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14.11.2023

### आईआरईएल एमके/ई एन वी-15/2023/ IRELMK/ENV-15/2023/

### 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 E-mail: eccompliance-tn@gov.in

- विषय : मणवालकुरिच्ची, लक्ष्मीपुरम और कोलाचेल गांवों, कलकुलम तालुक, कन्याकुमारी जिला, तमिलनाडु में स्थित मैसर्स आईआरईएल (इंडिया) लिमिटेड, के 7.06 हेक्टेयर के एमएल क्षेत्र के लिए अप्रैल - 2023 से सितंबर - 2023 की अवधि के लिए अर्धवार्षिक अनुपालन रिपोर्ट ।
- Sub: Half yearly compliance report for the period from April-2023 to September -2023 for ML area of 7.06 ha of M/s IREL (India) Limited, Manavalakurichi located at Manavalakurichi village. Kalkulam Taluk, Kanniyakumari District, Tamil Nadu
- संदर्भ: एम ओई एफ और सीसी पत्र सं. जे-11015/61/2011-आईए.॥ दिनांक 06.04.2018
- Ref : MoEF & CC letter no. J-11015/61/2011-IA.II dated 06.04.2018

महोदय Sir,

हम अप्रैल - 2023 से मितंबर - 2023 तक की अवधि के लिए अर्धवार्षिक अनुपालन रिपोर्ट अनुबंध-। के रूप में प्रस्तुत करते हैं। हमारे 7.06 हेक्टेयर खनन पट्टा क्षेत्र के लिए प्रासंगिक निगरानी रिपोर्ट अनुबंध-। के रूप में संलग्न हैं। यह आपके सादर सूचनार्थ है। We are submitting the Half Yearly Compliance report for the period from April-2023 to September-2023 as Annexure - I. Relevant monitoring reports are enclosed as Annexure-II for our mining lease area of 7.06 ha. This is for your kind information please.

धन्यवाद, Thanking you,

, भवदीय, Yours truly, आईआरईएल(इंडिया)लिमिटेड के लिए For IREL (India) Limited

2th Jaw 4 U मुख्य महाप्रबंधक एवं प्रधान, एमके

Chief General Manager& Head, MK

संलग्न / Encl : i. Compliance report (Annexure – 1) i. अनुपालन रिपोर्ट (अनुवंध- 1) : ii. Monitoring reports (Annexure – 11) ii. निगरानी रिपोर्ट (अनुवंध- 11)

मणवालकुरिच्चि, कन्याकुमारी जिला, तमिलनाडु - 629 252

Manavalakurichi, Kanyakumari Dist, Tamil Nadu - 629 252

• 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.

### प्रतिलिपि/Copy to;

1.

सलाहकार पर्यावरण प्रभाव आकलन प्रभाग (आईए) भारत सरकार, एमओईएफ और सीसी इंदिरा पर्यावरण भवन, अलीगंज, जोरवाग रोड नई दिल्ली–110003

### The Adviser,

Environmental Impact Assessment Division (IA), Government of India, MoEF & CC, Indira Paryavaran Bhawan, Aliganj, Jorbagh Road, New Delhi-110 003 ŧ

### 2. सदस्य सचिव

तमिलनाडु प्रदूषण नियंत्रण वोर्ड 76, माउंट सालाई, गिंडी, चेन्नई-600032

### The Member Secretary,

Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032

### HALF YEARLY COMPLIANCE REPORT

# (APRIL - 2023 To SEPTEMBER- 2023)

# MINING LEASE: G.O.3(D) No.6 DATE: 28.01.2000/ G.O. 327 dated 01.12.2021; AREA:7.06 Ha

-	ENVIRONMENTAL CLEARANCE ORDER: J-11015/61/2011-IA.II DATED: 06.04.2018					
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 backets and hand spades for collection or	Only manual mining is being carried out in the inter-tidal zone as per approved Mining Plan by deploying persons using baskets and hand				
	ore or minerals as per the approved mining plan.	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 Zone 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 remedial action on the event of any adverse impacts. (v) There should not be any sea water intrusion due to the project activities and periodical water quality monitoring shall be conducted and (vi) The unit shall not establish new mineral separation plant/processing unit within CRZ areas and also	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) Only 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. Mining operations are carried out in a systematic manner to avoid disturbance in the intertidal zone. All the mining operations are undertaken as per approved mining plan. (iii) The inland mined out area is refilled with tailings generated out of the ROM collected from this ML area. (iv) The beach profile monitoring is carried out and the relevant records are maintained. (v) There is no chance of any sea water intrusion due to IREL mining activities, however periodical water quality monitoring is				

Half Yearly Compliance Report 2023-7.06 Ha, IREL (India) Limited, Manavalakurichi

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SI.	Conditions	Compliance		
	there should not be any expansion of existing	conducted.		
	mineral separation plant / processing unit.	(vi) IREL. Manavalakurichi will not establish		
		any new mineral separation plant/processing		
		unit within CRZ areas. There will not be any expansion of the existing mineral separation		
	and the second			
7	The private patto lands which are not owned by	The entire 7.06 hectares MI area is an		
'	M/s IPEL mining will be carried out only after	un-surveyed sea-beach noromboke		
	obtaining the concerned land	Government land Hence not applicable		
	owners as per the provisions of the Atomic	Government und. Trenet net approacte.		
	Mineral Concession Rules 2016 and MMDR			
	Act. 1957.			
8	During mining operations, the village built up	No built up areas, roads and human settlements		
	areas, roads, human settlement areas shall not be	are available within the ML area.		
e	disturbed.			
	The tailing will be backfilled only in the	Mining operations are carried out over 7.06		
9	Mined out area.	hectares ML area, which is a replenishable		
		area. The replenishable areas are not backfilled.		
10	Necessary AERB clearance shall be obtained	AERB clearance has been obtained under		
	under the Atomic Energy (Radiation Protection)	Atomic Energy (Radiation Protection) Rules,		
	Rules, 2004 for operation of BSM (Beach Sand	2004 for operation of Beach Sand Minerals		
	Minerals) facility	facility. Present AERB clearance is valid upto		
		31.08.2024.		
11	Occupational health and safety measures,	Medical check up is carried out for radiation		
140	especially concerning radiation to be enhanced	workers once in six months.		
	for workers who are having some ailments like			
	hypertension, diabetes etc. They should have			
_	health check up once in six months.			
12	Project Proponent shall run an awareness	Awareness campaign on sanitation for women		
- 1	campaign on sanitation for women and	and utilization of Sanitary Napkins has been		
	utilization of Sanitary napkin and also to	carried out.		
	distribute the Sanitary Napkin/pads to the			
	women and provide the training for proper			
12	disposal.	The entire MI area is leasted within the		
13	to undertaking mining activities and their	intertidal zone. No cand duract hills natural		
	concervation shall as ner MoEF quidelines from	features etc are available within the MI Area		
	time to time. No flattering of sand duras shall be	Hence not applicable		
	carried out Dressing or altering the sand dunes	nence, not applicable.		
	bills natural features including landscape			
	changes shall not be carried out for			
	beautification /recreational nurnoses Precautions			
	shall be taken to prevent intrusion of sea water			
	into hinterland to avoid problem of			
	submersion/flooding.			
14	Tailings and rejects shall be filled back	Mining operations are carried out		
	systematically after separating the heavy/rare	systematically in a sustainable manner as per		
6 1 1	minerals. Sand tailing shall be put back at the	the approved mining plans. The replenishable		
	mined area on completion of extraction of rare	areas are not backfilled. No Afforestation is		
	minerals. Afforestation shall be taken up with	carried out over 7.06 hectares ML area as it is a		
	suitable species on mined out areas to prevent	replenishable zone. The tailing generated after		

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SI.	Conditions	Compliance		
	erosion of shoreline. Under no circumstance, the	separation of atomic minerals (beach sand		
	tailings will be dumped in agricultural lands, wet	minerals) are used for backfilling the mined		
	be carried out only in the inland mined out areas.	tailing will be dumped in agricultural lands,		
		wet lands, paddy field and canals.		
15	The mining activities shall be regulated in such a	Mining operations do not affect any fauna		
	way that there will be minimum disturbance to	during spawning & breeding period.		
	i e from November to March.			
16	Mining shall be carried out in phases only.	Mining operations are carried out in phases		
	Simultaneous opening of entire beach front is not	only. A number of Permanent approach roads		
	permissible. There shall be uninterrupted access	to seafront are already available. Also,		
	to the searront. Minimum 20m whath of approach roads shall be provided where	are provided wherever necessary		
	necessary.	are provided wherever necessary.		
17	Mining shall be carried out by permitted	Mining is carried out by permitted methods as		
	methods without the use of any forms of	per approved mining plan. No explosives are		
	blasting. Use of explosives for blasting is	used. The mining operations are progressed in		
	side and mining should be progressed parallel to	operations are carried out as per the approved		
	sea coast so that inland water table is not	mining plan in the intertidal zones. The inland		
	disturbed.	water table is not disturbed due to IREL		
10	Dediction summer shall be considered out of	manual mining operations.		
10	stipulated by the Atomic Minerals Directorate	minerals, radiation survey is carried out at		
14.1	for Exploration and Research, Department of	regular intervals by Health Physics Unit		
	Atomic Energy, Government of India to	(HPU), an independent organisation under		
	ascertain the effects of radioactive minerals.	Department of Atomic Energy.		
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 monitoring		
	be carried out and record of monitoring data	data are being submitted to MoEF & CC, its		
	should be maintained and submitted to Ministry	Regional Office, Chennai, Central		
	Regional Office. Chennai. Central Groundwater	Central Groundwater Board, State Pollution		
	Authority, Regional Director, Central	Control Board and Central Pollution Control		
	Groundwater Board, State Pollution Control	Board at regular intervals.		
	Board and Central Pollution Control Board.	(Annexure-II, SI no.2)		
20	A Final Mine Closure Plan along with details of	Final Mine Closure Plan along with details of		
	Corpus Fund shall be submitted to the Ministry	Corpus Fund will be submitted to MoEF&CC		
	of Environment, Forest and Climate Change 5	5 years in advance, while seeking approval for		
	approval	mai mne ciosure.		
В	Standard Conditions	· · · · · · · · · · · · · · · · · · ·		
1	No change in mining technology and scope of	Mining technology and scope of working will		
	working should be made without prior approval	be not changed without prior approval of $M_{0}EE \approx CC$		
	Climate Change	MOEF & CC		
	Chinate Change.			

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2	No change in the calendar plan including excavation, quantum of beach sand mineral i.e. Ilmenite, Rutile, Zircon, Monazite, Sillimanite	Will be adhered to.
3	The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) for the project.	There is no requirement of water for mining operations over 7.06 hectares ML area. Hence, not applicable.
4	Mining shall be carried out as per the provisions outlined in mining plan approved by AMD as well as by abiding to the guidelines of Directorate General Mines Safety (DGMS).	Mining operations are carried out as per mining plan approved by AMD and the guidelines of DGMS.
5	The lands which are not owned by Proponent, mining will be carried out only after obtaining the consents from all the concerned land owners as per the provisions of the Atomic Mineral Concession Rules, 2016 and MMDR Act, 1957.	The entire 7.06 hectares ML area is an un-surveyed sea-beach poromboke Government land. Hence, not applicable
6	Digital processing of the entire lease area using remote sensing technique shall be carried out regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment, Forest and Climate Change its Regional Office.	Digital processing of the entire lease area using remote sensing technique will be carried out regularly once in 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 <sub>10</sub> , PM <sub>2.5</sub> , 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 ROM collected from 7.06 Hectares ML area is transported to the MSP located adjacent to ML boundary towards mineral beneficiation plant. 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 data is 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, sl. nos. 3, 4 & 6) Regular water sprinkling and cleaning of the
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 PM10 and PM2.5 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	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.

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	regard. Monitoring of Ambient Air Quality to be carried out based on the notification 2009, as amended from time to time 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 Authority and Regional Director, Central Ground Water Regord	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 is sent regularly to MoEF&CC, its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board. (Annexure-II, sl. nos. 9)
	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 well located in village should be incorporated to ascertain the impact of mining over ground water table.	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	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	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. nos. 5, 8)

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		levels well within the prescribed limits for day light/night hours	
ŀ	13	Main haulage road in the mine should be	Haul roads are regularly wetted with water
		provided with permanent water sprinklers and	sprinklers. The ROM collected from 7.06 hects
	5.14	other roaders should be regularly wetted with	ML area is transported to Mineral Separation
		water tankers fitted with sprinklers. The material	Plant located adjacent to ML Boundary for
		transfer points should invariably be provided	separation of individual minerals. The material
		with Bag filters and or dry fogging system. In	transfer points in Mineral Seperation Plant is
		case of Belt-conveyors facilities the system	provided with Bag filters to control dust
		should be fully covered to avoid air borne dust;	generation.
		Use of effective sprinkler system to suppress	
		fugitive dust on haul roads and other transport	
		roads shall be ensured.	
	14	Sufficient number of Gullies to be provided for	Regular monitoring of water quality including
		better management of water. Regular Monitoring	pH is carried out. The reports are submitted to
		of PH shall be included in the monitoring plan	the Ministry of Environment, Forest and
		and report shall be submitted to the Ministry of	Climate Change and its Regional Office on six
		Environment, Forest and Climate Change and its	monthly basis. ( Annexure-II, sl. no.7)
		Regional Office on six monthly basis.	
	15	There shall be planning, developing and	The mining and mineral separation plant
		implementing facility of rainwater harvesting	operations are carried out very near to shore.
		measures on long term basis and implementation	Rain water harvesting system is implemented at
	3	of conservation measures to augment ground	IREL, Manavalakurichi where all the rooftop
		water resources in the area in consultation with	rain water collected from plant area is stored in
	16	Central Ground Water Board.	a harvesting pond.
	10	The reclamation at waste dump sites shall be	Scientific reclamation & systematic
1		shall be followed. The local species may be	anorestation are practised in order to generate
		encouraged and species are so chosen that the	restore the natural tonography over the mined
		slope bottom of the dumps and top of the dumps	out areas Native species viz Casuarina
1	120	are able to sustain these species. The aspect of	Coconut etc are planted over the backfilled
		the dump is also a factor which regulates some	areas
	- 50	climate parameters and allows only species	
		adapted to that micro climate.	
T	17	The top soil, if any, shall temporarily be stored at	There is no top soil. No overburden is
		earmarked site(s) only and it should not be kept	generated during mining operations at IREL,
		unutilized for long. The top soil shall be used for	Manavalakurichi. Mineralisation occurs right
	1.4	land reclamation and plantation. The over burden	from surface of the deposit. Mined out areas
		(OB) generated during the mining operations	are backfilled with tailings generated from
		shall be stacked at earmarked dump site(s) only	Mineral Processing followed by systematic
		and it should not be kept active for a long period	plantation to restore the natural topography.
		of time. The OB dumps should be scientifically	The compliance status is submitted to the
		vegetated with suitable native species to prevent	Ministry of Environment, Forest and Climate
		erosion and surface run off. In critical areas, use	Change and its Regional Office on six monthly
		of geo textiles shall be undertaken for	basis.
		stabilization of the dump. The entire excavated	
ľ		area shall be backfilled and afforested.	
		Monitoring and management of rehabilitated	
	1.00	areas should continue until the vegetation	
		becomes sen-sustaining. Compliance status shall	
		Forest and Climete Change and its Designal	
		Office on six monthly basis	
		Office on six monthly basis.	

18	Plantation shall be raised in a 7.5 m wide green belt in the safety zone around the mining lease, backfilled and reclaimed area, around water body, along the roads etc. by planting the native species in consultation with the local DFO/Agriculture Department and as per CPCB Guidelines. The density of the trees should be around 2500 plants per ha. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.	The entire 7.06 hectares ML area is located within the Inter-tidal zone. The replenishment occurs within the ML area due to littoral action. Hence, no plantation/ green belt are raised over the mining lease area. (Annexure-II, sl. no.10)
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-11013/57/2014-1A.II (M), dated 29th October, 2014. As such, there is no village, habituated zones, etc. located within the ML area.
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. IREL (India) Limited, Manavalakurichi has spent Rs. <b>18.19lakhs</b> towards implementation of CSR schemes from Apl-2023 to Sep-2023. 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.	7.06 hectares Mining Lease area of IREL is existing at Manavalakurichi since 1970 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.	Mining operations are carried out manually as per the approved mining plan. The manually collected ROM from 7.06 hectares ML area is heaped and then the collected ROM from the heap is transported by trucks to the adjacent Mineral Beneficiation Plant for individual mineral separation. Workers engaged in operations of HEMM are provided with ear plugs/ muffs and the noise levels are maintained below 85 dBA in work environment. (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 19 <sup>th</sup> May, 1993 and 31 <sup>st</sup> December, 1993 or as amended from time to time. Oil and grease traps should be installed before discharge of workshop effluents.	No industrial waste water is generated during Beach Mineral Sand mining operations.
25	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.	All persons employed in mines are imparted with trained 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, Manavalakurichi and effectively functioning. Unit head is the Chairman of the Cell. Once in every three months, the environmental parameters of the mines and mineral beneficiation areas are reviewed by the 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. 11)
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 7.06 hectares ML area has been existing since 1970. 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 soft 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	IREL. Manavalakurichi will extend full		
	composite of the supulated conditions. The	cooperation to the Officers of MoEF & CC in		
project authorities should extend full cooperation		the event of monitoring the compliances of		
	to the officer (s) of the Regional Office by	the stipulated conditions.		
	furnishing the requisite data / information /			
	monitoring reports.			
31	A copy of clearance letter will be marked to	A copy of Clearance letter has been sent to		
1.1	concerned Panchayat / local NGO, if any, from	Panchayat.		
	whom suggestion / representation has been			
	received while processing the proposal.			
32	State Pollution Control Board should display a	Complied.		
	copy of the clearance letter at the Regional Office,			
1	District Industry Centre and Collector's office/			
	Tehsildar's office for 30 days.			
33	The project authorities should advertise at least in	Information on Environment Clearance for		
1	two local newspapers widely circulated, one of	7.06 hects ML area of IREL was published in		
	which shall be in the vernacular language of the	two local newspapers Dinamani and The New		
	locality concerned, within 7 days of the issue of	Indian Express on 11.04.2018 and the same		
11.0	the clearance letter informing that the project has	was forwarded to the Regional office.		
1.1.1	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			
	www.environmentclearance.nic.in and a copy of			
<u>a</u> .	the same should be forwarded to the Regional			
- 24	Office.			

Jucces CGN Manavalakurichi Ilmenite Mine

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## <u>Annexure- II</u>

## **IREL (India) Limited** Manavalakurichi

# **Monitoring Report**

# From April-2023 to September -2023

S. No.	Description	Page No.
1.	Radio activity Monitoring Report	1-26
2.	Water Quality upstream and downstream Report	27
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4.	Stack Emission Monitoring Report	29
5.	Illumination Report	30-31
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7.	Water Quality of adjoining water bodies Report	38-42
8.	Ambient Noise Level monitoring and In-Plant Noise Level Survey Report (Day/Night)	43
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11	Fund allocation for Environment Protection/CSR activities	47

भारत सरकार / Government of India

# भाभा परमाणु अनुसंधान केंद्र / BHABHA ATOMIC RESEARCH CENTRE स्वास्थ्य भौतिकी प्रभाग / Health Physics Division

विकिरण सुरक्षा अनुभाग (परमाणु ईंधन) / Radiation Protection Section (Nuclear Fuels) स्वास्थ्य भौतिकी इकाई / Health Physics Unit

फैक्स / Fax : 04651-237220 आईआरईएल(इंडिया)लिमिटेड / IREL(India)Limited फ़ोन / Tel : 04651-237255-58 मणवालकुरिच्ची /Manavalakurichi- 629252 ईमेल/ e.mail : <u>oic.hpu-mk@irel.co.in</u> तमिलनाडु ,इंडिया /Tamil Nadu, India दिनांक Date: 15-05-2023

Dear Sir,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of April -2023 for your kind information and necessary action.

Regards

Yours Sincerely

DGM (MIS 3 Seyle

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

Dr.Harikumar M, Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Chief General Manager & Head IREL(India) Limited, MK

### RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (April -2023)

### 1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of March -2023 are presented in Table 1. Background radiation field at Guest House ranged from 0.40 to 0.60  $\mu$ Sv h<sup>-1</sup>. Radiation field at the MK beach area is in the range 1.10 to 1.60 $\mu$ Sv h<sup>-1</sup>. The background radiation field inside the Minerals Separation Plant varied from 1.00 to 15.30  $\mu$ Sv h<sup>-1</sup>. The maximum fields were at the Monazite section, Zircon section and Monazite Exolon section. . Table 2 gives the radiation field in the plant premises.

### 2 Air monitoring:

The results of analysis of airborne dust, <sup>232</sup>Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.80 to 2.80 mgm<sup>-3</sup> (mean 1.54 $\pm$ 0.43) (respirable = 25%; TLV= 4 mg.m<sup>-3</sup>). The higher dust levels were observed at Monazite RCBMS, Garnet Platform, Zr air tables, Zircon ground floor, Rutile platform, and Vibratory screen platform. The air activity due to <sup>232</sup>Th varied from 0.002 to 0.025 Bq.m<sup>-3</sup> (mean= 0.009 $\pm$  0.005Bq.m<sup>-3</sup>). Higher concentrations of airborne thorium were observed at Monazite ground floor. Air activity due to Thoron (<sup>220</sup>Rn) progenies varied from 0.22 to 1.84 (mean=0.71 $\pm$ 0.37mWL).

#### 3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. <sup>232</sup>Th activity in the samples ranged from 2 to 25 mBqm<sup>-3</sup>. 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 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.

Table: 1 Results of the radiation survey of the plant area (April -2023) Radiation field ( $\mu$ Sv h<sup>-1</sup>)

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	2.00	18.70	
2.	HUP ground floor	1.10	1.30	
3.	HUP first floor	0.90	1.00	
4.	HUP concentrate	1.90	6.20	
5.	HUP tailings Area	0.30	0.40	
6.	Conc.sand godown	4.00	6.70	
7.	F.B. drier area	1.20	2.50	
8.	Weighing room	1.10	1.30	
9.	Vibrating screen Section	1.10	2.00	_
10.	Rutile section	1.20	2.50	* 2
11.	H.T.Plant Section	1.10	3.30	ан алан алан алан алан алан алан алан а

12.	Ilmenite / Rutile readings	1.10	2.00	
13.	Zircon section	0.90	3.10	
14.	Monazite exolons Section	1.50	3.20	
15.	Monazite Section	2.40	15.30	
16.	Garnet section	1.70	3.70	
. 17.	Ilmenite section	1.30	2.50	
18.	Monazite silos (ground floor)	1.70	2.80	
19.	Road in front of godown	1.00	1.20	
20.	Monazite stores near ETP outside	3.00	10.00	
21.	New monazite store(outside walls)	1.00	1.10	No stock
22.	Road out side Monazite store	1.50	3.00	
23.	Monazite pumping area	1.10	1.40	· · · · ·

Table: 2 Radiation Survey results of the plant premises (April -2023) Radiation field - ( $\mu$ Sv h<sup>-1</sup>)

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	0.90	1.10	
2	Dry Mill waste area	5.10	24.80	
3	Con A yard	1.90	6.20	
4	Guest House area	0.40	0.60	
5	MK Beach	1.10	1.60	
6	Main Gate	0.50	0.80	
7	In front of Lab	0.60	0.90	
8	In front of Dry mill	0.80	1.00	
9	In front ZOP	0.60	1.00	
10	In front stores	0.60	1.00	<i>a</i>
11	In front m/w/shop	0.60	0.70	E
12	In front of Electrical w/s	0.80	1.00	
13	In front of civil section	0.90	1.00	
14	In front of canteen	0.70	0.90	
15	ETP area	2.40	4.40	
16	Raw sand dump (HUP)	0.90	1.50	

3

C M.	Location	Dust conc	Thoron	<sup>232</sup> Th
S. No		(mgm <sup>-3</sup> )	daughters	(Bq m <sup>-3</sup> )
1	Vibratory screens platform	0.93	0.31	0.006
2	Vibratory screens Ground floor	1.60	0.22	0.006
, 3	Weighing room	1.60	0.50	0.002
4	H.T.Platform East	1.07	0.95	0.013
5	H T Ground floor East	2.53	0.64	0.012
6	H.T.Platform West	2.67	0.61	0.011
7	H.T Ground floor West	2.40	0.72	0.004
8	Exolon ground floor	2.53	0.53	0.013
9	Exolon platform	2.40	0.58	0.011
10	Rutile Platform	1.33	0.39	0.007
11	Rutile Ground floor	2.27	0.61	0.010
12	Garnet Platform	2.13	0.58	0.011
13	Garnet ground floor	1.07	0.61	0.005
14	Zircon (Coarse) Platform	2.80	0.33	0.007
15	Zircon (Coarse) ground floor	2.40	0.72	0.010
16	Zircon (Fine) Platform	2.27	0.75	0.010
17	Zircon (Fine) ground floor	2.52	1.34	0.007
18	Zircon air tables	2.67	0.61	0.011
19	Monazite platform	1.73	1.28	0.014
20	Monazite ground floor	2.53	1.84	0.025
21		1.33	0.45	0.002
22	limente Clattor floor	1.73	0.58	0.002
	Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22

Table: 3 Air monitoring, Manay	alakurichi Plant	(April	-2023)
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No of Samples	=	23
Average dust conc.	=	2.02±0.56mgm <sup>-3</sup>
Average air activity $(^{232}$ Th)	=	$0.009 \pm 0.005 \text{ Bq m}^{-3}$
Average air activity (Thoron daughters)	=	0.71±0.37mWL

Table 4: Air monitoring, plant premises - (April -2023)

S. No	LOCATION	Dust mg m <sup>-3</sup>	Th(B) mWL	<sup>232</sup> Th Bq m <sup>-3</sup>
1	In front of Lab	1.07	0.11	0.002
2	In front of ZOP	0.80	0.22	0.002
3	In front of Dry mill	1.20	0.19	0.003
4	In front of Stores	0.93	0.11	0.002
5	In front of E/W shop	1.33	0.11	0.003
6 /	In front of canteen	1.20	0.08	0.004

Table 5: Analyses of Solid Tailings (April -2023)

S.No	Location	<sup>232</sup> Th (Bq g <sup>-1</sup> )	MDL(Bq g <sup>-1</sup> )	Regulatory limit (Bq g <sup>-1</sup> )
1	HUP Tailings	0.033	0.022	1.0

भारत सरकार / Government of India

# भाभा परमाणु अनुसंधान केंद्र / BHABHA ATOMIC RESEARCH CENTRE स्वास्थ्य भौतिकी प्रभाग / Health Physics Division

विकिरण सुरक्षा अनुभाग (परमाणु ईंधन) / Radiation Protection Section (Nuclear Fuels) स्वास्थ्य भौतिकी इकाई / 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 तमिलनाडु ,इंडिया /Tamil Nadu,India दिनांक Date: 01- 06- 2023

Dear Sir,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of May -2023 for your kind information and necessary action.

Regards

Yours Sincerely

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

ENV-12

Dr.Harikumar M, Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Chief General Manager & Head IREL(India) Limited , MK

DETM (Saledy 3 MIS)

# RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (May -2023)

### 1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of, May -2023 are presented in Table 1. Background radiation field at Guest House ranged from 0.40 to  $0.60 \,\mu\text{Svh}^{-1}$ . Radiation field at the MK beach area is in the range 1.10 to  $1.60\mu\text{Svh}^{-1}$ . The background radiation field inside the Minerals Separation Plant varied from 1.00 to 15.30  $\mu\text{Svh}^{-1}$ . The maximum fields were at the Monazite section, Zircon section and Monazite Exolon section. Table 2 gives the radiation field in the plant premises.

### 2 Air monitoring:

The results of analysis of airborne dust, <sup>232</sup>Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.80 to 2.80 mgm<sup>-3</sup> (mean 1.54±0.43) (respirable = 25%; TLV= 4 mg.m<sup>-3</sup>). The higher dust levels were observed at Monazite RCBMS, Garnet Platform, Zr air tables, Zircon ground floor, Rutile platform, and Vibratory screen platform. The air activity due to <sup>232</sup>Th varied from 0.002 to 0.025 Bq.m<sup>-3</sup> (mean= 0.009± 0.005Bq.m<sup>-3</sup>). Higher concentrations of airborne thorium were observed at Monazite ground floor. Air activity due to thoron (<sup>220</sup>Rn) progenies varied from 0.22 to 1.84 (mean=0.71±0.37mWL).

### 3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. <sup>232</sup>Th activity in the samples ranged from 2 to 25 mBqm<sup>-3</sup>. 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 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.

Table: 1 Results of the radiation survey of the plant area (May -2023) Radiation field (µSv h<sup>-1</sup>)

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	2.00	18.70	
2.	HUP ground floor	1.10	1.50	
3.	HUP first floor	0.80	1.20	
4.	HUP concentrate	1.50	6.50	
5.	HUP tailings Area	0.30	0.40	
6.	Conc.sand godown	4.00	6.70	
7.	F.B. drier area	1.20	2.20	
8.	Weighing room	1.00	1.30	141 1
9.	Vibrating screen Section	1.10	2.00	
10.	Rutile section	1.10	2.00	
11.	H.T.Plant Section	1.10	2.10	
12.	Ilmenite / Rutile readings area	1.10	1.50	

13.	Zircon section	1.20	4.60	
14.	Monazite exolons Section	1.20	3.00	
15.	Monazite Section	2.50	14.50	
16.	Garnet section	1.20	4.30	
17.	Ilmenite section	1.10	2.10	
. 18.	Monazite silos (ground floor)	1.00	1.20	
19.	Road in front of godown	1.00	1.20	
20.	Monazite stores near ETP outside	3.00	10.00	19 1
21.	New monazite store(outside walls)	1.00	1.10	No stock
22.	Road out side Monazite store	1.50	2.00	
23.	Monazite pumping area	1.10	1.20	

Table: 2 Radiation Survey results of the plant premises (May -2023) Radiation field - ( $\mu$ Sv h<sup>-1</sup>)

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	0.90	1.10	
2	Dry Mill waste area	5.10	28.90	
3	Con A yard	1.90	6.20	4
4	Guest House area	0.40	0.60	
5	MK Beach	1.40	2.70	
6	Main Gate	0.50	0.80	
7	In front of Lab	0.60	1.00	
8	In front of Dry mill	0.80	1.00	
9	In front ZOP	0.60	1.00	•
10	In front stores	0.60	0.70	
11	In front m/w/shop	0.60	0.70	2
12	In front of Electrical w/s	0.80	1.00	
13	In front of civil section	0.70	1.00	
14	In front of canteen	0.70	0.90	
15 /	ETP area	2.40	4.40	
16	Raw sand dump (HUP)	1.00	2.50	

C N	Location	Dust conc	Thoron	<sup>232</sup> Th
S. NO		(mgm <sup>-3</sup> )	daughters	(Bq m <sup>-3</sup> )
1	Vibratory screens platform	0.93	0.33	0.003
2	Vibratory screens Ground floor	1.60	0.19	0.002
3	Weighing room	1.60	0.28	0.004
4	H.T.Platform East	1.07	0.42	0.006
5	H T Ground floor East	2.53	0.45	0.006
6	H.T.Platform West	2.67	0.45	0.007
7	H.T Ground floor West	2.40	0.61	0.007
8	Exolon ground floor	2.53	0.31	0.009
9	Exolon platform	2.40	0.56	0.005
10	Rutile Platform	1.33	0.50	0.006
11	Rutile Ground floor	2.27	0.31	0.010
12	Garnet Platform	2.13	0.67	0.004
13	Garnet ground floor	1.07	1.70	0.007
14	Zircon (Coarse) Platform	2.80	0.33	0.012
15	Zircon (Coarse) ground floor	2.40	0.50	0.007
16	Zircon (Fine) Platform	2.27	1.22	0.009
17	Zircon (Fine) ground floor	2.52	2.39	0.006
18	Zircon air tables	2.67	0.70	0.013
19	Monazite platform	1.73	4.37	0.020
20	Monazite ground floor	2.53	2.84	0.034
21	Ilmenite Section	1.33	0.25	0.004
22	Ilmenite Ground floor	1.73	0.36	0.005
	Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22

Table: 3 Air monitoring, Manavalakurichi Plant	May	-2023)	
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No of Samples	=	23
Average dust conc.	=	1.63±0.72mg m <sup>-3</sup>
Average air activity $(^{232}$ Th)	=	$0.009 \pm 0.010 \text{ Bq m}^{-3}$
Average air activity (Thoron daughters)	=	1.04±1.24mWL

Table 4: Air monitoring, plant premises - (May -2023)

S. No	LOCATION	Dust mg m <sup>-3</sup>	Th(B) mWL	<sup>232</sup> Th Bq m
1	In front of Lab	1.07	0.14	0.002 🛸
2	In front of ZOP	0.80	0.11	0.002
3	In front of Dry mill	1.20	0.19	0.004
4	In front of Stores	0.93	0.14	0.003
5	In front of E/W shop	1.33	0.08	0.002
6	In front of canteen	1.20	0.14	0.003

Table 5: Analyses of Solid Tailings (May -2023)

S.No	Location	<sup>232</sup> Th (Bq g <sup>-1</sup> )	MDL(Bq g <sup>-1</sup> )	Regulatory limit (Bq g <sup>-1</sup> )
1	HUP Tailings	0.033	0.022	1.0

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 : <u>oic.hpu-mk@irel.co.in</u>तमिलनाडु ,इंडिया /Tamil Nadu,India दिनांक Date: 06- 07- 2023

Dear Sir,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of June - 2023 for your kind information and necessary action.

Regards

Yours Sincerely

K.Sreekumar

Officer in Charge, HPU, IREL, MK

Dr.Harikumar. M, Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Chief General Manager & Head IREL(India) Limited, MK

# RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (June -2023)

### 1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of, June -2023 are presented in Table 1. Background radiation field at Guest House ranged from 0.40 to  $0.60 \ \mu \text{Svh}^{-1}$ . Radiation field at the MK beach area is in the range 1.20 to 2.20. The background radiation field inside the Minerals Separation Plant varied from 1.00 to 14.70  $\mu \text{Svh}^{-1}$ . The maximum fields were at the Monazite section, Zircon section and Monazite Exolon section. Table 2 gives the radiation field in the plant premises.

### 2 Air monitoring:

The results of analysis of airborne dust, <sup>232</sup>Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.80 to 2.53 mgm<sup>-3</sup> (mean 1.30±0.40) (respirable = 25%; TLV= 4 mg.m<sup>-3</sup>). The higher dust levels were observed at Monazite RCBMS, Garnet Platform, Zr air tables, Zircon ground floor, Rutile platform, and Vibratory screen platform. The air activity due to <sup>232</sup>Th varied from 0.004 to 0.033 Bq.m<sup>-3</sup> (mean= 0.012± 0.007Bq.m<sup>-3</sup>). Higher concentrations of airborne thorium were observed at Monazite ground floor, varied from 0.22 to 3.06 (mean = 1.181±0.80mWL).

### 3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. <sup>232</sup>Th activity in the samples ranged from 3 to 12 mBqm<sup>-3</sup>. 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 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.

Table: 1 Results of the radiation survey of the plant area (June - 2023) Radiation field-( $\mu$ Svh<sup>-1</sup>)

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	2.00	9.90	
2.	HUP ground floor	1.00	1.20	
3.	HUP first floor	0.60	1.10	
4.	HUP concentrate	1.80	6.10	a
5.	HUP tailings Area	0.30	0.40	and the second second
6.	Conc.sand godown	1.30	2.70	
7.	F.B. drier area	1.10	2.60	
8.	Weighing room	1.00	1.20	
9.	Vibrating screen Section	1.00	1.80	
10.	Rutile section	1.20	2.80	
11.	H.T.Plant Section	1.10	3.50	

12.	Ilmenite / Rutile readings area	1.10	1.50	
13.	Zircon section	1.20	6.00	
14.	Monazite exolons Section	1.50	3.00	and the second second
15.	Monazite Section	1.80	14.70	deres since a constant
16.	Garnet section	1.40	3.50	
17.	Ilmenite section	1.10	2.10	and all and all
18.	Monazite silos (ground floor)	1.00	1.10	
19.	Road in front of godown	0.60	1.10	in the second
20.	Monazite stores near ETP outside	2.00	4.10	
21.	New monazite store(outside walls)	1.00	1.10	No stock
22.	Road out side Monazite store	1.10	2.00	
23.	Monazite pumping area	1.00	1.10	

Table: 2 Radiation Survey results of the plant premises (June -2023) Radiation field - ( $\mu$ Svh<sup>-1</sup>)

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	0.90	1.10	
2	Dry Mill waste area	4.10	10.90	
3	Con A yard	1.80	6.10	
4	Guest House area	0.40	0.60	and the second second
5	MK Beach	1.20	2.20	
6	Main Gate	0.30	0.60	
7	In front of Lab	0.40	0.60	
8	In front of Dry mill	0.60	1.00	
9	In front ZOP	0.50	1.00	
10	In front stores	0.50	0.70	
11	In front m/w/shop	0.60	0.70	
12	In front of Electrical w/s	0.50	1.00	
13	In front of civil section	0.60	0.70	
14	In front of canteen	0.50	0.60	
15	ETP area	2.00	4.10	
16	Raw sand dump (HUP)	1.00	3.50	

11

S. No	Location	Dust conc (mgm <sup>-3</sup> )	Thoron daughters	<sup>232</sup> Th (Bq m <sup>-3</sup> )
1	Vibratory screens platform	0.93	0.28	0.005
2	Vibratory screens Ground floor	1.33	0.25	0.004
3	Weighing room	1.07	0.22	0.006
4	H.T.Platform East	1.20	1.25	0.012
5	H T Ground floor East	2.53	0.67	0.009
'6	H.T.Platform West	0.80	1.00	0.008
7	H.T Ground floor West	1.47	1.50	0.007
8	Exolon ground floor	1.47	1.00	0.016
9	Exolon platform	1.33	0.89	0.012
10	Rutile Platform	0.80	0.47	0.009 -
11	Rutile Ground floor	1.33	0.78	0.016
12	Garnet Platform	0.93	0.75	0.009
13	Garnet ground floor	1.87	0.50	0.020
14	Zircon (Coarse) Platform	1.07	0.75	0.008
15	Zircon (Coarse) ground floor	1.07	1.86	0.012
16	Zircon (Fine) Platform	1.20	1.20	0.011
17	Zircon (Fine) ground floor	1.33	1.36	0.008
18	Zircon air tables	1.87	2.42	0.013
19	Monazite platform	1.07	3.01	0.029
20	Monazite ground floor	1.20	3.06	0.033
21	Ilmenite Section	1.07	0.95	0.013
22	Ilmenite Ground floor	1.20	0.84	0.009
	Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22

# Table: 3 Air monitoring, Manavalakurichi Plant (June -2023)

No of Samples = 23 Average dust conc. =  $1.30\pm0.40$ mgm<sup>-3</sup> Average air activity (<sup>232</sup>Th) =  $0.012 \pm 0.007$  Bq m<sup>-3</sup> Average air activity (Thoron daughters) =  $1.18\pm 80$ mWL

Table 4: Air monitoring, plant premises - (June -2023)

S. No	LOCATION	Dust mg/m <sup>3</sup>	Th(B)mWL	<sup>232</sup> ThBqm <sup>-3</sup>
1	In front of Lab	0.93	0.14	0.001
2	In front of ZOP	1.07	0.17	0.002
3	In front of Dry mill	1.07	0.14	0.003
4	In front of Stores	0.80	0.11	0.002
5	In front of E/W shop	1.20	0.17	0.003
6	In front of canteen	0.80	0.11	0.001

S.No	Location	Dust.con (mg m <sup>-3</sup> )	Th (B) ( mWL )	<sup>232</sup> Th (Bq m <sup>-3</sup> )
1	Guest House Area	0.67	0.11	0.001
2	Pillavar coil junction	1.07	0.11	0.002
2	Periavilai	1.87	0.17	0.003
4	HUP Tails Area	0.67	0.08	0.001

Table 5: Quarterly air activity-Environmental samples (April - June 2023)

Table 6: Quarterly Analysis of Water samples (April - June, 2023)

S No	Location	ion Gross α Bq Γ <sup>1</sup>	
1	Pillavarcoil junction well	0.039	0.302
2	Vallivar river water	0.011	0.056
3	Guest House Well No 1	0.022	0.077
<u>J.</u>	Guest House Well No 2	0.018	0.091
5	Guest House Well No 3	0.015	0.187
6	HUP Tails water	0.011	0.077

Table 7: Analyses of Solid Tailings (June - 2023)

S.No	Location	<sup>232</sup> Th (Bqg <sup>-1</sup> )	MDL(Bqg <sup>-1</sup> )	Regulatory limit (Bqg <sup>-1</sup> )
1	HUP Tailings	0.027	0.022	1.0

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Dear Sir,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of July -2023 for your kind information and necessary action.

Regards

Yours Sincerely

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

Dr.Harikumar M, Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Chief General Manager & Head IREL(India) Limited, MK

# RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (July -2023)

### 1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of, July -2023 are presented in Table 1. Background radiation field at Guest House ranged from 0.40 to  $0.60 \ \mu \text{Svh}^{-1}$ . Radiation field at the MK beach area is in the range 1.20 to 2.20. The background radiation field inside the Minerals Separation Plant varied from 1.00 to 11.50  $\mu \text{Svh}^{-1}$ . The maximum fields were at the Monazite section, Zircon section and Monazite Exolon section. Table 2 gives the radiation field in the plant premises.

### 2 Air monitoring:

The results of analysis of airborne dust, <sup>232</sup>Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.80 to 2.80 mgm<sup>-3</sup> (mean 1.54±0.43) (respirable = 25%; TLV= 4 mg.m<sup>-3</sup>). The higher dust levels were observed at Monazite RCBMS, Garnet Platform, Zr air tables, Zircon ground floor, Rutile platform, and Vibratory screen platform. The air activity due to <sup>232</sup>Th varied from 0.002 to 0.025 Bq.m<sup>-3</sup> (mean= 0.009± 0.005Bq.m<sup>-3</sup>). Higher concentrations of airborne thorium were observed at Monazite ground floor, varied from 0.22 to 1.84 (mean = 0.71±0.37mWL).

#### 3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. <sup>232</sup>Th activity in the samples ranged from 2 to 25 mBqm<sup>-3</sup>. 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 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.

Table: 1 Results of the radiation survey of the plant area (July -2023) Radiation field ( $\mu$ Svh<sup>-1</sup>)

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	2.00	9.70	
2.	HUP ground floor	1.10	1.30	
3.	HUP first floor	0.50	1.00	
4.	HUP concentrate	1.80	6.10	4
5.	HUP tailings Area	0.40	0.50	protection in the second
6.	Conc.sand godown	2.00	6.0	
7.	F.B. drier area	1.10	2.70	Plana di Ukus
8.	Weighing room	1.00	1.30	18 18 18 18 18 18 18 18 18 18 18 18 18 1
9.	Vibrating screen Section	1.10	1.80	
10.	Rutile section	1.20	2.80	
11.	H.T.Plant Section	1.10	2.50	

12.	Ilmenite / Rutile readings area	1.40	1.90	
13.	Zircon section	1.20	6.00	
14.	Monazite exolons Section	1.70	3.80	Prist tomorrow up
15.	Monazite Section	2.50	11.50	
16.	Garnet section	1.50	4.50	
17.	Ilmenite section	1.40	1.90	
18.	Monazite silos (ground floor)	1.00	1.20	
19.	Road in front of godown	0.60	1.00	
20.	Monazite stores near ETP outside	2.00	3.50	
21.	New monazite store(outside walls)	1.00	1.10	No stock
22.	Road out side Monazite store	1.50	2.00	and a second analyse for
23.	Monazite pumping area	1.10	1.20	AND AN A DATE OF A DECK

Table: 2 Radiation Survey results of the plant premises (July -2023) Radiation field -  $(\mu Svh^{-1})$ 

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	1.00	1.10	
2	Dry Mill waste area	4.50	14.00	
3	Con A yard	1.90	6.20	
4	Guest House area	0.40	0.60	
5	MK Beach	1.20	2.20	
6	Main Gate	0.40	0.70	
7	In front of Lab	0.40	0.80	
8	In front of Dry mill	0.60	1.00	and the second
9	In front ZOP	0.50	1.00	Charles and the second
10	In front stores	0.50	0.80	and have in the second second
11	In front m/w/shop	0.60	0.70	2
12	In front of Electrical w/s	0.50	1.00	
13	In front of civil section	0.50	0.80	in the Sult 1 - Series
14	In front of canteen	0.40	0.60	production of the later of the
15	ETP area	2.00	3.50	Stage Street The L
16	Raw sand dump (HUP)	1.00	3.10	Here appropriate the second

16

S No	Location	Dust conc	Thoron	<sup>232</sup> Th
5.110		(mgm <sup>-3</sup> )	daughters	(Bq m <sup>-3</sup> )
1	Vibratory screens platform	0.93	0.19	0.004
2	Vibratory screens Ground floor	1.47	0.19	0.004
3	Weighing room	1.07	0.39	0.007
4	H.T.Platform East	0.93	0.47	0.007
5	H T Ground floor East	2.13	0.50	0.008
• 6	H.T.Platform West	1.07	0.28	0.004
7	H.T Ground floor West	1.20	0.19	0.003
8	Exolon ground floor	1.07	0.42	0.007
9	Exolon platform	1.33	0.56	0.009
10	Rutile Platform	2.40	0.39	0.009
11	Rutile Ground floor	2.27	0.42	0.008
12	Garnet Platform	1.60	0.53	0.010
13	Garnet ground floor	2.00	1.36	0.030
14	Zircon (Coarse) Platform	1.20	0.64	0.009
15	Zircon (Coarse) ground floor	1.07	1.09	0.017
16	Zircon (Fine) Platform	1.20	0.42	0.009
17	Zircon (Fine) ground floor	0.93	0.50	0.007
18	Zircon air tables	2.27	0.67	0.010
19	Monazite platform	2.00	3.26	0.028
20	Monazite ground floor	1.60	3.03	0.033
21	Ilmenite Section	1.20	0.70	0.011
22	Ilmenite Ground floor	1.60	0.31	0.006
	Limits	<b>TLV: 4.00</b>	DAC: 1WL	DAC: 0.22

# Table: 3 Air monitoring, Manavalakurichi Plant (July -2023)

No of Samples	=	23
Average dust conc.	=	1.48±0.81mgm <sup>-3</sup>
Average air activity $(^{232}$ Th)	=	$0.011 \pm 0.009 \text{ Bg m}^{-3}$
Average air activity (Thoron daughters)	=	0.75±0.82mWL

Table 4: Air monitoring, plant premises - (July -2023)

S. No	LOCATION	Dust mg/m <sup>3</sup>	Th(B)mWL	<sup>232</sup> ThBqm <sup>-3</sup>
1	In front of Lab	0.93	0.14	0.002
2	In front of ZOP	0.67	0.14	0.001
3	In front of Dry mill	0.93	0.17	0.003
4	In front of Stores	0.67	0.17	0.002
5	In front of E/W shop	1.07	0.19	0.003
6	In front of canteen	0.67	0.14	0.002

Table 5: Analyses of Solid Tailings (July -2023)

S.No	Location	<sup>232</sup> Th (Bqg <sup>-1</sup> )	MDL(Bqg <sup>-1</sup> )	Regulatory limit (Bqg <sup>-1</sup> )
1	HUP Tailings	0.022	0.022	1.0

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Dear Sir,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of August - 2023 for your kind information and necessary action.

Regards

Yours Sincerely

K.Sreekumar

Officer in Charge, HPU, IREL, MK

Dr.Harikumar. M, Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Chief General Manager & Head IREL(India) Limited, MK

# RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (August - 2023)

### 1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of, August -2023 are presented in Table 1. Background radiation field at Guest House ranged from 0.40 to 0.60  $\mu$ Svh<sup>-1</sup>. Radiation field at the MK beach area is in the range 1.20 to 2.20. The background radiation field inside the Minerals Separation Plant varied from 1.00 to 14.70  $\mu$ Svh<sup>-1</sup>. The maximum fields were at the Monazite section, Zircon section and Monazite Exolon section. Table 2 gives the radiation field in the plant premises.

### 2 Air monitoring:

The results of analysis of airborne dust, <sup>232</sup>Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.93 to 1.87 mgm<sup>-3</sup> (mean 1.34±0.26) (respirable = 25%; TLV= 4 mg.m<sup>-3</sup>). The higher dust levels were observed at Monazite RCBMS, Garnet Platform, Zr air tables, Zircon ground floor, Rutile platform, and Vibratory screen platform. The air activity due to <sup>232</sup>Th varied from 0.007 to 0.032 Bq.m<sup>-3</sup> (mean= 0.015± 0.009Bq.m<sup>-3</sup>). Higher concentrations of airborne thorium were observed at Monazite ground floor, varied from 0.5 to 4.20 (mean=1.154±0.1.56mWL).

### 3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. <sup>232</sup>Th activity in the samples ranged from 3 to 19 mBqm<sup>-3</sup>. 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 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.

Table: 1 Results of the radiation survey of the plant area (August - 2023) Radiation field-( $\mu$ Svh<sup>-1</sup>)

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	2.00	9.90	
2.	HUP ground floor	1.00	1.20	
3.	HUP first floor	0.50	1.00	1
4.	HUP concentrate	1.60	6.70	
5.	HUP tailings Area	0.40	0.50	
6.	Conc.sand godown	1.30	2.70	
7.	F.B. drier area	1.20	2.70	
8.	Weighing room	1.00	1.20	
9.	Vibrating screen Section	1.10	2.00	
10.	Rutile section	1.20	2.00	5 N
11.	H.T.Plant Section	1.10	4.00	

12.	Ilmenite / Rutile readings area	1.10	1.50	
13.	Zircon section	1.20	4.00	
14.	Monazite exolons Section	1.10	3.50	
15.	Monazite Section	3.00	11.20	
16.	Garnet section	1.60	4.50	
17.	Ilmenite section	1.20	2.10	alt water test model
18.	Monazite silos (ground floor)	1.00	1.10	stadio anti espera de
i9.	Road in front of godown	0.60	1.10	
20.	Monazite stores near ETP outside	2.00	4.10	
21.	New monazite store(outside walls)	1.00	1.10	No stock
22.	Road out side Monazite store	1.10	2.00	
23.	Monazite pumping area	1.00	1.10	

Table: 2 Radiation Survey results of the plant premises (August -2023) Radiation field - ( $\mu$ Svh<sup>-1</sup>)

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	1.00	1.10	
2	Dry Mill waste area	3.50	13.00	and the state of the second
3	Con A yard	1.60	6.70	Section destructions
4	Guest House area	0.40	0.60	office on early heating the
5	MK Beach	1.20	2.50	
6	Main Gate	0.60	0.80	heledites in the letter i
7	In front of Lab	0.50	0.60	
8	In front of Dry mill	0.60	1.00	
9	In front ZOP	0.50	1.00	
10	In front stores	0.50	0.80	
11	In front m/w/shop	0.60	0.70	
12	In front of Electrical w/s	0.50	1.00	
13	In front of civil section	0.50	0.80	
14	In front of canteen	0.40	0.60	
15	ETP area	2.20	3.60	-
16	Raw sand dump (HUP)	1.10	2.70	

20

	Location	Dust conc	Thoron	<sup>232</sup> Th
S. No		(mgm <sup>-3</sup> )	daughters	(Bq m <sup>-3</sup> )
1	Vibratory screens platform	1.07	0.25	0.004
2	Vibratory screens Ground floor	1.20	0.17	0.004
3	Weighing room	1.20	0.25	0.004
4	H.T.Platform East	1.07	0.53	0.009
5	H T Ground floor East	1.33	0.39	0.007
6	H.T.Platform West	1.60	0.36	0.008
7	H.T Ground floor West	1.73	0.42	0.006
8	Exolon ground floor	1.20	1.17	0.012
9	Exolon platform	1.73	0.50	0.011
10	Rutile Platform	1.20	0.33	0.007
11	Rutile Ground floor	1.47	0.56	0.013
12	Garnet Platform	1.33	0.56	0.010
13	Garnet ground floor	1.73	0.64	0.011
14	Zircon (Coarse) Platform	1.20	0.39	0.007
15	Zircon (Coarse) ground floor	1.07	0.64	0.011
16	Zircon (Fine) Platform	0.93	0.53	0.008
17	Zircon (Fine) ground floor	1.33	0.56	0.009
18	Zircon air tables	1.87	0.72	0.011
19	Monazite platform	1.33	2.73	0.020
20	Monazite ground floor	1.47	4.20	0.032
21	Ilmenite Section	1.07	0.56	0.011
22	Ilmenite Ground floor	1.33	0.50	0.007
	Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22

# Table: 3 Air monitoring, Manavalakurichi Plant (August -2023)

No of Samples = 23 Average dust conc. =  $1.34\pm0.26$ mgm<sup>-3</sup> Average air activity (<sup>232</sup>Th) =  $0.015\pm0.009$  Bq m<sup>-3</sup> Average air activity (Thoron daughters) =  $1.54\pm1.56$ mWL

Table 4: Air monitoring, plant premises - (August -2023)

S. No	LOCATION	Dust mg/m <sup>3</sup>	Th(B)mWL	<sup>232</sup> ThBqm <sup>-3</sup>
1	In front of Lab	0.80	0.11	0.002
2	In front of ZOP	0.93	0.19	0.002
3	In front of Dry mill	0.93	0.14	0.002
4	In front of Stores	0.80	0.14	0.002
5	In front of E/W shop	1.07	0.14	0.002
6	In front of canteen	0.93	0.11	0.001
12 S				

Table 5: Analyses of Solid Tailings (August - 2023)

S.No	Location	<sup>232</sup> Th (Bqg <sup>-1</sup> )	MDL(Bqg <sup>-1</sup> )	Regulatory limit (Bqg <sup>-1</sup> )
1	HUP Tailings	0.028	0.022	1.0

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 : <u>oic.hpu-mk@irel.co.in</u>तमिलनाडु ,इंडिया /Tamil Nadu,India दिनांकDate: 07- 10- 2023

Dear Sir,

Enclosed please find the monthly report on the activities of Health Physics Unit for the month of September - 2023 for your kind information and necessary action.

Regards

Yours Sincerely

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

Dr.Harikumar. M, Officer in Charge, Health Physics Unit IREL, Udyogamandal

Cc: The Chief General Manager & Head IREL(India) Limited, MK

# RADIOLOGICAL MONITORING AT IREL, MANAVALAKURICHI PLANT (September - 2023)

### 1. Radiation Fields:

Radiation field at different locations in the mining areas and plant measured during the month of, September -2023 are presented in Table 1. Background radiation field at Guest House ranged from 0.40 to 0.60  $\mu$ Svh<sup>-1</sup>. Radiation field at the MK beach area is in the range 1.00 to 2.40. The background radiation field inside the Minerals Separation Plant varied from 1.00 to 8.0  $\mu$ Svh<sup>-1</sup>. The maximum fields were at the Monazite section, Zircon section and Monazite Exolon section. Table 2 gives the radiation field in the plant premises.

### 2 Air monitoring:

The results of analysis of airborne dust, <sup>232</sup>Th and thoron daughters are provided in Table 3. The gross dust concentration inside the plant varied from 0.80 to 2.53 mgm<sup>-3</sup> (mean 1.30 $\pm$ 0.39) (respirable = 25%; TLV= 4 mg.m<sup>-3</sup>). The higher dust levels were observed at Monazite RCBMS, Garnet Platform, Zr air tables, Zircon ground floor, Rutile platform, and Vibratory screen platform. The air activity due to <sup>232</sup>Th varied from 0.008 to 0.020 Bq.m<sup>-3</sup> (mean= 0.014 $\pm$  0.005Bq.m<sup>-3</sup>). Higher concentrations of airborne thorium were observed at Monazite ground floor, varied from 0.58 to 2.45 (mean =1.25  $\pm$ 0.83mWL).

3. Environmental Air Samples:

Data of environmental (plant premises) air samples collected from six locations is given in Table 4. <sup>232</sup>Th activity in the samples ranged from 8 to 14 mBqm<sup>-3</sup>. 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 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.

Table: 1 Results of the radiation survey of the plant area (September - 2023) Radiation field-(µSvh<sup>-1</sup>)

S.No	LOCATION	MIN	MAX	REMARKS
1.	DWCP,Kottumangalam	2.00	9.90	
2.	HUP ground floor	0.60	1.20	*
3.	HUP first floor	1.00	1.40	4
4.	HUP concentrate	1.60	6.70	
5.	HUP tailings Area	0.40	0.50	
6.	Conc.sand godown	1.30	2.70	a sa sa sa sa sa
7.	F.B. drier area	1.30	1.60	
8.	Weighing room	1.00	1.20	
9.	Vibrating screen Section	1.10	1.70	
10.	Rutile section	1.40	2.90	
11.	H.T.Plant Section	1.10	2.00	

12.	Ilmenite / Rutile readings area	1.10	1.50	
13.	Zircon section	0.80	5.40	
14.	Monazite exolons Section	1.50	3.00	
15.	Monazite Section	3.0	8.00	grade a fissi secon
16.	Garnet section	1.60	3.80	
17.	Ilmenite section	1.10	1.80	
18.	Monazite silos (ground floor)	1.00	1.10	
19.	Road in front of godown	0.60	1.10	
20.	Monazite stores near ETP outside	2.20	4.60	1 Shother Louise L.
21.	New monazite store(outside walls)	1.00	1.10	No stock
22.	Road out side Monazite store	1.10	2.00	a na fi shaka tan
23.	Monazite pumping area	1.00	1.10	

Table: 2 Radiation Survey results of the plant premises (September -2023) Radiation field -  $(\mu Svh^{-1})$ 

S.No	Location	Min	Max	Remarks
1	In front of Precon&HUP Road	1.00	1.10	1.750 million al anticipat
2	Dry Mill waste area	3.00	12.00	onthe United States and
3	Con A yard	1.60	6.70	Stressing the bar best
4	Guest House area	0.40	0.60	HAR ST. F. OF ST. ST. ST.
5	MK Beach	1.20	2.40	
6	Main Gate	0.60	0.80	and the second second
7	In front of Lab	0.50	0.70	
8	In front of Dry mill	0.60	1.00	
9	In front ZOP	0.50	1.00	
10	In front stores	0.50	0.80	
11	In front m/w/shop	0.60	0.70	<i>a</i>
12	In front of Electrical w/s	0.50	1.00	
13	In front of civil section	0.50	0.70	
14	In front of canteen	0.40	0.70	
15	ETP area	2.20	4.60	
16	Raw sand dump (HUP)	1.00	2.60	

S. No	Location	Dust conc (mgm <sup>-3</sup> )	Thoron daughters	<sup>232</sup> Th (Bq m <sup>-3</sup> )
1	Vibratory screens platform	1.33	0.33	0.005
2	Vibratory screens Ground floor	1.33	0.17	0.004
3	Weighing room	1.07	0.28	0.007
4	H.T.Platform East	1.20	0.50	0.007
5	H T Ground floor East	2.53	0.31	0.007
'6	H.T.Platform West	0.80	0.36	0.008
7	H.T Ground floor West	1.47	0.61	0.007
8	Exolon ground floor	1.47	0.70	0.012
9	Exolon platform	1.33	0.56	0.009
10	Rutile Platform	0.80	0.42	0.007
11	Rutile Ground floor	1.33	0.67	0.012
12	Garnet Platform	0.93	0.45	0.009
13	Garnet ground floor	1.87	0.72	0.013
14	Zircon (Coarse) Platform	1.07	0.28	0.012
15	Zircon (Coarse) ground floor	1.07	0.75	0.012
16	Zircon (Fine) Platform	1.20	1.11	0.011
17	Zircon (Fine) ground floor	1.33	0.33	0.007
18	Zircon air tables	1.87	0.72	0.015
19	Monazite platform	azite platform 1.07 1.78		0.013
20	Monazite ground floor	1.20	2.45	0.020
21	Ilmenite Section	1.07	0.70	0.011
22	Ilmenite Ground floor	1.2	0.58	0.008
1	Limits	TLV: 4.00	DAC: 1WL	DAC: 0.22

Table: 3 Air monitoring	Manavalakurichi Plant	(September	-2023)
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No of Samples = 23 Average dust conc. =  $1.30\pm0.39$ mgm<sup>-3</sup> Average air activity (<sup>232</sup>Th) =  $0.014\pm0.005$  Bq m<sup>-3</sup> Average air activity (Thoron daughters) =  $1.25\pm0.83$ mWL

Table 4: Air monitoring, plant premises - (September -2023)

S. No	LOCATION	Dust mg/m <sup>3</sup>	Th(B)mWL	<sup>232</sup> ThBqm <sup>-3</sup>
1	In front of Lab	0.93	0.11	0.002
2	In front of ZOP	0.80	0.17	0.002
3	In front of Dry mill	1.07	0.17	0.003
4	In front of Stores	0.80	0.11	0.002
5	In front of E/W shop	1.07	0.14	0.002
6	In front of canteen	0.93	0.11	0.002

<b>S.No</b> 1 2 3	Location	Dust.con (mg m <sup>-3</sup> )	Th (B) (mWL)	<sup>232</sup> Th (Bq m <sup>-3</sup> )
1	Guest House Area	0.67	0.08	0.001
2	Pillayar coil junction	1.07	0.08	0.002
3	Periavilai	1.07	0.14	0.002

0.93

0.11

0.002

Table 5: Quarterly air activity-Environmental samples (July - September 2023)

Table 6: Quarterly Analysis of Water samples (July - September, 2023)

S. No	Location	Gross a Bq I <sup>-1</sup>	Gross β Bql <sup>-1</sup>
1.	Pillayarcoil junction well	0.039	0.302
2.	Valliyar river water	0.013	0.166
3.	Guest House Well No 1	0.022	0.077
4	Guest House Well No 2	0.015	0.068
5	Guest House Well No 3	0.018	0.089
6	HUP Tails water	0.013	0.075

Table 7: Analyses of Solid Tailings (September - 2023)

HUP Tails Area

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S.No	Location	<sup>232</sup> Th (Bqg <sup>-1</sup> )	MDL(Bqg <sup>-1</sup> )	Regulatory limit (Bqg <sup>-1</sup> )
1	HUP Tailings	0.027	0.022	1.0



### CIN: U93000TN2000PTC043869

**TEST REPORT** 

	M/S. IREL(India) Limited								
CUSTOMER NAME :	(A Govt of India Undertaking) Manavalakurichi-629 252.								
	Kanyakumari District,Tan	ıyakumari District,Tamil Nadu.							
LOCATION :	Valliyar River								
Sampling Period	April 2023 & August 2023								
Sample Description By Customer	River Water								
DADAMETEDC	UNITE	MO	ONTH						
PARAMETERS	UNITS	Apr-23	Aug-23						
Colour	HU	5	5						
Odour	-	Agreeable	Agreeable						
Taste	-	Agreeable	Agreeable						
Turbidity	NTU	4	2						
pH @ 25°C	-	7.7	7.6						
Total Hardness as CaCO <sub>3</sub>	mg/l	45	46						
Iron as Fe	mg/l	0.27	0.23						
Chloride as Cl	mg/l	30	23						
Free Residual Chlorine	mg/l	BDL(DL:0.1)	BDL(DL:0.1)						
Fluoride as F	mg/l	0.10	0.11						
Total Dissolved Solids	mg/l	116	102						
Calcium as Ca	mg/l	13	15						
Magnesium as Mg	mg/l	3	2						
Sulphate as SO <sub>4</sub>	mg/l	4	8						
Nitrate as NO <sub>3</sub>	mg/l	1.7	1.3						
Phenolic Compounds as $C_6H_5OH$		BDL(DL:0.001)	BDL(DL:0.001)						
Cvanide as CN		BDL(DL:0.01)	BDL(DL:0.01)						
Anionic detergent as MBAS	mg/l	BDL(DL:0.1)	BDL(DL:0.1)						
Total Alkalinity as CaCO <sub>2</sub>	mg/l	59	44						
Boron as B	mg/l	BDL(DL:0.1)	BDL(DL:0.1)						
Copper as Cu		BDL(DL:0.02)	BDL(DL:0.02)						
Manganese as Mn	mg/l	0.08	0.05						
Mercury as Hg		BDL(DL:0.001)	BDL(DL:0.001)						
Cadmium as Cd	mg/l	BDL(DL:0.002)	BDL(DL:0.002)						
Selenium as Se	mg/l	BDL(DL:0.005)	BDL(DL:0.005)						
Total Arsenic as As	mg/l	BDL(DL:0.001)	BDL(DL:0.001)						
Lead as Pb		BDL(DL:0.005)	BDL(DL:0.005)						
Zinc as Zn		BDL(DL:0.08)	BDL(DL:0.08)						
Aluminium as Al	mg/l	BDL(DL:0.02)	BDL(DL:0.02)						
Mineral oil	mg/l	Absent	Absent						
Total Suspended Solids	mg/l	8	4						
Biological Oxygen Demand			- 2						
(BOD 3 days at 27°C)	mg/I	< 2	< 2						
Chemical Oxygen Demand (COD)	mg/l	10	< 4						
Hexavalent Chromium as Cr <sup>6+</sup>	mg/l	BDL(DL:0.01)	BDL(DL:0.01)						
Dissolved Oxygen	mg/l	6.4	6.8						
Depth of Water	ft	1.2	1.4						
Microbiology:									
Total Coliform	Per 100ml	Absent	Absent						

BDL - Below Detection Limit; DL - Detection Limit

\*\*\*END OF REPORT\*\*\*

For Chennai Testing Laboratory Pvt ltd

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Verified by

A. Dajum Authorised Signatory

A. RAJKUMAR Head - Water & Soil Division (CHEMICAL)

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The Report is meant only for sole use of the addressee to promote his/her own business.



### CIN: U93000TN2000PTC043869

### **TEST REPORT**

Custome	Name & Address	-	M/S. IREL (A Govt of Manavalaku Kanyakuma	<b>-(India) Lim</b> India Underta urichi-629 252 ari District,Tai	i <b>ited.,</b> aking) 2 mil Nadu. SAM	PLE DETAIL	s							
C			Ambiont Ai	r Quality	5411	LE DEIMA			*					
Sample L	Period		April 23- September 23											
Sampling	Period		The start A and (Dart YTA) Sampled By Chennai Testing Laboratory Pvt. Ltd.,											
Sampling	Method	Deer	15 5182 (P	art v) and (Pa	Oridon of			Carbon		Cherner 1000			Benzo (a)	
	Pollutant /	Sucr	onded	dioxide	Nitrogen	Ozone	Lead	monoxide	Ammonia	Arsenic	Nickel	Benzene	Pyrene	
.c	Bollutant short form	PM2.5	PM10	SO2	NOX	03	Pb	CO	NH3	As	Ni	C6H6	B(a)P	
onti	*National Ambient Air Quality	60	100	80	80	180	1	4	400	6	20	5	1 -	
Σ	Unit	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	ng/m <sup>3</sup>	ng/m <sup>3</sup>	µg/m³	ng/m <sup>3</sup>	
	TOP OF THE CANTEEN	24.7	52.5	5.8	12.3	49.2	BDL(DL:0.1)	BDL(DL:1.15)	25.8	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
.23	TOP OF THE CIVIL DEPARTMENT	31.2	64.7	7.9	18.2	46.8	BDL(DL:0.1)	BDL(DL:1.15)	21.6	8DL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
Apr-	TOP OF THE LABORATORY	30.1	61.5	9.1	20.3	43.8	BDL(DL:0.1)	BDL(DL:1.15)	23.5	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE DISPENSARY	26.9	55.2	6.2	13.5	43.2	BDL(DL:0.1)	BDL(DL:1.15)	19.5	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE CANTEEN	23.9	50.6	5.2	13.1	45.7	BDL(DL:0.1)	BDL(DL:1.15)	21.2	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
-23	TOP OF THE CIVIL DEPARTMENT	29.1	61.3	8.5	17.9	45.2	BDL(DL:0.1)	BDL(DL:1.15)	18.7	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
May	TOP OF THE LABORATORY	32.1	64.8	10.3	23.6	48:9	8DL(DL:0.1)	BDL(DL:1.15)	21.7	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE DISPENSARY	28.1	57.2	7.1	15.2	44.8	BDL(DL:0.1)	BDL(DL:1.15)	16.3	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE CANTEEN	26.1	54.7	6.1	14.8	33.6	BDL(DL:0.1)	BDL(DL:1.15)	25.9	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
-23	TOP OF THE CIVIL DEPARTMENT	32.8	65.2	7.2	16.4	32.7	BDL(DL:0.1)	BDL(DL:1.15)	20.5	BDL(DL:1.0)	BDL(DL:5.0)	8DL(DL:1.0)	BDL(DL:0.5)	
Jun	TOP OF THE LABORATORY	33.2	67.9	11.5	25.3	38.6	BDL(DL:0.1)	BDL(DL:1.15)	22.8	8DL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE DISPENSARY	29.5	61.2	8.6	19.5	31.7	BDL(DL:0.1)	BDL(DL:1.15)	20.2	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE CANTEEN	22.6	48.9	4.4	11.5	23.1	BDL(DL:0.1)	BDL(DL:1.15)	18.2	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
-23	TOP OF THE CIVIL DEPARTMENT	23.9	54.7	5.1	12.5	23.8	BDL(DL:0.1)	BDL(DL:1.15)	14.6	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
Jul	TOP OF THE LABORATORY	33.6	69.7	11.2	26.9	28.5	BDL(DL:0.1)	BDL(DL:1.15)	24.2	8DL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE DISPENSARY	26.9	58.6	7.9	16.3	26.4	BDL(DL:0.1)	BDL(DL:1.15)	20.8	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE CANTEEN	23.8	51.6	4.9	12.8	27.7	BDL(DL:0.1)	BDL(DL:1.15)	24.5	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
)-23	TOP OF THE CIVIL DEPARTMENT	25.9	58.3	6,6	14.8	26.9	BDL(DL:0.1)	BDL(DL:1.15)	17.4	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
Auç	TOP OF THE SECURITY TOWER - 6 (NEAR GUEST HOUSE)	30.5	62.8	10.9	23.6	30.5	BDL(DL:0.1)	BDL(DL:1.15)	20.7	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE DISPENSARY	31.4	64.7	11.5	25.8	32.1	BDL(DL:0.1)	BDL(DL:1.15)	23.6	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE CANTEEN	21.4	45.6	5.1	10.6	22.5	BDL(DL:0.1)	BDL(DL:1.15)	17.1	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
0-23	TOP OF THE CIVIL DEPARTMENT	22.0	51.6	4.8	11.2	18.5	BDL(DL:0,1)	BDL(DL:1.15)	15.9	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
Set	(NEAR GUEST HOUSE)	27.9	60.5	9.6	20.8	26.1	BDL(DL:0.1)	BDL(DL:1.15)	19.7	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	BDL(DL:0.5)	
	TOP OF THE DISPENSARY	25.1	54.3	6.8	14.2	21.6	BDL(DL:0.1)	BDL(DL:1.15)	19.4	BDL(DL:1.0)	BDL(DL:5.0)	BDL(DL:1.0)	8DL(DL:0.5)	

\*National Ambient Air Quality Standards - CPCB BDL - Below Detection Limit(D.L - Detection Limit)

Verified by

\*\*\*END OF REPORT\*\*\*

2 ized Signatory Page 1 of 1 G. MANIKANDAN Head - Environment Division (CHEMICAL)

**Chennai Testing Laboratory** 

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CIN: U93000TN2000PTC043869

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## **TEST REPORT**

29

	4	M/S. IREL(India) Limi	ted.,									
Customer Name & Address		(A Govt of India Undert	(A Govt of India Undertaking)									
	·	Manavalakurichi-629 2	52,Kanyakumari Distr	ict,Tamil Nadu.								
			SAMPLE DETAILS									
Sample De	escription	Stack Emission Monito	ring									
Sampling	Period	April 23- September 23										
Sampling	Method	IS 11255		Sampled By	Chennai Testing La	boratory Pvt. Ltd.,						
đ	Pollutant / Sample Point	Oxides of nitrogen	Sulphur dioxide	Conc. of Particulate Matter	Carbon monoxide	SUSPENDED PARTICULATE MATTER						
Мог	Pollutant short form	NOX	SO2	РМ	CO	(SPM)						
_	Limit	Not specified	Not specified	150	Not specified	Not specified						
	Unit	mg/Nm <sup>3</sup>	mg/Nm <sup>3</sup>	mg/Nm <sup>3</sup>	mg/Nm <sup>3</sup>	mg/Nm <sup>3</sup>						
	22 TPH FBD CHIMNEY	63	158	66.2	BDL(DL:0.2)	133						
3	GARNET SD NO.701 CHIMNEY	16	9	40.2	BDL(DL:0.2)	91						
5	ILMENITE SD NO.351 CHIMNEY	. 19	6	37.4	BDL(DL:0.2)	83						
Id	ZIRCON SD NO.851 CHIMNEY	18	BDL(DL:3.0)	26.5	BDL(DL:0.2)	91						
A	RUTILE SD NO.401 CHIMNEY	23	BDL(DL:3.0)	47.9	BDL(DL:0.2)	96						
The second sec	2 TPH FBD CHIMNEY	22	81	48.2	BDL(DL:0.2)	112						
	22 TPH FBD CHIMNEY	57	149	64.1	BDL(DL:0.2)	128						
3	GARNET SD NO.701 CHIMNEY	13	7	41.6	BDL(DL:0.2)	86						
-2	ILMENITE SD NO.351 CHIMNEY	21	5	40.7	BDL(DL:0.2)	94						
May	ZIRCON SD NO.851 CHIMNEY	15	BDL(DL:3.0)	24.1	BDL(DL:0.2)	88						
	RUTILE SD NO.401 CHIMNEY	17	BDL(DL:3.0)	45.9	BDL(DL:0.2)	91						
	2 TPH FBD CHIMNEY	18	79	47.1	BDL(DL:0.2)	105						
	22 TPH FBD CHIMNEY	66	171	67.9	BDL(DL:0.2)	135						
m	GARNET SD NO.701 CHIMNEY	15	5	39.2	BDL(DL:0.2)	80						
N.	ILMENITE SD NO.351 CHIMNEY	18	4	36.5	BDL(DL:0.2)	77						
H	ZIRCON SD NO.851 CHIMNEY	19	BDL(DL:3.0)	27.1	BDL(DL:0.2)	93						
-	RUTILE SD NO.401 CHIMNEY	14	BDL(DL:3.0)	49.8	BDL(DL:0.2)	102						
	2 TPH FBD CHIMNEY	23	84	50.2	BDL(DL:0.2)	110						
	22 TPH FBD CHIMNEY	49	155	65.3	BDL(DL:0.2)	131						
and the second second	GARNET SD NO.701 CHIMNEY	12	4	37.6	BDL(DL:0.2)	77						
23	ILMENITE SD NO.351 CHIMNEY	15	7	38.9	BDL(DL:0.2)	81						
-Iu	ZIRCON SD NO.851 CHIMNEY	16	BDL(DL:3.0)	25.9	BDL(DL:0.2)	84						
ļ	RUTILE SD NO.401 CHIMNEY	18	BDL(DL:3.0)	52.5	BDL(DL:0.2)	112						
	2 TPH FBD CHIMNEY	19	75	48.5	BDL(DL:0.2)	106						
	22 TPH FBD CHIMNEY	45	167	62.1	BDL(DL:0.2)	127						
3	GARNET SD NO.701 CHIMNEY			Under Maintenance								
-2	ILMENITE SD NO.351 CHIMNEY	19	8	37.4	BDL(DL:0.2)	75						
ng	ZIRCON SD NO.851 CHIMNEY	14	BDL(DL:3.0)	21.6	BDL(DL:0.2)	77						
A	RUTILE SD NO.401 CHIMNEY	16	BDL(DL:3.0)	48.6	BDL(DL:0.2)	94						
	2 TPH FBD CHIMNEY			Under Maintenance								
	22 TPH FBD CHIMNEY	53	176	64.8	BDL(DL:0.2)	123						
~	GARNET SD NO.701 CHIMNEY	14	8	42.3	BDL(DL:0.2)	84						
5	ILMENITE SD NO.351 CHIMNEY	17	6	35.9	BDL(DL:0.2)	72						
de	ZIRCON SD NO.851 CHIMNEY	17	BDL(DL:3.0)	23.5	BDL(DL:0.2)	86						
Š	RUTILE SD NO.401 CHIMNEY	21	BDL(DL:3.0)	51.4	BDL(DL:0.2)	99						
	2 TPH FBD CHIMNEY	15	11	44.3	BDL(DL:0.2)	89						

BDL- Below Detection Limit, D.L-Detection Limit,

#### \*\*\*END OF REPORT\*\*\*

For Chennai Testing Laboratory

Authorized Signatory

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A - Super 19, T.V.K. Industrial Estate, Guindy, Chennai - 600

Page 1 of 1

Phone : +91-44-2250 1757 | E-mail : chennaitesting@chenna(estinglab.com



CIN: U93000TN2000PTC043869

### **TEST REPORT**

Custo	mer Name & Address	M/S. IREL(Ind (A Govt of India Manavalakuric	<b>ia) Limited</b> . 1 Undertakin hi-629 252,F	, ig) (anyakumari I	)istrict,Tam	il Nadu.									
-						SAM	PLE DETAIL	.S							
Sampl	e Description			ILLUMINATIO	N			1							
Sampl	ing Period			April 23- June	e 23				dia ta						
Samp	led By			Chennai Test	ing Laborat	ory Pvt. Ltd.,			Mar	. 99			hur	-23	
	Month				Ap	r-23			Ma	V-23			Jui	1 20	
S.NO	LOCATION	Minimum St illuminati Provided(	andards of on to be in Lux)*	Day	ſime	Night	Time	Day	lime	Night	Time	Day	ſime	Night	Time
		Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
1	BUNKER - MSP	15	1011	12780	10710	328	205	14325	11321	315	196	8050	7700	298	171
2	HUP YARD	15	1000	1752	2478	81	57	2525	3471	89	61	2250	1225	94	68
3	TIPPER	50		312	264	228	362	328	273	235	348 ·	310	252	271	329
4	HUP YARD RAMP	10		83316	29700	136	114	76732	27816	129	108	46512	27122ª	115	102
5	GUEST HOUSE ROAD	10		85675	26345	63	41	76345	26395	59	40	46398	26900	54	48
6	MAIN GATE ENTRY	10		85902	20282	76	53	77650	28412	72	48	46700	27300	67	44
7	SPILLAGE CLEANING OF MSP	50	141	106	62	71	64	102	59	80	59	121	84	95	63
8	CONVEYORS -MSP BC 101	40		225	136	134	112	208	115	128	106	160	98	78	52
9	CONVEYORS -MSP BC 102	40	-	1113	867	173	128	1071	896	153	114	2420	1736	168	121
10	MSP-22 TPH FBD	50	-	210	153	112	96	186	171	109	89	221	157	121 -	96
11	MSP-MONAZITE SAND	50	-	289	210	352	236	265	194	365	253	259	92	344	219
12	MSP-ILMENITE SHAFT DRIER	50		352	489	246	194	247	206	257	202	463	196	266	211
13	MSP-GARNET SCREEN	50	-	225	183	312	221	232	156	326	243	229	144	313	225
14	VALLIYAR PUMP HOUSE	40	•	78	56	61	44	69	51	65	42	65	48	56	40
15	11 KV SUBSTATION	100	50	287	190	188	141	264	145	171	129	226	121	165	114
16	DISPENSARY	50	-	250	162	192	156	241	164	206	163	252	128	184	140
17	PERIYAVILLAI BEACH	30		86403	30360	245	486	78185	29472	271	510	47292	28195	288	537
18	ELECTRICAL SECTION	100	50	577	348	277	179	562	312	266	171	559	470	255	148
19	ZIRCON BAGGING	50		97	53	86	42	91	48	91	45	173	88	102	62
20	SPIRAL DISTRIBUTOR	40		489	230	265	144	434	225	273	158	610	247	265	147

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### CIN: U93000TN2000PTC043869

### TEST REPORT

Custo	omer Name & Address	M/S. IREL(I (A Govt of Ind Manavalakurid	ndia) Limit dia Undertak :hi-629 252,	t <b>ed.,</b> ing) Kanyakumari	District, Tan	hil Nadu.		ALLS							
-	In Description			TUTIMINATI	ON	SA	MPLE DEI	AILS							
Sam	ple Description			July 23- Sen	tember 23						-h1010				
Sam	pled By			Chennai Testing Laboratory Pvt. Ltd.,											
	Mont	h			Ju	1-23			Au	g-23			Se	p-23	
S.N O	N LOCATION Provided (in Lux)* Day Time		Night Time		ILLUMINATION ( Day Time		Night Time		Day	Time	Night	Time			
		Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertica
1	BUNKER - MSP	15	5.e-1	10921	9572	182	135	7928	6568	210	153	7495	6110	189	136
2	HUP YARD	15	-	1835	1340	114	86	1369	1210	108	79	1162	1085	101	. 74
3	TIPPER	50	-	391	284	232	358	351	238	246	362	328	226	281 -	357
4	HUP YARD RAMP	10		64800	22890	316	167	58945	19626	297	154	52559	18728	256	139
5	GUEST HOUSE ROAD	10	-	73610	25310	193	85	57661	18915	136	79	54461	17612	116	71
6	MAIN GATE ENTRY	10	1	72375	26745	226	94	59528	20652	98	69	53166	18691	102	63
7	SPILLAGE CLEANING OF	50	1.00	118	67	102	65	134	73	114	62	129	68	121	68
8	CONVEYORS -MSP BC	40		124	93	60	35	118	86	72	58	141	91	68	52
9	CONVEYORS -MSP BC	40	-	2368	1695	185	137	1965	1326	210	154	1879	1227	199	146
10	MSP-22 TPH FBD	50	1.22	187	148	128	63	164	135	116	71	153	124	102	77
11	MSP-MONAZITE SAND	50	-	236	89	344	265	253	96	338	244	288	110	361	253
12	MSP-ILMENITE SHAFT	50	-	314	252	238	196	321	264	256	188	323	256	237	176
13	MSP-GARNET SCREEN	50	- e	286	151	236	140	279	145	228	127	312	163	268	143
14	VALLIYAR PUMP HOUSE	40	-	75	58	63	50	69	52	56	48	63	49	51	46
15	11 KV SUBSTATION	100	50	317	118	147	84	296	110	156	79	291	126	169	81
16	DISPENSARY	50		298	167	199	120	285	146	210	131	269	118	194	125
17	PERIYAVILLAI BEACH	30	-	75359	26734	215	486	59775	21628	226	510	55721	20966	218	496
18	ELECTRICAL SECTION	100	50	640	390	182	102	525	326	194	120	496	302	201	133
19	ZIRCON BAGGING	50	-	188	94	175	75	210	101	188	79	191	86	221	75
20	SPIRAL DISTRIBUTOR	40	-	937	349	371	481	725	296	348	466	684	277	319	448

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\*\*\*END OF REPORT\*\*\*

For Chennai Testing Laboratory

G. MANIKANDAN Page 1 of Head - Environment Division (CHEMICAL)

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CHEMICAL TEST REPORT

	WAS	TE WAT	ER ANALYSIS			
Report N	No TC64292200000002F	Report Date		10.04.2023		
Custor	ner Name & Address:	Sample Ref. N	0.	AAL/WR/02/23-24		
M/s.India (A Gover	n Rare Earths Limited, nment of India Undertaking)		Sample Descri	ption	STP Treated Water Customer Fit For Analysis 04.04.2023	
Manavala	akurichi-629 252.		Sample Drawn	Ву		
Папуаки	man (bi).		Sample condit	ion		
			Sample Collec	ted Date		
			Quantity of Sample Sample Received on Test Commenced on		2 Litters 05.04.2023 05.04.2023	
1.°						
			Test Completed on		08.04.2023	
SI. No.	PARAMETER(s)	TE	ST METHOD	UNIT	TNPCB NORMS	RESULT
1	pH @25°C	IS 302	25 Part 11 :1983	-	5.5 to 9.0	7.45
2	2 Total Suspended Solids @105°C IS 302		3025 Part 17 :1984		30	18
3	Chemical Oxygen Demand ( COD )	IS 302	25 Part 58 :2006	mg/l	100	29
4	Biological Oxygen Demand ( BOD )@27 <sup>0</sup> C for 3 days	IS 302	25 Part 44 :1993	mg/l	20	17

Note: All above Parameters within the Acceptable Limits

AUTHORIZED SIGNATORY Lab Manager



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### CHEMICAL TEST REPORT

	WAS	TE WAT	ER ANALYSIS	·		
Report	No TC64292200000018F		Report Date		10.05.2023	
Custo	mer Name & Address:	Sample Ref. N	0.	AAL/WR/18/23-24		
M/s.India (A Gove	an Rare Earths Limited, rnment of India Undertaking)	e#	Sample Descri	ption	STP Treated Water Customer Fit For Analysis 05.05.2023	
Manaval	akurichi-629 252.		Sample Drawn	Ву		
run, an			Sample condit	ion		
			Sample Collec	ted Date		
			Quantity of Sample Sample Received on Test Commenced on		2 Litters 06.05.2023 06.05.2023	
			Test Complete	d on	10.05.2023	
SI. No.	PARAMETER(s)	TE	ST METHOD	UNIT	TNPCB NORMS	RESULT
1	pH @25⁰C	IS 302	25 Part 11 :1983	-	5.5 to 9.0	7.52
2	2 Total Suspended Solids @105°C IS		IS 3025 Part 17 :1984		30	19
3	Chemical Oxygen Demand ( COD )	IS 302	25 Part 58 :2006	mg/l	100	32
4	Biological Oxygen Demand ( BOD )@27 <sup>o</sup> C for 3 days	IS 302	25 Part 44 :1993	mg/l	20	11

Note: All above Parameters within the Acceptable Limits



AUTHORIZED SIGNATORY

Lab Manager

\*\*\* End of Report\*\*\*

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### CHEMICAL TEST REPORT

	WAS	TE WAT	ER ANALYSIS			-
Report I	No TC64292200000048F		Report Date	10.06.2023		
Custor	mer Name & Address:	Sample Ref. N	0.	AAL/WR/48/23-24		
M/s.India (A Gover	in Rare Earths Limited, ment of India Undertaking)		Sample Descri	ption	STP Treated Water Customer Fit For Analysis 05.06.2023	
Manavala Kanyaku	akurichi-629 252. mari (Dt).		Sample Drawn	Ву		
			Sample condit	ion		
			Sample Collec	ted Date		
			Quantity of Sample		2 Litters	
		Sample Received on		red on	06.06.2023	
			Test Commenced on		06.06.2023	
			Test Complete	d on	10.06.2023	
SI. No.	PARAMETER(s)	TE	ST METHOD	UNIT	TNPCB NORMS	RESULT
1	pH @25°C	IS 302	25 Part 11 :1983	-	5.5 to 9.0	7.22
2	Total Suspended Solids @105°C	IS 302	25 Part 17 :1984	mg/l	30	22
3	Chemical Oxygen Demand ( COD )	IS 302	25 Part 58 :2006	mg/l	100	39
4	Biological Oxygen Demand (BOD)@27°C for 3 days	IS 302	25 Part 44 :1993	mg/l	20	13

Note: All above Parameters within the Acceptable Limits



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#### CHEMICAL TEST REPORT

	WAST	E WAT	ER ANALYSIS		8.		
Report N	lo TC642923000000070F		Report Date	08.07.2023			
Custon	ner Name & Address:		Sample Ref. No	).	AAL/WR/70/23-24		
M/s.India	n Rare Earths Limited,	3 - <sup>31</sup>	Sample Descrip	otion	STP Treated Water		
Manavala	kurichi-629 252.		Sample Drawn	Ву	Ċustomer		
Kanyakui	mari (Dt).		Sample condition		Fit For Analysis		
			Sample Collect	ed Date	04.07.2023		
			Quantity of Sample Sample Received on Test Commenced on		2 Litters 05.07.2023 05.07.2023		
			Test Complete	d on	08.07.2023		
SI. No.	PARAMETER(s)	TE	ST METHOD	UNIT	TNPCB NORMS	RESULT	
1	pH @25⁰C	IS 30	25 Part 11 :1983	-	5.5 to 9.0	7.12	
2	Total Suspended Solids @105°C	IS 30	25 Part 17 :1984	mg/l	30	21	
3	Chemical Oxygen Demand ( COD )	IS 30	25 Part 58 :2006	mg/l	100	26	
4	Biological Oxygen Demand ( BOD )@27 <sup>0</sup> C for 3 days	IS 30	25 Part 44 :1993	mg/l	20	10	

Note: All above Parameters within the Acceptable Limits



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\*\*\* End of Report\*\*\*

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### CHEMICAL TEST REPORT

-	WAS	TE WAT	ER ANALYSIS				
Report I	No TC642923000000125F		Report Date 12.08.2023				
Custor	ner Name & Address:	Sample Ref. No	э.	AAL/WR/70/23-24			
M/s.Indian Rare Earths Limited, (A Government of India Undertaking)			Sample Descri	ption	STP Treated Water		
Manavala	akurichi-629 252.		Sample Drawn	Ву	Customer		
Kanyakuman (Di).			Sample conditi	ion	Fit For Analysis		
			Sample Collect	ted Date	07.08.2023		
		Quantity of Sample Sample Received on		2 Litters			
				ed on	08.08.2023		
			Test Commenc	ed on	08.08.2023		
		an ann an Anna an Anna An Anna an Anna	Test Complete	d on	11.08.2023		
SI. No.	PARAMETER(s)	. те	ST METHOD	UNIT	TNPCB NORMS	RESULT	
1	pH @25⁰C	IS 302	5 Part 11 :1983	040	5.5 to 9.0	7.89	
2	Total Suspended Solids @105°C	IS 302	5 Part 17 :1984	mg/l	. 30	22	
3	Chemical Oxygen Demand ( COD )	IS 302	5 Part 58 :2006	mg/l	100	29	
4	Biological Oxygen Demand (BOD)@27 <sup>0</sup> C for 3 days	IS 302	5 Part 44 :1993	mg/l	20	11	

Note: All above Parameters within the Acceptable Limits



AUTHORIZED SIGNATORY Lab Manager

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### CHEMICAL TEST REPORT

	WA	STE WAT	ER ANALYSIS	(*****)(******************************		
Report	No TC6429230000000112F	Report Date			16.09.2023	
Custo	mer Name & Address:	Sample Ref. N	0,	AAL/WR/123/23-24		
M/s.Indi (A Gove	an Rare Earths Limited, rnment of India Undertaking)	Sample Descr	ption	STP Treated Water		
Manava Kanyaki	lakurichi-629 252. umari (Dt).		Sample Drawn	Ву	Customer	
			Sample condit	lon	Fit For Analysis	
			Sample Collec	ted Date	12.09.2023	
			Quantity of Sample Sample Received on		2 Litters 12.09.2023 13.09.2023	
		Test C		ed on		
			Test Complete	d on	16.09.2023	
SI. No.	PARAMETER(s)	TE	ST METHOD		TNPCB NORMS	RESULT
1	pH @25 <sup>⁰</sup> C	IS 302	25 Part 11 :1983	-	5.5 to 9.0	7.79
2	Total Suspended Solids @105°C	IS 302	25 Part 17 :1984	mg/l	30	23
3	Chemical Oxygen Demand ( COD )	IS 302	25 Part 58 :2006	mg/l	100	30
4	Biological Oxygen Demand ( BOD )@27 <sup>0</sup> C for 3 days	IS 302	25 Part 44 :1993	mg/l	20	9

Note: All above Parameters within the Acceptable Limits

AUTHORIZED SIGNATORY

ab Manager

End of Report\*\*\*

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### CIN: U93000TN2000PTC043869

#### **TEST REPORT**

38

	M/S. IREL(India) Limited.,						
CUSTOMER NAME :	(A Govt of India Undertaking) Manavalakurichi-629 252. Kanyakumari District,Tamil Nadu.						
LOCATION :	Kootumangalam						
Sampling Period	April 2023 & August 2023						
Sample Description By Customer	Open Well Water						
DADAMETERC	UNUTC	MONTH					
PARAMETERS	UNITS	Apr-23	Aug-23				
Colour	HU	2	2				
Odour	-	Agreeable	Agreeable				
Taste	-	Agreeable	Agreeable				
Turbidity	NTU	< 1	2				
pH @ 25°C	-	8.4	8.1				
Total Hardness as CaCO <sub>3</sub>	mg/l	138	133				
Iron as Fe	mg/l	0.06	0.18				
Chloride as Cl <sup>-</sup>	mg/l	134	145				
Free Residual Chlorine	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Fluoride as F	mg/l	0.16	0.12				
Total Dissolved Solids		404	440				
Calcium as Ca	mg/l	42	40				
Magnesium as Mg	mg/l	8	8				
Sulphate as SO	mg/l	33	23				
Nitrate as NO <sub>2</sub>	mg/l	87	59				
Phenolic Compounds as C. H-OH	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Cvanide as CN	mg/l	BDL(DL:0.01)	BDL(DL:0.01)				
Anionic detergent as MBAS	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Total Alkalinity as CaCO-	mg/l	95	80				
Boron as B	mg/l	BDI (DI :0.1)	BDI (DI :0.1)				
Copper as Cu	mg/l	BDI (DI :0.02)	BDI (DI :0.02)				
Manganese as Mn	mg/l	0.07	0.07				
Manganese as Min	mg/l	BDI (DI :0.001)	BDI (DI :0.001)				
Cadmium as Cd	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Salanium as Sa	mg/l	BDL(DL:0.002)	BDL(DL:0.002)				
Total Arsonic as As	mg/l	BDI (DI :0.001)	BDL(DL:0.003)				
Load as Ph	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Zinc as Zn	mg/l	BDI (DI :0.08)	BDI (DI :0.08)				
Aluminium as Al	mg/l	BDL(DL:0.08)	BDL(DL:0.03)				
Minoral oil	mg/l	Absont	Absont				
Total Suspended Solids	mg/l	- 2	2				
Biological Ovygen Demand	111g/1		<u> </u>				
(BOD 3 days at 27°C)	mg/l	< 2	< 2				
Chemical Oxygen Demand (COD)	mg/l	< 4	< 4				
Hexavalent Chromium as Cr <sup>6+</sup>	 mg/l	BDL(DL:0.01)	BDL(DL:0.01)				
Dissolved Oxygen	 mg/l	6.7	7.2				
Depth of Water	ft	6.4	5.8				
Microbiology:			1 5.00				
Total Coliform	Per 100ml	Absent	Absent				

BDL - Below Detection Limit; DL - Detection Limit

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Verified by

\*\*\*END OF REPORT\*\*\*

For Chennai Testing Laboratory Pvt ltd

A. Rajum

Authorised Signatory A. RAJKUMAR Head - Water & Soil Division (CHEMICAL)

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### CIN: U93000TN2000PTC043869

#### **TEST REPORT**

39

	M/S. IREL(India) Limited.,						
CUSTOMER NAME :	(A Govt of India Undertaking) Manavalakurichi-629 252. Kanyakumari District,Tamil Nadu.						
LOCATION :	Panan Vilai						
Sampling Period	April 2023 & August 2023						
Sample Description By Customer	Open Well Water						
		MC	NTH				
PARAMETERS	UNITS	Apr-23	Aug-23				
Colour	HU	2	2				
Odour	-	Agreeable	Agreeable				
Taste	-	Agreeable	Agreeable				
Turbidity	NTU	1	< 1				
pH @ 25°C	-	8.2	8.0				
Total Hardness as CaCO <sub>3</sub>	mg/l	47	70				
Iron as Fe	mg/l	0.09	0.02				
Chloride as Cl <sup>-</sup>	mg/l	70	67				
Free Residual Chlorine	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Fluoride as F	mg/l	0.11	BDL(DL:0.1)				
Total Dissolved Solids	mg/l	220	236				
Calcium as Ca	mg/l	17	23				
Magnesium as Mg	mg/l	1	3				
Sulphate as $SO_4$	mg/l	24	19				
Nitrate as NO <sub>3</sub>	mg/l	6.2	3.7				
Phenolic Compounds as $C_6H_5OH$	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Cyanide as CN	mg/l	BDL(DL:0.01)	BDL(DL:0.01)				
Anionic detergent as MBAS	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Total Alkalinity as CaCO <sub>3</sub>	mg/l	45	61				
Boron as B	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Copper as Cu	mg/l	BDL(DL:0.02)	BDL(DL:0.02)				
Manganese as Mn	mg/l	BDL(DL:0.01)	BDL(DL:0.01)				
Mercury as Hg	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Cadmium as Cd	mg/l	BDL(DL:0.002)	BDL(DL:0.002)				
Selenium as Se	mg/l	BDL(DL:0.005)	BDL(DL:0.005)				
Total Arsenic as As	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Lead as Pb	mg/l	BDL(DL:0.005)	BDL(DL:0.005)				
Zinc as Zn	mg/l	BDL(DL:0.08)	BDL(DL:0.08)				
Aluminium as Al	mg/l	BDL(DL:0.02)	BDL(DL:0.02)				
Mineral oil	mg/l	Absent	Absent				
Total Suspended Solids	mg/l	< 2	< 2				
Biological Oxygen Demand		- 7	- 2				
(BOD 3 days at 27°C)	mg/1	< 2	< 2				
Chemical Oxygen Demand (COD)	mg/l	< 4	< 4				
Hexavalent Chromium as Cr <sup>6+</sup>	mg/l	BDL(DL:0.01)	BDL(DL:0.01)				
Dissolved Oxygen	mg/l	6.8	7.0				
Depth of Water	ft	12.4	9.8				
Microbiology:							
Total Coliform	Per 100ml	Absent	Absent				

BDL - Below Detection Limit; DL - Detection Limit

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Verified by

\*\*\*END OF REPORT\*\*\*

For Chennai Testing Laboratory Pvt ltd

A. Rajum

Authorised Signatory

A. RAJKUMAR Head - Water & Soil Division (CHEMICAL)

Page 1 of 1

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CIN: U93000TN2000PTC043869

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#### **TEST REPORT**

40

	M/S. IREL(India) Limited.,						
CUSTOMER NAME :	(A Govt of India Undertaking) Manavalakurichi-629 252.						
	Kanyakumari District,Tamil Nadu.						
LOCATION :	Thattan Vilai						
Sampling Period	April 2023 & August 2023						
Sample Description By Customer	Open Well Water						
PARAMETERS	UNITS	UNITS					
		Apr-23	Aug-23				
Colour	HU	2	2				
Odour	-	Agreeable	Agreeable				
Taste	-	Agreeable	Agreeable				
Turbidity	NTU	< 1	<1				
pH @ 25°C	-	8.4	7.6				
Total Hardness as CaCO <sub>3</sub>	mg/l	103	177				
Iron as Fe	mg/l	0.04	0.04				
Chloride as Cl <sup>-</sup>	mg/l	72	102				
Free Residual Chlorine	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Fluoride as F	mg/l	0.14	0.13				
Total Dissolved Solids	mg/l	346	432				
Calcium as Ca	mg/l	25	51				
Magnesium as Mg	mg/l	10	12				
Sulphate as $SO_4$	mg/l	87	68				
Nitrate as NO <sub>3</sub>	mg/l	10.3	6.5				
Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Cyanide as CN	mg/l	BDL(DL:0.01)	BDL(DL:0.01)				
Anionic detergent as MBAS	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Total Alkalinity as CaCO <sub>3</sub>	mg/l	99	147				
Boron as B	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Copper as Cu	mg/l	BDL(DL:0.02)	BDL(DL:0.02)				
Manganese as Mn	mg/l	0.02	BDL (DL:0.01)				
Mercury as Hg	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Cadmium as Cd	mg/l	BDL(DL:0.002)	BDL(DL:0.002)				
Selenium as Se	mg/l	BDL(DL:0.005)	BDL(DL:0.005)				
Total Arsenic as As	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Lead as Pb	mg/l	BDL(DL:0.005)	BDL(DL:0.005)				
Zinc as Zn	mg/l	BDL(DL:0.08)	BDL(DL:0.08)				
Aluminium as Al	mg/l	BDL(DL:0.02)	BDL(DL:0.02)				
Mineral oil	mg/l	Absent	Absent				
Total Suspended Solids	mg/l	< 2	< 2				
Biological Oxygen Demand	mg/l	- 2	- 2				
(BOD 3 days at 27°C)	mg/1	< 2	< 2				
Chemical Oxygen Demand (COD)	mg/l	< 4	< 4				
Hexavalent Chromium as Cr <sup>6+</sup>	mg/l	BDL(DL:0.01)	BDL(DL:0.01)				
Dissolved Oxygen	mg/l	6.8	7.2				
Depth of Water	ft	13.6	10.3				
Microbiology:			-				
Total Coliform	Per 100ml	Absent	Absent				

BDL - Below Detection Limit; DL - Detection Limit

non

\*\*\*END OF REPORT\*\*\*

For Chennai Testing Laboratory Pvt ltd

A. Dajum

Authorised Signatory A. RAJKUMAR Head - Water & Soil Division (CHEMICAL)

Page 1 of 1

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### CIN: U93000TN2000PTC043869

#### **TEST REPORT**

41

	M/S. IREL(India) Limited.,					
CUSTOMER NAME :	(A Govt of India Undertaking) Manavalakurichi-629 252. Kanvakumari District Tamil Nadu.					
LOCATION :	Chinna Vilai					
Sampling Period	April 2023 & August 2023					
Sample Description By Customer	Open Well Water					
		MONTH				
PARAMETERS	UNITS	Apr-23	Aug-23			
Colour	HU	2	2			
Odour	-	Agreeable	Agreeable			
Taste	-	Agreeable	Agreeable			
Turbidity	NTU	< 1	1			
pH @ 25°C	-	7.7	7.9			
Total Hardness as CaCO <sub>3</sub>	mg/l	338	266			
Iron as Fe	mg/l	0.08	0.12			
Chloride as Cl	mg/l	141	121			
Free Residual Chlorine	mg/l	BDL(DL:0.1)	BDL(DL:0.1)			
Fluoride as F	mg/l	0.28	0.11			
Total Dissolved Solids	mg/l	602	512			
Calcium as Ca	mg/l	45	52			
Magnesium as Mg	mg/l	55	33			
Sulphate as $SO_4$	mg/l	55	47			
Nitrate as NO <sub>3</sub>	mg/l	12.6	7.8			
Phenolic Compounds as $C_6H_5OH$	mg/l	BDL(DL:0.001)	BDL(DL:0.001)			
Cyanide as CN	mg/l	BDL(DL:0.01)	BDL(DL:0.01)			
Anionic detergent as MBAS	mg/l	BDL(DL:0.1)	BDL(DL:0.1)			
Total Alkalinity as CaCO <sub>3</sub>	mg/l	237	206			
Boron as B	mg/l	BDL(DL:0.1)	BDL(DL:0.1)			
Copper as Cu	mg/l	BDL(DL:0.02)	BDL(DL:0.02)			
Manganese as Mn	mg/l	0.04	0.02			
Mercury as Hg	mg/l	BDL(DL:0.001)	BDL(DL:0.001)			
Cadmium as Cd	mg/l	BDL(DL:0.002)	BDL(DL:0.002)			
Selenium as Se	mg/l	BDL(DL:0.005)	BDL(DL:0.005)			
Total Arsenic as As	mg/l	BDL(DL:0.001)	BDL(DL:0.001)			
Lead as Pb	mg/l	BDL(DL:0.005)	BDL(DL:0.005)			
Zinc as Zn	mg/l	BDL(DL:0.08)	BDL(DL:0.08)			
Aluminium as Al	mg/l	BDL(DL:0.02)	BDL(DL:0.02)			
Mineral oil	mg/l	Absent	Absent			
Total Suspended Solids	mg/l	< 2	2			
Biological Oxygen Demand		- 7	- 2			
(BOD 3 days at 27°C)	111g/1	< Z	< Z			
Chemical Oxygen Demand (COD)	mg/l	< 4	< 4			
Hexavalent Chromium as Cr <sup>6+</sup>	mg/l	BDL(DL:0.01)	BDL(DL:0.01)			
Dissolved Oxygen	mg/l	6.7	7.2			
Depth of Water	ft	14.5	12.1			
Microbiology:						
Total Coliform	Per 100ml	Absent	Abcont			

BDL - Below Detection Limit; DL - Detection Limit

non

\*\*\*END OF REPORT\*\*\*

For Chennai Testing Laboratory Pvt ltd

A. Rajum

Authorised Signatory A. RAJKUMAR Head - Water & Soil Division (CHEMICAL)

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### CIN: U93000TN2000PTC043869

#### **TEST REPORT**

42

	M/S. IREL(India) Limited.,						
CUSTOMER NAME :	(A Govt of India Undertaking) Manavalakurichi-629 252.						
	Kanyakumari District, Tamil Nadu.						
LOCATION :	IREL Guest House						
Sampling Period	April 2023 & August 2023						
Sample Description By Customer	Open Well Water						
DADAMETEDS	MONTH						
PARAMETERS	UNITS	Apr-23	Aug-23				
Colour	HU	2	2				
Odour	-	Agreeable	Agreeable				
Taste	-	Agreeable	Agreeable				
Turbidity	NTU	< 1	< 1				
pH @ 25°C	-	8.0	8.0				
Total Hardness as CaCO <sub>3</sub>	mg/l	284	213				
Iron as Fe	mg/l	0.05	0.07				
Chloride as Cl <sup>-</sup>	mg/l	84	100				
Free Residual Chlorine	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Fluoride as F	mg/l	0.22	0.13				
Total Dissolved Solids	mg/l	452	442				
Calcium as Ca	mg/l	25	54				
Magnesium as Mg	mg/l	54	19				
Sulphate as $SO_4$	mg/l	30	38				
Nitrate as NO <sub>3</sub>	mg/l	11.6	5.9				
Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Cyanide as CN	mg/l	BDL(DL:0.01)	BDL(DL:0.01)				
Anionic detergent as MBAS	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Total Alkalinity as $CaCO_3$	mg/l	231	185				
Boron as B	mg/l	BDL(DL:0.1)	BDL(DL:0.1)				
Copper as Cu	mg/l	BDL(DL:0.02)	BDL(DL:0.02)				
Manganese as Mn	mg/l	0.04	BDL (DL:0.01)				
Mercury as Hg	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Cadmium as Cd	mg/l	BDL(DL:0.002)	BDL(DL:0.002)				
Selenium as Se	mg/l	BDL(DL:0.005)	BDL(DL:0.005)				
Total Arsenic as As	mg/l	BDL(DL:0.001)	BDL(DL:0.001)				
Lead as Pb	mg/l	BDL(DL:0.005)	BDL(DL:0.005)				
Zinc as Zn	mg/l	BDL(DL:0.08)	BDL(DL:0.08)				
Aluminium as Al	mg/l	BDL(DL:0.02)	BDL(DL:0.02)				
Mineral oil	mg/l	Absent	Absent				
Total Suspended Solids	mg/l	< 2	< 2				
Biological Oxygen Demand (BOD 3 days at 27°C)	mg/l	< 2	< 2				
Chemical Oxygen Demand (COD)	mg/l	< 4	< 4				
Hexavalent Chromium as Cr <sup>6+</sup>	mg/l	BDL(DL:0.01)	BDL(DL:0.01)				
Dissolved Oxygen	mg/l	6.7	7.1				
Depth of Water	ft	11.6	9.4				
Microbiology:							
Total Coliform	Per 100ml	Absent	Absent				

BDL - Below Detection Limit; DL - Detection Limit

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\*\*\*END OF REPORT\*\*\*

For Chennai Testing Laboratory Pvt ltd

A. Rajum

Authorised Signatory A. RAJKUMAR Head - Water & Soil Division (CHEMICAL)

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### CIN: U93000TN2000PTC043869

### **TEST REPORT**

		M/S. IREL(India)	Limited.,					
Customer	Name & Address	(A Govt of India Undertaking)						
		Manavalakurichi-62	9 252,Kanyakumari D	District, Tamil Nadu.				
		SA	MPLE DETAILS					
Sample D	escription	Noise Monitoring	l					
Sampled	Ву	Chennal Testing La	boratory PVt. Ltd.,					
Sampling	Period	CTI /SOP//INS/035	.5					
Sampling	Method		NOISE LEVE	L dB (A)Leg				
SL.NO	LOCATION	Ma	y-23	Au	g-23	Remarks		
		Day Noise	Night Noise	Day Noise	Night Noise			
I-MINER	AL SEPARATION PLANT (MSP)					<b>1</b>		
1	Zircon Section	81.8	80.3	78.1	77.1	Ear Muff/ EarPlug is to be used		
2	22 TPH FBD Control Cabin	70.1	69.4	71.0	70.7			
3	Rutile Section -Bagging Area	83.0	82.0	80.3	78.9	Ear Muff/ EarPlug is to be used		
4	Zircon Section - Final Air Tables	86.1	84.0	78.6	77.7	Ear Muff/ EarPlug is to be used		
5	Zircon Section - Primary Air Tables	85.2	83.1	77.0	76.9	Ear Muff/ EarPlug is to be used		
6	Shift Incharge Cabin	62.3	61.9	64.5	62.5			
7	2 TPH FBD Control Cabin	81.3	81.8	62.5	63.0	Ear Muff/ EarPlug is to be used		
8	Air Tables in the Zircon Wet	85.3	82.9	80.4	77.5	Ear Muff/ EarPlug is to be used		
9	Zircon Bagging Area	82.1	81.5	76.7	76.2	Ear Muff/ EarPlug is to be used		
10	Garnet Final Collecting Area	85.5	83.9	77.5	76.1	Ear Muff/ EarPlug is to be used		
11	Monozite Section	82.0	80.2	80.2	78.8	Ear Muff/ EarPlug is to be used		
12	Generator Operator Cabin	54.9	51.0	57.8	57.2	-		
	Generator Operator Cabin	51.5	5110					
12	Operator Control Cabin - 1ct Floor	67.6	66.3	67.8	64.2	-		
15	Pueles Area	80.2	76.9	77.7	76.9	Ear Muff/ EarPlug is to be used		
14	Bunker Area	66.2	65.0	68.0	65.7	-		
15		00.2	05.0	00.0	05.7			
111- PUM	PHOUSE	(2.0	59.4	61.0	61.2	-		
16	Pump House Operator Cabin Inside	62.9	58.4	79.0	77.0			
- 17	Pump House Operator Cabin Outside	/8.8	11.2	78.0	77.0	-		
IV-OUT S					51.6			
18	Near Electrical Work shop	61.6	57.1	55.5	51.6	-		
19	Housing Complex (Nr Water Tank)	48.2	42.6	51.4	46.7	· · · · · · · · · · · · · · · ·		
- 20	Guest House	46.5	40.0	59.1	43.1	-		
V-HEM M	ACHINARY							
21	Front End Loader Inside Cabin (TN69 BD 3646)	85.9	83.9	85.5	81.0	Ear Muff/ EarPlug is to be used		
22	Dipper (TN 18 AQ 2777)	78.2	77.5	77.5	76.4			
23	Excavator (JS 205LC)	84.0	81.6	78.9	77.5	Ear Muff/ EarPlug is to be used		
VI- MINI	NG SITES							
24	Periavilai Beach	64.5	66.3	66.1	64.2	-		
25	Chinnavilai Beach	63.4	66.7	66.6	65.4	-		
26	Sea Side	62.5	66.2	65.6	64.8			
27	Front Entrance (North)	56.9	51.0	61.8	56.5	-		
28	East Side of IREL	55.6	52.6	52.8	47.5	-		
29	South Side of IREL	65.0	57.7	62.7	63.3	*		
30	West Side of IREL	55.0	54.0	61.3	58.1			

\*\*\*END OF REPORT\*\*\*

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#### For Chennai Testing Laboratory

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Phone : +91-44-2250 1757 | E-mail : chennaitesting@chennaitestingfab.com

# TAMILNADU WATER SUPPLY AND DRAINAGE BOARD

# DISTRICT WATER TESTING LABORATORY

Post Office Upstair, Medical College Road, Asaripallam, Nagercoil - 629201

Phone: 04652 - 238315

E-mail:jwalabngl@gmail.com

		TES	TREPORT	Doc.No:	DW11/FORM/2 8/01		
Test Report No:	TR/2023/46887	-	Report Issue Date :	18.07.2023	Page No.01 of 01		
Invoice Details:	10021/ Dt.04.07.20	023	ULR No. TC106992300000332F TC106992300000333F TC106992300000334F				
Customer Name Contact No / Ema Sample Name Sample Name Sample Descriptic	& Address uil.ID	: S.P.Ga C M.Te Manavi K.K.Di : Water : 46887. : BW,BV	neshan, ech,IREL (India) Limit alakurichi(PO), st. Pin-629252. 466889, 46891 V, OW Water – Drinki	ed, ng Purpose			
Sample Submitted Location & Date Quantity of sample	l by	Custom	er ISP,Tap Near Dispensa	ry,VTC Well			
Sample Container	on Receipt	<ul><li>2 Litres</li><li>PT Cane</li><li>Good</li></ul>	•		~		
Sample Received ( Test Commenced of Test Completed or	On on i	: 04.07.20 : 04.07.20 : 18.07.20	)23 )23 )23				
Environmental Cor	ndition	: 24.5° C					

-	S.No	Parameters	Tost Mathed		-	Result			ation as per 012(RA:2019)
		I atameters	I est Miethod	Unit				Acceptable	Permissible Limit in the
	-				46887	46889	46890	Límit	absence of
l	1	ftq	IS 3025 Part 11-1983		6.58	6.95	6.95	6.5-8.5	65.85
	2	Total Hardness as CaCO3	15 3025 Part 21-2009	mg/I.	64	180	166	200	(AKI
	_3	Total Alkalinity	IS 3025-Part 23-1986	mg/L	44	60	116	200	(38)
	4	Chloride as Cl	IS 3025-Part 32-1988	mg/L	40	150	145	250	1000
	5	Sulphate as SO4	IS 3025-Part 24-1986	mg/L	Less than 5	16	13	200	400
	6	Nitrate as NO <sub>3</sub>	APIA 23rd Edition 2017-4500 -NO3 B	mg/1.	Less than 2	2	2	45	- 45
L	7	Fluoride as F	APHA 23rd Edition 2017 - 4500- F-D	mg/t.	0.2	0.2	0.2	1.0	1.5

Remarks : The above water sample confirmed to IS 10500-2012. Drinking water specification with respect to above tested parameters.

7.23

Authorised Signatory B.Hari Govind - Assistant Executive Engineer

Note:

t. The test results relate only to the items tested.

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4. The Result apply to the sample as Received.

Issue No./Date	01/01.10.2021	Amend. No/ Date	00/	Page No	lofi
			and which an other than the state of the sta	the same sea all the same second seco	<ul> <li>P. P. P. P. P. P.</li> </ul>



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# MILNADU WATER SUPPLY AND DRAINAGE BOARD

45

DISTRICT WATER TESTING LABORATORY

Asaripallam Medical College Road, Post Office Upstair,

Asaripallam - 629201

Phone: 04652 - 238315

E-mail:jwalabngl@gmail.com

TES	T REPORT	Doc.No: DWTL/FORM/7.8/01
Test Report No: TR/2023/46887-46892	Report Issue Date :	18.07.2023
Invoice Details: 10021/ Dt.04.07.2023		5.000 (A)

				Result			Specifics	ation as per IS 12(RA-2019)
S.No	Parameters	Test Method	Unit				Acceptabl c Limit	Permissible Limit in the absence of alternate source
8	Appearance	Physical observation		Clear	Clear	Clear		-
9	Colour	APHA 23rd Edition 2017 4500 H+B	Hazen	Colourless	Colourless	Colourless	Agreeable	Agreeable
10	Ödour	IS 3025 Part 5 : 1983		None	None	None		
п	Torbidity	APHA 23rd Edition 2017 - 2130 B	NTU	0	0	D	1	5
12	Total Dissolved Solids	APHA 23rd Edition 2017 – 2540 C	mg/L	126	126	126	500	2000
13	Conductivity	APHA 23rd Edition 2017 - 2510 B	µS/em	191	191	191	•	-
14	P - Alkafinity	18 3025-Part 23-1983	mg/L	U	0	0	1.21	1.
15	Calcium	APHA 23rd Edition 2017 - 3500 Ca B	mg/L	П			75	200
16	Magnesium	APHA 23rd Edition 2017-3500 Mg B	nıg/L	6	6	6	30	100
-17	Sodium	APHA 23rd Edition 2017 ~ 3500 Na B	mg/L	14	40	\$5	-	sei en
18	Potassium	APHA 23rd Edition 2017 - 3500 K B	mg/L	4	18	20	i- 1	-
19	lron	APHA 23rd Edition 2017-3500 Fe B	mg/L	0.24	0.24	0.24	0.3	1
20	Manganese	APHA 23rd Edition 2017 - 3500 Mn B	mg/L	0.00	0.00	0.00	1.0	0,3
21	Ammonia	APHA 17th Edition- 1989- 4500 NH3C	mg/L	0.04	0.08	0.12	0.5	0.5
22	Nitrite as NO2	APHA 23rd Edition 2017–4500-NO2 B	mg/L	0.03	0.01	<b>Ú</b> ,04	5. 19	
23	Total Phosphate as PO4	APHA 23rd Edition 2017 - 4500 P- D	mg/L	0.05	0.10	0.05		-
24	Tidys *	APHA 23rd Edition 2017 4500 () - B	mg/L	0.24	0.28	0.36	. 1	
25	Residual Chlorine as RC	IS ( APHA	mg/l.	0	U	0	0.2	0.2
				46888	46890	46891		attend for a
26	Feacal Coliform	IS/ APHA	CFU/100	0	Ð	0	0	0

Remarks : The above water sample confirmed to IS 10500-2012. Drinking water specification with respect to above tested parameters.

..... End of the report ...

7.23

Authorised Signatory B Hari Govind - Assistant Executive Engineer

I, The test results relate only to the items tested,

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The Result apply to the sample as Received. 4.

Issue No./Date	01/01.10.2021	Amend. No/ Date	00/	Page No	2 of 1
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### Details of Afforestation & Green belt Development by the Unit

Year	Area	Area Planted (in Ha)			No. of trees Planted		
	Mined (in 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	1/ <u>1</u>	3.0	6500		6500
2014-15	2.57	3.0	-	3.0	7140	-	7140
2015-16	2.8	3.0	-	3.0	6410	<b>1</b> 20	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
2019-20	2.0	3.0	-	3.0	7500	-	7500
2020-21	3.1	2.5	0.5	3.0	7300	-	7300
2021-22	3.5	2.2	1.0	3.2	7000	500	7500
2022-23	2.0	2.5	0.5	3.0	7493	540	7853
2023-24 1 <sup>st</sup> Half	1.5	-	1.5	1.5	-	3400	3400

DGM-Tech (Mining & Safety)

मणवालकुरिच्चि, कन्याकुमारी जिला, तमिलनाडु - 629 252.

Manavalakurichi, Kanyakumari Dist, Tamil Nadu - 629 252.

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.

फोन / Tel. : 022 - 2421 1630 / 2438 2042 फैक्स / Fax : 022 - 2422 0236



# Fund allocation towards Environmental Protection, Prevention & Control of Pollution and CSR activities.

### Period: April 2023 to September 2023

SI.No.	Activities	Amount (Rs.)
1	Sewage Treatment operation & Maintenance	3,62,283
2	AAQ & Stack Monitoring, Noise, Illumination & Water	1,43,724
3	Water & Air Consent fees, AAQ, Stack Noise and sewage Monitoring fees to TNPCB	1,58,440
4	Radioactivity & Dust Monitoring	1,30,000
5	Afforestation/Green Belt Development	2,78,294
6	Watering to suppress the dust & Spillage Cleaning from the Road	7,24,970
7	Maintenance of garden& lawn	3,52,096
8	Cleaning of bushes, weeds etc	4,50,000
9	Clearing drainage, Road & Valley gutter	1,18,728
10	Cleaning, Housekeeping & Up keeping works	8,85,103
11	Cleaning of Plant floor & Spillage	16,55,513
12	Awareness programs	10,000
13	Expenditure on CSR activities	18,19,000
	Total	70,88,151

DGM-Technical (Mining & Safety)

मणवालकुरिच्चि, कन्याकुमारी जिला, तमिलनाडु - 629 252 Manavalakurichi, Kanyakumari Dist, Tamil Nadu - 629 252

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