia.com e-mai op.of/filmesic/filmesic result of result	1BATORE Tel :+91 (422) 4 a: 8055766956 : ecicbe@envirocarcindia.cc



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TAMILNADU POLLUTION CONTROL BOARD

Advanced Environmental Laboratory, Tirunelveli - 10.

AMBIENT AIR QUALITY SURVEY - REPORT OF ANALYSIS

Report, No. 19/AEL-TNV/AAQS/2018 - 2019 Dated: 05.12.2018

- 1. Name of the Industry : M/s, Indian Rare Earths Limited
 - Address of the Industry

2,

3,

- Manavalakurichi Post, Kanyakumari District.
- . <u>X</u>
- - : 8 hours

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Red Large

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Duration of survey
 Category/Classification

6. Land use classification

Meteorological Conditions

Ambient	Min	Max	Relative	Min		Max
Temperature (°C)	26	31	Humidity (%)	60		78
Weather condition	Partial	y Cloudy	Rain Fall (mm)		Nil	· .
Predominant Wind	South West to	North East	Mean Wind			
Direction	·		Speed (Km/hr.)	•	. · · .	

AMBIENT AIR QUALITY SURVEY RESULTS

St	Location of the sampling station		te ieter	GL	F	ollutants (μg/m ³⁾	
No		action.	xima s ih rr *	m) m)	PM ₁₀	SO ₂	NO2
		Duc	Appro	Appro Height (
<u> </u>	On top of Laboratory Building	North	100	4	160.03	10.03	10.1
2.	On top Administrative block	North East	150	4	91.5	24.08	10.1
3.	On top of civil department building	East	150	4	91.10	13.04	9,6
4.	On top of guest house building	South East	1000	4	73.30	5.0	9.14
5.	On top of building at canteen	South West	100	4	97.9	47.5	16.6

Note: * With respect to major emission sources.

The analytical results are restricted to the sampling period of 8 hrs

Test Performed	Test Method
PM10	IS 5182: (Part23) - 2006
SO ₂	Modified west Graeke / IS 5182 : (Part 2) - 2001 RA: 2012
NO ₂	Jacobs - Hochheiser / IS 5182: (Part 6) - 2006 RA : 2012

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Page no.2 of 1/



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ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd, Manavalakurichi, Kanyakumari Dt ,	
Source of Emission	Ambient Air Quality Monitoring	
Date of Sampling	24-10-2018 & 25-10-2018 (24hrs)	
Report date	30-10-2018	
Report No	AAQM/2018/10/07/1	
Location	Top of Guest House Building	

SL No	Particulars	Unit	Value	Limit
1	Particulate Matter (PM ₁₀)	microgm/m3	57.1	100
2	Particulate Matter (PM 2.5)	microgm/m3	17.4	60
3	Sulphur Dioxide (SO 2)	microgm/m3	5.0	80
4	Nitrogen Dioxide (NO 2)	microgm/m3	10.8	80

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ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd,	
-	Manavalakurichi,	
	Kanyakumari Dt ,	
Source of Emission	Ambient Air Quality Monitoring	
Date of Sampling	24-10-2018 & 25-10-2018 (24hrs)	· · · · · · · · · · · · · · · · · · ·
Report date	30-10-2018	
Report No	AAQM/2018/10/07/2	
Location	Near Workers Rest Room	

SL No	Particulars	Unit	Value	Limit
1	Particulate Matter (PM ₁₀)	microgm/m3	59.2	100
2	Particulate Matter (PM 2.5)	microgm/m3	18.9	60
3	Sulphur Dioxide (SO 2)	microgm/m3	4.5	80
4	Nitrogen Dioxide (NO 2)	microgm/m3	11.6	80





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ANALYSIS REPORT

M/s. Indian Rare Earths Ltd,
Manavalakurichi,
Kanyakumari Dt ,
Ambient Air Quality Monitoring
24-10-2018 & 25-10-2018 (24hrs)
30-10-2018
AAQM/2018/10/07/3
Top of Laboratory Building

SL No	Particulars	Unit	Value	Limit
1	Particulate Matter (PM ₁₀)	microgm/m3	71.5	100
2	Particulate Matter (PM 2.5)	microgm/m3	21.4	60
3	Sulphur Dioxide (SO 2)	microgm/m3	5.6	80
4	Nitrogen Dioxide (NO 2)	microgm/m3	12.2	80

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ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd,	
	Manavalakurichi,	
	Kanyakumari Dt ,	
Source of Emission	Ambient Air Quality Monitoring	
Date of Sampling	24-10-2018 & 25-10-2018 (24hrs)	
Report date	30-10-2018	
Report No	AAQM/2018/10/07/4	
Location	Top of Canteen Building	

SL No	Particulars	Unit	Value	Limit
1	Particulate Matter (PM ₁₀)	microgm/m3	77.2	100
2	Particulate Matter (PM 25)	microgm/m3	23.8	60
3	Sulphur Dioxide (SO 2)	microgm/m3	6.0	80
4	Nitrogen Dioxide (NO 2)	microgm/m3	12.8	80





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ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd, Manavalakurichi, Kanyakumari Dt ,	
Source of Emission	Ambient Air Quality Monitoring	
Date of Sampling	24-10-2018 & 25-10-2018 (24hrs)	
Report date	30-10-2018	
Report No	AAQM/2018/10/07/1	
Location	Top of Guest House Building	

SL No	Particulars	Unit	Value	Limit
1	Particulate Matter (PM10)	microgm/m3	57.1	100
2	Particulate Matter (PM 2.5)	microgm/m3	17.4	60
3	Sulphur Dioxide (SO 2)	microgm/m3	5.0	80
4	Nitrogen Dioxide (NO 2)	microgm/m3	10.8	80





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ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd,
	Manavalakurichi,
	Kanyakumari Dt ,
Source of Emission	Ambient Air Quality Monitoring
Date of Sampling	24-10-2018 & 25-10-2018 (24hrs)
Report date	30-10-2018
Report No	AAQM/2018/10/07/2
Location	Near Workers Rest Room

SL No	Particulars	Unit	Value	Limit
1	Particulate Matter (PM ₁₀)	microgm/m3	59.2	100
2	Particulate Matter (PM 2.5)	microgm/m3	18.9	60
3	Sulphur Dioxide (SO 2)	microgm/m3	4.5	80
4	Nitrogen Dioxide (NO 2)	microgm/m3	11.6	80





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ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd,
	Manavalakurichi,
	Kanyakumari Dt ,
Source of Emission	Ambient Air Quality Monitoring
Date of Sampling	24-10-2018 & 25-10-2018 (24hrs)
Report date	30-10-2018
Report No	AAQM/2018/10/07/3
Location	Top of Laboratory Building

SL No	Particulars	Unit	Value	Limit
1	Particulate Matter (PM ₁₀)	microgm/m3	71.5	100
2	Particulate Matter (PM 2.5)	microgm/m3	21.4	60
3	Sulphur Dioxide (SO 2)	microgm/m3	5.6	. 80
4	Nitrogen Dioxide (NO 2)	microgm/m3	12.2	80

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ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd,	
	Manavalakurichi,	
	Kanyakumari Dt	
Source of Emission	Ambient Air Quality Monitoring	
Date of Sampling	24-10-2018 & 25-10-2018 (24hrs)	
Report date	30-10-2018	
Report No	AAQM/2018/10/07/4	
Location	Top of Canteen Building	_

SL No	Particulars	Unit	Value	Limit
1	Particulate Matter (PM ₁₀)	microgm/m3	77.2	<u> </u>
2	Particulate Matter (PM 2.5)	microgm/m3	23.8	60
3	Sulphur Dioxide (SO 2)	microgm/m3	6.0	80
4	Nitrogen Dioxide (NO 2)	microgm/m3	12.8	80

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TEST REPORT

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STACK MONITORING

leport No :	ECI-NN-SM-199/03/2	2019	Report Da	te:	20.03.2019				
∶ustomer Ňame ⊭ Address	M/s. Indian Rare Ea (A Government Of In Manavalakurichi-629 Kanyakumari District	urths Limited Idia Underlaki 1252 I, Tamil Nadu	ng)			•			
Customer Reference MW-26/1819 Dt: 10/11/2018 Sample Reference No.: ECI-NN-SM-199/03/2019									
ample Drawn By 📖 👫	ECI	•	Sample R	ecelved On :	18.03.2019	•			
ample Collected Date :	16.03.2019	,	Test Com	menced On :	18.03.2019				
ty of Sample Received :	Thimble & 50 ml Solr	n [.]	Test Com	pleted On :	20.03.2019				
ample Description :	Stack ·		Sampling	Method :	IS :11255:P1				
ample Mark:	2 TON FBD - Chimne	ey			·	• • • • • • • • • • • • • • • • • • • •			
No PARAMETERS	UNITS	RESUL		CTESTMETI	łOD	Max Permissible TNPCB norms for General Emission Standards			
1. Ambient Temperature	°C -	32		IS 11255:Pa	rt 03	NA			
2. Carbon Monoxide (as CC	D) % (v/v)	< 0.2		IS 13270)	1.0			
3. Flow rate	Nm ³ /hr	5089		IS 11255:Pa	rt 03	NA			
4. Flue Gas velocity	m/sec	9.0		IS 11255:Pa	rt 03 🕓	NA			
5. Oxides of Nitrogen (as N	O _{x)} mg/Nm ³	17,2	IS	11255:Part 07 & IS	5182 :Part 06	. NA			
6. Particulate Matter (PM)	mg/Nm ³	112.2		IS 11255:Part 01		150			
7. Port hole Height from G I	Level m	10.0			NA				
8. Stack Diameter at port h	ole m	0.50			·	NA -			
9. Stack Height from G Lev	el m	16.0		7777		NA			
10. Stack Temperature	°C	101		IS 11255:Part 03		NA			
1. Sulphur Dioxide (as SO ₂)) mg/Nm ³	- 8.6		IS 11255:Pa	rt 02	NA			
		< End of	Report	->					
emarks: NA - Not Appli	cable		For I	ENVIRO CARE I (Laborat	NDIA PRIVA ory Division)	TE LIMITED			
				A	1.5	W			
				Authoriz	ed Signatory	r 			
		DIN IN AND	AB IISION						
	Mal e-m	IENNA1 Tel :+91 (* bile : 9944938637 nail : ecichennai@en	14) 42867084 virocareIndia.com	MADURAI Tel :+91 (Mabile : 82200 5870 n e-mail : 1ab@envirocari	452) 4355103 COIM Mobile sindla.com e-mail :	BATORE Tel : +91 (422) 42 : 8036766966 : edcbe@envirocareindia.co			
 Josephine, Contractional and Accessive Contractions and Contraction Statements and statement of Manager Statements in a second contraction and the second statement of Table International Statements and statement and an another Statement Statement of Statements Statements and statement of Statements Statements and statement of Statements Statements and statements and statements of Statements Statements Statements and statements and statements of Statements Statements and statements an	i an malaita 1990 - Englister Sala 2010 - Englister Sala a dat kassignesegika syagiantister Stocky tompanging situeda	of t Chille & Chille Machiel Miller Machiel Miller Machiel Willer Machiel Miller Machiel Miller	. 1લ(ગા <u>રી</u>) કુલાવા:) (કુલુ અલગુરુરકા ² ())નેલું	ા. જુરાતેઓ દીત: (વાળા ક (2.4 સુર, વાળા હાલાની	uti anan kitakin Manang				

Enviro Care INDIA PRIVATE LIMITED ISO 14001 : 2004 Certified Company ISO 14001 : 2004 Certified Company ONSAS : 18001 : 2007 Certified Company n marsenal of Marshall (Cornell) Referencementaria, Rochter Auff

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TEST REPORT

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Report No		ECI-NN	4-SM-200/03/2	2019	Report	Date	20,03.2019		
M/s. Indian Rare Earths Limited Customer Name (A Government Of India Undertaking) & Address Manavalakurichi-629252 Kanyakumari District, Tamil Nadu									
Customer	Reference :	MW-26	/1819 Dt: 10/1	1/2018	Sampl	e Reference No	ECI-NN-SM-20	0/03/2019	
Sample Dr	awn By :	ECI	·····	······································	Sampl	e Received On	18.03.2019	• .	
Sample Co	ollected Date :	16.03.2	2019		TestiC	ommenced On :	18.03.2019		
Qty of San	nple Received :	Thimbl	e & 50 ml Solr	1	Test C	ompleted On	20.03.2019	-	
Sample De	scription :	Stack		·	Såmpl	ing Method 🗧 👔	IS:11255:P1		
Sample M:	ark:	llumina	te SD No-351	- Chimney				,	
S.No	PARAMETERS		UNTS	RESULI	(S	TESTMETH	OD.	Max:Permissible TNPCB norms for General Emission Standards	
1. Amb	vient Temperature	10.00 .00 100 100	°C	32	-	IS 11255:Par	t 03	NA	
2. Cart	oon Monoxide (as C	0)	% (v/v)	< 0.2		IS 13270		1.0	
3. Flow	v rate		Nm ³ /hr	1842		IS 11255:Par	t 03	NA	
4. Flue	Gas velocity		m/sec	9.3		IS 11255:Par	t03.	NA	
5. Oxid	les of Nitrogen (as N	(O _{x)}	mg/Nm ³	15.5		IS 11255:Part 07 & IS	5182 :Part 06	NA	
6. Parti	iculate Matter (PM)		mg/Nm ³	97 .3		. IS 11255:Par	150		
7. Port	hole Height from G Level m . 13.0							NA .	
8. Stac	k Diameter at port h	ole	m	0.30				ŇA	
9. Stac	k Height from G Lev	<i>r</i> el	m	19.3	19.3			NA	
10. Stac	k Temperature		°C	· 110		IS 11255:Par	t 03	NA	
11. Sulp	hur Dioxide (as SO	2)	mg/Nm ³	7.6	·	IS 11255:Par	t 02	NA	
َ rified ا	By: Briar	7.	•	< End of	Report	:>			
Remarks	: NÁ – Not Appl	icable			F	or ENVIRO CARE IN (Laborate)	DIA PRIVA	TE LIMITED	
				ist INC	IA PRI	Authorize	• (The signatory	~	
	•			L VIC	AB ISION	LUM IN			
			CH Ma e-m	IENNAI Tel : +91 (bile : 9944938637 ail : ecichennai@en	44) 428670 virocareind	184 MADURAI Tel : +91 (* Mobile : 82200 5870 lia.com e-mall : lab@envirocare	52) 4355103 COIM Mobile india.com e-mail	BATORE Tel : +9 (422) 420 : 8056766966 ecicbe@envirocareindia.com	
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อาร์กรับของสารณ์สารณ์ จากเรื่องสารสาร สารณ์สารณ์ เป็นสารณ์จากเรื่องสารสารสารสาร

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TEST REPORT

Repo	rt No :	N-SM-201/03	V2019	Report Da	te : 1	20.03.2019	
Custo Add	omer Name (A Go dress Manax Kanya	ndian Rare E vernment Of I valakurichi-62 kumari Distriv	arths Limited India Undertaki 19252 ct, Tamil Nadu	ing)		· · · · · · · · · · · · · · · · · · ·	
ust	omer Reference : MW-2	6/1819 Dt: 10	/11/2018	Sample Re	eference No	ECI-NN-SM-2	201/03/2019
am	le Drawn By: ECI	1	· · · · · ·	Sample Re	ceived On :	18.03.2019	
amp	le Collected Date 16.03.	2019		Test Com	nenced On :	18.03.2019	
ty o	f Sample Received 🚺 Thimb	le & 50 ml So	dn	Test Com	bleted On	20.03.2019	
amp	le Description : Stack			Sampling	Method	IS :11255:P1	
amp	le Mark: Reference Zircon	SD No-851 -	Chimney			d .	·
S.No	PARAMETERS	UNITS			TESTMETH	GD	Max.Permissible : TNPCB norms for General Emission
<u>1</u>	Amhient Temperature	<u>@#######</u> # ℃	15品は唐僧和博徳を紹う 32	◇建築設計量 (本学型	IS 11255 Par	#03 103	NA
2	Carbon Monoxide (as CO)	% (v/v)	< 11 2		IS 13270		1.0
3	Flow rate	Nm ³ /hr	1876	·	IS 11255:Par	1.03	NA NA
4.	Flue Gas velocity	m/sec	9.6		IS 11255:Par	t 03	. NA
5.	Oxides of Nitrogen (as NO ₂)	ma/Nm ³	14.6	15	1255:Part 07 & IS	5182 :Part 06	NA
6.	Particulate Matter (PM)	mg/Nm ³	109.1		IS 11255:Par	150	
7.	Port hole Height from G Level	 m	10.0				NA
8.	Stack Diameter at port hole			NA			
9.	Stack Height from G Level	. m	17.05				· NA
10.	Stack Temperature	°C	115		IS 11255:Par	t 03	· NA
11.	Sulphur Dioxide (as SO ₂)	mg/Nm ³	7.0		IS 11255:Par	t 02	NA
_:rif ema	ied By : B NA - Not Applicable		< End of	Report For E	> NVIRO CARE II (Laborat	NDIA PRIVA ory Division)	TE LIMITED
			25 HO		Authorize	d Signator	¥
	· · · · · · · · · · · · · · · · · · ·		Convis				• •
		• M	HENNAI Tel : +91 (lobile : 9944938637 mail : ecicheonai@en	44) 42867084 virocareindia.com	MADURAJ Tel :+91 (* Mobile : 8220015870 n e-mail : lab@envirocare	452) 4355103 COI Mabii sindia.com e-mai	MBATORE Tel : +91 (422) 4 le : 8056766966 l : ecicbe@envirocareindia.co
	and a second s and a second s		mail : ecicheonai@en		n e-mail : lab@envirocare	india.com e-mai	i : ecicbe@envirocareindia.





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* STACK MONITORING

Report No		ECI-NN	-SM-202/03/2	2019	Repo	t Date:	20.03.2 0 19	
Customer & Address	Name	M/s. In (A Gov Manava Kanyak	dian Rare Ea ernment Of In alakurichi-629 kumari District	rths Limited dia Undertaki 252 , Tamil Nadu	ng)			
istomer l	Reference:	MW-26	/1819 Dt: 10/1	1/2018	Samp	le Reference No	ECI-NN-SM-2	02/03/2019
ample Dr	awn By 🗧 👘	ECI			Samp	le Received On :	18.03.20 19	
ample Co	llected Date : 🕬	16.03.2	2019		Test C	Commenced On :	18.03.2019	
ty of Sam	ple Received	Thimble	e & 50 ml Soln		Test C	ompleted On :	20.03.2019	
ample De	scription 7	Stack			Samp	ling Method :	IS :11255:P1	
mple Ma	rk:	Rutile S	SD No-401 - C	himney		1		
S.No	PARAMETERS		UNITS.	RESUL	IS I	TESTMETH	ÓD	Max Permissible TNPCB norms for General Emission Standards
1. Ambi	ient Temperature	(*89) (4 :92,8+1)	°C	<u></u>		IS 11255:Par	03	NA
2. Carb	on Monoxide (as Co	0)	% (v/v) ′	< 0.2		IS 13270		1.0
3. Flow	rate		Nm ³ /br	1841		IS 11255:Par	03	NA
4. Flue	Gas velocity		m/sec	9.5		IS 11255:Par	03	NA
5. Oxide	es of Nitrogen (as N		mg/Nm ³	17.3		IS 11255:Part 07 & IS 5	5182 :Part 06	NA
6. Parti	culate Matter (PM)		mg/Nm ³ 96.4 IS 11255:Part 01				150	
7. Port	hole Height from G	Level	m	15.0	15.0			NA
8. Stack	Stack Diameter at port hole m 0.30					NA		
9. Stack	k Height from G Lev	/el	m	17.8				NA
10. Stack	k Temperature		ಿ	1 17		IS 11255:Part	03	NA
11. Sulpl	nur Dioxide (as SO ₂)	mg/Nm ³	8.1.		IS 11255:Parl	02	· NA
erified E emarks	iv: Biwiev NA-Not Applic	able		< End of	Repor F	t>	IDIA PRIVA	TE LIMITED
					14 0.	(Laborato	ory Division) ເມສຫ	_t
	-	•		· BH	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Authorize	ed Signator	v V
				DIVI DIVI	AB SION	I.U.MI		
			CHI Mob e-m	ENNAITel:+91 (; ille:9944938637 ill:ecichennai@em	14) 428671 virocareino	084 MADURAI Tel :+9 (4 Mobile : 622001 5870 dia.com e-mail :lab@envirocare	S2) 4355 103 COIN Mobile ndia.com e-mail	1BATORE Tel :+9 (422) 4 2: 8056766966 : ecicbe@envirocareindia.co

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STACK MONITORING

Repo	rt No :	ECI-NN	-SM-203/03	/2019	Report	Date :	20.03.2019	
Custo & Ado	omer Name dress	M/s, Inc (A Gove Manava Kanyake	fian Rare E arnment Of I lakurichi-62 umari Distric	arths Limited ndia Underlaki 9252 ct, Tamil Nadu	ing)			
Custo	omer Reference :	MW-26/	1819 Dt: 10	/11/2018	Sample	Reference No :	ECI-NN-SM-20	3/03/2019
Samp	le Drawn By (ECI			Sample	Received On :	18.03.2019	
Samp	le Collected Date	16.03.20	019		Test Co	mmenced Oh 😒	18.03.2019	
۵ty o	f Sample Received :	Thimble	& 50 ml So	In	Test Co	mpleted On :	20.03.2019	
Samp	le Description :	Stack			Sampli	ng Method :	IS :11255:P1	
\amp	le Märk	22 TON	FBD - Chim	ney	-			
S.No	PARAMETERS		UNITS	RESUL			(OD	Max.Permissible INPCB norms for General Emission
								Standards
1.	Ambient Temperature		°C	32		IS 11255:Pa	ct 03	NA .
2.	Carbon Monoxide (as C	0)	% (v/v)	< 0.2		· IS 13270) <u>.</u>	1.0
3.	Flow rate		Nm [°] /hr	· 20862	1	IS 11255:Part 03		NA
4.	Flue Gas velocity		m/sec	· 9.4		IS 11255:Part 03		NA
5.	Oxides of Nitrogen (as N	10 _{x)}	mg/Nm [*]	17.6		IS 11255:Part 07 & IS	5182 :Part 06	NA
6.	Particulate Matter (PM)		mg/Nm°	120.5		IS 11255:Pa	rt 01	150
7.	. Port hole Height from G Level m 14.5					, ,		NA
8.	Stack Diameter at port h	ole	m	1.0				NA
9.	Stack Height from G Lev	/el	m	32.0				NA
10.	Stack Temperature		°C ·	108	,	IS 11255:Pa	rt 03	NA
11.	Sulphur Dioxide (as SO ₂)	mg/Nm ³	8.8		IS 11255:Pa	rt 02	NA
erif	ied By : Brig			< End of	Report	>		
ema	arks : NA – Not Applic	able		· · · · · · · · · · · · · · · · · · ·	Fa	r ENVIRO CARE IN (Laborato	(DIA PRIVA ory Division)	IE LIMITED
				141	014 po.	. Authorize	- d Signatory	Ý .
				UN CININO CA	AB ISION			-
		18	C	HENNA! Tel : +91 ((44) 4286708	84 MADURAITel : +91 (4 Mabile : 8220015870	152) 4355103 COIM Mobile	BATORE Tel : +91 (422) 42 : 9056766966





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STACK MONITORING

Repo	rt No :	ECI-NN-SM-33/03/2	019 R	eport Date: 05.03.2019	
Custo & Ado	omer Name (dress N	M/s. Indian Rare E A Government Of I Manavalakurichi-62 Kanyakumari Distric	arths Limited ndia Undertaking 9252 t, Tamil Nadu)	
Custo	omer Reference:	MW-26/1819 Dt: 10	/11/2018 S	mple Reference No	33/03/2019
Samp	le Drawn By :	ECI	S	ample Received On a 01.03.2019	
Samp	le Collected Date : 2	28.02.2019		st Commenced On 01.03.2019	
λŧy ο	f Sample Received : 1	Thimble & 50 ml So	n R	st Completed On (2 04.03.2019	
Samp	le Description	Stack	S	impling Method :	
Samp	le Mark;	luminate SD -No - 3	351 - Chimney		
S.No	PARAMETERS	UNITS	RESULTS	TEST METHOD	Max Permissible TNPCB norms for General Emission Standards
1.	Ambient Temperature	°C	32	IS 11255:Part 03	NA
2.	Carbon Monoxide (as CO) ⁻ % (v/v)	< 0.2	IS 13270	1.0
3.	Flow rate ·	Nm ³ /hr	1894	IS 11255:Part 03	NA
4.	Flue Gas velocity	m/sec	9.8	IS 11255:Part 03	NA
5.	Oxides of Nitrogen (as NO	D _{x}} mg/Nm ³	14.4	IS 11255:Part 07 & IS 5182 :Part 06	NA
6.	Particulate Matter (PM)	mg/Nm ³	95.8	IS 11255:Part 01	150
7.	Port hole Height from G L	evel m	13.0		NA
8.	Stack Diameter at port ho	le m	0.30	·	NA
9.	Stack Height from G Leve	i m	19.3		NA
10.	Stack Temperature	°C	1 18	IS 11255:Part 03	NA
11.	Sulphur Dioxide (as SO ₂)	mg/Nm ³	7.3	IS 11255:Part 02	NA
'erif	ied By : るッッック		< End of Re	eport>	
(em:	arks : NA - Not Applic	cable	INDIA A	For ENVIRO CARE INDIA PRIVA (Laboratory Division)	
	•		C LAB DIVISIO	N STATES	·
			EHENNAI Tel ;+91 (44 lobile :9944938637 -mail : ecichennai@envir) 42867084 MADURAI Tel : +91 (452) 4355103 CO Mobile : 82200 ! 5870 Mob rocareindia.com e-mail : lab@envirocareindia.com e-ma	IMBATORE Tel : +91 (422) ille : 8056766966 ail : ecicbe@envirocareindiz
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TEST REPORT

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Repo	rt Nó :	ECI-N	N-SM-34/03/20	19	Report	Date:	05.03.2019	
Custo & Ado	omer Name Gress	M/s. Ir (A Gov Manav Kanya	ndian Rare Ear /emment Of Inc /alakurichi-6292 kumari District,	ths Limited lia Underta) 252 Tamil Nadu	i king) 1	•		
Çusto	mer Reference :	MW-26	5/1819 Dt: 10/1	1/2018	Sample	Reference No :	ECI-NN-SM-3	34/03/2019
Samp	le Drawn By :	ECI			Sample	e Received On S	01.03.2019	•
Samp	le Collected Date : ;	28.02.	2019	•	Test C	ommenced On :	01.03.2019	
Qty o	f Sample Received	Thimbl	le & 50 ml Soln		Test C	ompleted On	04.03.2019	· · · · ·
Samp	le Description	Stack			Sampli	ng Method :	IS :11255:P1	
Samp	le Mark:	Zircon	SD -No - 851 -	Chimney				
S.No	PARAMETERS		UNITS	RESU	LTS	TESTMETH	Ə D	Max.Permissible TNPCB norms for Seneral Emission Standards
1.	Ambient Temperature		°C	32		IS 11255:Part 03		NA
2.	Carbon Monoxide (as CO	»)	% (v/v)	< 0,	2 [.]	IS 13270		1.0
3.	Flow rate		Nm ^a /hr	186	6	IS 11255:Par	t 03	NA
4.	Flue Gas velocity		m/sec	9.6		IS 11255:Par	: 03	NA
5.	Oxides of Nitrogen (as NC	D _{x1}	mg/Nm ³	13.9	Э	IS 11255:Part 07 & IS !	5182 :Part 06	NA
6.	Particulate Matter (PM)		mg/Nm ³	100.	6	IS 11255:Par	01	150
7.	Port hole Height from G L	evel	m	10.0)			NA
8 .	3. Stack Diameter at port hole m		m	0.30	•	'		, NA
9.	9. Stack Height from G Level		m	17.05		· · · ·		NA
10.	10. Stack Temperature °C		°C	119)	IS 11255:Part	03	NA
11.	Sulphur Dioxide (as SO ₂)		mg/Nm ³	6.9		IS 11255:Part	02	NA
	· · ·			End of	Report	>		

Verified By : 🌾

kemarks: NA - Not Applicable

NDIA LAB n:visioN 8901⁹⁴⁷

For ENVIRO CARE INDIA PRIVATE LIMITED (Laboratory Division)

لكر - 1 m **Authorized Signatory**

Mobile : 8220015870

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MADURAI Tel : +91 (452) 4355103 COIMBATORE Tel : +91 (422) 4206686 Mobile : 6056766966 e-mail : ecicbe@envirocareindia.com

e-mail : lab@envirocareindia.com

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e-mail : ccichennai@envirocareIndia.com



KE Enviro Care INDIA PRIVATE LIMITED ISC 9001 : 2000 Certified Company ISC 14001 : 2000 Certified Company OHAS : 18001 : 2007 Certified Company

TEST REPORT

STACK MONITORING

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Repo	nt No >	ECI-N	N-SM-35/03/2	019	Report	Date :	05.03.2019	
Custo & Ad	omer Name dress	M/s. Ir (A Go ^y Manav Kanya	ndian Rare Ea vernment Of Ir valakurichi-629 kumari Distric	arths Limited ndià Undertak 9252 t, Tamil·Nadu	ing)	· · ·	•	
Cust	omer Reference :	MW-2	6/1819 Dt: 10/	11/2018	Sample	Reference No	ECI-NN-SM-3	5/03/2019
Samp	ole Drawn By	ECI			Sample	Received On 2	01.03.2019	
Sam	ole Collected Date :	2 8.02.	2019	<u> </u>	Test Co	mmenced On :	01.03.2019	
Qty o	f Sample Received :	Thimb	le & 50 ml Sol	n	Test Co	moleted On z	04 03 2019	
Samo	le Description	Stack.			Samplin	d Method	IS -11255-P1	
Samp	Je Mark!	Rutile	- SD. No-401	- Chimney			10 11 200.1 1	
S.No	PARAMETERS			RESUL	rs	TEST METH	OD	Max.Permissible TNPCB norms fo General Emission Standards
1.	Ambient Temperature		°C	32	TUP Y APON SE	IS 11255:Par	t 03	NA
2.	Carbon Monoxide (as CO))	% (v/v)	. < 0.2		I\$ 13270		1.0
З.	Flow rate		Nm ³ /hr	1876		IS 11255:Part 03		NA
4.	Flue Gas velocity		m/sec	9.8		IS 11255:Part 03		NA
5.	Oxides of Nitrogen (as N	O _{x)}	mg/Nm ³	15.5	·	IS 11255:Part 07 & IS 5182 :Part 06		NA
6.	Particulate Matter (PM)	· ·	mg/Nm ³	rg/Nm ³ 94.6		IS 11255:Part 01		150
7.	Port hole Height from G Level		m	15.0		4c		NA
8.	Stack Diameter at port hole		m	0.30				NA
9.	Stack Height from G Level		m	17.8				NA
10.	Stack Temperature		°C	121		IS 11255:Part 03		NA
11.	Sulphur Dioxide (as SO ₂)	· ·	mg/Nm ³	7.9		IS 11255:Part 02		NA
erin "Ema	arks: NA - Not Appli	 cable	· · · · · · · · · · · · · · · · · · ·	-	Foi	ENVIRO CARE IN (Laborato	IDIA PRIVAT	
				AL IND	h Phile	Authorize	d Signatory	\sim
				Divis Divis	8 IGN	· · · · · · · · · · · · · · · · · · ·		
			Cł Ma er	HENNAI Tel ; +91 bbile : 9944938637 mail : ecichennai@er	(44) 4286708 Mirocareindia	4 MADURAITel:+9 (* Mobile:8220015870 Loom e-mail:lb@envirocare	152) 4355103 COIN Mobile India.com e-mal	1BATORE Tel :+91 (422) 2 : 8055766766 : ecicbe@envirocareindia.
	i an aine bha an an air an a Tha chuide an an chuidhean Tha chuide an an chuide Tha gan ta dhaan chuide Na chuide an an an an an an an an Tha chuidhean an an an an an an an an An an	n de da Galender Golder Golder Reight	Prinsis Wahari Cesupa Wahari Cesupa Kali Uga Seda Ratis Indagawa Kali Kali Seda	rat Guu muhala al c clunci al c clunci al constant constant constant	્રાઝ)નંદ્ર શિ 81 મહાદુર્શ	niictuu liictuu liic goolaan niictuu liictuu liic goolaan niir (Sotatuu liictuu liic) niir (Sotatuu liictuu liictuu niir	លាល់ ពោះ ដែមមាក ស្រីមាន៧ សៅកេះ	

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TEST REPORT

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STACK MONITORING

Repo	ort No :	ECI-N	N-SM-36/03/2	019	Repo	t Dàte :	05.03.2019	
Cust & Ad	omer Name dress	M/s. In (A Gov Manav Kanyal	odian Rare Ea /emment Of Ir /alakurichi-629 kumari Districi	arths Limited Idia Underlak 9252 t, Tamil Nadu	ing)		•	
ust	omerReference :	MW-26	5/1819 Dt: 10/	11/2018	Samp	le Reference No ;	ECI-NN-SM	-36/03/2019
Samp	ole Drawn By :	ECI			Samp	ple Received On 01.03.2019		
Samj	ole Collected Date ;	28.02.2	2019		Test C	ommenced On :	01.03.2019	
Jty o	f Sample Received :	Thimbl	e & 50 ml Sol	Π	Test C	ompleted On	04.03.2019	
Samj	ole Description :	Stack			Samp	ing Method :	IS :11255:P	
Sam	ole Mark!	2 TON	FBD - Chimn	êy .			•	• .
S.No	PARAMETERS		UNITS	RESUL	8	TEST METHO	B	Max Permissible TNPCB noms for General Emission Standards
1.	Ambient Temperature	1	°C	3 2		IS 11255:Part	03	NA
2.	Carbon Monoxide (as CO)	% (v/v)	< 0.2		IS 13270		1.0
3.	Flow rate		Nm ³ /hr	5212		IS 11255:Part 03		NA
4.	Flue Gas velocity		m/sec	. 9.1		IS 11255:Part 03		NA
5.	Oxides of Nitrogen (as N	O _{x)} .	mg/Nm ³	17.9		IS 11255:Part 07 & IS 5182 :Part 06		NA
6.	Particulate Matter (PM)		mg/Nm ³	109.6		IS 11255:Part 01		150
7.	Port hole Height from G 1	evel	m .	10.0				NA
8.	Stack Diameter at port ho	ole	m	0.50		·		NA
9	Stack Height from G Leve	el	m .	16.0				NA
10:	Stack Temperature		°C	96		IS 11255:Part 03		NA
11.	Sulphur Dioxide (as SO ₂)		mg/Nm ³	. 8.3		IS 11255:Part 02		NA
	· · · ·			< End of	Report	:>	•	
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eima	arks: NA – Not Appli	cable			F	or ENVIRO CARE IN	DIA PRIV	ATE LIMITED
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	,					Le Authorize	d Signator	У
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				VIG JE	ISION	Jā:		
				13	Ż	8		
				**	DURNY	•		•
	T. Drawn	•						
			CH	HENNAI Tel :+91	(44) 42867	084 MADURAI Tel : +91 (4	152) 4355103 CC	IMBATORE Tel ; +91 (422) 4
			Ма Справни е-п	bile : 9944938637 nail : ecichennai@e	nvirocarein	Mobile : 8220015870 dia.com e-mail : lab@envirocare	Мо india.com e-п	bile : 8056766966 ail : ecicbe@envirocareindia.c
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	(2) per los l'apres logistiques d'artes la secondada de la secondad secondada de la secondada de la secondada secondada de la secondada	· · · · · · · · · · · · · · · · · · ·	sedicidade siting da y anticas consistencias	ang shiya Na Newson as			n a fuist rite	and to Condema
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¹² S. M. S. SARAN, M. P. S. BURNER, M. S. S. SARAN, Phys. Rev. Lett. 81, 1000 (1995).

TEST REPORT

STACK MONITORING

lep c	e rt No : E	CI-NN-SM-37/03/	/2019	Repor	t Date : 05.03.2019	
ust Ad	omer Name (/ dress // K	Ws. Indian Rare E A Government Of Ianavalakurichi-6/ anyakumari Distri	Earths Limited India Undertak 29252 ict, Tamil Nadu	îng)	· ·	
ust	omer Reference : M	W-26/1819 Dt: 10	0/11/2018	Samp	e Reference No : ECI-NN-SM	-37/03/2019
am	ole Drawn By : E	CI		Samp	e Received On	0/100/2015
Sami	ole Collected Date : 2	8.02.2019		Test C	ommenced On	
)ty c	f Sample Received	himble & 50 ml Sc		Tect C	ompleted Op	
Sami	le Description	tack		Samn	109 Matora 11 19 11255-P	4
Sam	sle Mark: 22	2 TON FBD - Chir	nnev ·	Andrik	1997日を建設設備構造的設計運動の11200.F	·
S:No	PARAMETERS	UNITS	RESULT	8	TESTMETHOD	Mac.Permissible TNPCB norms for Seperal Emission Standards
1.	Ambient Temperature	°C	32	<u>hurren er Grei</u>	IS 11255:Part 03	NA
2.	Carbon Monoxide (as CO)	· % (v/v)	< 0.2		IS 13270	1.0
З.	Flow rate	Nm ³ /hr	20609		IS 11255:Part 03	NA
4.	Flue Gas velocity	Flue Gas velocity m/sec 9.4			IS 11255:Part 03	NA
5.	Oxides of Nitrogen (as NO	x) mg/Nm ³	15.9		IS 11255:Part 07 & IS 5182 :Part 06	NA
6.	Particulate Matter (PM)	mg/Nm ³	118.6		IS 11255:Part 01	150
7.	Port hole Height from G Le	vel m	14.5			NA
8.	Stack Diameter at port hole	e m	1.0		·	NA
9.	Stack Height from G Level	m 32.0				NA
10.	Stack Temperature		. 111		IS 11255:Part 03	NA
11.	Sulphur Dioxide (as SO ₂)	ma/Nm ³	8,6		IS 11255:Part 02	NA
éma	arks: NA – Not Applica	able		F	or ENVIRO CARE INDIA PRIVA (Laboratory Division)	ATE LIMITED
	,	a.			Authorized Signator	~~/' '¥
				NURAL S		·
			CHENNAJ Te) : +91 (tobile : 9944938637 :-mail : ecichennai@er	(44) 42967 ovinocarein	084 МАДИРАНТен: +91 (452) 4355 i 03 СС Mobile : 82200 i 5870 Мо dia.com e-mail : lab@envirocareindia.com e-m	MBATORE Tel : +91 (422) + bile : 8056766966 bil : ecicbe@envirocareindia.c
To and the second s	ાન્ય તેનું આવ્યા અને આ ગામ ૨. દેવા ગામનું તેનું આ ગામનું આવ્યું આવ્યું છે. આવેલું પ્રશ્નો પ્રાથમિક માં માં આવ્યું છે. આવેલું પ્રાથમિક સંસ્થાય છે અવેલું છે. આવેલું આવેલું આવ્યું છે. આવેલું પ્રાથમિક આ ગામનું છે.	an an trig of any her trig datawatan a stati datawatan a stati datawatan datawatan datawatan datawatan datawatan datawa	Alia an	a sanc Sanc Canon Sanco	មានស្ថាន ការស្រុកស្រុកការប្រកាសទាំង សាការ (ស្រុក អិសត) នាល់ស្សីស្សារ៉ាអូស្រុក មាកា ស្រែកលុក អិសត) នាល់ស្សីស្សារ៉ាអូស្រុក ចំពេត	


TEST REPORT

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STACK MONITORING

Report No : EC	-NN-SM-206/01/2	019 Re	port Date : 12.01.2019	<u> </u>
Lustomer Name (A d Address Mai Kar	. Indian Rare Eau Government Of In navalakurichi-6292 nyakumari District,	rths Limited dia Undertaking) 252 Tamit Nadu	ма и на малите роколо и до дата и на	
ustomer Reference: MV	-26/1819 Dt: 10/1	1/2018 Sa	nple Reference No	206/01/2019
ample Drawn By		5	mpic Received On 09.01.2019	
ample Collected Date	01.2019		Commenced On 09.01.2019	
ty of Sample Received	nble & 50 ml Soln	Tel	Completed On 12.01.2019	
ample Description	ck	Sa	npling Method	· · · · · · · · · · · · · · · · · · ·
ample Mark: 22 ~	fon FBD - Chimne	en la serie de la		
No PARAMETERS	UNITS	RESULTS	TEST METHOD	Max Permissible INPCE norms for General Emission
1. Ambient Temperature	<u>ං</u> ද	32	IS 11255:Part 03	NA
2. Carbon Monoxide (as CO)	% (v/v)	< 0.2	IS 13270	1.0
3. Flow rate	Nm ³ /hr	20354	IS 11255:Part 03	NA
4. Flue Gas velocity	m/sec	9.0	IS 11255:Part 03	NA
5. Oxides of Nitrogen (as NOx)	mg/Nm ³	15.4	IS 11255:Part 07 & IS 5182 :Part 06	NA
6. Particulate Matter (PM)	mg/Nm ³	120.5	IS 11255;Part 01	150
7. Port hole Height from G Lev	el m	14.5		NA
8. Stack Diameter at port hole	m	1.0		NA
9. Stack Height from G Level	m	32.0		NA
0. Stack Temperature		101	IS 11255;Part 03	NA
1. Sulphur Dioxide (as SO ₂)	mg/Nm ³	8.3	IS 11255:Part 02	NA
erified By : N. Janust.	· ·	< End of Rep	00rt>	·
e marks : NA – Not Applicat	le ,	NDIA A	For ENVIRO CARE INDIA PRIV (Laboratory Division)	
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STACK MONITORING

M/s. Indian Rare Earths Limited (A Government Of India Undertaking) Manavalakurunari District, Tamil Nadu IKomik: Réference: M/V-26/1819 Dt: 10/11/2018 Simple Charvillsy, Missie ECI Simple Charvillsy, Missie ECI Simple Charvillsy, Missie ECI Simple Received Ori 00.01.2019 Thimble So mi Soln Test Commenced Ori Thimble & So mi Soln Test Completed Ori Thimble Received St. Thimble & So mi Soln Test Completed Ori IS: 11255:P1 Imple Charvillsy, Missie 2 Ton FBD - Chirnney No PARAMETERS UNITS RESULTS PARAMETERS UNITS Reserved St. Interferences Interferences 1. Amblent Temperature *C 2. Carbon Monoxide (as CO) % (w) 3. Flow rate Nm ² /nr 5. Dxides of Nitrogen (as NO ₄) mg/Nm ² 6. Particulate Matter (PM) mg/Nm ² 7. Port hole Height from G Level m 8. Stack Diameter at port hole m 9. Stack Diameter at port hole m<	Repo	rt No ?	I-NN-SM-205/01/2	019 Rep	ort Date 12.01.2019	· · · ·	
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STACK MONITORING

TEST REPORT

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Sample Description Stack Sample Description Is :11256;P1 Sample Description Zircon - SD: No-851 - Chimney Image: Stack Sciences and Scienc	Div of Sample Received	Thimble	& 50 ml Soln		Test	ompleted On s	12.01.2019			
Bamble Matter Zircon - SD. No-851 - Chinney Sixo PARAMETERS UNITS RESULTS TEST METHOD Met Parities in TWPD romas 1. Ambient Temperature *C 32 15 11255.Part 03 NA 2. Carbon Monoxide (as CO) % (vM) <0.2	Sample Description	Stack		• • • •	Samp	ling Method	IS :11255:P1	<u> </u>		
Sino FARAMETERS UNITS RESULTS IEST METHOD Max Permission Standards 1. Ambient Temperature °C 32 IS 11255/Part 0.3 NA 2. Carbon Monoxide (as CO) % (W) <0.2	Sample-Marku	Zircon -	SD. No-851 -	Chimney	2.051546369			·		
1: Ambient Temperature *C 32 IS 11255:Part 03 NA 2: Carbon Monoxide (as CO) % (v/v) <0.2	S.No PARAMETERS		UNITS	RESUL	TS	TESTMETRO	2D	Max Permissible TNPCB norms for General Emission Standards		
2. Carbon Monoxide (as CO) % (v/v) < 0.2	1. Ambient Temperature		°C	32		IS 11255:Part	03	NA		
3. Flow rate Nm ³ /hr 1858 IS 11255:Part 03 NA 4. Flue Gas velocity m/sec 9.8 IS 11255:Part 03 NA 5. Oxides of Nitrogen (as NO ₂₀ mg/Nm ³ 14.5 IS 11255:Part 07 & IS 5182 :Part 06 NA 6. Particulate Matter (PM) mg/Nm ³ 102.3 IS 11255:Part 01 150 7. Port hole Height from G Level m 10.0 NA 8. Stack Height from G Level m 17.05 NA 9. Stack Temperature °C 129 IS 11255:Part 03 NA 11. Suphur Dioxide (as SO ₂) mg/Nm ³ 7.1 IS 11255:Part 02 NA Authorized Signatory CHENNAITEL: *91 (49 426/06H MADURAITEL: *91 (49 426/06H Maduraite: *91 (41 42	2. Carbon Monoxide (as C	0)	% (v/v)	< 0.2		IS 13270		1.0		
4. File Gas velocity m/sec 9.8 15 11255:Part 03 NA 5. Oxides of Nitrogen (as NO ₂) mg/Nm ³ 14.5 IS 11255:Part 07 & IS 5182 :Part 06 NA 6. Particulate Matter (PM) mg/Nm ³ 102.3 IS 11255:Part 01 150 7. Port hole Height from G Level m 10.0	3. Flow rate	· .	Nm ³ /hr	1858		IS 11255:Part	03	NA		
5. Oxides of Nitrogen (as NO ₂) mg/Nm ³ 14.6 IS 11255:Part 07 & IS 5182:Part 06 NA 6. Particulate Matter (PM) mg/Nm ³ 102.3 IS 11255:Part 01 150 7. Port hole Height from G Level m 10.0	4. Flue Gas velocity		m/sec	9.8		IS 11255:Part	03	NA		
6. Particulate Matter (PM) mg/Nm³ 102.3 IS 11255:Part 01 150 7. Port hole Height from G Level m 10.0	5. Oxides of Nitrogen (as N	IO _{x)}	mg/Nm ³	1 4 .5		IS 11255:Part 07 & IS 5	182 :Part 06	NA		
7. Port hole Height from G Level m 10.0 NA 8. Stack Diameter at port hole m 0.30 NA 9. Stack Height from G Level m 17.05 NA 10. Stack Temperature °C 129 IS 11255:Part 03 NA 11. Sulphur Dioxide (as SO ₂) mg/Nm ³ 7.1 IS 11255:Part 02 NA 11. Sulphur Dioxide (as SO ₂) mg/Nm ³ 7.1 IS 11255:Part 02 NA (File d By : N. Actward . Center of Report> For ENVIRO CARE INDIA PRIVATE LIMITED (Laboratory Division) Authorized Signatory (LAS Division) Maburature: :91 (44) 2807084 Maburature: :91 (44) 2807084 <td <="" colspan="2" td=""><td>6. Particulate Matter (PM)</td><td></td><td>mg/Nm³</td><td>102.3</td><td></td><td>IS 11255:Part</td><td>01</td><td>150</td></td>	<td>6. Particulate Matter (PM)</td> <td></td> <td>mg/Nm³</td> <td>102.3</td> <td></td> <td>IS 11255:Part</td> <td>01</td> <td>150</td>		6. Particulate Matter (PM)		mg/Nm ³	102.3		IS 11255:Part	01	150
8. Stack Diameter at port hole m 0.30 NA 9. Stack Height from G Level m 17.05 NA 10. Stack Temperature °C 129 IS 11255:Part 03 NA 11. Sulphur Dloxide (as SO ₂) mg/Nm ² 7.1 IS 11255:Part 02 NA refified By : N. Actual A. centrified Colspan="2">Mathematics (Colspan="2">Centrified Colspan="2">Mathematics (Colspan="2">Centrified Colspan="2">Centrified Colspan="2">Centrified Colspan="2">Centrified Colspan="2">Centrified Colspan="2">Centrified Colspan="2">Centrified Colspan="2" <td <="" colspan="2" td=""><td>7. Port hole Height from G</td><td>Level</td><td>m</td><td>10.0</td><td></td><td></td><td></td><td>NA</td></td>	<td>7. Port hole Height from G</td> <td>Level</td> <td>m</td> <td>10.0</td> <td></td> <td></td> <td></td> <td>NA</td>		7. Port hole Height from G	Level	m	10.0				NA
9. Stack Height from G Level m 17.05 NA 10. Stack Temperature °C 129 IS 11255:Part 03 NA 11. Sulphur Dioxide (as SO ₂) mg/Nm ³ 7.1 IS 11255:Part 02 NA rerified By : N. Actual A. certified By : N. Actual A. Cherinal Colspan="2">Mature Colspan="2">Mature Colspan="2">NA Cherinal Colspan="2">Colspan="2">NA Colspan="2">Colspan="2">Colspan="2">NA Colspan="2">Colspan="2">Colspan="2">Colspan="2">NA Colspan="2">Colspan="2" Colspan="2" <	8. Stack Diameter at port h	ole	л	0.30				NA		
10. Stack Temperature *C 129 IS 11255:Part 0.3 NA 11. Sulphur Dioxide (as SO ₂) mg/Nm ³ 7.1 IS 11255:Part 0.2 NA rerified By : N. Actual . c== End of Report> rerified By : N. Actual . c== End of Report> rerified By : N. Actual . c== End of Report> rerified By : N. Actual . c== End of Report> rerified By : N. Actual . c== End of Report> rerified By : N. Actual . CHENNAI Tol: *01 (Source Colspan="2">Colspan="2" Mactual is the isotope: Colspan="2" Mactual is the isotope: Colspan="2" Colspan= 2" <td>9. Stack Height from G Lev</td> <td>el</td> <td>m</td> <td>17.05</td> <td>_</td> <td></td> <td></td> <td>NA</td>	9. Stack Height from G Lev	el	m	17.05	_			NA		
11. Sulphur Dioxide (as SO2) mg/Nm³ 7.1 IS 11255:Part 02 NA (erified By : N. Actuard. Cend of Report> Generative Colspan="2">(aboratory Division) Actuard. Center Not Applicable For ENVIRO CARE INDIA PRIVATE LIMITED (Laboratory Division) Authorized Signatory (aboratory Division) Authorized Signatory (aboratory Division) Authorized Signatory (aboratory Division) Authorized Signatory (aboratory Division) Mathematical Signatory <td>10. Stack Temperature</td> <td></td> <td>°C</td> <td>129</td> <td></td> <td>IS 11255:Part</td> <td>03</td> <td>NA</td>	10. Stack Temperature		°C	129		IS 11255:Part	03	NA		
CHENNAITE: *91 (49) 428/0046 CHENNAITE: *91 (49) 428/0046 Mathematical Signatory CHENNAITE: *91 (49) 428/004	11. Sulphur Dioxide (as SO ₂))	mg/Nm ³	7.1		IS 11255:Part (02	NA		
CHENNAITEL +91 (41 A260704 LAB UNISION Authorized Signatory Authorized Signatory Authorized Signatory Authorized Signatory CHENNAITEL +91 (41 A260704 Mobile :94493637 e-mail : ecidemusi@envirocareinda.com MADURAITEL +91 (452) 435103 COMBATORETEL :+91 (42 Mobile :822013570 e-mail : ecidemusi@envirocareinda.com Chen / J + (10) - of A + C + of B + of B + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 +	erified By: N. Actuar	ړ . Icable		+ End of	Repor	t>				
CHENNAITEL: 191 (44) 42867084 MADURAITEL: 191 (452) 4355103 COMBATORE Tel : 191 (42) 4365704 Mobile: 391493637 MADURAITEL: 191 (44) 42867084 Maduratination (452) 4355103 COMBATORE Tel : 191 (42) 4365704 Mobile: 391493637 e-mail: ecidemusi@envirocareinda.com MADURAITEL: 191 (452) 4355103 COMBATORE Tel : 191 (42) 4365704 Mobile: 391493637 e-mail: ecidemusi@envirocareinda.com Maduratination (452) 4355103 COMBATORE Tel : 191 (42) 436570 Mobile: 391493637 e-mail: ecidemusi@envirocareinda.com Maduratination (452) 4355103 COMBATORE Tel : 191 (42) 4365676 Mobile: 391493637 e-mail: ecidemusi@envirocareinda.com mail: lab@envirocareinda.com mail: ecide@envirocareinda.com Mobile: 301404 Gambaste Maduratination (41) 4267084 Maduratination (41) 4267084 mail: lab@envirocareinda.com Mobile: 301404 Gambaste Maduratination (41) 4267084 Maduratination (41) 4267084 mail: lab@envirocareinda.com Mobile: 301404 Gambaste Maduratination (41) 4267084 Maturatination (41) 4267084 mail: lab@envirocareinda.com mail: lab@envirocareinda.com Mobile: 301404 Maturatination (41) 4267084 Maturatination (41) 4267084 Maturatination (41) 4267084 Maturatination (41) 4267084 Mobile: 30140					•	(Laborato	ry Division)			
CHENNAITEI:+91 (41) 42867084 Mobile:9914938637 e-mail:ecichenrai@envirocareindia.com MADURAITeI:+91 (452) 4355103 Mobile:8020015870 e-mail:ecichenrai@envirocareindia.com MADURAITeI:+91 (452) 4355103 Mobile:8020015870 e-mail:ecichenrai@envirocareindia.com Matter State (14) (452) 4355103 Mobile: 8020015870 e-mail:eciche@envirocareindia.com Matter State (14) (452) 4355103 Mobile: 802075870 e-mail:eciche@envirocareindia.com Matter State (14) (400000000000000000000000000000000000	X			EIN	DIADO	Authorize	へ 「「」 d Signator	\sim		
CHENNAITEL; +91 (44) 42867084 Mobile : 994493837 e-mail : ecichemai@envirocaraindia.com MADURAITEL; +91 (452) 4355103 Mobile : 802015870 e-mail : ebb@envirocareindia.com MADURAITEL; +91 (452) 4355103 Mobile : 8026766966 e-mail : ebb@envirocareindia.com COMBATORETEL:+91 (42 Mobile : 8026766966 e-mail : ebb@envirocareindia.com Combatore : ebb@envirocareindia.com MADURAITEL; +91 (452) 4355103 e-mail : ebb@envirocareindia.com Combatore : eb				CULINAT & MAD	AS SION	ALL DESCRIPTION	1			
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	e in Grand de Hiller verdetinge	i). Daug	agi çiri Marina (1995)							
	() ช่างให้สารประกัดหนึ่งให้ผู้ได้ชื่อให้ผู้ได้ เป็นสืบให้สารประสารประสารประสารประสารประวัติ เป็นสืบให้สารประสารประสารประสารประวัติ เป็นสืบให้สารประสารประสารประวัติ เป็นสารประวัติ (1997)	9260 1692 C C C C C C	energie Henche There are the	រស្មែន សំរើមខាត់សំតែ សំភ		ວາມສາຍ ແມ່ນການຮ່ວມ	ราง เกมร์ได้เป็นไปเมวร	ALL TO COMPANY		
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	s. East pully a contract	भूतुः अन्युः अन्युः अन्युः		CEMON	s Tre trees	(Three Party of the Party of th				
	2~ (AROMASHIDSHABILIASHI) ON A	มมีการณ์ ได้เจ็กไ			51016(1(3))					

Enviro Care INDIA PRIVATE LIMITED ISO 9001 : 2005 Gettind Company 0H9A3 : 18001 : 2007 Certified Company

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andre handels (1711) van die Nesenaan Gestaarde gevenere gestaanse van 2013

STACK MONITORING

TEST REPORT

Re po	rt No:	-SM-204/01/2	019	Report Date	l Frank Stati	12.01.2019	
uste L Ade	mer Name (A Gove dress Manava	lian Rare Ear mment Of Inc lakurichi-6292	ths Limited lia Undertaki 252	g)	· · · · · · · · · · · · · · · · · · ·	- -	
		uman District,	Tamil Nadu	_ 8:5#: 11.2 1.24			
LUSIC	Siner Reference: MVV-26/	1819 Dt: 10/1	1/2018	Sample Refe	rençe No r	ECI-NN-SM-2	204/01/2019
anj				Sample Rece	ivel on the	09.01.2019	
amp	DIE COLECTED LIATE E UN	019		lest Comme	iced One	09.01.2019	
ity o	Sample Received	& 50 ml Soln		TestComplet	ed On 💷 👘	1 2.01.2019	
iamp	e Description Stack			Sampling Me	thod	JS :11255:P1	
amp	e Mark: Rutile -	SD. No-401 - (Chimney				
5.No	PARAMETERS	UNITS	RESUL	S.	TEST METH	OD	Max Permissible INPCB norms for General Emission Standards
1.	Ambient Temperature	°C	32		IS 11255:Par	t 03	NA
2.	Carbon Monoxide (as CO)	% (v/v)	< 0.2		IS 13270		1.0
3.	Flow rate	Nm ³ /hr	1835		IS 11255:Par	t 03	NA
4.	Flue Gas velocity	m/sec	9.7		IS 11255:Part 03		NA
5.	Oxides of Nitrogen (as NO _{x)}	mg/Nm ³	15.2	IS 112	55:Part 07 & IS	5182 :Part 06	NA
6.	Particulate Matter (PM)	mg/Nm ³	93.5		IS 11255:Par	t 01	150
7.	Port hole Height from G Level	m	15.0				NA
8.	Stack Diameter at port hole	m	0.30				NA
9.	Stack Height from G Level	m	17.8		·		NA
10.	Stack Temperature	°C	126		IS 11255:Par	t 03	NA
1 1.	Sulphur Dioxide (as SO ₂)	mg/Nm ³	7,5		IS 11255:Par	102	NA
erifi ema	arks: NA - Not Applicable			For ENV	/IRO CARE IN (Laborati	NDIA PRIVA	TE LIMITED
			(RE 1910	PRIL	Authorize	ed Signatory	v v
			OUINIS HADUR	DN THE			
		CHE Mobil e-mail	NNAITel:+91 (4 e:9944938637 l:ecichennai@em) 42967084 rocareindia.com	MADURAŝTel : +91 (4 Mobile : 8220015870 e-mail : lab@envirocare	152) 4355103 COIN Mobile India.com e-mail	18ATORE Tel :+9 (422) 42 5 :8056766966 : ecicbe@envirocareindia.com
	ি এ এ এনার চেনে, তন্য, জনীয় বাবলার পর করা সমর্গে করা বাববোরে চিরি কার মন্ট্রের রাজনোগ্র দে ভারবারেরে জেল লার্জ্যা নির্মার্গি কার্বনা বিকরে হিন্দু বিজে জিলা নির্মার্গি কার্বনা বিকরে হিন্দু বিজে জিলা নির্মারিকার দের বিজেনার বিজেন	and Increan ann Anns Areanna A cha Areanna Anns Anna Anna Anns Anna Anna Anna Anna Anna Anna Anna Anna	n all szene lev be artelnediz szeneteni Mistary Joss	enne te metalika enne te metalika arche bi a de letiope@ally	noni in ingeneration noni interation nev/chieni osticod n	ono futur asteoncars	

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TEST REPORT

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STACK MONITORING

Repo	ort Nó :	ECI-N	N-SM-202/01/	2019	Repor	Date 12.01.2019		
Cust & Ad	omer Name dress	M/s. Ir (A Gov Manav Kanya	idian Rare Ea /ernment Of ir /alakurichi-629 kumari Distric	ian Rare Earths Limited mment Of India Undertaking) akurichi-629252 mari District Tamil Nadu				
ust	omer Reference	MW-20	3/1819 Dt: 10/	11/2018	Samol		202/01/2010	
am	ole Drawn By :: 1	EC!	·		Samol		20270112019	
am	ole Collected Data :	08.01.	2019	<u> </u>	TestC		<u></u>	
ty c	fiŞample Received :: •	Thimb	e & 50 ml Sol	n	TestC	Ompleted an article 12 01 2019		
ami	e Description	Stack		······	Samol	nu Method		
àmp	ole Mark:	llumina	ite - SD. No-3	51 - Chimney	3900 (BH 494) 53	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		
No No	PARAMETERS		UNITS	RESUL	S	TEST METHOD.	Max Permissible TNPCB norms for General Emission	
1.	Ambient Temperature	-∱-	°C	32	44571111128.8500	[S 11255:Part 03		
2.	Carbon Monoxide (as C(D) - (C	% (v/v)	< 0.2	<u> </u>	IS 13270	10	
3.	Flow rate	1	Nm ³ /hr	1814		IS 11255 Part 03	NA	
4.	Flue Gas velocity	1	m/sec	9.4		IS 11255:Part 03	NA	
5.	Oxides of Nitrogen (as N	O _{x)}	mg/Nm ³	13.6		IS 11255:Part 07 & IS 5182 :Part 06	NA	
6.	Particulate Matter (PM)	10	mg/Nm ³	96 .5		IS 11255:Part 01	150	
7.	Port hole Height from G I	Level	m	13.0			NA	
9.	Stack Diameter at port ho	ole	m	0.30			NA	
9.	Stack Height from G Leve	el	m	19.3			NA	
0.	Stack Temperature	1	0°	122		IS 11255:Part 03	NA	
1.	Sulphur Dioxide (as SO2) 🧳		mg/Nm ³	7.6		IS 11255:Part 02	NA	
erifi ema	ied By : N Not Applie	cable			Fo	r ENVIRO CARE INDIA PRIVA (Laboratory Division)	TE LIMITED	
				UNI	NDIA PA	Authorized Signatory	\sim	
27			-	DIV.	ISION RALX			
			CHI Mob e-m	ENNAITel:+91 (4 ile:9944938637 iil:ecichennai@envi	4) 4286708 irocareindia	4 MADURAI Tel : +91 (452) 4355103 COIN Mobile : 8220015870 Mobil .com , e-mail : lab@envirocareindia.com e-mail	18ATORE Tel : +91 (422) 4 e : 8056766966 l : ecicbe@envirocareindia.cc	
	Nernsteins delse is den ander Nernsteinstein oder delse in Intersteinstein mit bei der einer Intersteinstein delse der ander Intersteinstein delse interstein Intersteinstein delse intersteinstein Intersteinstein delse interstein delse interstein Interstein delse interstein delse interstein Interstein delse interstein delse interstein Interstein delse interstein delse interstein delse interstein Interstein delse interstein delse interstein delse interstein Interstein delse interstein delse interstein Interstein delse interstein delse interstein delse interstein Interstein delse interstein delse interstein delse interstein Interstein delse interstein delse interstein delse interstein delse interstein delse interstein delse interstein Interstein delse interstein delse interstein delse interstein delse interstein delse interstein delse interstein Interstein delse interstein delse int	i Tini 1671–62 1611–62 1611–62 1611–62 1611–62 1611–62	SUE. Churathis an Churathis an Churathire Ch	976 - 900 (2001) A 446 1 000 - 4210 (4 6 6 6 92 6 6 90 6 6 9 6 92 6 6 9 6 6 9 6 9 6 9 6 9 6 9 6 9 6 9	ទីខ្មែរពីលេខ ទីខ្មែរពីលេខ ស្រុកពល់	មិនតែលោក អាមុនរបស់ ក្រស់ ការបាល ត្រៃខ្លាំនាក់ទេលា ២ តែនៅសិលា ការ ស៊ើនចំប៉ុន សំណាល់ខណ្ឌ ប៉ុន្តែទូរសេលាស្មែមសាក្		



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TAMILNADU POLLUTION CONTROL BOARD

Advanced Environmental Laboratory, Tirunelveli - 10.

STACK MONITORING SURVEY - REPORT OF ANALYSIS

Report .F.No. 19/AEL- TNV/ SM/ 2018 - 2019, Dated: 05.12.2018

- Name of the Industry :
- : M/s.Indian Rare Barths Limited
- 2. Address of the Industry
- : Manavalakurichi Post, Kanyakumari District.
- 3. Date of Survey
- : 27.11.2018 & 28.11.2018
- 4. Type of Industry
- Mineral Separation

STACK MONITORING SURVEY RESULTS

• • •			smp °k	(m/sec)	arge ³ /day)	Pollı	itants (mg/	′ன³)
	Sl. No	Stack attached to	ck Te	Se Si S	Discl (NIM			•
			Sta	Flue Velo	Gas] rate	PM	SO ₂	NOx
••	1.	22 TPH FBD (Fluidized bed dryer)	333	3.84	. 233070	9 4.7	102.56	30.26
-	2.	Ilmanite Shaft dryer SD 351	401	3.86	17348	82.7	4.27	12.16
/3	-3 5.1-	Zircon wet Section dryer 851.	332	× 10.93	-33058	73.0	4.27	9.2
	4.	2TPH FBD	337.	9.18	137467	43.3	34.19	30.26

	Test Performed	Test Method
	PM10	IS 5182: (Part23) - 2006
į	SO ₂	Modified west - Graeke / IS 5182 : (Part 2) - 2001 RA: 2012
	NO ₂	Jacobs - Hochheiser / IS 5182: (Part 6) - 2006 RA : 2012

fficer, Board. Tirunelveli -10

Page no.4 of 11



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Tele : 0484-2575930,2108730 Fax: 0484-2540108 (M) 9446239504 E-mail: jescolab1@yahoo.co.in

(Environmental Laboratory approved by K.S.P.C.B.) Vellackal Building, Club Junction, Pookattupadi Road, Edappally P. O. P. B. No. 2204, Cochin - 682 024

ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd, Manavalakurichi, Kanyakumari Dt ,
Source of Emission	22TPH FDB (Stack Emission)
Date of Sampling	24-10-2018
Report date	30-10-2018
Report No	SEM/2018/10/07/1

SL No	Particulars	Unit	Value
1	Velocity of gas emission	m/sec	6.65
2	Temperature of stack gas	°C	70
3	Volume of stack emission	Nm ³ /hr	16327
4	Concentration of Pollutants		
4.1	Particulate matter	mg/Nm ³	144.8
4.2	Sulphur Dioxide	39	385.5
4.3	Carbon Monoxide	>>	Nil
4,4	Nitrogen Oxides	23	8.8



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Tele : 0484-2575930,2108730 Fax: 0484-2540108 (M) 9446239504 E-mail: jescolab1@yahoo.co.in

(Environmental Laboratory approved by K.S.P.C.B.) Vellackal Building, Club Junction, Pookattupadi Road, Edappally P. O. P. B. No. 2204, Cochin - 682 024

ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd,
	Manavalakurichi,
	Kanyakumari Dt ,
Source of Emission	2TPH FDB (Stack Emission)
Date of Sampling	24-10-2018
Report date	30-10-2018
Report No	SEM/2018/10/07/2

SL No	Particulars	Unit	Value
1	Velocity of gas emission	m/sec	6.44
2	Temperature of stack gas	°C	110
3	Volume of stack emission	Nm ³ /hr	3535
4	Concentration of Pollutants		
4.1	Particulate matter	mg/Nm ³	118.2
4 .2	Sulphur Dioxide	59	240.9
4.3	Carbon Monoxide	37	Nil
4.4	Nitrogen Oxides	>>	7.8

ANALYST 500



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Tele : 0484-2575930,2108730 Fax: 0484-2540108 (M) 9446239504 E-mail: jescolab1@yahoo.co.in

(Environmental Laboratory approved by K.S.P.C.B.) Vellackal Building, Club Junction, Pookattupadi Road, Edappally P. O. P. B. No. 2204, Cochin - 682 024

ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd,
	Manavalakurichi,
	Kanyakumari Dt ,
Source of Emission	RUTILE SD 401 (Stack Emission)
Date of Sampling	24-10-2018
Report date	30-10-2018
Report No	SEM/2018/10/07/3

SL No	Particulars	Unit	Value
1	Velocity of gas emission	m/sec	3.27
2	Temperature of stack gas	°C	. 55
3	Volume of stack emission	Nm ³ /hr	759
4	Concentration of Pollutants		
4.1	Particulate matter	mg/Nm ³	69.1
4.2	Sulphur Dioxide	22	Nil
4.3	Carbon Monoxide	**	Nil
4.4	Nitrogen Oxides	>>	6.0

LYST AN 500 nr.HI





Tele : 0484-2575930,2108730 Fax: 0484-2540108 (M) 9446239504 E-mail: jescolab1@yahoo.co.in

(Environmental Laboratory approved by K.S.P.C.B.) Vellackal Building, Club Junction, Pookattupadi Road, Edappally P. O. P. B. No. 2204, Cochin - 682 024

ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd,	
	Manavalakurichi,	
	Kanyakumari Dt.,	•
Source of Emission	ILMENITE SD 351 (Stack Emission)	
Date of Sampling	24-10-2018	
Report date	30-10-2018	
Report No	SEM/2018/10/07/4	

SL No	Particulars	Unit	Value
1	Velocity of gas emission	m/sec	5.18
2	Temperature of stack gas	°C	125
3	Volume of stack emission	Nm ³ /hr	795
4	Concentration of Pollutants		
4.1	Particulate matter	mg/Nm ³	119.7
4.2	Sulphur Dioxide	>>	Nil
4.3	Carbon Monoxide	>>	Nil
4_4	Nitrogen Oxides	>>	6.4



70 '



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Tele : 0484-2575930,2108730 Fax: 0484-2540108 (M) 9446239504 E-mail: jescolab1@yahoo.co.in

(Environmental Laboratory approved by K.S.P.C.B.) Vellackal Building, Club Junction, Pookattupadi Road, Edappally P. O. P. B. No. 2204, Cochin - 682 024

ANALYSIS REPORT

Client	M/s. Indian Rare Earths Ltd, Manavalakurichi, Kanyakumari Dt ,
Source of Emission	ZIRCON SD 851 (Stack Emission)
Date of Sampling	24-10-2018
Report date	30-10-2018
Report No	SEM/2018/10/07/5

SL No	Particulars	Unit	Value
1	Velocity of gas emission	m/sec	4.05
2	Temperature of stack gas	°C	95
3	Volume of stack emission	Nm³/hr	838
4	Concentration of Pollutants	· · · · · · · · · · · · · · · · · · ·	
4.1	Particulate matter	mg/Nm ³	56.3
4.2	Sulphur Dioxide	33	Nil
4.3	Carbon Monoxide	>>	Nil
. 4.4	Nitrogen Oxides	>>	5.0



71 '



TEST REPORT_

 $\int_{-\infty}^{\infty} |\psi_{i}| = 0$ $(1-\frac{1}{2})^{2} = \frac{1}{2}$ ISO 9001 : 2015 & IS/ISO/IEC 17025 ; 2005 Quality Management System Implemented & NABL Accredited Laboratory





WATER ANALYSIS

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		WATER ANALY	(SIS		
ULR No :	TC6932-19-0-00001149-F	Liopla Stress			09.03.2019
Customer Na	me & Address	Simpleseirrenetto			L-NL-WR-11-03-2019
		Sample Description			Water
M/s. Indian R	are Earths Limited	Simple Drayin Eye		· · · · · · · · · · · · · · · · · · ·	Customer
Manavalakuri	chi – 629 252.	Stupplied tracelogy			04.03,2019
Kanyakumari I Tamil Nadu	District,	Petersense in the second		2	Liter (Approximately)
10110114000.		SampleReady-digits			04.03.2019
		W-DCountentairons.		· · · · · · · · · · · · · · · · · · ·	05.03.2019
		ACREAN STATE OF	CARLON CONTRACTOR		09.03.2019
		Sampling Method: Fi			
A PROVIDE LA PROVIDENCE		Stuple Mark 1		,IRI	L STP Treated Water
S:No	NameOrtherest		i topice -	icritin	ETS PERMISSIPE AUMIES STANDED EDUCAT
1. Biocher at 27°C	nical Oxygen Demand (BOD) for 3 days.	IS 3025 (Part 44) : 1993 (Reaffirmed 2014)	mg/L	3.8	20
2. pH valu	e @ 25°C:	X IS 3025/Patrity (per an Reaffirmed 2015/Perture No.2	1 76	510 510	5.5.5
3. Total Di	issolved Solids @ 105°C.	IS 3025 (Part 16) - 1984 (Reaffirmed 2017)	mg/L	1480	NA
a storalist		159 5 07 25 (FE m 777) - 1974 	mg/L	410	(n) (s(t))
		< End of Report	>		1 1
LA R.REV W.Lab Ch	JU ATHI Permat		ince exponential ince exponential ince	Authorized Signa T. KARTHII Head - Lat	ST tory KEYAN Korstory
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		1877 - 1889 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	A AL PACK MAR A	A SH A BURNER TO	Real Contraction of the second second

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B info@excellencelaboratory.com www.excellencelaboratory.com 32 0452 4506252



Page 1



TEST REPORT_

WATER ANALYSIS

ULR No : TC6932-19-0-00000026-F ഷങ്ങള്ളരം ി 09.01.2019 am lekterner (EL-NL-WR-14-01-2019 Customer Name & Address ទីលើៅទម្រធារតារបៅខ Water M/s. Indian Rare Earths Limited Sumfalmanning Customer (A Government of India Undertaking) Similar and the second second 04:01.2019 Manavalakurichi - 629 252. Kanyakumari District, Survis Indekteringen 2 Liter (Approximately) Tamil Nadu. Ennicrical veille 04.01.2019 1-1 Communation C 05:01.2019 ិក ۰. . • ലോ തോടിവം ത്ര 09.01.2019 ShirlingKraasi ចំណាំងដែល 🖓 IREL STP Treated Water 局的法律情况 Name of the Test साहित्य के लिप कि जिसके के लिप Marking Company Contraction and a state Biochemical Oxygen Demand (BOD) IS 3025 (Part 44) : 1993 mg/L 5.0 at 27°C for 3 days. (Reaffirmed 2014) 30F'5 ((1- Fri) 1-1) - 1/3) . م]¹ (0, 0)ី ភ្លៀវ ំហ្គោ filling and dealer IS 3025 (Part 16) - 1984 з Total Dissolved Solids @ 105°C. mg/L 1350 ŇĂ (Reaffirmed 2017) સ્ EDRA (CHIRCON) - OCH 前別 CEMPTOR PARA <--- End of Report ---> Notes: The concentration of the parameters tested in the above sample is within the prescribed limits of TNPCB tolerance limits of 2017. **Report Confirmed By :** FOR EXCELLENCE LABORATORY 8 g. liht Authorized Signatory R.REVATH! R.S.DINAKARAA Sclab Chemist Ċ Quality Manager and the second of a second Lab: No. 23/93, Fifth Street, Ram Nagar, S.S. Colony, Madurai - 625 010, 8.0: No 15, Metha Layout, Masakalipalayam Road, Peelamedu, Coimbatore - 641 004. 8.0: No. 22/33A) Second Street, Ram Nagar, Tiruppur - 641 602.

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		TEST REPORT					Pag€	-1 of 1	
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•	× .							09.02.2019	
£	ULR No :	TC6932-19-0-00000665-F			MARCE		 	NE-MK-11-02-2013	4
- 1997 - No. - 3	Customer Na	me & Address				· · ·		Wəter	1
Ĺ	BE/s Indian B	are Farths limited		Print Providence		······································		Customer]
	(A Governme	nt of India Undertaking)	2 Sectometrics	Giorienoe				05.02.2019	ļ
	Menavalakuri Kanyakumari	ichi — 629 252. District.	CONTRACTOR	pitastavaiva. (s			2 Li1	er (Approximately)	
1	Tamil Nadu.		STATE STRE	citri di Oh				05.02.2019	-
	4 · · ·	<i>,</i>	heselan	(fina)(e nse		· · · · · · · · · · · · · · · · · · ·		06.02.2019	-
SiF		- <u>.</u>	SCH Verime	(in tellowe				09.02.2019	-
	SIN 10	We lie to a W	Miles P Something				1051	ETR Troated Water	-
	<u>11/24</u>		Samelo M				INCL	Max Permissible	ก่
	Bill	ព្រាចន៍សារមិនទ	ansir -			T TResults		Limits of TNPCB Std for Treated Sowage	
98-4 1	1. Bioch	emical Oxygen Demand (BOD) C for 3 days	IS 3025 (Part 4 (Reaffirmed	14) - 1993 1 2014)	mg/L	8.3	andan in branch ar ing a	20	
	21	110 @ 2595	7.5. IS: 3025 (Parl	141) - 1283 66 - 1983 - 1983	NOTE	8.2		3.3.7.2.U	
•			IS 3025 (Part	16) - 1984	mg/l.	1400		NA	
4	3. Total	Dissolace 20192 (6, 102, C	(Reaffirme	1 2017) 15/1-15/32(1)				a Linn	
		เฐิบุรุญกัน⊓ุลเ⊽ลโกไร/อิ.105 C	Retuiner-	112403771	DE A				
			<	End of Report	<u>~~~~</u>				-
st for	Notes:	ration of the parameters lested	In the above sample	e is within the j	prescribed lin	nits of TNPCB tole	rance limits	of 2017.	
	14				<u> </u>	For EXCE	LLENCE LAB	ORATOBY	
	Report Conf	firmed By :				**** ~		HE]	1
	1 1	pto		ll.	a na	AUT	horized Sign	atory F	Ĺ
	RR	VATHI	······			TEN TK	ARTHE	EVAN	
• •	Sr.Lab	Chemist	· # _				iead - Leco		
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616	1 11 - 00	an (\$1.5 ± 320 (5.5 ± 7.5)). 		÷			•		
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		e herrier and a second s						ការ ពេលនេះបានទ ស្រុកស្រុកស្រុកស្រុកស្រុក ស្រុកស្រុកស្រុកស្រុកស្រុកស្រុកស្រុកស្រុក	50
	Lalli				and	ાં આવેલાનું ખાસ લેખન છાં મુખ્યત્વે કહેવું છે	ાત છે. કુલ છે. આ ગામના છે.	THE REAL AND IN	
			a a construction de la construction La construction de la construction d		e provinsi se	$w(z_{1}, -y) = 0.2^{2} W(z_{1}, -y)$	per al parte de 1995 y		
		Lab:	No. 23/93, Fifth Street	, Ram Nagar, S.S.	Colony, Madur	ai - 625 010.	n + -		
	B.O: N	o, 15, Metha Layout, Masakalipalayah	r Kudu, Pellutin du,	12 C. 1					





CERT No. TC-6429

TEST REPORT 1

		WASTE WATER A	NALYSIS		
Repo	rt No : AAL/WR/274/20	18-19	Report Da	te	09 11 2018
Custo	mer Name& Address :		Samula De	f No	4 AT (11) (054/0010
			Sample Re	scription	AAL/WK/2/4/2018-19
M/s l	ndian Rare Earths Limi	ted,	Sample Dr	awn Ry	Customer
(A G	overnment of India unde	rtaking)	Sample Co	lected Date	05 11 2018
Mana	valakurichi,		Quantity o	f Sample	4 Lit
Kany	akumari- 629252		Sample Re	ceived On	05 11 2018
•			Test Comm	lenced On	05 11 2018
			Test Com	leted On	00.11.2010
SNo	Name of the Test	Test Method	Units	TNPCB	09.11.2018 Results
				Standards	Results
<u>. </u>	PH (a)25°	IS 3025 : P11:1983(RA.2002)	Value	5.5 to 9.0	78
<u> </u>	Callos ^o C	IS 3025 : P17:1984(RA.2003)	mg/l	30	18
3	Biological Oxygen Demand (BOD)@27 ⁰ C	IS 3025 : P44:1993(RA.2003)	mg/l	20	12
		End of R	eport	· · ·	
OF A	CCURACY ANALABS	CTANA/			
1. 2. 3. 4. 5.	The test results relate only to the item to The test item will not be retained for m The test report shall not be reproduce in The report cannot be used as evidence i Total liability of our laboratory is limits	ested. Samples are not drawa by us unless otherwo ore than 10 days from date of issue of test reports, full or part without the written approval of Fresh n the court of law and should not be used in any a d to the invoice amount and any dispute arising o	ise stated. unicas otherwise sp Aqua Makers. dvertising media wi ut of this report is si	ectified by customer. thout our special permubject to Dindigu! Jari	ission in writing. sdiction only.

Head Office : No. 7A, 17 Sri Sakthi Vinayagar Complex, Ramalakshmi Nagar Extn, Dindigul - 624 004Mobile: 76392 03132, 99448 09484, 84383 85571E-mail : accuracyanalabs@gmail.comBranches: Chennai, Madurai, Nagercoil, Karur & Thanjavur

आईआरईएल (इंडिया) लिमिटेड	जेन हो <u>क</u> ्रा
IREL (India) Limited	04651-237255 04651-237256 04651-237257
(Formerly Indian Rare Earths Limited)	ग्रेस 45651-237258
(भारत सरकार का उपक्रम)	ax : 04651-237220
(A Govt. of India Undertaking)	
मणवालकुरिच्चि, कन्याकुमारी जिला, तमिलनाडु - 629 252	
Manavalakurichi, Kanyakumari Dist. Tamil Nadu - 62 CIN: U15100MH1950GOl008187 Website: www.irel.co.in	9 252
ISO 9001:2015 , ISO 14001:2015 & OHSAS 18001:2007 Company-	

IRELMK/ENV-15/2019

02.05.2019

AMBIENT NOISE LEVEL MONITORING

Monitoring period from October 2018 to March 2019

	Noise Level in dB(A) Day time		Average Noise Level in dB(A) Day time	Noise Level in dB(A) Night time		Average Noise Level in dB(A) Night time
	Max.	Min.		Max.	Min.	
Sea Side (North)	74.0	73.0	73.5	68.5	67.0	67.75
Front entrance (North)	74.0	72.2	73.1	67.0	66.0	66.5
East side of IREL	70.5	69.0	69.75	69.0	67.5	68.25
South side of IREL	73.5	70.0	71.75	68.0	66.5	67.25
West side of IREL	73.0	71.0	72.0	67.5	68.5	68.0

6 Deputy Officer (S&T)

kyynih,

Chief Manager (S&T)

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

TEST WATER BEFORE TASTE

TAMIL NADU WATER SUPPLY & DRAINAGE BOARD District Level Water Testing Laboratory,



TWAD Board, 46/50 Vellalar Colony, Ramavarmapuram, Nagercoil 629001.

Ph.04652-238315

TEST REPORT

. From J.Jayanthi Jayala,B.Sc. Junior Water Analyst, D.W.T.Lab,TWAD Board, Nagercoil.

To The Dy.General Manager, Indian Rare Earths Ltd., Manavalakurichi.

Lr.No.Lab No.38734-38739/[WA/Lab-NGL/18-19 Dated 25.02.2019

 Sub : Examination of water sample - Report furnished - Reg.

 Ref :1) Lr.No. MK/CE/36/2018-2019/
 Dt.14.02.2019

 2) Your D.D No. 121788/Dt.05.02.19 for Rs.4200/ 3) Our Invoice No. 8247/Dated 14.02.19 for Rs.4200/

The result of analysis for the water sample sent under reference is furnished below. Scheme : Drinking

<u>Source</u>: Open well

jcation: 38734-38735 : Drinking water tap near MSP

38736-38737: Drinking water tap near Administrative office

Date of Collection : 14.02.2019 Date of Receipt : 14.02.2019

38738-38739:Drinking water tap near VTC

				Result	
BIS 10500 : 2012			Lab No.38734	Lab No.38736	Lab No.38738
I. PHYSICAL EXAMINATION.					
1. Appearance			Clear	Clear	Clear
2. Colour			Colourless	Colouriess	Colourless
3. Odour	h San San Sar		None	None	None
4. Turbidity NT Units			5	2	1
5. Total dissolved Solids mg/L			467	487	480
6. Electrical Conductivity Micro mho/cm			708	738	728
II.CHEMICAL EXAMINATION:		6 6			
7. pH			6.91	7.73	7.32
8. Ph. Alkalinity as CaCo _{3 mg/L}	1997 - 1997 -		0	0	0
Total Alkalinity. as CaCo _{3 mg/L}			92	172	152
10. Total Hardness as CaCo _{3 mg/L}			164	172	160
11. Calcium as Ca mg/L			42	40	34
12. Magnesium as Mg mg/L			14	17	18
13. Sodium as Na mg/L			78	82	79
14. Potassium as K mg/L			19	18	16
15. Iron as Fe mg/L	19,49		0.59	0.35	0.12
16 Manganese mg/L	10,611		0.00	0.00	0.00
17. Free Ammonia as NH _{3 mg/L}			0.04	0.12	0.08
18. Nitrite as NO _{2mg/L}		11 1 1 1 1 1 1 1 1 1	0.01	0.00	0.01
19. Nitrate as NO _{3 mg/L}			5	6	4
20. Chloride as Cl mg/L	24510		146	134	128
21. Fluoride as F mg/L			0.4	0.4	0.4
22. Sulphate as SO _{4 mg/L}			24	17	23
23. Phosphate as PO4 mg/L		الالية، من عند المراجعة، المراجعة، المراجعة، المراجعة، المراجعة، المراجعة، المراجعة، المراجعة، المراجعة، المراج المراجعة المراجعة الم	0	0	
24, Tidys Test 4 hrs.as O2mg/L		n staat de terre gebeer bijzed is Die geboer op die geboer op die geboer Die geboer op die geboer op die geboer Die geboer op die geboer op die geboer Die geboer op die	0.2	0.08	0.12
BACTERIOLOGICAL EXAMINATION			Lab No.387 35	Lab No.38737	Lab No.38739
Fecal coliform per 100 ml.			0	0 -	0

الم يحد الالملة بالمانين (11) (11) الماية المالية المالية المالية المالية المالية المالية المالية الم

Report:Lab No. 38734/38736/38738 : The water is chemically Potable

Lab No.38735/38737/38739 : The water is bacteriologically safe.

ن جا جور آرکی (پی کاری) Junior Water Analyst, TWAD Board, D.W.T Lab, Nagercoil.



Sir,

TEST WATER	BEFORE TASTE 78
	THE REAL TRADILY CT BOA

TAMIL NADU WATER SUPPLY & DRAINAGE BOARD

District Level Water Testing Laboratory, TWAD Board, 46/50 Vellalar Colony, Ramavarmapuram, Nagercoil 629001.

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154× =3

Ph.04652-238315

The Dy.General Manager,

Date of Collection : 26.10.2018

Date of Receipt : 26.10.2018

Recult

Indian Rare Earths Ltd.,

Manavalakurichi.

TEST REPORT

To

From J.Jayanthi Jayala,B.Sc. Junior Water Analyst, D.W.T.Lab,TWAD Board, Nagercoil.

Lr.No.Lab No.38206-38211/IWA/Lab-NGL/18-19 Dated 31.10.2018

Sir,

Sub : Examination of water sample - Report furnished - Reg.

Ref :1) Lr.No. MK/CE/36/2018-2019/ Dt.26.10.2017 2) Your D.D No. 041419/Dt.17.10.18 for Rs.4200/-3) Our Invoice No. 8142/Dated 26.10.18 for Rs.4200/-******

The result of analysis for the water sample sent under reference is furnished below.

Scheme : Drinking

Source_: Open well

Location: 38206-38207 : Drinking water tap near MSP

38208-38209: Drinking water tap near Administrative office

38210-38211:Drinking water tap near VTC

0210-00-4-1	하는 이 이 것 같아. 이 가 있다. 이 것 같아. 이 있 것 같아. 이 것 같아. 이 것 같아. 이 있 집 집 집 집 집 집 집 집 집 집 집 집 집 집 집 집 집 집			
BIS 10500 : 2012		Lab No.38206	Lab No.38208	Lab No.38210
PHYSICAL EXAMINATION.			Clear	Clear
		Clear	Colourless	Colourless
2 Colour		Colourless	Nano	None
		None	None	
3. Odour		0	<u> </u>	
4. Turbidity NI Glus		500	447	40/
5. Total dissolved Solids mg/ L		758	678	
6. Electrical Conductivity Micro Mator Che				<u> </u>
II, CHEMICAL EXAMINATION:		7.15	7.63	7.22
7. pH		0	0	0
8. Ph. Alkalinity as CaCo _{3 mg/L}		192	204	180
9. Total Alkalinity. as CaCO _{3 mg/L}		224	224	192
10. Total Hardness as CaCo _{3 mg/L}		58	51	59
11. Calcium as Ca mg/L		19	23	11
12. Magnesium as Mg mg/L		62	36	64
13. Sodium as Na mg/L		24	11	19
14. Potassium as K mg/L		0.00	0.00	0.00
15. Iron as Fe mg/L		0.00	0.00	0.00
16 Manganese mg/L			0	0
17. Free Ammonia as NH _{3 mg/L}		0.01	0.01	0.03
18. Nitrite as NO _{2 mg/L}	محملها . 10 مدادي محمد المربية المربية (100 من مربية) . محمد المربية (100 من محمد المربية (100 من محمد المربية) . 10 من محمد المربية (100 من محمد المربية) . 10 من محمد		4	5
19. Nitrate as NO3 mg/L			90	92
20. Chloride as Cl mg/L			0.4	0.4
21. Fluoride as F mg/L	1 1 1 1 1 1 1 1 1 1	26	20	23
22, Sulphate as SO _{4 mg/L}				0
23. Phosphate as PO _{4 mg/L}				0,20
24. Tidys Test 4 hrs.as O _{2 mg/L}		0.16 1115 U.16	17 Lab No.3820	9 Lab No.3821
BACTERIOLOGICAL EXAMINATION				0
Fecal coliform per 100 ml.			!	
		thið		

Report: Lab No. 38206/38208/38210 ; The water is chemically Potable Lab No.38207/38209/38211 :The water is bacteriologically safe.

Bunior Water Analyst, TWAD Board, D.W.T Lab, Nagercoil.



IRELMK/ENV-15/2019

02.05.2019

Details of Afforestation & Green belt Development for last 7 years by the Unit

Year	Area	Area Planted in, (Ha)			No. of trees Planted		
	Mined (Ha)	Mined out area	Others (Plant & Colony)	Total	Mined out area	Others (Plant & Colony)	Total
2012-13	1.8	1.5		1.5	6500	-	6500
2013-14	1.8	3.0	-	3.0	6500	-	6500
2014-15	2.57	3.0	-	3.0	7140	-	7140
2015-16	2.8	3.0	-	3.0	6410	-	6410
2016-17	2.45	3.0	-	3.0	6765	-	6765
2017-18	0	3.0	-	3.0	7000		7000
2018-19	3.0	3.0	-	3.0	6928	-	6928

Deputy Officer (S&T)

Chief Manager (S&T)



आईआरईएल (इंडिया) लिमिटेड

IREL (India) Limited

फोन Teł. 04651-237255 04651-237256 04651-237257 45651-237258 that

(Formerly Indian Rare Earths Limited) (भारत सरकार का उपक्रम)

Fax ÷ 04651-237220

(A Govt. of India Undertaking)

मणवालकुरिच्चि, कन्याकुमारी जिला, तमिलनाडु - 629 252

Manavalakurichi, Kanyakumari Dist. Tamil Nadu - 629 252

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

IRELMK/ENV-15/2019 03.05.2019

Plant (In-house) Noise-Survey for the period from October 2018 to March 2019

SI. No.	Location	Noise level-dB (A)		Duration	Personal
		Maximum Minimum		_ of	Protective
i i				Exposure	Equipments used
1	22 toh EBD Control cabin - inside	77.0	80.7	5 hre	
2	Improved primary section - outside	Not in operation	Not in operation	0105	
	supervisor cabin		Not in operation	-	
3	Rutile section - Bagging area	88.5	89.8	6.5 hrs	Ear Muff/Ear Plug
4	Zircon section - Bagging area	87.0	89.0	6.5 hrs	Ear Muff/Ear Plug
5	Zircon section- Final air tables area	87.0	89.9	6.5 hrs	Ear Muff/Ear Plug
6	Zircon section - Primary air tables area	87.5	89.8	5 hrs	Ear Muff/Ear Plug
7	Shift-In- Charge cabin	68.0	70.0	2 hrs	
8	2 tph – FBD control cabin	74.0	80.9	4 hrs	
9	Air tables in the Zircon wet section	89.0	89.0	5 hrs	Ear Muff/Ear Plug
10	Bagging area in the Zircon wet section	88.0	87.0	5 hrs	Ear Muff/Ear Plug
11	Garnet final collecting area	86.5	89.8	6.5 hrs	Ear Muff/Ear Plug
12	Ilmenite section (ground floor)	Not in operation	Not in operation	-	<u> </u>
13	Generator operator cabin	Not in operation	Not in operation	-	······································
II.	HUP				
1	Operator Control cabin I Floor	70.0	79.0	6.5 hrs	
2	Bunker area	86.0	86.5	7 hrs	Ear Muff/Ear Plug
3	Shift Incharges cabin II Floor	71.0	74.0	1 hrs	
I II.	PUMP-HOUSE				
1	Operator's cabin-inside	73.0	73.0	6.5 hrs	
2	Operator's cabin-outside	83.5	83.5	6.5 hrs	
IV.	OUT SIDE PLANT				
1	Near Electrical work shop	74.0	74.5	8 hrs	
2	Housing complex (near water tank)	59.0	60.0	8 hrs	
3	Guest House	56.0	58.0	8 hrs	
٧.	HEM Machinery				
1	Front End Loader - Inside cabin	88.0	88.9	5 hrs	Ear Muff/Ear Plug
VI	Mining Sites	-	-		
1	Periavili vilai -Inland	80.0	84.0	7 hrs	
2	Chinna Vilai -Inland	79.0	81.0	7 hrs	
3	Pillayar Coil- Inland	78.0	82.9	7 hrs	

Instrument name: Sound level meter- RT-5001 Calibrated on: 25.05.2018 Next calibratiendue on: 17.05.2019 term) Öffic≢r (S&T) Depu Chief Manager (S&T)

पजीकृत 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



	आईआरईएल ँ(इंडिया) लिमिटेड	फोन रन्म		
	IREL (India) Limited	101.	•	04651-237255 04651-237256 04651-237257
[]	(Formerly Indian Rare Earths Limited)	फैक्स		45651-237258
J	(भारत सरकार का उपक्रम)	Fax	:	04651-237220
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	मणवालकुरिच्चि, कन्याकुमारी जिला, तमिलनाडु - 629 252	2		
	Manavalakurichi, Kanyakumari Dist. Tamil Nadu - 6	29 2	25	2

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

IRELMK/ENV-15/2019

02.05.2019

Sub: Fund allocation for environmental protection, prevention & control of pollution &CSR

-	Period : April 2018-March 2019	
SI. No.	Item	Amount spent (in rupees)
1	Sewage treatment operation & maintenance	7,97,108
2	AAQ & Stack monitoring	3,29,928
3	Water & Air Consent fees, AAQ, Stack Noise and sewage monitoring fees to TNPCB	6,85,124
4	Radioactivity Monitoring	4,00,000
5	Afforestation Development	4,68,922
6	Watering to suppress the dust & spillage cleaning from the Road	16,65,000
7	Maintenance of garden& lawn	5,96,726
8	Removal of bushes & Jungies	4,34,233
9	Clearing drainage, haul road	4,76,543
10	Cleaning & House keeping	10,50,938
11	Cleaning of Plant floor & spillage	6,66,044
12	Up-Keeping works	3,68,896
13	Maintenance of aqua-guard for drinking	16,685
14	14 Awareness programs such as National Safety Week, World Environment Day, Fire Service Week	
15	CSR activities	25,70,000
	1,05,64,757	

Deputy Officer^I(S&T)

Chief Manager (S&T)

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