

**BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI**

Application Nos.142, 290 and 453 of 2013 (SZ)

Application No.142 of 2013 (SZ)

In the matter of

1. Joy Kaitharnath
General Secretary,
State Human Rights Protection Centre
Vellikulangara
Thrissur 680 693

सत्यमेव जयते

.. Applicant

Vs.

1. The Managing Director,
The Kerala Minerals and Metals Ltd.
Sankaramangalam,
Chavara, Kollam 691 583
2. The Principal Secretary,
Department of Industries,
Government Secretariat,
Government of Kerala,
Thiruvananthapuram 695 001
3. The Chairman,
Kerala State Pollution Control Board,
Pattom PO.
Thiruvananthapuram - 695004
4. The Chairman,
Atomic Energy Regulatory Board,
Niyamak Bhavan, Anushaktinagar,
Mumbai 400 094
5. The Secretary,
Ministry of Environment & Forests,
Indira Paryavaran Bhavan,
Jor Bagh Road, New Delhi 110003
6. The General Secretary,
INTUC of Kerala Minerals & Metals Ltd.,
Sankaramangalam, Chavara,
Kollam 691 583
7. The General Secretary,
AITUC of Kerala Minerals & Metals Ltd.
Sankaramangalam, Chavara,
Kollam 691 583

8. The General Secretary,
CITU of Kerala Minerals & Metals Ltd.
Sankaramangalam, Chavara,
Kollam 691 583
9. The General Secretary,
STU of Kerala Minerals & Metals Ltd.
Sankaramangalam, Chavara,
Kollam 691 583
10. The Chief Executive Officer,
Kerala Enviro Infrastructure Ltd.
TSDF Project, Inside FACT (CD) Campus,
Ambalamedu, Ernakulam 682 303
11. The Secretary,
Polluted Area Welfare Society,
Panmana P.O., Chavara,
Kollam
12. The Member Secretary,
Central Pollution Control Board,
Parivesh Bhavan,
East Arjun Nagar, New Delhi 110032

.. Respondents

Counsel appearing for the applicant:

M/s. Babu Joseph Kuruvathazha
And T.K.Biju

Counsel appearing for the respondents

Mr.K.Anand, Senior Counsel for
Mr.Kaushik N.Sharma for R1
Mrs.A.S.Suvitha for R2
M/s.Ajay & Rema Smirithi for R3
Mrs.Hema for R4
Mr.Syed Nurullah Sheriff for R5
Mr.P.Viswanathan for R6 to R9
M/s.V.Sidharth, Senior Counsel for
D.G.Vipin for R10
M/s.K.Shaj & Sajju S. for R11
Mr.D.S.Ekambaram & Mrs.P.Jayalakshmi
for R12, CPCB

Application No. 290 of 2013 (SZ)**In the matter of**

1. Mr.D.Suresh Kumar, Secretary,
Polluted Area Welfare Society
Regn.No.Q 464/2010,
Panmana PO, Chavara,
Kollam

.. Applicant

Vs.

1. The Managing Director,
The Kerala Minerals and Metals Ltd.
Sankaramangalam,
Chavara, Kollam 691 583
2. The Member Secretary,
Kerala State Pollution Control Board,
Pattom P.O.
Thiruvananthapuram 695004
3. The Environmental Engineer,
The Kerala State Pollution Control Board,
The District Office,
Kadapakada PO., Kollam 691008
4. The Member Secretary,
Central Pollution Control Board,
Parivesh Bhawan,
CBD cum Office Complex,
East Arjun Nagar, New Delhi 110032
5. The Secretary,
Union of India,
Ministry of Environment & Forest,
Government of India,
New Delhi 110001
6. The Chief Secretary,
State of Kerala
Government Secretariat,
Thiruvananthapuram 695001
7. The Secretary to Government,
Department of Health and Social Welfare,
Government Secretariat,
Thiruvananthapuram 695001
8. The Secretary to Government,
Department of Environment,
Government Secretariat,
Thiruvananthapuram 695001

9. The Principal Secretary to Government,
Department of Industries and Commerce,
Government Secretariat,
Thiruvananthapuram 695001
10. The Secretary to Government,
Department of Water Sources,
Government Secretariat,
Thiruvananthapuram 695001
11. The Secretary,
Panmana Grama Panchayat,
Panmana, Kollam 691583
12. The Secretary,
Chavara Grama Panchayat,
Chavara, Kollam 691 583
13. The Director,
National Environmental Engineering
Research Institute
Nehru Marg, Nagpur 440020
14. The Registrar,
The Kerala State Human Rights Commission,
Arka Nilayam, M.P.Appan Road,
Vazhuthacaud,
Thiruvananthapuram 695014
15. The Director,
Vikram Sarabhai Space Centre,
ISRO P.O, Thiruvananthapuram 695022
16. Ultra-Tech (Environmental Consultancy
And Laboratory)
Unit No.224, Jai Commercial Complex,
463, Eastern Express Highway,
Opp. Vadbury Factory,
Thane (West) 400 601
17. The Director of Factories and Boilers,
Thiruvananthapuram 695022
18. The Joint Director of Factories & Boilers,
Thiruvananthapuram, Kollam 691004
19. The Chemical Inspector,
Safety Cell, Office of the Joint Director
of Factories & Boilers,
Thiruvananthapuram, Kollam 691004

20. Inspector of Factories & Boilers,
Civil Station, Kollam 691013

21. The District Collector, Kollam 691001

Counsel appearing for the applicant:

M/s.K.Shaj, Sajju S., L.Rajmohan, C.D.Anil,
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Smitha C.R., Rethesh N.A. & Praveen Abraham Thomas

Counsel appearing for the respondents

Mr.K.Anand, Senior Counsel
Shri Kaushik N Sharma for R-1
Smt. Rema Smrithi R-2 and R3
Mr.D.S.Ekambaram & Mrs.P.Jayalakshmi for R4
Smt. M.Sumathi for R-5
Smt. Suvitha A.S.for R-6 to
R-10 and R-17 to R-21
M/s.Sethumadhavan
Mrs.Aravindha Bharathi and Subbu
Bharathi for R-11 and R-12
Shri N.Ramesh for R15

Application No. 453 of 2013 (SZ)

In the matter of

1. Mrs.Kamalakshy Amma G
W/o P.N.Kunjikrishna Panickar,
Kamala Bhavan, Panmana,
Chavara P.O, Kollam District.

.. Applicant

Vs.

1. The Managing Director,
The Kerala Minerals and Metals Ltd.
Sankaramangalam,
Chavara, Kollam 691 583
2. The Chief Environmental Engineer,
Kerala State Pollution Control Board,
Pattom P.O.
Thiruvananthapuram 695004
3. The District Office,
The Kerala State Pollution Control Board,
High School Junction,
Cutcherry PO., Kollam
4. The Member Secretary,
Central Pollution Control Board,
Parivesh Bhawan,

CBD cum Office Complex,
East Arjun Nagar, New Delhi 110032

5. The Secretary,
Union of India,
Ministry of Environment & Forest,
Government of India,
New Delhi 110001
6. The Chief Secretary,
State of Kerala
Government Secretariat,
Thiruvananthapuram 695001
7. The Secretary to Government,
Department of Health and Social Welfare,
Government Secretariat,
Thiruvananthapuram 695001
8. The Secretary to Government,
Department of Environment,
Government Secretariat,
Thiruvananthapuram 695001
9. The Principal Secretary to Government,
Department of Industries and Commerce,
Government Secretariat,
Thiruvananthapuram 695001
10. The Secretary to Government,
Department of Water Sources,
Government Secretariat,
Thiruvananthapuram 695001
11. The Secretary,
Panmana Grama Panchayat,
Panmana, Kollam 691583
12. The Registrar,
Kerala State Human Rights Commission,
Arka Nilayam, M.P.Appan Road,
Vazhuthacaud PO, Thiruvananthapuram-14
13. The Director,
National Environmental Engineering
Research Institute
Nehru Marg P.O, Nagpur 440020

Counsel appearing for the applicant:

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Rexy Elizabeth Thomas

Counsel appearing for the respondents

Mr.K.Anand, Senior Counsel for
 For Mr.Kaushik N.Sharma for R1
 Smt. Rema Smrithi for R-2 and R-3
 Mr.D.S.Ekambaram & Mrs.P.Jayalakshmi for R4
 Shri.G.M.Syed Nurullah Sheriff for R-5
 Smt. Suvitha A.S., for R-6 to R 10
 M/s.Sedhumadhavan, Aravindha
 Bharathi and Subbu
 Ranga Bharathi for R11

ORDER

Present

Hon'ble Shri Justice Dr.P.Jyothimani, Judicial Member

Hon'ble Shri P.S.Rao, Expert Member

 Delivered by Justice Dr.P.Jyothimani,
 Judicial Member

Dated:31st August , 2017

Whether judgment is allowed to be published on the Internet .. Yes/No

Whether judgment is to be published in the All India NGT Reporter .. Yes/No

Application No.142 of 2013 (SZ):

This application was filed in the Hon'ble High Court of Kerala as a Public Interest Litigation in W.P.(C) No.24088 of 2012 by the General Secretary of State Human Rights Protection Centre, Thrissur which is stated to be engaged in activities relating to environmental protection, anti-corruption, anti-adulteration and public awareness. The Writ Petition was originally filed against five respondents. Subsequently, respondent Nos.6 to 9 Trade Unions were impleaded as per the orders in M.A.No.218 of 2014 dated 27.10.2014 by this Tribunal. After the Writ Petition was transferred to this Tribunal it is numbered as Application No.142 of 2013. Likewise, the 10th respondent, Kerala Enviro Infrastructure Limited (KEIL) was *suo motu* impleaded as per order dated 28.05.2015. The 11th respondent, Polluted Area Welfare Society was impleaded as per order dated 28.05.2015

passed in M.A.No.135 of 2015. The Central Pollution Control Board (CPCB) was also *suo motu* impleaded as 12th respondent.

2. The prayer in this application is (1) to direct the 2nd respondent Government of Kerala to constitute an Expert Team, to assess the status and trend of radioactivity and impact thereof on health and environment in Chavara blacksand area and precincts to evolve necessary preventive and precautionary measures and to ban sale off of returned wastesand from mining, by directing the 1st respondent Kerala Minerals and Metals Ltd. (KMML) to use the same for reclamation of mined area, (2) to issue direction to the first respondent (KMML) to stop abstraction of groundwater and to shift to alternate source of water, (3) to issue direction to the first respondent (KMML) to assure uninterrupted water supply in the neighbouring area round the clock, to meet the minimum requirement of 135 litre per person per day, (4) to issue direction to the first respondent (KMML) to get the accumulated wastes of iron oxide sludge and Effluent Treatment Plant (ETP) sludge in the old and new ponds transferred to Kerala Enviro Infrastructure Ltd. (KEIL) or any other agency approved by the Government of India, for the storage, treatment and disposal of hazardous wastes and polluting wastes and to dewater and transfer the wastes generated thereafter on a day to day basis, (5) to issue direction to the 2nd respondent, State of Kerala to conduct appropriate investigation to unearth the conspiracy and foul play in the construction of two new ponds at the cost of Rs.40 crores and (6) to issue direction against Respondent Nos.2 & 3 viz., State of Kerala and Kerala State Pollution Control Board (Board) to exercise superintendence and surveillance over the first respondent Company (KMML) to ensure compliance with other directions that may be issued deemed fit.

3. It is stated that the first respondent (KMML) is a public sector undertaking of the Government of Kerala established in 1972 to produce Titanium Dioxide out of Ilmenite, present in the black sand of Chavara belt and was commissioned in 1984. The predecessor of the first respondent was F.X. Pereira & Sons (Travancore) Pvt. Ltd. established in 1932 to separate Ilmenite ore from the black sand. As per the extract from the website of the Mining & Geology Department, Government of Kerala, the Chavara deposits of black sand are estimated to contain 127.09 million tonnes (MT) of heavy minerals out of an estimated deposit of 1400 million tonnes of black sand. The heavy minerals constitute 79.45 MT of Ilmenite, 5.38 MT. of Rutile, 4.82 MT. of Zircon, 28.72 MT of Sillimanite and 0.82 MT of Monazite. It is stated that Ilmenite and Rutile are rich in Titanium which is made use by KMML. The other minerals like Zircon and Sillimanite are said to be sold by KMML. The Monazite available in KMML black sand is said to contain 57.5% Rare Earth Oxide including 7.96% Thorium oxide stated to find place in US Geological Survey Minerals Year Book 2002.

4. It is the case of the applicant that the mineral Monazite which is a reddish brown phosphate is "radioactive" in character as it contains Thorium and Uranium. The applicant also relies upon an article "Rn in Indoor Environment in India: a Review" published in 2011 by the Universal Journal of Environmental Research and Technology in support of its case that Thorium and Uranium present in Monazite are radioactive. The radioactivity attributable to Thorium and Uranium in beach sand in India is stated to be 0.32 – 6.44 and 0.04 -0.74 Becquerel per kilogram (Bq/kg). It is stated that the radioactivity attributable to Thorium and Uranium in monazite sand is 322 and 37 Bq/kg. Even though the monazite constitutes

only 0.82 MT out of 1400 MT of black sand, if the non monazite constituents are reduced, the radioactivity of Monazite will become more pronounced. Earlier KMML used to extract Monazite also as Thorium in it had demand for use in manufacture of gas mantles. However, later the use of gas mantles was discontinued. Since monazite has no significant market value, it is buried deep under the land by way of disposal. The remaining Monazite is masked with the unutilised sand which forms part of 91% of the sand mined. As per Rule 34 of Mines and Minerals (Development and Regulation) Act, 1957, the license holder must undertake the restoration, reclamation and rehabilitation of land affected by mining operation. As per the information available in an Article "Untold story of mining" published in 2011 in the journal "Down to Earth", KMML has sold off 39553 tonnes of waste sand in 2009 and that was also confirmed from an information gathered under Right to Information Act.

5. According to the applicant, the sale of waste sand by first respondent KMML continues authorisedly and unauthorisedly with the result that the waste sand which should be made available for refilling the mining area from the site gets reduced resulting thereby the possibility of radioactivity in the area which according to the applicant is significantly high in Chavara belt. The applicant also relies upon the above said study to show that the exposure to Thorium has an effect of increasing stillbirth and infant mortality and the study also shows that the indoor levels in dwelling areas have increased significantly. If the sale of unutilised sand is reduced, there will be a substantial reduction of radioactivity. By virtue of the sale, the local employees who constitute 60% of the total work force of the Company, are exposed to radiation during working hours and therefore it is

necessary to be examined by Expert group, Bio Medical group, Bhabha Atomic Research Centre, Mumbai, I.I.T. Kanpur etc.

6. It is stated that the 3rd respondent Board issued consent to operate/ authorisation to KMML on 20.09.2000 to abstract 11,728 cubic metres of water per day by tube wells which is equivalent to 1,17,28,000 litres of water per day. As per the condition of the consent viz., condition No.3.6, the quantity of waste water of treated effluent discharged into the sea shall not exceed 7344 cu.m. equivalent to 73,44,000 litres. Therefore, according to the applicant when 1,17,28,000 litres per day is abstracted from ground water, major portion is let out into sea and there is no portion of water used for recharge with the result the groundwater level falls continuously. The effect of fall in ground water level is felt in the entire locality and as KMML abstracts ground water at deeper levels, the residents cannot afford to deepen the same. The applicant also relies upon a study made by a Committee chaired by Dr.M.S.Swaminathan to review the Coastal Regulation Zone Notification 1991 and submitted to the Ministry of Environment & Forest (MoEF) which according to the applicant warns that coastal ground water extraction may lead to intrusion of saline water and to subsidence. Therefore, it is necessary that KMML should find out alternate source of water. The diminishing of water level is also found in various statements made by the KMML.

7 The applicant particularly relies upon the contents of the official website of the first respondent (KMML) which shows that various constituent minerals like Iron, silicon, chromium, aluminium, zircon, vanadium, magnesium, manganese, phosphorus etc other than titanium form part of waste discharges in solid, liquid and gaseous forms. The main materials

are iron oxide sludge which is 23,000 tonnes per year and Effluent Treatment Plant (ETP) sludge which is 20,000 tonnes per year as it is seen in Exhibit P7, which is an environmental statement in the prescribed form given by KMML. The said wastes were dumped in the company premises during the first decade of its functioning and thereafter vast unroofed ponds were constructed to hold Iron Oxide Sludge and ETP Sludge. They are called the old ponds which were provided with a number of vertical PVC pipes from below the base to above the pond top to release the ground water. The PVC pipes have started falling resulting in number of holes in the base with the result the liquid portion of Iron Oxide sludge and ETP slurry started draining into the ground polluting the soil and the ground water. During rainy season more pollutants are dissolved and carried down to the ground and groundwater to far away areas. As Kollam has an average rainfall of 2.6 metre per year, the rain water falling over the old ponds of nearly 5 hectare area results in generation of 130 million litres of polluted water per year spreading downward and outward contaminating the ground water.

8. The applicant also states that the analysis report of the Board dated 10.06.2009 shows that the iron oxide sludge contains large quantity of iron oxide, vanadium pentoxide, manganese dioxide, chromium oxide, zirconium oxide, cadmium, lead, zinc, nickel and fluoride and these constituents have adverse effect on human health. The health effects are shown by the applicant in the form of table of data as seen in Exhibit -9.

9. It is further stated that the potential danger of constituents of minerals, iron oxide sludge itself is highly hazardous and polluting due to its high acidic nature. Even though the high acidic and alkaline materials to be

discharged is stated in the consent order to be within the permissible limit of 5.5 to 9.0 pH the Board allows discharge of effluents to sea after treatment, the first respondent KMML not only discharges effluents on to the ground allowing it to percolate into the ground but with more than permissible level of concentration. In addition to iron oxide sludge, the ETP sludge is highly polluting in nature and the ETP sludge also contains Iron oxide, titanium dioxide and other metal oxides including hexavalent chromium, lead, zinc, nickel and fluoride. The ETP sludge was dumped on the ground in the factory premises for one decade and then in perforated ponds for the next 15 years resulting in leachate causing harm to soil and ground water. It is stated that the first respondent KMML does not have any facility for treatment and safe disposal of such hazardous and polluting wastes and there was no common facility for this purpose in Kerala. There was some direction issued by the Board to cap the open leaky old ponds containing iron oxide sludge and ETP sludge and except some token compliance, there was no progress. However, the first respondent stated that it is considering the transfer of wastes to a common facility coming up at Ernakulam. By virtue of large quantity of discharged polluted water every year through old pond into sub soil layers polluting the ground water, the environment in the area was totally affected, the gravity of which is seen in the report of the analysis made by Kerala Water Authority dated 15.09.2008. The analysis from the wells stated to be situated nearly 2 ½ km from KMML belonging to Karthika and Sivanandan shows the turbidity level as well as iron contents more than permissible. The applicant also relies upon the 'Environmental Assessment and Environmental Management Framework for Jalanidhi-2' to substantiate its contention. The drinking water standard level is more than 1,00,000 times

the permissible limit. The study made by the Department of Geology, University of Kerala has also identified severe pollution caused by the first respondent KMML in the locality and that was also published in the media particularly in "The Hindu" dated 12.12.2011. The first respondent in its official website "social responsibility" has stated that it is supplying water to public by laying about 55 km long pipeline in the Meppad, Chittoor, Panmana, Kollam and Kalari wards in Panmana Panchayat and part of Thottin vadakku ward and part of Kovilthottam ward of Chavara Panchayat. As per the statistics provided by the Local Self Government Department, Government of Kerala, the total population of Panmana Panchayat is 45,722 and 23 wards of Chavara Panchayat is 38,309 and average population per ward in each Panchayat covered by the first respondent for supply of water comes to 11,600 for which 3,60,000 litres of water is stated to be supplied per day which works out to 31 litres per person per day. As per the Manual on Water Supply and Treatment issued by the Central Public Health and Environmental Engineering Organisation (CPHEEO) under the Ministry of Urban Development, Government of India, the minimum supply of water for domestic purpose excluding institutional, community, commercial and industrial requirements is 135 litres per person per day. Therefore, there is a huge shortfall of supply of water by the first respondent KMML. It is stated that out of the total extraction of water by first respondent as per the consent order given by the Board, only 3% is supplied to people.

The applicant also relies upon the direction given in the Judgement dated 14.10.2003 by Hon'ble Supreme Court of India regarding implementation of Hazardous Wastes (Management and Handling) Rules, 1989(HW Rules) in W.P.(C) No.657 of 1995 in *Research Foundation for*

Science, Technology and Natural Resources Policy vs. Union of India and others. The Government of India as per the direction of Hon'ble Supreme Court constituted a Monitoring Committee (SCMC) to oversee timely compliance of its directions. One of the directives is to issue closure order in respect of units operating without authorisation or in violation of conditions of authorisation issued under HW Rules. The Iron Oxide sludge and ETP sludge generated by the first respondent is within the purview of HW rules and in the circumstances that the first respondent has not provided any facility for secured storage, treatment and safe disposal of hazardous materials, it must have been closed by the third respondent Board within 3 weeks from the date of judgement dated 14.10.2003. However, the Government of Kerala took up the case of first respondent and other industries to SCMC pleading for grace time. The Government has also made it clear that it was going to establish a Common Treatment Storage and Disposal facility (CTSDF). Accordingly, the State of Kerala has nominated Kerala State Industrial Development Corporation (KSIDC) as Nodal Agency to constitute a special purpose vehicle 'Kerala Enviro Infrastructure Limited (KEIL)' in public-private-partnership mode buying 50 acres land at Ambalamedu, Ernakulam from Fertilizers and Chemicals Travancore Limited (FACT) and securing a grant of Rs.2 crores from Government of India under a Tripartite Agreement. The first respondent being the largest producer of hazardous waste in Kerala, is represented through its General Manager in the Board of Directors of KEIL. However, the first respondent has failed to use the facilities of KEIL.

10. It is stated that the first respondent KMML has submitted an application on 13.09.2008 to the Board that they have commissioned "two new secured landfills (ponds) for storage of the ETP sludge and iron oxide"

in September, 2008 called 'new ponds' in the total area of 6.8 hectare and volume of 3,21,000 cub. mt. The said ponds are stated to be unroofed, situated in a place where there is an average annual rainfall of rate of 2.6 mt. The evaporation rate can be assumed at 1.6 mt. per year and the net gain in the pond from the rain would be 1 mt. per year corresponding to 6,80,00,000 litres of water per year. 23,000 tonnes of iron oxide sludge generated per year reaches the ponds as slurry at the rate of 1,440 cub.mt. per day which means 52,56,00,000 litre per year. Likewise 20,000 tonnes of ETP sludge generated per year can be expected to pour in as 45,70,43,460 litres of slurry into the ponds and both slurry viz. iron oxide sludge and ETP sludge put together comes to 105,06,43,000 litres per year which means that the ponds will get filled up in two to three months in a year. Even though it is stated by the first respondent that the liquid portion of iron oxide slurry is recycled, it has no effective mechanism. Therefore, the slurry overflows from the ponds into the neighbourhood. According to the applicant, there is no effective comprehensive legislation to deal with the pollution control and environmental protection. Various rules are framed under Environment (Protection) Act, 1986 but some substances were left out in Rules and such exclusion does not mean that such substances are safe and healthy. Under the HW Rules, 1989 Iron Oxide sludge and ETP sludge of KMMML were hazardous. But the subsequent HW Rules, 2008 exempts its applicability as claimed by the 1st respondent in respect of ETP sludge. Iron Oxide sludge and ETP sludge constitute to be hazardous and both are harmful and unsafe. As per the Annual Report of the first respondent for the year 2004-05, the first respondent has taken up construction of secured landfill for ETP sludge from pigment plant and iron oxide sludge from Acid Regeneration plant

simultaneously at Kochi as another secured landfill facility which is wrong and the KMML has misnomered the Kochi Project as a secured landfill facility. It is the KEIL which is more secured landfill facility in the State of Kerala which has been constituted with elaborate system as per the guidelines of Ministry of Environment & Forests (MoEF) with more safety norms.

11. The item relating to dewatering system for temporary storage of iron oxide and ETP sludge were stated to be under construction. According to the applicant, as per HW rules, 1989, the waste should not be allowed to be stored for more than 90 days which can be extended by the Board for another 90 days in case of generation of waste which does not have any access to treatment, storage and disposal facility in the concerned State. "Storage" under HW Rules, 2008 is meant only for temporary period at the end of which such waste is processed and disposed of. The new ponds constructed by the first respondent are only to minimise the percolation but they are open to rain and facilities were temporary till the CTSDF in the State becomes functional. Once the said CTSDF is functional, the period of storage must be limited to 90 days and therefore the storage of Iron Oxide and ETP sludge by KMML for a longer period is in violation of Rules and such act is liable for prosecution and heavy fine. The ponds of KMML are stated to be operational from September, 2008 whereas KEIL which is an authorised CTSDF, has commenced its operations from August, 2008 and therefore the first respondent ought to have transferred its Iron Oxide sludge and ETP sludge to KEIL which is represented by a representative from the KMML and therefore KMML is aware of the progress of CTSDF. Hence, the construction of extra large ponds for temporary storage at a cost of Rs.40 crores is illogical and first respondent has incurred wasteful

expenditure by constructing unduly large and inappropriate storage facility. The Report on dewatering system and temporary storage for iron oxide sludge and ETP sludge of 2004-2005 clearly shows that even after 3 ½ years the dewatering equipments for ETP sludge and iron oxide sludge were under procurement. As it is stated in the consent order passed by the Board dated 13.09.2008 presently KMML is installing a dewatering filter system only for ETP sludge.

12. It is also stated that Tsunami which has occurred on 26.12.2004 has left significant impact in the coastal area of southern Kerala particularly in Chavara area where erosion was predominantly noticed between Chavara Bridge and further north near the Azheekal sector. The canal depth has increased gradually from 2 Mt. to 5 Mt. near Azheekal. The hazardous and polluting sludges stored in the ponds in the first respondent unit are likely to get dispersed massively to the adjoining environment in case of occurrence of any such natural calamity in future.

13. The SCMC in its report "Concerning Kerala" on 14.08.2004 the portion of which is marked as Exhibit P18 by the applicant, states that the ETP acidic Iron Oxide sludge of KMML, Kollam has begun to seep through the containment and contaminated the wells of the local residents, making the well water unpotable and as on the said date, the sludge ponds are in violation of the provisions of the HW Rules. Hence, the Authorisation must be withdrawn till the problem is resolved. In addition to that the Chairman of the Central Pollution Control Board has issued a direction under Section 5 of the Environment (Protection) Act, 1986 to KMML on 27.04.2010 observing that hazardous wastes are stored in four ponds which are single lined LDPE and not complying with the guidelines of

CPCB. The process sludge and ETP sludge generated during the process are not disposed in compliance with the provision of the CPCB guidelines and there is a continuous violation of the HW rules and the CPCB has given a show cause notice as to why the facilities of the first respondent should not be closed by directing the authorities to disconnect the water and electricity supply. The first respondent has given its reply on 14.05.2010 stating that it has already established dewatering filter plant which is expected to come into continuous service by July, 2010. It is also stated in the reply that the first respondent is planning to dispose of the dewatered sludge to CTSDF owned by KEIL at Kochi and agreement is being signed with KEIL. The applicant also relies upon a communication of KEIL dated 28.08.2008 marked as Exhibit P17 wherein KEIL has expressed its readiness to receive wastes from KMML for treatment and disposal. The letter of KEIL dated 10.11.2011 addressed to the Board shows the lethargic attitude of non compliance by the KMML whose representative is on the Board of KEIL. Therefore, KMML ought to have transferred Iron Oxide sludge and ETP sludge generated by it to KEIL for treatment and disposal. This is more pertinent in the circumstance that in the consent to operate granted by the Board, the first respondent has given an undertaking to abide by the conditions of consent. As the first respondent has committed continuous breach, the sludge stored in old and new ponds have caused enormous environmental disaster and in respect of the same, the first respondent has not taken any steps to transfer this waste of Iron Oxide and ETP sludge to KEIL for treatment. The Writ Petition was originally filed by the applicant as stated above with the above said prayers which came to be transferred to this Tribunal and numbered as Application No.142 of 2013.

14. The first respondent KMML has filed a counter affidavit in the High Court of Kerala on 07.12.2012. While denying various allegations made by the applicant, it is stated by the first respondent that after February, 2010, no sand is sold to any one as alleged by the petitioner. The separated sand is used for masking the monazite as per the direction of Atomic Energy Regulatory Board (AERB) and license issued by them. Therefore, there is no question of decrease in quantity for masking. It is also denied that radioactivity in Chavara belt is high. It is stated that even in "The Hindu" in the article it has been quoted from Health Physics Journal that "exposure of monazite sand does not cause any risk of health problems"

15. In so far as it relates to the allegation relating to the generation of waste water, it is stated by the first respondent that it is treated as per the statutory norms in the ETP before it is disposed of in the outlet to the sea. The allegation that the fall in groundwater level is not only confined to the factory premises but also in the entire locality to the detriment of the people, is denied. It is stated that there is no reason to believe that the groundwater level has fallen either inside the factory premises or outside. It was as per the corporate social responsibility (CSR) the first respondent is providing 2,00,000 to 2,80,000 litres of drinking water per day to local public through pipeline. In addition to that, the drinking water for special occasions like Marriage, festival etc. was supplied as per the request of the people, the first respondent has spent Rs.117 lakhs for Jalanidhi project constituted for distribution of drinking water to the local people through Panchayat. In addition to the above, the first respondent has spent Rs.50 lakhs for construction of drainage system. During flood season, the first respondent conducts relief camps and free medical aid for the affected

local residents is given apart from cleaning the drainage. It is stated that the first respondent is drawing water through tube wells and the same water is used for production, drinking etc.

16. It is denied that the quality of treated water is not good enough for discharging into the land and therefore it is discharged into the sea. It is reiterated that the treated water is as per standards and therefore permitted to be discharged into the sea. The first respondent has not received any complaint about the depletion of groundwater level. However, the first respondent has initiated steps for rain water harvesting system. It has entrusted M/s.Wascon, a consultancy organisation of Kerala Water Authority to conduct feasibility study and they have also prepared a detailed Engineering Report for intake of water from the Pallikkal river. It is further stated that the Report of the Committee headed by Dr.M.S.Swaminathan does not relate to any of the activities of the first respondent. Further, it is stated that Titanium pigment unit does not come within the Coastal Regulation Zone.

17. The allegation that during rainy time the old ponds get filled with the generation of 130 million litres of polluted water per year and spread downward contaminating ground, is denied. The vast unroofed ponds were constructed by providing impervious lining as per the guidelines issued by the National Environmental Engineering Research Institute (NEERI) , a Central Government Agency having its office at Nagpur. The ponds were constructed for the purpose of depositing the Iron Oxide and ETP sludge. The system was discontinued from 2008 as per the directions of the SCMC. Therefore, as of now the ponds are not used at all. No rain water also spreads downward or outward and there is no contamination of

groundwater as alleged. While denying the allegation that the constituents of sludge are adverse to human health, it is stated that the presence of constituents of iron oxide sludge are natural and they will have no adverse effect on human health.

18. It is not established that there is any high concentration of the constituent in the iron oxide. There is no biomagnification of any constituents. The method used is seven liner system and therefore there is no possibility of any pollution of the ground water. Exhibit P9 does not contain the details of the author of the same and cannot be said to be authentic. It is stated that even otherwise it gives only certain data which has no connection to the factual situation prevailing in the first respondent Company. The reliance placed on Exhibit P5 consent order issued by the Board is misleading. What is discharged in the Sea is treated water and it is as per the conditions of the consent issued by the Board. Even in respect of discharge on the land, the first respondent is following the terms and conditions prescribed by the Board and as per the prescription made by the Board which cannot be questioned.

19. The allegation that the ETP sludge was dumped in the factory premises for one decade and then in perforated ponds for the next 15 years, is denied as incorrect. It is stated that Iron Oxide and ETP sludge were earlier deposited in the ponds constructed with lining as per the guidelines of NEERI. After discontinuance of the said practice as per directions of SCMC from 2008 it is deposited in ponds having seven liner system as per the consent given by the Board. The allegation that the first respondent does not have the facility for treatment and disposal of hazardous materials is incorrect. It is stated that KMML has got well

equipped treatment plant apart from ponds having liner system as per the directions of the Board. KMML has initiated steps for capping of old ponds as instructed by the Board. Number of parties are showing interest in purchasing the iron oxide and hence the capping process was stopped, since after capping it will be difficult to take iron oxide from the ponds. KMML invited tenders for disposal of iron oxide after informing to the Board. It is also stated that the first respondent has agreed to transfer iron oxide to KEIL. It is also disposing iron oxide at the common disposal facility of KEIL, Kochi based on an agreement signed with KEIL as per the direction of Central and State Pollution Control Boards by paying an amount to KEIL for taking iron oxide sludge. It is stated that there is no leachate and no contamination of groundwater.

20. In so far as it relates to analysis report dated 06.09.2008 of Kerala Water Authority relied upon by the applicant, it is stated by the first respondent that as it is seen from Exhibit P1, sample was not collected by the Kerala Water Authority. Even otherwise, as per Exhibit P10, analysis report, pH level is within the limits and that represents the acidity part of iron oxide. But for the acidity part, iron oxide cannot be said to be as hazardous. It is submitted that even in Exhibit P11, pH value is well within the limit. Even though the first respondent is not aware under what circumstances the report was made especially when the first respondent has not been given notice and not aware as to how petitioner connects pollution with the contamination stated in the report, to the first respondent. Even in respect of Exhibit P12 it is stated that the first respondent was not aware regarding its authenticity and no notice was given prior to Exh.P.12 and in any event the contents are denied.

21. In so far as it relates to supply of drinking water, it is being supplied to the local people, apart from supply of water under Jalanidhi Project by the Panchayat. Therefore, the calculation of the applicant that only 3% of the total abstraction is supplied to people is misleading. The water for Jalanidhi project is drawn from fresh water lake at Sasthamkotta. Based on the amounts disbursed for Jalanidhi Project, overhead tanks of sufficient capacity are constructed for water supply and accordingly the drinking water is supplied. While reiterating that the first respondent has got all facilities for secured storage of Iron Oxide and ETP sludge, it is stated that the first respondent has got a centralised ETP Plant for treatment and safe discharge of treated effluent through the approved outlet. The operation of the plant is as per the consent granted by the Board. It is stated that the first respondent has already entered into an agreement with KEIL based on the direction of SCMC and constructed new ponds and has discontinued the using of old ponds. The water supply to the local area was also enhanced through the Jalanidhi Project funded by the first respondent and it is complying with all the directions of the Board.

22. It is further stated that the first respondent has already installed a filter system for de-watering ETP sludge and the same is put into service. The liquid portion is pumped into the sea as per the direction of the Board and SCMC and not recycled. The water in the iron oxide slurry is recycled to the plant for slurring and not discharged into the neighbourhood. The first respondent has received a notification from KEIL regarding the common disposal facility after it has constructed its own facility. However, the first respondent has agreed for transfer of mutual quantity of iron oxide to KEIL. For the purpose of de-watering ETP sludge, a plant has been installed and commissioned and therefore there is no violation of HW

Rules. The first respondent has decided to construct new storage ponds for iron oxide and ETP sludge in 2004 itself and in fact there was a direction from SCMC for safe disposal of wastes apart from receiving notification from KEIL regarding its common disposal facility. It is stated that ETP sludge and iron oxide are in slurry form and the common disposal facility could not accept this waste in view of the agreement entered into with KEIL. There is no violation of any of the conditions of consent order and the new ponds were constructed based on a consultancy report through a competent consultant approved by Government of Kerala. There is no intentional or wasteful expenditure on the part of the first respondent for disposal of waste. The construction of new ponds was not for temporary storage of the waste and the same was done as CTSDF was not functioning at that time. The first respondent has taken new ponds to service as a better option for storage of waste in view of the direction of SCMC and that was done only after due intimation to the Board. The de-watering plant was already commissioned in 2010 and all formalities have been complied with.

23. It is stated that the filter press plant was constructed and put into operation only after following all procedures and there was no delay or failure in operating the de-watering system. The allegation that the ponds were constructed in violation of the conditions imposed by the Board are incorrect. The Annexure 1 to Exhibit P15 is of the year 2008 and now that the de-watering plant has been installed and commissioned, it has no meaning. It is further stated that original design provided by the Board does not contain construction of cells or modules which was subsequently suggested by it. At that time, the construction of ponds was almost completed and therefore it was informed to the Board that further

construction of cells or modules was not possible and therefore the entire action taken by the first respondent was only after due intimation to the Board and there was no misleading information as alleged by the applicant.

24. It is stated that the water collected in the iron oxide pond is sent back to acid regeneration plant as supernatant for slurring of iron oxide generated and hence it is not pumped out for disposal. The ETP slurry is a neutralised slurry and supernatant of the same is pumped only to sea which is an approved outlet for the supernatant. It is further stated that ponds are constructed with all safety requirements and there is no calamity as alleged by the applicant. Due to poor drainage system outside the company premises, sometimes water flows into the company premises from outside particularly during rainy season. Even in those circumstances, the Company takes all efforts to see that there is no overflow of Iron Oxide or ETP slurry. The first respondent has constructed the pond based on the inspection report of SCMC and its direction dated 14.08.2004 and it is also disposing of mutually agreed quantity of iron oxide to M/s.KEIL. It is further submitted that in accordance with the inspection of SCMC in 2004 and direction of the Board dated 17.04.2010, it has constructed new storage facility for iron oxide and ETP sludge and stopped disposal of iron oxide and ETP sludge into old ponds. It has also installed the de watering filter system and temporary storage facility which are put into service. It has signed an agreement with KEIL in October, 2010 and is disposing mutually agreed quantity of iron oxide to KEIL. It has also taken action to identify parties interested for use of iron oxide for disposal.

25. It is stated that the agreed quantity of Iron oxide and ETP sludge given to KEIL on payment by KMML to KEIL is at an approximate rate of

Rs.4000/- per MT. Some parties have approached the first respondent for purchase of iron oxide by paying KMML based on which tender has been invited for the sale of the said items. Therefore, there is no violation of the directives of the Hon'ble Supreme Court /SCMC.

26. During one of the hearings the learned counsel appearing for the applicant referred to a report published in "India Today" a weekly magazine dated 20.01.2014 stating that toxic effluents from the first respondent Company had a free run ever since the factory was set up in 1984 when it began dumping deadly waste into a patch of ground within its premises and that nearby canals are overflowing with foaming waste and domestic wells and ponds have been run over by pale effluents and that the vegetation has been nearly wiped out and Panmana once a green patch, is now a picture of industrial apocalypse. Apart from this, various kinds of diseases are reported in the Company surroundings due to discharge of liquid and gaseous effluents from the Company. The magazine also reported that iron oxide sludge mixed with acid and heavy metals has been leaking from the effluent ponds causing cancer and skin diseases and there has been spreading of radiation and fleeing of residents of Chittoor ward and the Company has always tried to scuttle protests against the plant by promising temporary jobs. The first respondent has filed an affidavit on 18.02.2014 before this Tribunal denying various statements made in the said magazine.

27. It is stated that as a result of processing in Mineral Separation Plant, major part of tailing generated is Silica sand which is used for refilling the mined out area. The Silica sand (Tailing) is stated to be free of Monazite except a small fraction of tailings. It is stated that the AERB has issued

license to operate under Rule 3 of Atomic Energy (Radiation Protection) Rules, 2004 valid upto 31.08.2014. The tailings containing the Monazite are stored in earthen pits in the areas earmarked for the same as per guidelines of AERB. Further, it is stated that as required under the above said Rules, a Radiological Safety Officer has been appointed and approved by AERB and monitoring of radiation levels is done regularly by sending returns to AERB which is the competent Authority. It is further stated that AERB conducts periodical inspection of the plant to monitor the radiation level and to see that the directions of the guidelines are followed. The Monazite rich tailings are stated to be stored in pits which are topped with 2 meters of silica sand tailings and the radiation above the pits are equal to general background level in the area.

28. The first respondent refers to one of the reports of Baba Atomic Research Centre (BARC) wherein it was stated that the radiation level of Chavara area has come down from 4.5 – 4.9 micro gray/ hour to 0.6 -0.7 micro gray/ hour after mining and refilling. The latest inspection was done by AERB in April, 2013 enclosing a report. It is stated that out of approximate extent of 88.119 Hectares of lease area in Block III about 85 Hectares were acquired and in possession of the Company and there are no inhabitants near the plant or nearby monazite tailing pits. Personal radiation monitoring is also carried out on selected nine employees by Thermo Luminescent Dosimeter (TLD) badges issued and monitored by M/s.Avanttec Laboratories (P) Ltd. which is an accredited lab of AERB. It was found that none of the employees monitored were exposed to radiations beyond the permissible limit which is 30 milli sievert per year and the maximum recorded was 3.9 milli sievert per year in one case. In the TP unit of the first respondent radio activity study was conducted on the

iron oxide through M/s.Atomic Mineral Directorate of Exploration and Research (Department of Atomic Energy, Government of India) and Indira Gandhi Centre for Atomic Research, Kalpakkam, Chennai (Department of Atomic Energy, Government of India) in the year 2012 and found that the values were within the limit.

29. It is further stated that the report on study conducted by the District Cancer Registry, Kollam indicates that incidence rate in 1,00,000 population is low in Chavara and Panmana Panchayats when compared to other far away Panchayats like Oachira and Thazhava. The fully equipped unit of BARC is already based in Kollam known as “Low level radiation research lab” which takes care of the preventive and precautionary measures which is one of the prayers of the applicant. The affidavit further states about the establishment of outstation of BARC set up in 1975 to study the health aspects of background radiation and relating to congenial malformations and Cytogenetic anomalies and descriptive epidemiological survey, it was found that there was no health risk of the background radiation of population residing there. It is stated that the first respondent Company has a well equipped ETP since 1984 where all its effluents are treated as per norms and thereafter disposed into the sea which is the approved outlet and there was no dumping of any waste on the ground. From the beginning of production in 1984, ETP sludge and Iron Oxide generated were stored in the lined ponds constructed as per the advice of the NEERI and based on guidelines. The treated effluents were declared as non hazardous by the Board.

30. When there was a breakage of effluent pipeline in 2008, immediately it was repaired and compensation was also paid to the affected people

numbering about 250 who were affected because of flood which was caused due to uncontrollable rain. It is further stated that the first respondent does not dispose foaming waste to any canal or domestic wells or ponds. There is appreciable growth of vegetation including flower bearing, fruit bearing, good yielding coconut trees and other types of trees and the surrounding areas are having enormous natural vegetation. The first respondent has installed equipment in scrubbing and treating waste gases like lime scrubbers, caustic scrubbers, cyclones, bag filters etc. and there was no unauthorised emission of gases. Based on the additional facilities installed by the first respondent, the Board has issued the "consent to operate" from 16.08.2013 to 30.06.2015 and the statutory bodies were constantly inspecting the plant. As directed by the SCMC and the Board, the first respondent has installed the filter press plant for de-watering of ETP sludge. Steps are being taken for capping of old iron oxide ponds and the work in that regard has already been started. However, since the parties have shown interest in purchasing the iron oxide, the capping work was stopped and tenders were invited.

31. According to the first respondent in its affidavit dated 18.02.2014, the iron oxide is categorised as hazardous from the beginning of the Company, could be disposed only to genuine end users authorised by the Board. A study in this regard has been conducted in the year 2011 regarding the nature of iron oxide through an external agency approved by MoEF and CPCB and it shows that the iron oxide is not containing any ingredient going upto hazardous level except for acidity caused due to process condition and therefore the genuine end user to dispose the material is being identified. It is the further case of the first respondent that since 2010 it has been supplying iron oxide to KEIL about 400 MT per

month paying Rs.4000/- per MT. as per the direction of SCMC. It has also identified M/s.Jindal Steel Works as a potential end user of iron oxide and around 2000 MT was sold to M/s.Jindal at Rs.300/- per MT for steel making and if such disposal is made, not only the cost will be reduced but public complaints could also be avoided. It is further stated that additional efforts were made by the Company for disposal of iron oxide and ETP sludge after discussions with Dr.Muthunayagam (Former Secretary, Government of India & Chairman and Authority of State dealing with Environmental Clearance Committee) and accordingly:

- i) A Contract has been signed with M/s. National Cement and Building Material Research Institute at a cost of Rs.18 lakhs to carry out the R & D works for using iron oxide and ETP sludge in cement industries.
- ii) R & D works by Professor Natarajan of Vellore, Institute of Technology, Vellore was initiated in 2013 for using iron oxide.
- iii) R & D works taken up by NATPAC for road construction which is in progress.
- iv) R & D works for separating the solid waste and recovery into useful products thereby reducing the quantity of solid waste generation is taken up by the R & D wing of first respondent.

32. It is also denied that various ailments like cancer, asthma etc are caused because of the activities of the first respondent. The situation in Panmana and Chavara Panchayats wherein the first respondent factory is situated, is as similar as that of other Panchayats. Statistics prepared by Dr.P.Jayalakshmi, Associate Professor, Cancer Epidemy, Regional Cancer Centre, Trivandrum clearly shows that the incidence of cancer in these

two Panchayats is comparatively less when compared to other Panchayats. The first respondent also relied upon a study conducted by Researchers from Regional Cancer Centre, Trivandrum as reported in "The Hindu" on 1st January, 2009 to show that there is no excess cancer risk to people living in the area. The allegation that people are fleeing from Chittoor ward is denied. On the other hand, in Chittoor ward area there is an increase of 459 houses when compared to 2009 and an adequate quantity of supply of water is being made to people. The first respondent has also taken various projects with respect to conservation of groundwater by making a feasibility study, introducing a project for rain water harvesting.

33. The further allegation that the first respondent always tries to scuttle protests is denied and in this regard it is stated that various settlements have been arrived between the Company and the Trade Unions as would be revealed in the judgements of the Hon'ble High Court of Kerala. Under the corporate social responsibility, the Company has acquired nearby lands in the buffer zone to an extent of 32 acres on the North west side in 2004 and is taking steps to acquire another 6 acres on the eastern side and 3 acres on the North West side. Contributions were also made to mining area welfare Board. Concreting the basin on the southern side storm water canal leading to TS canal was made. Facility for drawing of water from Vazhuthayil field at Chittoor ward was made. An auxiliary industry is functioning outside the Company for the rural employment. The Company conducts periodical free medical camps for local residents and also providing facilities to public health centres like oxygen cylinders, drinking water etc. apart from various other activities which include payment of amount for a Doctor and a Pharmacist. Further, contribution for construction of a ward at Chavara PH centre, donation of ambulance to the

Panmana Panchayat in 2009, contribution of amounts to people as medical assistance, arrangements for de-watering in low lying areas, contribution of amount for drainage purpose at Chittoor and Mekkadu wards have been done by the Company. It also provided red earth/ sand for filling low lying areas, arranging free relief camps during rainy season and undertook construction of roads.

34. In a further affidavit filed in August 2014 while reiterating the above said facts, it is stated by the first respondent that it has provided all provisions for Managing, Handling, Storage and Disposal of Hazardous Wastes as per HW Rules 2008 with authorisation from the Board. While again reiterating the historical background of the first respondent Company, it is stated that it has applied for mining plan approval to the Indian Bureau of Mines and such approval was obtained on 02.01.2013. It is further stated that the first respondent has applied as per the requirements of EIA Notification, 1994 and even after the EIA Notification, 2006 has come into effect, it is functioning as it has not started any new project or activity. The first respondent is also not seeking for expansion or modernisation and therefore there was no requirement for obtaining EC under EIA Notification 2006 as it is an existing unit as per approval under EIA Notification 1994. It is further stated that the first respondent has applied for EC to MoEF & CC for two blocks falling in 'A' category projects which are more than 50 hectares in extent and other two blocks wherein the extent is less than 50 hectares and therefore falling in category 'B'. The MoEF in its letter dated 26.06.2013 has directed the first respondent to obtain necessary permission under Coastal Regulation Zone Notification, 2011. Accordingly, an application was made on 06.11.2013 for CRZ clearance and EC to the Kerala Coastal Zone Management Authority (KCZMA) for

recommendation and after presentation the authority has recommended all the 4 mining lease blocks to Government of India for finalisation of TOR and for preparation of EIA Report forwarding the same to MoEF on 25.01.2014. The request for granting EC under EIA Notification, 2006 after extension of lease period is pending consideration before MoEF. Therefore, according to the first respondent, all statutory requirements have been fulfilled.

35. It is further stated that MoEF has accorded clearance for expansion of Titanium Dioxide Plant and Titanium Sponge Plant. However, the expansion of Titanium Dioxide plant was not taken up as per the decision of the State of Kerala. In respect of Titanium Sponge plant as per the specific condition of EC, after recycling, the effluents and the remaining shall be discharged to sea through the existing pipeline. The first respondent is treating the sanitary sewage in septic tank followed by soak pit and no effluents are discharged outside the factory premises and zero liquid discharge (ZLD) method is adopted and presently Titanium Sponge Plant is working only with 30% capacity and that is as a part to qualify for military airworthiness and there is no commercial production. The first respondent has also categorised various environmental protection measures carried out by it which includes exploring possibilities for process modification to obtain iron oxide as a product with neutral pH and disposal of the same through sale to end users, to mitigate the possibility of spreading of pollution to nearby areas by caustic dosing system by abandoning old iron ponds. Further, the iron oxide from old pond is continuously disposed of to the common disposal site at KEIL as per the direction of the Board and SCMC. Largescale development of green belt outside the Company and Environmental Impact Assessment (EIA) study is

being done at the affected area near old pond through the National Institute of Interdisciplinary Science and Technology, Trivandrum (NIIST). Further, an EIA study is arranged through NEERI as per direction of the Government of Kerala and accordingly Scientists from NEERI visited the site on 12.06.2014 and submitted the proposal. Efforts are being taken for disposal of Iron Oxide/ETP Sludge by taking various steps as stated earlier.

36. The 3rd respondent Kerala State Pollution Control Board in its reply dated 10.09.2013 has stated that the first respondent Company has a mineral separation plant and Titanium Dioxide Pigment Plant at Sankaramangalam, Chavara and the main product of the Company is Rutile grade Titanium Dioxide pigment. The other products are like Ilmonite, Rutile, Zircon and Sillimanite. As per the website of the first respondent, it was started much before the Board was constituted in 1974. Titanium Dioxide pigment plant contains six process units viz., Ilmenite beneficiation plant, acid regeneration plant, chlorination unit, oxidation unit, pigment finishing unit and air separation unit. The acidic waste produced from ilmenite beneficiation plant, acid regeneration unit and pigment finishing unit are sent to Effluent Neutralisation Plant with primary and secondary neutralisation tanks where it is treated with fresh lime or caustic soda solution. Effluent entering primary neutralisation tank at 120-150 m³ per hour is treated with spent lime solution obtained from the Chlorination unit and the oxidation unit apart from lime scrubbers. The partially treated neutralised slurry from the primary neutralisation tank is then allowed to enter secondary neutralisation tank where it is treated with fresh lime. The neutralised slurry from the secondary neutralisation tank is pumped to a 241990 m³ capacity sludge pond. It is stated that clear water from the

sludge pond conforming to the standards prescribed by the Board is pumped into the sea.

37. It is stated that there is another process in the form of slurry produced by pigment plant at 100 tons per day. This is categorised as "21-1" under Schedule-I the Hazardous Waste (Management, Handling & Transboundary) Rules, 2008. This is acidic in nature containing mainly iron oxide and heavy metal impurities in less quantities. It is because of high acidity it is categorised as hazardous waste. Therefore, the Company is not allowed to transport the iron oxide slurry out of its premises. It is stored in hazardous waste storage pond called iron oxide pond constructed as per rules. It is a pond of open concrete tank with HDPE lining with capacity of 100000 m³ to hold the iron oxide slurry. It is stated that till the commissioning of the sludge cum neutralized effluent settling pond and the hazardous waste sludge/slurry pond in 2008, there were two polishing ponds for settling of the neutralised effluent and two iron oxide sludge storage ponds at the northern side of the factory. Even though the pond was constructed based on technology given by NEERI, it became defective. As the leakage was at the bottom of the Tank, it was identified only at a later stage and after the continuous efforts by the Board, the first respondent had to abandon the leaking pond and constructed the new ponds strictly as per the Hazardous Waste (Management, Handling and Transboundary) Rules, 2008.

38. While denying the allegation that the pollution of sub soil and groundwater through old pond is still continuing as false, it is stated that on insistence of the Board, the first respondent stopped discharging the neutralised effluent and iron oxide slurry into the old ponds and it has

started capping it in the year 2008. As the old ponds were abandoned, there was no fresh incidence of effluent in the form of iron oxide slurry or ETP sludge entering the ponds. However, past seepage had some residual effect on the people living on the northern boundary of the factory since the drinking water got contaminated and paddy fields and coconut trees were also affected. After the commissioning of new ponds in 2008 which are impervious and open ponds of capacity 241990 m³ and 100000 m³ respectively, the Company is discharging its neutralised effluents and iron oxide slurry into these impervious and open ponds. The supernatant liquid from the settling pond is discharged by pumping into Arabian Sea after recycling process. The allegation of the applicant that the ponds will get filled up in 3 ½ months time in a year is denied and it is stated that the applicant has not considered the fact that the entire supernatant liquid from the ETP sludge pond is being pumped out through the outlet approved by the Board and clear solution from iron oxide slurry pond is recycled in the process.

39. It is stated that even though the steps taken by the 1st respondent are adequate to control water pollution, there has been some operational failure in pumping system during heavy rain in September, 2009 when the slurry in the iron oxide pond overflowed into the Company premises and outside causing damage to vegetation and groundwater. There was also discharge of waste as surface run off during rainy season from the factory into the southern side "Thodu" leading to T.S.Canal. The Company has constructed delay ponds on instruction from the Board to collect and pump the floor washings to the neutralisation plant to prevent contaminated water from entering the storm water drain (Thodu). The Chairman of the Board has conducted a hearing on 18.07.2011 after receiving complaint and

issued various directions which were stated to have been complied with by the Company. There were reminders made to the Company and ultimately the Company has given schedule for implementation of pollution control measures in the letter dated 21.05.2012. However, the schedule was not adhered to resulting in several inspections by the Board to assess the extent of pollution caused by seepage of acidic water into the surrounding areas. Water samples were collected at a distance of 250 m from the industry for analysis which was conducted on 26.08.2011 and 04.05.2012. It revealed that pH of water samples around the factory upto a distance of 500 m was in the range of 1.93 and 3.02 while the permissible limit is 6.5 and 8.5. On a direction from the Board, the Company has taken all measures of remedial action thereby improving the pH value from 1.93 to 3.02 to 3 to 8 as per the Analysis Report dated 14.09.2012 and 04.12.2012.

40. The first respondent has also submitted to the Board a status report on the remedial measures on 25.07.2013. It is further stated that to meet the domestic needs of the people living around the factory premises, the Company has been providing drinking water through water supply lines to about 2500 families for approximately two hours per day. However, it does not cater to the needs of the people and therefore, it is suggested that the Company should explore alternate source of water such as water recycling, desalination etc. Therefore, according to the Board, it has been taking constant monitoring of the functioning of the first respondent Company.

41. In the additional Report filed by the Board dated 03.12.2014 which was as per the direction of this Tribunal dated 27.10.2014 directing the Board to convene a meeting with all stakeholders to arrive at a technically

feasible solution on the issues raised by the applicant, the Board has stated that in respect of disposal of iron oxide sludge, a study regarding characteristics of the same was entrusted to NEERI and the report is expected in April, 2015. Regarding disposal of ETP sludge, the National Council for Cement and Building Materials, Government of India, Faridabad (Haryana) was entrusted with the study on exploring the possibility of using ETP sludge in the cement industry as a raw material and it is in the 2nd stage of trial and after receiving the report, sludge will be used for cement manufacturing plant. Regarding functioning of dewatering press plant, it is stated that it is functional and action will be taken before Monsoon 2015. Kerala Water Authority has formulated water supply scheme from Pallikkal River for Chavara and Panmana Panchayats and the first respondent will also contribute on Pro rata basis and take water from the project to avoid further exploitation of water.

42. Regarding drinking water supply, it is stated that the first respondent at present is distributing drinking water regularly to local residents of more than 4000 families and it is trying to increase supply of water and stated that the first respondent will also include the representatives of the Trade Unions of its employees in the Monitoring Committee. For the purpose of acquiring polluted land estimated to be 150 acres, the Government issued an order dated 01.03.2014 and a Committee was constituted to identify the land and the activities connected with it. Regarding radiation, the Board states that the first respondent has to abide by the AERB guidelines including all preventive measures. Regarding Monazite tailing, AERB guidelines are strictly followed in the place of storage. IRE has also requested the possibility of processing monazite in the first respondent premises so that monazite will be shifted. NIIST, Thiruvananthapuram

has been approached for the purpose of treating generation of dioxine in the KMML premises which was turned down and NEERI will be requested to take the project. It is stated by the 3rd respondent that clearance from CRZ and Mining Committee have to be obtained by the first respondent for obtaining EC.

43. In another report filed by the Board dated 07.08.2015 based on the direction of this Tribunal to collect samples from different locations of the old storage ponds and file a report, it is stated that accordingly samples were collected on 23.07.2015 and the work of analysis of the samples was entrusted to the Central Laboratory, Ernakulam which is accredited to NABL. Before such samples were taken for analysis, the Board itself as per the direction of this Tribunal, has collected samples from old and new ponds viz., 3 samples in old Iron Oxide Sludge pond and one in new pond got the samples analysed in the Central Laboratory, Ernakulam which has given a copy of its report filed before this Tribunal along with the report of the Environmental Engineer dated 04.07.2015. As per the said report in Sample KM2 Manganese value was found to be 1.52 mg/l while detection limit is 0.05 mg/l. Likewise, in Sample 3 also, Manganese found was 10.03 mg/l as against the permissible limit of 0.1 mg/l. In sample 5 also, the Manganese level was found to be 33.5 mg/l as against the permissible limit of 0.1 mg/l. It was in those circumstances, the Tribunal has directed as stated above, to take samples of sludge ponds and accordingly samples were taken from old iron oxide pond of the first respondent on 23.07.2015 by the Officers of the Board and all the 8 samples collected from the old ponds were analysed by Core Sampling method using solid sampler. The report of the Board filed dated 18.08.2015 states that the samples were collected at about 3 feet depth and mixed well in a plastic tray and one

portion was taken to Central Laboratory for analysis. All the eight samples collected were from different locations at the northern and eastern side of the pond. However, southern and western sides of the ponds were not accessible for sampling. The analysis report of the sampling in respect of pH value and electrical conductivity of 1/5th water extract in the form of table is as follows:

S. No.	Parameters	Old Pond			New Pond
		Location-1	Location-2	Location-3	Location-4
1	pH at 25° C	2.2	1.8	2.3	1.5

Sample No.	Sampling Location	Location (GPS data)	pH	Electrical Conductivity (S/cm)
KMML-1	North Side	9.00.276 N 76.32.078E	3.18	364.4
KMML-2	North side at 6 m towards east from 1 st point	9.00.276 N 76.32.086E	3.15	406
KMML-3	Eastern side at 80 m from 1 st point	9.00.276 N 76.32.122E	3.05	1567
KMML-4	Eastern side at 88 m from 1 st point	9.00.272 N 76.32.124 E	3.79	1392
KMML-5	Eastern side at 90 m from 1 st point	9.00.269 N 76.32.125 E	3.52	734.4
KMML-6	Eastern side at 87 m from 1 st point	9.00.266 N 76.32.125 E	3.33	586.6
KMML-7	Northern side at 7 m towards west from 1 st point	9.00.275 N 76.32.074 E	3.22	454.4
KMML-8	At 68 m towards east from 1 st point	9.00.272 N 76.32.038 E	2.63	1828

It is further stated in the Report that pH value in all the samples taken by Board is above 2.0 and therefore it is not corrosive and non hazardous. Toxicity Characteristic Leaching Procedure (TCLP) extraction of samples is completed. However, analysis of samples for heavy metals is delayed due to unexpected repairs of Atomic Absorption Spectrophotometer and that is expected to be completed and final report will be filed.

44. As there was complaint that the first respondent was not supplying adequate potable water and the water was not suitable for drinking, the Tribunal has given direction on 29.02.2016 based on which the Board has collected drinking water sample on 03.03.2016, 08.03.2016 and 15.03.2016 from the outlet of reservoir of treated water stored for supply to the public by the first respondent. In the report of the Board dated 18.03.2016 it is stated that the said reservoir is situated within the unit premises of the first respondent. It is stated that the first respondent has been supplying drinking water to the public since 1990 as a part of social welfare activities. The unit has stated that drinking water is being supplied to the Public through pipelines running 58 km. length for three hours in the morning from 7.30 a.m to 10.30 a.m and one and a half hour in the evening from 4.30 p.m. to 6.00 pm at the rate of 5 lakhs litres per day. It is stated that in addition to the drinking water supply through pipelines the unit is supplying water by means of tankers from 7.30 a.m to 10 pm. at the rate of 2.05 lakhs litres per day to 4500 families (18000 individuals) covering 7 wards namely Chittoor, Mekkad, Kalari, Kolam, Panmana, Ponmana and Porrukara of Panmana Grama Panchayat at the western and northern sides of the unit. It is stated that since the unit is supplying water in total at the rate of 7,50,000 ltrs. per day through pipelines and tankers to 4500 families it amounts to one person getting an average of 39 ltrs per day which according to the Board is more than sufficient for drinking purpose. It is also stated that the Analysis Report which has been enclosed with the report does not reveal any anomaly.

45. In the reply filed by 4th respondent Atomic Energy Regulatory Board dated 24.02.2014, it is stated that AERB was established in November, 1983 under the Atomic Energy Act, 1962 to carry out certain regulatory and

safety functions and it is a Certified Organisation. Its jurisdiction extends to all nuclear and radiation facilities except those which are under the purview of Bhabha Atomic Research Centre (BARC). At present, it is responsible for safety surveillance of 20 operating nuclear plants, 7 nuclear power projects undergoing construction and commissioning, fuel cycle projects and facilities which include uranium mines and ore processing plants of UCIL, fuel fabrication facilities of Nuclear Fuel Complex, thorium mining etc. It also includes large number of non-DAE radiation facilities including diagnostic x-ray units, radiotherapy units, medical cyclotrons, nucleonic gauges, gamma radiations, industrial radiography units and facilities processing naturally occurring radioactive materials and consumer products containing radioactivity. While explaining the functions and responsibilities of AERB, the 4th respondent has stated that it is a preliminary submission in respect of the first respondent KMMML on the regulation of Beach Sand Minerals (BSM) facilities in India with respect to radiological safety. It is stated that BSM are a group of minerals found in the beach sands along the country's coastline. It comprises 7 minerals of significance, with three of them being titanium bearing ones (Ilmenite, Rutile, Leucoxene) and other four minerals are Zircon, Monazite, Garnet, and Sillimanite. It is stated that Monazite, the source of thorium, uranium and rare earths is only a minor constituent of BSM. It varies from an extremely low level of (less than 0.01%) to upto a maximum of 5%. Only Indian Rare Earths Limited (IREL) has been permitted to process monazite from BSM under the Atomic Energy (Radiation Protection) Rules, 2004. AERB regulates separation of monazites and its further processing to obtain Thorium and Uranium values. However, BSM which is invariably associated with radioactive

monazite, enhancement of the monazite contents in the left over sands are referred to as tailings. The unregulated disposal of monazite enriched tailings may cause undue exposure to the members of the public and therefore a Committee was constituted in 2004 with experts and the Committee has recommended that these facilities warrant radiological separation. Accordingly a gazette notification was issued in May, 2009 specifying the requirement of license from AERB by these facilities and that was followed by a detailed licensing procedure with application etc.

46. It is stated by AERB that a separate Beach Sand Mineral and NORM Safety Committee, consisting of Radiation Safety and Waste Management Experts, which reviews the license applications and based on their recommendations license is granted by AERB. It is stated that till date AERB has granted 24 non DAE BSM facilities with design radiological safety procedures and the condition with which the license is granted, is that any deviation from those conditions need to be immediately informed to AERB. In order to avoid increase in radiation level in monazite enriched tailings, a procedure was recommended by AERB for mixing enriched tailings with Silica enriched tailings prior to their disposal in the backfilled sites which generate large quantities of tailings with monazite content less than 10%. This was also recommended in respect of storing monazite enriched tailings in trenches located within the premises and topping them with Silica rich tailings to avoid background radiation level. AERB conducts inspections once in a year to ensure due compliance.

47. In so far as it relates to the radiological impact due to operations of KMML, Chavara, it is stated that AERB issued license to KMML for carrying out mineral separation based on a detailed review by the Expert Beach

Sand Minerals and NORM Safety Committee. Since the percentage in the tailings is around 25-35%, AERB has recommended to storage in trenches and subsequent topping with Silica rich sand to avoid enhancement in the natural radiation background of the tailings disposal area. Periodical reports providing information regarding monazite enriched tailings and radiation levels are considered. The Annual Reports submitted for the year 2009, 2010, 2011 and 2012 contain the quantity of monazite tailings stored in trenches and monazite content in the tailings are as follows:

Year	Quantity of monazite tailings stored in trenches	Monazite content in the tailings
2012	1178	32.58%
2011	4029	33.1%
2010	5402	24.5%
2009	5809	20.5%

The information regarding radiation level provided in the Annual Reports submitted to AERB in respect of those years are as follows:

Year	Background Radiation level in the mining area	Radiation level on top of trenches after topping with silica
2012	1.6- 2.0 Micro Gray/hour	2.0 Micro Gray/ hour
2011	2.6- 3.5 Micro Gray/hour	2.0 Micro Gray/ hour
2010	2.0- 2.1 Micro Gray/hour	0.9-1.8 Micro Gray/hour
2009	2.0 Micro Gray/hour	0.7-1.0 Micro Gray/ hour

48. It is stated that AERB conducts inspection once in a year and during the survey it was found that no enhancement in background radiation level noted due to storage of monazite enriched tailings. Due to the applicant's contentions that there is an enhanced radiation level, AERB has conducted surprise inspection of the first respondent on 6th and 7th February, 2014 and it was found that there was no enhancement in the background level due to the storage of monazite tailings and therefore

there is no merit in the contentions raised by the applicant. Copy of the said inspection report has been filed by AERB as Annexure I.

49. The 5th respondent MoEF in its reply dated 9th May, 2014 has stated that in respect of the allegation of presence of radioactive elements of Thorium and Uranium in beach sand, the AERB is the authority competent to deal with. Regarding the resultant feature of abstraction of 11,728 cubic meter of water per day by the first respondent, it is stated that under Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 which were notified, it is for the State Pollution Control Board to monitor the compliance of the conditions laid down in the consent order issued. Regarding want of facilities by the 1st respondent to secure storage, treatment and safe disposal of hazardous waste, it is stated that MoEF has notified the Hazardous Wastes (Management, Handling and Transboundary) Rules, 2008 and as per the provisions it is stated that SPCB which is responsible for inventorisation of hazardous waste and implementation of HW Rules and deal with the units in cases of violation. Further, under the said rules, the State Government occupier, operator of the facilities or any association of occupier individually or jointly be responsible to identify sites for establishment of facility for treatment, storage and disposal of hazardous waste in the State and ultimately the Board which is responsible for monitoring the setting up and operating the said facilities as per the guidelines framed by CPCB.

50. It is stated that the Regional Office of MoEF, Bangalore has carried out inspection of the first respondent on 24th and 25th April, 2014 and the report was furnished to MoEF which states that the first respondent KMML has three plants viz., Mineral Separation Plant, Titanium Dioxide Pigment

Plant at Sankaramangalam, Chavara with the main product of the Company as Rutile grade Titanium Dioxide pigment with other products like Illemenite, Rutile, Zircon and Sillimenite and the 3rd plant is Titanium Sponge plant at Panmana. The report further states that in respect of Mining & Mineral Separation, there are 4 mining blocks with two types of mining in vogue viz., Beach mining within sea water between high Tide Line (HTL) and Low Tide Line (LTL) and Inland mining close to beach between TS canal and Sea. The report further states that at present mining is in progress in Block III. In block I it was reported that mining was done for few months in 2006 and thereafter stopped. In Block V and Block VII, no mining takes place. The report further states that mining carried out in Block III and in Block I in 2006 amounts to violation of EIA Notification, 2006. The KMML has not obtained Environmental Clearance (EC) for mining and mineral separation activity. The report further states that the Kerala Coastal Zone Management Authority (KCZMA) has forwarded the proposal in respect of Block I, III, V and VII on 25.01.2014 for prescribing the Terms of Reference to the MoEF under the CRZ Notification, 2011. MoEF has not granted CRZ clearance. Further no application has been received from KMML for EC under EIA Notification, 2006 for mining activity in the said four Block Nos.I, III, V & VII. MoEF is examining the matter for taking action in accordance with law.

51. It is further stated by the report that MoEF has accorded EC to the proposal for expansion of Titanium Dioxide plant on 08.08.2006. However, the first respondent has not taken up the expansion project. It is further stated that MoEF has granted EC also to Titanium Sponge Plant for production of 500 TPM in the order dated 23.05.2012 with a condition to maintain zero discharge for the project. It is stated that the Board has not

issued "consent" for operation of this plant as zero liquid discharge system was not established. As per the Environment Impact Assessment (EIA) Notification, 2006, notified by MoEF under the provisions of Environment (Protection) Act, 1986 which was subsequently amended, the project of mining requires prior EC as per the schedule. It is stated that as on date of the affidavit, non Coal Mining Projects having mining lease area of more than 50 hectare are treated as Category 'A'. Category 'B' projects are the proposals in respect of major minerals, having mining area from 5 hectare to less than 50 hectare and in respect of minor minerals, those having mining lease area upto less than 50 hectare. While category 'A' projects are handled at the level of MoEF, category 'B' projects are handled by the respective State Environment Impact Assessment Authority (SEIAA). As per the CRZ Notification, 2011, mining of sand rocks and other substrate materials except those rare materials not available outside the CRZ area, are permitted activity.

52. When it was informed that the 10th respondent Kerala Enviro Infrastructure Limited (KEIL) was granted EC by the MoEF, the Tribunal has directed the MoEF in its order dated 22.03.2016 to file a statement regarding EC stated to have been granted to KEIL. Accordingly, the MoEF through its advisor at the Regional Office, Southern Zone, Bangalore has filed its affidavit on 23.05.2016. MoEF is stated to have written a letter to KEIL on 11.04.2016 on two issues viz., date of starting of physical site on the project site since as per the sanction it was inferred that the work has been awarded on 07.10.2016 and Lay out approved on 16.04.2007 and the date of 'consent to establish' (CTE) since the site was taken possession by KEIL on 09.05.2016 particularly when CTE is site specific. It is stated that pursuant to the said clarification letter, KEIL has replied on 11.04.2016

which has been filed as Annexure 'B'. In the reply KEIL has stated that even though the work order as Developer for the project was awarded to United Phosphorus Ltd. (UPL) on 07.10.2016, the project activities were started by KSIDC, the nodal agency appointed by the Government of Kerala much earlier. The report on EIA Study was submitted in March, 2005, Public Hearing was conducted by the District Collectorate, Ernakulam on 20.04.2005, Site was approved by Government of Kerala on 08.07.2005, CTE was issued by the Board on 27.12.2005 and the Site was notified as industrial area on 23.05.2016. In the said letter KSIDC has also stated that the site was taken possession from the FACT by Government of Kerala on 09.05.2016 and even before that the Government has notified the Site on 08.07.2005 and the CTE was issued only after the finalisation and notification issued by State Government.

53. It is also stated by KEIL in their letter that the project was not listed in EIA Notification 1994 for which NOC was issued on or before 14.09.2006 shall not require EC under EIA Notification, 2006. The Common TSDF was not listed in the EIA Notification, 1994 and therefore it does not require EC under the said Notification. Consent to Establish (CTE) the Common TSDF was issued on 27.12.2005 which was prior to EIA Notification, 2006 viz, 14.09.2006 and therefore KEIL has requested the MoEF to decide accordingly. MoEF on receipt of the said clarification from the KEIL dated 11.04.2016 in the affidavit dated 23.05.2016 has chosen to state that the Ministry has observed on the reply of KEIL that the work has been awarded on 07.10.2016 and the date of physical work did not commence before the EIA Notification dated 14.09.2016 and therefore the Ministry is of the view that KEIL should have obtained prior EC under EIA Notification, 2006. It is stated by the MoEF that it has issued only TOR for KMML for the project

renewal of mining lease and enhancement of mineral sand production from 2,50,000/- TPA to 7,50,000 TPA in Block III along with mineral concentration and separation plant located at Villages- Panmana and Chavara, Taluk –Karunagapally, District Kollam, Kerala which is to the extent of 88.119 hec. It is stated that EC was not issued for the said project since EIA/EMP and public hearing documents are not received.

54. Respondent Nos.6 to 9 which are Trade Unions subsequently impleaded, in their reply dated 24.09.2014 while denying the averments contained in the application have stated that the applicant is a stooge of United Phosphorus, a Company situated at Gujarat owning 53% share of KEIL at Kochi and therefore having full control of business and activities of KEIL. While the first respondent started supplying the iron oxide sludge to KEIL at Rs.4000/ MT and kept 6,70,800 MT of Iron oxide and ETP sludge in the Company premises, the application is filed to speed up the process of disposal of the iron oxide by KEIL. When such facility of KEIL is used fully by the first respondent, it has to spend Rs.268 Crores to KEIL which according to the said respondents, it will lead to financial instability and ultimately affect the workers who are the members of the union. It is stated that the applicant himself is not a resident and is living 250 Km away from the premises of the first respondent and the application itself has been filed with ulterior intention. While stating that the first respondent which is an integrated titanium dioxide manufacturing public sector undertaking in Kollam, Kerala, operating mining, mineral separation, synthetic rutile and pigment production plants, it is stated that soil in the sea shore area wherein the first respondent is situated nearby from Neendakara, Kollam District for about 22 Km. where plenty of minerals including monazite, rutile, zircon and sillimanite are available. The said area was divided into blocks

and mining permission given by way of lease to Indian Rare Earths (IRE) and in the allotted place the first respondent is extracting the minerals which includes Ilmenite, Rutile which are the ores of Titanium. The first respondent has got 3 units viz., Mineral Separation Unit (MS), Titanium Pigment Unit (TPU) and Titanium Sponge Unit (TSP). The mineral excavated from the soil is separated in the MS Unit and Zircon and Rutile are sold by the first respondent while the Ilmenite will be given to Titanium Pigment Unit for value addition and the main component is iron in its impure form. By a process of beneficiation, the iron content present in the Ilmenite is removed and the product formed after the process is called synthetic Rutile. This synthetic Rutile is used for production pigment by the TP unit. The beneficiation process is done for the production of Titanium dioxide.

55. The Ilmenite Beneficiation Plant (IBP) which is also available is used for removing the impurities in the Ilmenite. The impure iron is in the form of oxide and it is called ferrous oxide and ferric oxide out of which the ferric oxide is more stable in its content and by way of chemical process it is reduced to ferrous oxide by a process of reduction conducted in a plant called roaster plant. The soil will thereafter undergo a process of leaching in the digester section. It is stated by leaching the impurity in the substance is removed by dissolving in a liquid by using diluted hydrochloric acid. In the digester section soil will be filled along with hydrochloric acid and will be heated upto 1000 degree Celsius by which soil will get reacted with acid. When the solution is removed, the impurity from the Ilmenite will also be removed and the iron oxide left after the process, will be neutralized and deposited in the pond constructed for the purpose. It is stated that the wastewater generated by the first respondent is treated as

per statutory norms in the ETP and thereafter discharged into the sea through the approved outlet for disposal of treated water. Therefore the allegations that rain falling over the old ponds causes over flow thereby causing pollution is not correct. The existence of iron oxide components have no adverse effect on human health.

56. The first respondent is taking all possible steps to dispose the waste materials from the Company premises by selling to authorised end users and it is also taking steps for capping the old ponds as instructed by Pollution Control Board. The first respondent has made various scientific studies for production of non acidic iron oxide and for utilisation of iron oxide and ETP sludge through various efforts including inviting expression of interests from authorised end users for disposal of ETP sludge which was in 2013 and for iron oxide in 2014. Efforts are also taken for de-categorization of the materials as non-hazardous in a scientific manner and in effect the ETP sludge has been categorised as non-hazardous by the Board. The Indian Institute of Chemical Technology (IICT) have expressed its willingness to undertake the work to maintain the chloride contents in iron oxide at a minimum level and first respondent is also willing to undertake the same. It is further stated by the Trade Unions that the studies on utilising iron oxide powder by M/s.Asian Paints are in progress. Further the preliminary studies for possible use of iron oxide for secondary steel at M/s.National Institute of Secondary Steel Technology (NISST), Punjab have been completed and the same is being evaluated by the first respondent. Studies have been commenced by M/s.National Counsel for Cement and Building Materials (NCCBM) , Haryana on utilisation of ETP solids in cement manufacture and the process is to be completed. The Vellore Institute of Technology is carrying out studies for the use of ETP

sludge in concrete brick making. M/s.Jindal Steel work, Salem has taken on trial for use of iron oxide for steel making and in fact they have purchased 2000 MT of iron oxide and paid Rs.300/- per MT to the first respondent which was abruptly stopped and it is suspected that the officials of the first respondent are in collusion with united phosphorus. By moving the iron oxide and ETP sludge to KEIL which is far away at an exorbitant price, the first respondent has to spend huge amount which will consequently bring down the financial status of the first respondent resulting in substantial harm to the workers.

57. It is stated that the ETP sludge and iron oxide sludge were deposited as per guidelines of NEERI and the first respondent has stopped capping of ponds with ulterior motives. While it is true that during rainy season the ponds overflow and iron oxide is dispersed to the adjoining areas, Such overflow does not damage the groundwater since iron oxide is denser than water. The respondents also stated that by capping process redressal will attain sufficiency. It is stated that the workers working are interested in matters affecting the existence of the first respondent Company itself and according to them the first respondent Company is hijacked by a group of officials who are not interested in its well being. It is stated that around 2000 permanent and 5000 indirect workers are engaged by the first respondent for its day to day affairs and the ETP sludge are taken away outside the premises to KEIL for treatment without treating it within the premises which will result in hardship to the workers who are employed.

58. The 10th respondent Kerala Enviro Infrastructure Ltd. (KEIL) in its reply affidavit dated 1st July, 2015 has stated that KEIL which is a disposal facility was set up by the Government of Kerala to collect, transport, treat,

store and for safe deposit/disposal of hazardous waste generated in the State of Kerala. The trade effluent defined under the Water (Prevention and Control of Pollution) Act, 1974 are to be discharged from the premises of the Company in accordance with the conditions of the consent issued by the Board. The wastewater and semi solid wastes with approximately 7% solid contents generated from the first respondent KMML comes under the purview of the consent issued by the Board. The HW Rules, 1989, define "Hazardous Wastes" which were to be treated and disposed in the occupier's own treatment and disposal facility as per the authorisation issued by the Board. It can be by a Common Treatment Storage and Disposal Facility (TSD) by various Companies joining together to ensure proper treatment and disposal of hazardous waste with the authorisation of the Board and the Board itself should act as per the guidelines framed by the CPCB. It is stated that the first respondent KMML has reported the Board that it was generating 23,000 tonnes of Process Sludge (Iron Oxide Sludge) and 20,000 tonnes of ETP sludge per year. Both the iron oxide sludge and ETP sludge are classified as hazardous waste. In the early years, by virtue of discharge of slurry by the first respondent on the ground resulted in leachate and thereafter the sludges were put in brick, clay and LDPE lined ponds constructed as per the design of NEERI. However, the ponds got cracked as a result of continuous discharge of waste till 2008. NEERI's report mentioned four types of solid/semi solid wastes created by first respondent KMML viz., spent pet coke, fluidized bed drain material from chlorinator, solid waste from cyclone separator and spent sand from pigment section. The said waste which contain organic matters have gone through heating and cooling process in the presence of chlorine and

therefore they are likely to contain toxic dioxins. The spent sand also contains the hazardous ferro silicates and alloys.

59. The Hon'ble Supreme Court in the order dated 14.10.2003 passed in W.P. (Civil) No.657 of 1995 having found that provisions of HW Rules have not been followed and has issued many directions including the direction that the units which did not have TSDF or linkage to Common TSDF which are non complying industry should be closed. The Supreme Court has constituted SCMC to oversee the implementation of its directions. More than 300 industries in Kerala including the first respondent have been under threat of immediate closure as they did not have TSDF individually and there was no common TSDF in Kerala. The industries generating hazardous waste in Kerala could not have individual TSDF, as it is not possible for acting as per criteria and guideline of CPCB, particularly relating to siting of TSDF which should be 500 m away from State/National Highways, habitation, public park, water supply well, Lakes and Ponds etc. and the same cannot be fulfilled in Kerala for want of space. The second reason is that construction of TSDF with advanced laboratory facilities which requires high expertise and close monitoring is highly expensive. Therefore, the industrial units in Kerala were unable to implement strictly the directions of the Hon'ble Supreme Court. The Government of Kerala has pleaded the SCMC to avoid en mass closure of the industry till the Common TSDF was established. It was in those circumstances that State of Kerala has entrusted KSIDC to function as a nodal agency to set up a Common TSDF and identify the area satisfying the criteria of the CPCB. The nodal agency ultimately with great difficulty has found the space at Ambalamedu in Ernakulam. It is stated that after obtaining environmental impact analysis, public hearing was conducted and clearance from all the

authorities were obtained and tenders were invited from the competent establishments for appointment as Developers. The request for proposal (RFP) was issued by KSIDC in April, 2006 and there were 193 hazardous waste generating industries in Kerala and the data was made available by the Board. The total waste generated by 193 industries as per the data furnished by the Board was 72,598 tonnes per annum and in the data the first respondent is 149, the Company producing 19,710 tonnes per annum (TPA) of process sludge (iron oxide) which is classified as item 26.1 and 12,775 TPA of ETP sludge classified as item 26.2 of Schedule I of HW Rules, 1989 and there was 32,485 tonnes per annum of hazardous wastes created by the first respondent to be collected, transported, treated, stored and disposed at the Common TSDF at Ambalamedu, Kochi viz, the space of 10th respondent KEIL at a distance of 135 km away from first respondent KMMML. In the tender process mooted by KSIDC, United Phosphorus Ltd. (UPL) was selected as developer to establish KEIL and the appointment of UPL as developers was approved by Government of Kerala on 08.07.2005 and 06.10.2006 by separate Government Orders.

60. Later, KSIDC has issued Letter of Award to UPL on 07.10.2006 and based on the same, a Memorandum of Understanding signed between Government of India, Government of Kerala, KEIL and 81 beneficiary shareholders of KEIL was entered. The Authorised Share Capital was Rs.15.00 Crores with 6.51 Crores as equity participation of UPL as per the requirement of Government of Kerala. Both Central and State Governments have contributed Rs.2 Crores towards establishment of KEIL. It is stated that the required facilities for Common TSDF were meticulously set up by KEIL under the supervision of Central and State Boards and after obtaining necessary statutory clearances, collection, storage and disposal

of waste was commenced in August, 2008 while the commercial production began in December, 2008. It is stated by the KEIL that the first respondent is the largest generator of hazardous waste in the State of Kerala as per the records of the Board and one of its Directors is in the Board of KEIL from its very inception in 2006. Further, the first respondent did not supply waste to Common TSDF till May 2010. It was in the meeting of the Government Officials held on 27.01.2010 attended by 34 industries including the first respondent, a direction was issued to all industries in the State to send their hazardous waste to common TSDF of KEIL without fail. It was thereafter the first respondent has executed an agreement with KEIL in 2010 to supply its hazardous wastes and the agreement was revalidated for another two years in November, 2012 which was valid upto November, 2014. However, the first respondent has not revalidated the agreement thereafter and stopped supply of waste to CTSDF from August, 2014. The KEIL has also given a tariff rate and it is stated that the hazardous waste generated by first respondent is transported and maintained by KEIL at Ambalamedu at the lowest rate. The quantity of waste supplied by first respondent during 4 years from 2010 to 2014 was 9202.600 tonnes.

61. It is stated that the accumulated hazardous wastes from the abandoned ponds is more than 2.5 lakhs tones as per records less than 4% of the hazardous waste has been sent to KEIL so far which according to the 10th respondent is a tactics adopted by first respondent. KEIL is always ready to remove the hazardous waste accumulated in the premises of the first respondent as per the agreement and directions issued by the Government. Due to the stoppage of supply, enormous pollution was caused by the first respondent and there were meetings with the Government officials particularly by the Additional Chief Secretary in

charge of Environment Department, Government of Kerala on 07.04.2014 and it was decided to remove the entire sludge storage ponds to the Common TSDF at Ambalamedu within 6 months under the supervision of the Board. The Board has directed the first respondent to remove the entire sludge from the abandoned ponds and send to Common TSDF on or before 07.10.2014 failing which the Consent to Operate issued by the Board will be revoked. KEIL has expressed its readiness to transport the waste to its Common TSDF for scientific disposal by its communication to the Board and also to the first respondent who have not taken any steps in furtherance thereof. The State Government itself cannot over rule the statutory directions of the Board and directions of the CPCB apart from directions of SCMC. Any direction of the Government of Kerala stated to be dated 13.08.2014 informing the first respondent to stop supply to KEIL and the decisions of the 1st respondent not to supply hazardous wastes is against the statutory provisions and illegal. The first respondent is discharging hazardous wastes partly or fully to the open yards, slurries were dumped erroneously in the ponds defectively designed by NEERI which became pervious due to falling off of the number of vertical PVC pipes cracking sides and bottom of the ponds resulting in downward percolation of contaminants. Even the NEERI report filed before the Tribunal shows that the waste of first respondent including iron oxide slurry from Acid Regeneration plant is mixed together and solid remains in suspension without settling the same and iron oxide sludge and ETP sludge which gets mixed with rain water is either pumped out to the sea or overflows from the Tank. The mixture of iron oxide sludge and ETP sludge is in violation of the terms and conditions of consent.

62. It is further stated by KEIL that on the application filed by the first respondent to the Board to establish new tanks for iron oxide and ETP slurry, the Board has pointed out that construction of such huge tanks are unnecessary for which KMML has replied stating that huge tanks was already in substantially advanced stage and as a result compartmentalisation of it was not possible. The 10th respondent has also found fault with the NEERI's report. According to the 10th respondent even the parameters are exceeding the limits on various grounds and ultimately the hazardous waste are discharged in the sea. The Board has already classified iron oxide sludge as hazardous and NEERI has not collected iron oxide sludge samples. The 10th respondent has also referred to the publication of a booklet by the Central Ground Water Board under the Ministry of Water Resources, Government of India highlighting the issues and problems faced in and around the place where KMML is situated. It is further stated that groundwater pollution reported in two areas viz., Chavara and Pozhikkara, are the causes of pollution by the first respondent. The low value of pH of groundwater samples show pH of Iron Oxide sludge is below 2.0. The statement by NEERI that around 2.50 lakh tonnes of iron oxide and 2.50 lakh tonnes of ETP sludge are accumulated in the first respondent premises is a confirmative evidence of hazardous wastes of first respondent and therefore it is the duty of the first respondent to transport hazardous waste to the 10th respondent which is a specialised agency created for the entire State of Kerala by the Government for treatment of hazardous wastes. The 10th respondent has also referred to some of the documents wherein the CPCB has warned the first respondent of cessation of electricity and water supply for causing continuous pollution in violation of HW Rules, The storage of hazardous

waste in the premises of first respondent is not permissible under HWM Rules. While the maximum time of storage prescribed in Rules is 90 days, the first respondent has dumped and stored hazardous wastes for 30 years. The practice of the first respondent since September, 2008 to dispose of hazardous wastes in watery solution/ suspension through overflow and effluent is in blatant violation of HWM Rules.

63. In an Additional Affidavit filed by KEIL dated 5th August, 2015, KEIL has stated that 45% of hazardous waste generated in the State of Kerala is by the first respondent Company, as per the data provided by KSIDC on the basis of information furnished by the Board. According to the 10th respondent, respondent Nos.1, 2, 3 and 5 and CPCB viz., 12th respondent have taken an unanimous stand that iron oxide sludge and the ETP sludge generated by the first respondent were hazardous as per HW Rules. However, the 3rd respondent Board has exempted ETP sludge from categorisation of hazardous waste on the basis of replaced provisions of HW Rules, 2008. The analysis data of iron oxide sludge reported by the Board and the CPCB establish that the iron oxide sludge is having pH less than 2 and therefore it is hazardous waste as per Class E3 of Schedule II of HW Rules, 2008. The pH data of iron oxide sludge in both old and new ponds on the basis of sampling taken in 2009-2010 respectively are given as follows:

Iron oxide sludge pH					
Pond		Old	New		
Sampling Date		25.05.2009	New Pond commissioned in September 2008	Old	
Monsoon Commencement date		23.05.2009		New	
pH	CPCB	-		02.06.2015	02.06.2015
	KSPCB	1.64		05.06.2015	05.06.2015
			1.80	1.50	
			1.93	1.65	

It shows that pH level is less than 2 in both old and new ponds. It is also stated that the stand taken by the first respondent that pH varies from 1.5 to 1.8 and it is only marginally, less than 2 is scientifically incorrect. Scientifically pH 2.0 in an aqueous solution means that the hydrogen ion concentration in it is 1,00,000 (One lakh) times that in pure water of pH 7. pH 1.0 means that the hydrogen ion concentration has gone upto 10,00,000 times that in pure water pH 1.5 shows hydrogen ion concentration is 3,16,200 that of pure water or 3.162 times that of water at pH 2.0. pH of 1.8 shows hydrogen ion concentration 1,55,500 that of pure water or 1.585 times that of water pH 2.0. Therefore the agreement that pH varies from 1.5 to 1.8 and it is only marginal is fallacious. The 10th respondent also relies upon Vermont Hazardous Waste Management Regulations which state that pH of less than or equal to 2 is corrosive in character. The analysis report regarding Chromium, Copper, Manganese, Vanadium, and Trivalent Chromium as per Hazardous Rules are exceeding the limit and therefore the iron oxide sludge is hazardous in nature. The erosion caused in the water adjacent to T.S.canal resulting in the reduction of depth of water from 2 to 3 meter to 0.1 to 0.6 meter in tsunami hit Chavara area in Kollam District shows the seriousness of the issue. It is further stated that during transport of waste to Common TSDF, no accident has taken place and KEIL is adhering to the norms laid down by CPCB for hazardous substances. The 10th respondent also states that as per CPCB norms and policies, Common Treatment, Storage and Disposal facility is always appreciated. KEIL also relies upon the Central Government's strategies on National Hazardous Wastes Management which appreciates the common TSDF.

64. In an another affidavit filed by KEIL dated 10.06.2016, the documents properly arranged have been filed. It is stated by KEIL that it was never the case of the 10th respondent that it has obtained EC. On the other hand the case of KEIL is that as per EIA Notification EC is not required for KEIL since the process of establishment of CTSDF did not fall within the ambit of EIA Notification 1994. The activities of the CTSDF was originally taken up by KSIDC, a Government of Kerala undertaking which was afterwards carried on by KEIL which is the Special Purpose Vehicle created by Government of Kerala. It is stated that CTSDF were commenced and carried on strictly in accordance with the Rules of HW (Management & Handling) Amendment Rules, 2003 and the Hon'ble Supreme Court in its order dated 14.10.2003 has stressed the necessity of common facilities for treatment , storage and disposal of hazardous waste. While reiterating as to how the CTSDF at Kochi has come into existence it is stated by the 10th respondent that as per EIA Notification, 1994 no EC is insisted for TSDF and CTSDF and in fact the Hon'ble Supreme Court has never mentioned about EC in the order dated 14.10.2003. While identifying the present site of KEIL, it was done based on EIA report and there was a public hearing conducted by the Board and the State Government has approved the site notifying the same to set up CTSDF apart from notifying it as an industrial area. SCMC has visited the site at Ambalamedu between 10th and 13th May, 2005 expressed its satisfaction about the serious efforts taken by Government of Kerala, KSPCB and KEIL to comply with the directions of Hon'ble Supreme Court. For development of CTSDF, Government of Kerala constituted an Expert Committee which has made various recommendations. After completing the procedures like submission of EIA report, Public Hearing, approval of the site by

Government of Kerala, the Board has issued Consent to Establish on 27.12.2005 and the activities connected thereof were commenced immediately. It is reported that provisions of HWM Amendment Rules, 2003 have been scrupulously followed.

65. The 10th respondent denies the contents of the affidavit of MoEF dated 23.05.2016 and states that the work was initiated by KSIDC in 2004 and was continued by KEIL which is a Special Purpose Vehicle established for that purpose by KSIDC. UPL was brought in at a later stage viz., on 07.10.2016 as Developer to impart professional competence and capital investment. Therefore, according to the 10th respondent, the project activities were already under way when UPL entered the scene and therefore the version that the work was commenced only after the entry of UPL is contrary to the fact. Even as per Audited Balance Sheet of KEIL as on 31.03.2006, an expenditure of Rs.60,04,000/- was incurred towards expenses of the project and the project work has been commenced before Consent to Establish was obtained. The 10th respondent has also relied upon a letter of MoEF dated 11.04.2016 alongwith another circular issued dated 21.11.2016 and 15.01.2008 wherein it has been specifically stated that the project for which NOCs have been issued before 14.09.2006 would not be required to take EC under EIA Notification 2006. The guidelines issued by Government of India by way of circular dated 21.11.2016 for the categories of projects which do not require EC under EIA Notification, 1994 which require EC under EIA Notification 2006 shows that KEIL and its TSDF facility does not require EC as per EIA Notification, 2006. The MoEF has also granted financial assistance for establishment of CTSDF apart from Monitoring Committee consisting of MoEF, CPCB, KSPCB and KEIL was constituted to monitor the performance of CTSDF periodically

and therefore all these activities show that MoEF is aware of the functioning of CTSDF by the 10th respondent. It is specifically stated that KEIL has complied with all the requirements particularly Hazardous Waste (Management & Handling) Rules 1989 as amended upto 2003 and the project activities were commenced well before 14.09.2006. The 10th respondent has given a chronological sequence of events leading to the setting up of Common TSDF at Ambalamedu, Kochi.

66. As a matter of reply to the counter filed by the 11th respondent viz., Polluted Area Welfare Society, Panmana who is the applicant in Application No.290 of 2013 and who was impleaded subsequently by this Tribunal as 11th respondent in this Application No.142 of 2013, The 10th respondent KEIL has also filed another affidavit dated 13th October, 2015 contraverting the allegations made by 11th respondent whose stand is that the iron oxide sludge and ETP sludge generated by the first respondent should not be carried to the 10th respondent KEIL for the purpose of treatment and disposal. While reiterating all statements elaborately made in the previous affidavits, the 10th respondent specifically denies the averments made by 11th respondent which includes, a specific denial that KEIL was not granted Consent to Establish by the Board. It is also stated that the safety audit as alleged by the 11th respondent is not mandated by Rules. It is also stated that construction of landfill was started only after obtaining approval for conceptual layout, construction of liners and other parameters and the designs of the secured landfill have been done as per the guidelines and after obtaining permission from the statutory authorities and it is not correct to say that KMML has got the hazardous waste facility without any labelling etc. It is stated that the 10th respondent has never suppressed any material fact. It is also pointed out that the 11th respondent

has chosen to state as if CTSDF facility is established at Elloor and Edayar region while it is established in Ambalamedu and therefore the applicant does not even know the location. Therefore, according to 10th respondent, the 11th respondent is not aware of the factual position and is making false and misleading statements. The KEIL is not situated in Elloor-Edayar Region as falsely stated by the 11th respondent.

67. In the reply filed by the 11th respondent viz., Polluted Area Welfare Society, who is the applicant in Application NO.290 of 2013, dated 18.09.2015, it is stated that the Polluted Area Welfare Society which has been impleaded as 11th respondent as per the order of this Tribunal in M.A.No.113 of 2015, is registered under the Travancore Kochi Literary Scientific and Charitable Societies Registration Act, 1955 with the main objective to strive for rehabilitation emancipation and upliftment of the people affected by the environmental pollution and degradation caused by the functioning of the first respondent KMMML and it is stated that the Society represents more than 5000 people living around the vicinity of the first respondent Company. It is the case of the 11th respondent Society that the applicant has got vested interest and a wayfarer trying to fish in the troubled water. It is its specific case that the application has been filed only to make undue profit for the 10th respondent KEIL stated to be situated in Eloor, Kochi. This is however, denied by the 10th respondent stating that it is not situated in Elloor but in Ambalamedu which fact is also proved by records. It is stated by the 11th respondent that the application has been filed in collusion with a former Chairman of the Kerala State Pollution Control Board who was removed of certain charges. According to the 11th respondent, KEIL is a Non-governmental Company fully owned by private parties, a Gujarat based Company United Phosphorus which owns 53%

share. It is further stated that the State Human Rights Protection Centre headed by the applicant, is a sham organisation for swindling, blackmailing and for making money. In any event, the applicant organisation is a defunct organisation for which the 11th respondent relies upon an information issued by the State Public Information Officer, District Registrar (General), Thrissur.

68. It is the case of the 11th respondent that the removal of 7 lakh metric tonnes of accumulated waste of iron oxide sludge and Effluent Treatment Plant (ETP) sludge from the first respondent to the 10th respondent (KEIL) will only result in undue benefit to KEIL. It is stated that as per EIA Notification, 2006 dated 14.09.2006, incineration and landfill requires EC from MoEF. In case of establishment of a secured landfill (SLF) alone, EC is to be obtained from SIEAA which can be done only after appraisal. It is stated that KEIL has obtained any EC from MoEF and sanctions as per the HW Rules, 2008. As per EIA Notification, 2006, safety audit internally by KEIL every year and externally once in two years by a reputed expert agency, ought to have been done which is not complied with. It is stated that huge quantum of incinerable hazardous wastes (organic wastes) are kept haphazardly without labelling and not stored properly. It is stated that even if it is found that iron oxide sludge and ETP sludge generated by the first respondent, is hazardous, KEIL does not have the infrastructure or sanction and permission to deal with such hazardous wastes. It is stated that the landfills of KEIL are situated adjacent to Chithirapuzha River and near Kadambayar River and other water bodies. The hazardous wastes in Elloor – Edayar region near Kochi has been found to be contaminated by various Companies which are polluters. The Companies are discharging their wastes into the water bodies wherein KEIL is situated

which is a contaminated area. The landfill and dumping sites of KEIL has been percolated to the adjacent water bodies.

69. It is stated that in the meeting held in the presence of Minister and other officers, the 11th respondent was purposefully excluded which according to the 11th respondent is a conspiracy for corruption. The 11th respondent also particularly referred to one Mr.Jeyaprasad, the removed Chairman of State Pollution Control Board. It is the case of the 11th respondent that Mr.Jeyaprasad is trying to influence the authorities including KSCB and CPCB to come to a finding that the waste accumulated by the first respondent is hazardous in nature as per HWM Rules, 2008 only with an intention that it has to be transported to KEIL. It is stated that on the very same sample NEERI found it is not hazardous. Therefore, there is no necessity to transport to KEIL. The 11th respondent also pleads collusion between KEIL and the applicant. It is the case of the 11th respondent that proper enquiry by a scientific agency uninfluenced by vested interest must be carried out and the 11th respondent is not concerned whether the waste is to be transported to third party site, if it is found to be hazardous and really required shifting as per HW Rules. Therefore, according to 11th respondent, it wants a solution for the pollution caused in the area. In effect, the 11th respondent makes it clear that the sludge generated by the first respondent is not hazardous and therefore it can be treated within the premises of the first respondent. Further, even if it is found to be hazardous, such finding must be by an independent agency and thereafter it is to be decided as to whether it is to be transported to any third party for treatment. Other than the above such statements, the 11th respondent has chosen to make personal allegations against some of the applicants, above which, as a Green Court we are not

very much concerned. The concern of this Tribunal is to find as to whether the pollution is caused by the first respondent and as to whether the iron oxide sludge and ETP Sludge generated by first respondent is hazardous, if so whether first respondent has facilities to treat the same in its own premises with all permissions and authorisation from the Authorities Competent including EC. In the absence of such facilities in the first respondent, it has to be decided as to whether the iron oxide sludge and ETP sludge are to be transported from 1st respondent to 10th respondent KEIL and while deciding the same it has to be incidentally decided as to whether KEIL itself is authorised in law to treat and dispose such hazardous wastes. It is also necessary to decide in this case as to whether by the discharge of the iron oxide sludge and ETP sludge it has caused pollution in the ground water and consequently whether people in the surrounding area are affected. If so, to what relief they are entitled to? Therefore, in our considered view it is not necessary for us to deal with personal allegation made by the 11th respondent against the applicant, against 10th respondent or any other persons.

70. The Central Pollution Control Board (CPCB) which was impleaded in this Application as 12th respondent which is also a party in the other cases has filed a common affidavit in all these cases based on a direction by this Tribunal to report sampling and analysis of iron oxide sludge generated by the first respondent. The said common affidavit of CPCB dated 07.07.2015 refers to the oral direction of the Tribunal to CPCB to inspect and carry out sampling and analysis of iron sludge generated by KMML and to verify as to whether the said iron oxide sludge falls under hazardous category. Accordingly, it is stated that KMML, Sankaramangalam, Chavara, Kollam was inspected by CPCB on 2.06.2015 and iron oxide

sludge samples were collected from old and new ponds of M/s.KMML and the analysis report has been filed in Annexure I. It is stated that four samples were collected at 4 different locations (three samples in old pond and one in new pond). As the plant is not in operation fresh sludge could not be collected. The sampling location is also given in Annexure I. According to the CPCB, the sampling report reveals pH of iron sludge during inspection which are as follows:

Analysis Results of Total Metals & TCLP in mg/kg

Parameters	Old Pond						New Pond		Detect ion limit Mg/l
	Location -1		Location -2		Location -3		Location -4		
	Total metals	TCLP							
Copper	18.5	6.8	20.8	4.00	28.7	0.86	26.5	21.7	0.01
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.01
Iron	459300	2.31	513280	23	404700	1.4	429400	3241	0.0
Manganese	2413	158	3690	171	2952	29	3908	247	0.2
Nickel	22.4	BDL	28.3	1.9	33.7	1.09	37.6	2.57	0.04
Lead	58.5	BDL	53.5	BDL	70.0	BDL	65.0	1.25	0.2
Zinc	245	0.32	275	5.7	304	1.7	333	36.27	0.01
Cobalt	45.1	BDL	90	2.37	63	0.35	71.4	3.46	0.01
Arsenic	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.1
Titanium	507	BDL	781	BDL	635	BDL	188	BDL	0.01
Vanadium	1262	BDL	1688	BDL	1300	BDL	1174	3.96	0.01
Hexavalent Chromium	2.7	BDL	6.4	BDL	BDL	BDL	BDL	BDL	0.01
Trivalent Chromium	42.6	0.54	40.8	1.61	609	BDL	544	7	-
Mercury	0.29	-	BDL	-	0.19	-	1.20	-	20 mg/l
Chloride	-	1800	-	5080	-	2040	-	20560	-
T.Phosphate	-	1.00	-	2.76	-	2.86	-	1	-
Nitrate	-	0.90	-	0.85	-	1.2	-	58	-
Sulphate	-	1000	-	1210	-	1500	-	480	-
Sodium	-	1255	-	2078	-	897	-	1477	-
Potassium	-	1.80	-	52	-	15	-	21	-
Calcium	-	136	-	317	-	328	-	1985	-
Magnesium	-	82.5	-	447	-	215	-	283	-

TCLP Report in mg/l

S.No.	Parameters	Old Pond			New Pond
		Location-1	Location-2	Location -3	Location-4
		mg/l	mg/l	mg/l	mg/l
1.	Copper	0.4	0.2	0.05	1.2
2.	Cadmium	BDL	BDL	BDL	BDL
3.	Iron	0.13	1.34	0.08	186
4.	Manganese	8.8	9.87	1.62	14.2
5.	Nickel	BDL	0.10	0.06	0.15
6.	Lead	BDL	BDL	BDL	0.072
7.	Zinc	0.02	0.33	0.09	2.08
8.	Cobalt	BDL	0.13	0.02	0.19
9.	Arsenic	BDL	BDL	BDL	BDL
10.	Titanium	BDL	BDL	BDL	BDL

11.	Vanadium	BDL	BDL	BDL	0.22
12.	Hexavalent Chromium	BDL	BDL	BDL	BDL
13.	Trivalent Chromium	0.03	0.09	BDL	0.4
14.	Mercury	BDL	BDL	BDL	BDL
15.	Chloride	101	293.56	114	1183
16.	T.Phosphate	0.06	0.16	0.16	0.06
17.	Nitrate	0.05	0.05	0.07	3.32
18.	Sulphate	56.5	70.40	84	28
19.	Sodium	70	120	50	85
20.	Potassium	0.10	3.0	0.8	1.2
21.	Calcium	7.6	18	18	114
22.	Magnesium	4.6	26	12	16

71. It is stated by the CPCB that under Rule 3(1) of HW Rules, 2008, hazardous waste is defined and in order to ascertain as to whether iron sludge is hazardous or not, the constituents stipulated in Schedule II of HWM Rules, 2008 are to be compared with the limit given in the Schedule. The affidavit also states about the various metals, organic, inorganic under various classes of the Schedule particularly Class E which refers about various characteristics of waste to arrive at a conclusion whether it is hazardous waste. The CPCB has also referred to the guidelines framed by it in September, 2005, for proper functioning and upkeep of sites particularly with specific reference to the corrosivity. It is stated that the provisions of Schedule II and Class E read with Rule 3 (I) of HWM Rules, 2008 concludes that a waste shall be categorised as hazardous waste if it is listed in one of the characteristics listed under Class E. On analysis it was found that pH of iron sludge has been found less than 2 in two of the four samples. Therefore, it exhibits characteristics of corrosivity and thus iron sludge shall be categorised as hazardous waste under HWM Rules, 2008 irrespective of the constituents of metals, organics, inorganic etc. vis-a-vis their limits prescribed in Class A, B, C and D of the Schedule II of the Rules. However, the concentration of various metals and inorganic analysed have also been given in the Annexure, the analysis report of which have been elicited above. In view of the above analysis, the iron

sludge of M/s.KMML shall fall under category of hazardous waste as defined under HWM Rules, 2008 notified under Environment (Protection) Act, 1986. The learned counsel appearing for CPCB, Mr.D.S.Ekambaram has also filed a copy of the guidelines for conducting Environmental Impact Assessment Site selection for common hazardous waste management facility, apart from Criteria for Hazardous Waste Landfills notified by CPCB.

72. The Hon'ble High Court of Kerala wherein the matter was pending as W.P (C) No.24088 of 2010 has transferred the Writ Petition to this Tribunal in 2013 and thereafter the application came to be numbered as Application No.142 of 2013 (SZ).

APPLICATION NO.290 OF 2013 (SZ):

73. The 11th respondent in Application No.142 of 2013 who was impleaded subsequently viz., the Polluted Area Welfare Society represented by its Secretary, D.Suresh Kumar, Panmana PO., Kollam has originally filed a public interest litigation in W.P. (C) No.32842 of 2010 on the file of the Hon'ble High Court of Kerala for the following steps:

- A. *To issue a writ of mandamus or any other appropriate writ order or direction commanding the first respondent Company to abate the pollution caused to the environment and ecology within a time stipulated by this Hon'ble Court and to stop its functioning till it abates the pollution caused by it by taking remedial measures as per the directions of the 13th respondent.*
- B. *To issue a writ of mandamus or any other appropriate writ order or direction commanding fifth respondent , the Central Government to determine the amount required for carrying out the remedial measures including the removal of trade pollutants lying in and around the Company, in the area affected therein, Panmana Panchayat of Karunagappally Taluk of Kollam District on account of the pollution being caused by the 1st respondent Company on the basis of the report of the 13th respondent.*
- C. *To issue a writ of mandamus or any other appropriate writ, order or direction to the first respondent to pay the compensation to the people living in and around the company premises within a*

radius of 10 kms., Panmana Panchayat of Karunagappally Taluk of Kollam District, as determined by the 13th respondent.

- D. To issue a writ of mandamus or any other appropriate writ, order or direction to the sixth respondent, State of Kerala to acquire the land of the people living in Panmana Panchayat of Karunagappally Taluk of Kollam District who are the most affected people, by paying ample compensation to the affected persons as the land has now become unfit for human habitation or cultivation.*
- E. To issue a writ of mandamus or any other appropriate writ directing the fifth and eighth respondents to constitute an authority as envisaged under Section 3 of the Environment (Protection) Act, 1986 for protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution in the area in and around the 1st respondent Company, especially in Panmana Panchayat of Karunagappally Taluk of Kollam District and also to determine the manner of compensation payable and rehabilitation to be made to the persons affected in the said area who have lost their paddy fields, plants, domestic animals, occupation of agriculture, fishing coir manufacture etc. and also to enquire into the larger danger posted to the environment, including that of Astamudi Lake as a result of the pollution being caused by the 1st respondent Company, as per the advise, directions and consultations rendered by the 13th respondent.*
- F. To issue a writ of mandamus or any other appropriate writ directing the 1st respondent company to start afforestation process in the vicinity of the 1st respondent company as per the advise, directions and reports rendered by the 13th respondent.*
- G. To issue a writ of mandamus or any other appropriate writ directing the thirteenth respondent to enquire and place before the Hon'ble Court a report as to whether the various plants and machineries and industries in the first respondent company, including the Titanium Sponge Plant have been established as per the norms, stipulations, directions contained in various laws, rules, notifications etc.*
- H. To issue a writ of mandamus or any other appropriate writ directing the 1st respondent company to stop functioning in the event it is found that the various plants and machineries and industries in the 1st respondent Company are not established as per the norms, stipulations, directions contained in various laws, rules, notifications etc. and also to stop functioning immediately if it does not stop the pollution caused by it without any delay.*
- I. To issue a writ of mandamus or any other appropriate writ directing the 1st respondent company to give drinking water facility to about 1500 families affected by the pollution 24 hours a*

day by installing water pipe connections to the house of each of these families, especially in Panmana Panchayat of Karunagappally Taluk of Kollam District.

- J. To issue a writ of mandamus or any other appropriate direction or order directing the 1st respondent company to give free medical aid to the residents of Panmana Panchayat of Karunagappally Taluk of Kollam District who have been affected by the pollution caused by the 1st respondent Company.
- K. To prosecute the management of the 1st respondent or to direct other appropriate authorities to prosecute the management of the 1st respondent for discharging untreated toxic trade effluents through unapproved outlet by invoking the power under the Water (Prevention and Control of Pollution) Act and the Air (Prevention and Control of Pollution) Act and other rules.
- L. To prosecute the 1st respondent for emitting noxious substances beyond the standard fixed under the Environmental Protection Act and Air (Prevention and Control of Pollution) Act.
- M. To desist from creating new effluent settling pond against the project report and without the approval and recognition of the appropriate authorities.
- N. To issue a writ of mandamus or any other appropriate direction or order directing the 1st respondent company from discharging any type of trade effluents through any outlets to T.S. Canal, irrigation canal to Vattkayal or to any other water channels, ponds or places adjoining the company premises
- O. To issue a writ of mandamus or any other appropriate direction or order directing the 1st respondent company to arrest the main source of all type of water and air pollution, to remove the huge quantity of toxic and acidic trade effluents filled in the defectively and unscientifically built ponds and newly built tanks and also to stop the pumping of toxic effluents to these ponds and tanks.
- P. To issue a writ of mandamus or any other appropriate direction or order compelling the respondents 1 to 12 and 14, 16 to 21 to perform their respective statutory duties mandated by the laws and rules of the land on the ground that their failure to carry out their statutory duties is seriously undermining the right to life of the people living in the affected area, guaranteed by Article 21 of the Constitution.
- Q. Grant such reliefs as may be prayed for and the court may deem fit and proper in the facts and circumstances of the case.
- R. To award the cost of this petition

74. It is the case of the applicant that the first respondent KMML which is a Government of Kerala Undertaking incorporated under the Companies Act is situated in an extent of 280 acres of land in a thickly populated area. To the west of the first respondent Company the Travancore-Shoranur Central (T.S.Canal), is situated, on the west of T.S.Canal is the Arabian sea separated by a narrow strip of land. It is more than 500 acres of land around the first respondent Company which according to them has become waste now. To the east of the first respondent Company the National Highway 47 is situated. An irrigation canal, by name "Chittoor Thodu" emanating from the paddy fields is situated on the eastern side of the highway passes along the side of the Company and flows north till it reaches the Vattakayal Lake. The manufacturing process of the first respondent Company was initially having two units viz. Mineral Separation Unit registered under the Mines Act, 1952 and Titanium Dioxide Pigment Unit registered as a factory under the Factories Act, 1948. The 3rd unit viz, Titanium Sponge Plant has been started by the first respondent Company as a Joint Venture along with 15th respondent viz., Vikram Sarabhai Space Centre and the Defence Metallurgical Research Laboratory (DMRL), and Defence Research and Development Organisation (DRDO), Ministry of Defence, funded by the 15th respondent which is the lead centre for the satellite launch vehicles and associated technologies contributing an amount of Rs.143.11 crores.

75. According to the applicant, the first respondent company is earning huge profit running to Rs.500 crores. by discharging and emitting radioactive trade effluents into the environment polluting the nearby sea, water courses, lakes, agricultural lands, destroying the aquatic organisms, fauna and flora, polluting the ground water and disturbing the ecological

balance. The Company has not been spending any amount for the welfare measures. According to the applicant, the activity of the company extends to Panmana and Chavara villages of Karunagappally Taluk in Kollam District. The applicant has also chosen to give the list of raw materials per annum stating that the total water consumption of the Company is about 25,000 m³ per day. The wastewater discharge is 10000 m³ per day. The ground water is contaminated by percolation / seepage of polluted water, effluents and waste from the Company, the Company now draws water from a depth of about 1500 ft. below sea level. According to the applicant, the installation of plants including production of Titanium Sponge are not in accordance with the standard care and specifications required in respect of hazardous industry. The applicant also categorises the sequence of the activities of the first respondent Company which includes destruction of ecological balance within a radius of about 10 kms in Chavara and Panmana area. It is also stated that an extent of 10 km radius in Arabian sea has become hazardous for fish and aquatic and other living organisms apart from the fact that T.S.canal has become dangerously polluted.

76. It is further stated that Vattakayal lake, a fresh water ecosystem has become acid pool by destroying the entire living organisms. That apart, the underground water is contaminated with acidic, toxic and radioactive elements making the water unfit for drinking. Most of the wells in the area have become unsuitable for drinking and irrigation purpose. Further, 500 acres of paddy fields in the surroundings of the Company particularly on either side of the Chittoor Thodu have become waste lands because of the untreated effluent discharged by the first respondent Company. The applicant has also relied upon some studies made in that regard. It is further stated that pollution caused by the first respondent has assumed

fatal proportions. The toxic gas released from the factories of the company without ensuring any adequate precautionary measures have polluted and contaminated the air dangerously. It is the further case of the applicant that in the original project report the first respondent has envisaged only two settling ponds to be constructed below the surface level by complying with strict conditions. However, the ponds were constructed defectively by violating the conditions. The ponds were constructed for collecting neutralised and treated acid free effluents containing slurry and solid waste. From the effluent settling ponds, only the acid free and treated effluents are to be discharged into the Arabian Sea. However, due to the cumulative effects of defective construction of the effluent settling ponds it resulted in contaminating the ground water and nearby wells and other water sources. It is stated that the Company has been setting two more effluent treatment ponds and the additional ponds were also defective. The overflowing and leaked effluents from the four ponds were collected in the polishing pond from there and was unauthorisedly pumped into Chittoor Thodu leading to Vattakkayal lake, T.S.Canal and other known and unknown outlets. The effluent settling ponds are constructed more than 10 feet above the surface level against the project report itself with the result that the entire water body within 10 km surroundings of KMML has been contaminated with radioactive untreated effluent which is toxic. In those circumstances, a society called "Neethi" and 17 others have filed O.P.No.12213 of 2001 before the Hon'ble High Court of Kerala against the Company and others seeking appropriate action regarding pollution caused by the first respondent company.

77. The State Pollution Control Board has filed a Report dated 09.06.2001 before the Hon'ble High Court stating certain discrepancies were found in

the waste disposal system provided by the Company and directions were given to rectify the same. It was also found that the southern side Thodu leading to T.S.Canal was still found to be contaminated with wastewater. However, according to the applicant, the Board has not submitted a fair report to the High Court. The additional report dated 03.01.2006 filed by the Board in the above O.P. shows that the main source of pollution in the nearby surrounding area was due to the seepage of iron oxide effluent which is acidic in nature to the ground water from the iron oxide waste slurry ponds due to the leakage affecting large number of people living within 2 km on the northern side of the first respondent company. The report further stated that the seepage has affected the agricultural operations as well as the mode of life of people apart from the flora and fauna. The report further states that seepage of water effluent through the storm water channels caused damage in the nearby area. It is stated that based on the direction issued by the Monitoring Committee appointed by the Hon'ble Supreme Court under HWM Rules, 2008 drinking water facility has been made by the first respondent to 3500 affected families by providing pipelines for a length of 55 kms. However, the provision was made for supply of water only to 200 families in the vicinity of the company premises and not 3500 families. That apart, supply of water is only for a restricted period with limited quantity. The additional report has also insisted the first respondent to take measures to prevent pollution and to facilitate people to lead a healthy life in the area. It also stated that the Board as well as CPCB were of the view that payment of compensation to the victims could be considered by conducting appropriate study. It was in those circumstances, the Hon'ble High Court in the Judgement dated 22.03.2016 passed in O.P.No.12213 of 2001 directed the PCB to

continuously inspect and check whether there are any water pollution or environmental problems and direct the Company to cure and to take appropriate action against the Company as per the statute.

78. It is further stated by the applicant that the four effluent tanks are already filled with the effluents and slurry deposits to a depth of 15 ft. and there has been a leakage which is one of the reasons for causing pollution. The Board has given direction to rectify the cause of pollution but there was no effective direction given by the Board with the result that pollution continued unabated. Pursuant to the judgement, even though the company has done some rectification works, no effective steps were taken to restore back to normalcy. The Company built two new effluent storage tanks having a length of 200 feet and breadth of about 100 feet and height of about 20 feet. Very soon toxic waste started seeping through the company premises causing environmental hazard. The situation has worsened much more than when O.P.No.12213 of 2001 was filed. While reiterating that the Board has not taken any action and there has been criminal negligence including on the part of MoEF the applicant states that they have turned a blind eye towards the devastation that was going on.

Titanium Sponge Plant is located within the premises of the first respondent with a capacity of 500 tonnes at Chavara. The plant after its operation has made India as the 7th Country in the world having the technology for producing Titanium Sponge which is the raw material for titanium metal. The Project is financed by the 15th respondent Vikram Sarabhai Space Centre. It is the case of the applicant that the first respondent in its plant is producing premium quality of titanium metal in the form of sponge. Titanium sponge possesses high corrosion crack and

fatigue resistance, high strength-to-weight ratio and the ability to withstand the temperatures and therefore the location of the plant should be at least 5 km away from the nearest human habitation. It is learnt that in the western and industrialised countries, the location of the titanium plant itself is essentially to be at least 2 km away from the dwelling places. It is the case of the applicant that as per the EIA Notification, 2006, prior EC is required since the establishment of Titanium Sponge plant comes under Item 1 of Schedule I of the notification. The EIA prepared by 16th respondent (Ultra-Tech Environmental Consultancy and Laboratory), Thane on behalf of the first respondent is nothing but a sham. The said report shows that the Titanium Tetrachloride mixing with moisture is mild. The report does not speak about the danger of such event to the people living in the area. It is stated that Titanium Tetrachloride is a colorless to pale yellow liquid which has fumes with strong odour. When it contacts with water, it becomes hydrochloric acid as well as titanium compounds. According to the applicant, Titanium Tetrachloride is not found naturally in the environment and is made from minerals which are used to make titanium metal and other titanium containing compounds. Titanium Dioxide is used as white pigment in paints and other products. The Titanium Tetrachloride enters the environment as air emission. If moisture is present in the air, Titanium Tetrachloride reacts with the moisture to form hydrochloric acid and other titanium compounds and it becomes corrosive in nature and such acid can be found in air and water for a long time causing irritation to skin, eyes, mucous membranes of the lungs. It may also cause serious respiratory problems and tightness in the chest. The applicant also relies upon a report on the Titanium Sponge plant prepared

by Prasun K.Roy, Arti Bhatt and Chitra Rajagopal, Centre for Fire, Explosive and Environment Safety, Delhi.

79. As per the EIA Notification, 2006 a public consultation process was required to be conducted to ascertain the concerns of local affected persons. Even though public consultation was held in respect of the proposal to start the Titanium Sponge Plant voice raised by the people who have assembled pointing out the pollution problem, was not heeded to. The objections raised in public consultation have been ignored by the Board and after the consultation process the environmental concerns raised by the people have not been addressed in the EIA and EMP. Therefore, the very permission granted to the first respondent and 15th respondent to start the Titanium Sponge Plant is illegal. The applicant would also state that the EC granted on the basis of the report is also liable to be set aside. It is also stated that none of the officials or workers of the Company except a few, are residing near the premises of the first respondent Company. Even though the Company acquired 50 acres of land on the eastern side for providing staff quarters, the same was not constructed as the staff and officials are not willing to stay in the nearby area fearing pollution. It is also stated that as part of the precautionary principle nearly 1000 acres of land is to be acquired for creating greenbelt on the western side of the industry. However, the Company acquired only 200 acres where the industrial plants are situated. The first respondent company is engaged in hazardous and inherently dangerous activity resulting in emission of toxic gas and effluent and is liable as per the strict liability principle. By the conduct of the first respondent in discharging the untreated trade effluents, the Constitutional right of the people guaranteed for pollution free environment is violated.

80 The applicant further stated that the NEERI, Nagpur viz., 13th respondent was established in 1958 to study about the environmental issues. One of the mandates of the 13th respondent is to render assistance to the industries of the region or local bodies in solving the problems of environmental pollution. The Institute has contributed to reorientation of the environmental policy towards prevention of pollution by providing developed technologies. At the instance of Hon'ble Supreme Court of India, Honble High Courts of various States, the 13th respondent has submitted several reports from time to time involving various critical environmental disputes/issues. The applicant also relies upon the judgement of the Hon'ble Supreme Court reported in 1996 (3) SCC 212 which relates to the chemical industrial plants in Bichri village in Udaipur District of Rajasthan. The chemical industrial plants were causing pollution by allowing untreated toxic waste waters and on the request of the Hon'ble Supreme Court of India, NEERI made a study of the situation in and around Bichri village and choice of the available remedial alternatives and the Hon'ble Supreme Court has passed orders based on the final report submitted by the NEERI. According to the applicant, the present case is also similar. The circumstances warrant a direction to the 13th respondent to inspect the first respondent company and give a report in respect of the following:

- a) *The Indoor Air Quality of the environment around the 1st respondent company within a radius of 10 kms in Panmana Panchayat of Karunagapally Taluk of Kollam District.*
- b) *The Ambient Air Quality of the environment around the first respondent company within a radius of 10 kms and steps necessary for improving the same or for restoring the air quality.*
- c) *The nature and level of pollution caused to Drinking Water in the surroundings of the 1st respondent company within a radius of*

10 kms and steps to be taken for improving the quality of drinking water.

- d) *The nature and level of pollution of Water Resources including surface and groundwater and aquifers etc. in the surroundings of the first respondent company within a radius of 10 kms and steps to be taken for improving its quality and the time necessary for its improvement.*
- e) *Inspection of the 1st respondent company to find out the source of the pollution which has caused environmental hazard and destruction and a solution for curbing the same.*
- f) *To find out whether the industrial plants of the company have been established adhering to all norms and formalities.*
- g) *To find out whether the details and contents given in Exhibit P19 Environmental Impact Assessment Report of the 16th respondent depicted the true and correct picture of the premises of the 1st respondent company and the surrounding environs on the basis of which environmental clearance was given by the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) constituted by the Central Government as per Environmental Impact Assessment Notification, 2006.*
- h) *To find out whether the effluent plants of the 1st respondent company meets the standard of reasonable care and whether the seepage of hazardous waste was due to the negligence of the officers of the Company.*
- i) *To find out the minimum safety distance from the premises of the 1st respondent company with which human habitation should be removed so as not to endanger them due to the functioning of the Titanium Sponge Plant as well as other plants of the 1st respondent company.*
- j) *To assess the cost of afforestation within a radius of 10 kms extending upto Vattakayil lake around the premises of 1st respondent company as a part of restoration of the environment around the company.*
- k) *To find out the amount of compensation payable to the persons affected/displaced by the pollution caused by the 1st respondent company and for rehabilitation of the person and property affected within a radius of 10 kms.*
- l) *The cost to be incurred by the 1st respondent company for restoring the environment to its normal self within a radius of 10 kms.*

m) The cost to be incurred for restoration of the ecosystem of Vattakayil Lake.

n) The estimated cost to be incurred each year by the 1st respondent company for the maintenance of the quality of the environment within a radius of 10 kms after the restoration of the environment and ecology.

81. The applicant further states that considering the environmental hazard caused by first respondent, the Central Government must invoke the powers under Section 5 of the Environment (Protection) Act, 1986 by giving suitable directions. The applicant has also referred to various other authorities constituted under the provisions of the Environment (Protection) Act, 1986 which includes *The Loss of Ecology (Prevention and Payments of Compensation) Authority* for the State of Tamil Nadu to assess the loss to the Ecology and environment caused by the bleaching units in Thiruppur apart from many other Authorities constituted by the Government of India by exercising powers under Section 5 of the Environment (Protection) Act, 1986 and this is a fit case for such exercise since the damages caused in the nearby area of the first respondent are enormous. There must be a direction to the Central Government to invoke Section 5 of the Environment (Protection) Act, 1986 and constitute any Authority for the purpose of assessing damages caused to the people living in and around the industrial area of the first respondent. The Applicant also states that the President of the applicant's Society Dr. Vasudevan, a prominent educationalist died of cancer on 25.11.2011 and due to leakage of obnoxious gas from the company premises nearly 100 students from nearby schools were hospitalised and that has also been reported widely in local newspapers like 'Malayala Manorama' and 'Mathrubhumi' as well as 'Indian Express'. It is also stated that Governmental Authorities have not taken care for the

sickness of the students. With various legal grounds, the applicant Society has filed this application for the prayers enumerated above.

82. The first respondent KMML in its reply dated 19.05.2012, filed when the matter was pending in the Hon'ble High Court of Kerala, contended that the application as such is misleading. It has also asserted that there is no environmental degradation by the functioning of the first respondent company. The first respondent KMML is a world first fully integrated titanium dioxide producing plant. The product of the first respondent with brand name "KEMOX" has a ready market. Titanium Dioxide which is called Titania, is a substance considered to be as old as earth and it is a mineral readily mined in its purest form from the beach sand. It was in 1909 Dr.Schomberg, a German Scientist discovered the traces of monazite in the sand flakes from Sankaramangalam. It was in 1932, a factory was established as F.X. Perira & Sons (Travancore) Pvt. Ltd. Later, it was taken over by the Government in 1956 and became a Public Limited Company in 1972 in the name of KMML. While stating that KMML is India's first and only manufacturer of rutile grade titanium dioxide by chlorine process, it is stated that Mineral Separation Plant (MSP) of the first respondent is engaged in separation of Ilmenite, Rutile, Monazite, Sillimanite etc. from beach sand. The MS unit employs gravitational, Magnetic and high tension electrostatic techniques for separation of minerals from sand. Raw Ilmenite is chemically processed such as iron, leaving the white pigment available for use. The Chloride process produces titanium dioxide products by reacting titanium dioxide ore with chlorine gas. Beneficiated Ilmenite from Ilmenite Beneficiation Plant is chlorinated in the chlorination plant to produce Titanium Tetra Chloride (TICKLE). Various other chemical processes are conducted and the raw

material is further purified to obtain pure Titanium Tetra Chloride and finally Titanium Dioxide.

83. The Company itself was formed in the area in 1932 because of the availability of mineral sand in abundance. It is stated by KMML that it has efficient and effective methods for effluent treatment. The effluents generated in all the plants are pumped into common effluent neutralisation plant, where the effluent is treated with lime to neutralise the slurry and after neutralisation, the effluent slurry is pumped to the storage plant constructed as per the norms prescribed by the Board. During the beneficiation process, one more by-product is generated viz., iron oxide which is acidic in nature and is nothing but oxidised form of iron oxide similar to the red colour material formed during rusting of iron. It is stated that iron oxide does not contain any ingredient in hazardous form as per the study conducted by a private agency approved by MoEF. The first respondent has also used effective methods to control air and water pollution based on which the Board has granted consent and the Board has also been constantly monitoring the functioning of the first respondent. In respect of pollution control measures, the first respondent has been granted many awards and it is maintaining international standard. The Awards include Quality Management System, Environment Management System and Occupational Health and Safety Management certifications. The first respondent is the first Public Sector Undertaking of the Government of Kerala having social accountability management certificate. The first respondent has acquired about 35 acres of land on the northern side of the Company and the proposal is submitted to the Government to acquire additional 3 acres of land on the north west area and 6 acres of land at the eastern side of the company. The purpose of acquisition is to

minimise the pollution. Further, the first respondent has contributed Rs.50 lakhs to Panmana Panchayat for construction of drainage system at Chittoor ward and it is providing drinking water facility to local residents at the rate of about 400 m³ per day. That apart the first respondent has contributed Rs.117 lakhs for the Jalanidhi project.

It is further stated that the first respondent is drawing water through tubewells and the same is used for production, for drinking etc. Installation of all the plants are as per statutory norms. It is stated that the first respondent is discharging only treated effluents into the sea as per norms suggested by the statutory bodies and it is not polluting the Vattakayal or T.S.Canal as falsely alleged. It is further stated that the first respondent company does not emit any toxic or acidic gas causing acid rain or loss of vegetation. There is in fact thick vegetation and the allegation that the people are suffering from diseases is denied.

84. It is further stated by the KMML that the effluent ponds are constructed in accordance with the norms. The old ponds containing iron oxide sludge and ETP sludge were abandoned in 2008 and the first respondent is regularly sending iron oxide accumulated in these old ponds to the common disposal site at Kochi viz, KEIL as directed by the CPCB. It is stated that the officials of the Company and most of the workers are residing within 2 Kms of the company premises. The scrubbing systems in the Chlorination and Oxidation plant were installed by KMML as per the design of its collaborator M/s.KMCC, USA and they are performing satisfactorily and any defect or contamination will be identified immediately and rectification is carried out by continuous process and monitoring. The first respondent has also categorised recognitions and Awards granted by

various Authorities and therefore submits that the Writ Petition is not bonafide and it is vexatious.

85. The 11th respondent Panmana Panchayat in its reply dated 25.10.2014 has stated that there is no omission of statutory duty on its part and therefore it is not a necessary party. It is further stated that no one residing in the local jurisdiction of the Panchayat complained of any inconvenience or water pollution created by the first respondent which is a Government of Kerala undertaking subject to control of various statutory authorities to prevent pollution. The statutory authorities are the Pollution Control Board, Inspector of Factories and others. The 11th respondent Panchayat has no infrastructure to deal with any kind of pollution.

86 Likewise, the 12th respondent Chavara Grama Panchayat in its reply dated 24.09.2014 has stated that the first respondent has no chemicals, or poisonous gas employed in the process of Mineral Separation and no pollution is caused. Out of the two units of the Company, only the Mineral Separation Unit is functioning under the geographical territory of Chavara Grama Panchayat and there is no complaint against this unit that it is polluting the environment. The 12th respondent has not shown any laxity or negligence in performing its duties and it has no statutory obligation to prevent pollution or nuisance.

87. The 15th respondent, Vikram Sarabhai Space Centre in its reply dated 10th October, 2014, has stated that the Government of India has set up the Department of Space for the development of Space Science Technology for the socio-economic benefits of the Nation. The Department of Space carries out these activities mainly through Indian Space Research Organisation (ISRO) which is engaged in the development of satellite launch vehicle technology and other space related

applications. The development activities of ISRO are carried out by various centres located across the country out of which Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram is the most prominent centre of ISRO leading to the activities of Space Research in the country. It is a lead centre for the development of rocketry and launch vehicle technology for ISRO's multi-disciplinary activities like satellite communication, weather forecasting, remote sensing, internet services etc. With the dedicated efforts of the 15th respondent and other ISRO centres, India has established 100% self-reliance in the most propulsion technologies - solid, liquid and cryogenic. It is stated that Titanium is an essential element for making Titanium alloys which is required for space programmes and defence projects. The Titanium alloys have been indigenously developed by Midhani, Hyderabad but using imported Titanium sponge. During the beginning of the last decade, the titanium sponge price has increased multifold and not even available for import. In view of the same, 500 MT Titanium Sponge Plant was set up at Chavara, a Government of India undertaking considering the importance of Titanium in India's space and Titanium projects. There was a Tripartite Agreement between KMML, Defence Metallurgical Research Laboratory (DMRL), Hyderabad and ISRO and as per the contract the Grade 1 sponge has to be sold to 15th respondent and space capacity to be utilised by first respondent. It is stated that the technology for realising space was indigenously developed by DMRL and Defence Research and Development Organisation (DRDO) and well proven in their pilot plant. The first respondent was chosen for setting up of this plant as it produces Titanium Tetrachloride a starting raw material for Titanium Sponge through Kroll's process. The plant when run to its full capacity will use just 2000 MT of Titanium Tetrachloride against

the installed capacity of 1,00,000 MT. The other reasons for identifying KMML as a location for sponge plant is its expertise in handling Titanium Tetrachloride and Chlorine. Titanium sponge plant consists of Titanium Tetrachloride Purification Plant, Metal Production Plant and Sponge Handling Plant.

88. All the equipments in the above plants have been designed jointly by KMML, KITCO and DMRL and the 15th respondent and for some equipments like Reactors, Indira Gandhi Centre for Atomic Research (IGCAR) is also involved. The first respondent is responsible for meeting the required stipulations under the environmental laws enforced in India and it has got very less impact on environment. In the event of any leak of titanium tetrachloride it can lead to formation of fumes of Hydrochloric acid and it can be contained by ventilation and exhaust system consisting of caustic solution scrubber, vent gas blower and stack for neutralising Hydrochloric acid. An efficient effluent treatment system is in place to neutralise Hydrochloric acid discarded from magnesium pickling system and residual caustic from vent gas scrubber. Another possible polluting substance is magnesium chloride which is a by-product. The magnesium chloride is packed in separate polythene bags and disposed through sale. Environmental friendly schemes like water harvesting and green belt are also in place in the first respondent. It is further stated that the first respondent has obtained clearance from the MoEF after undergoing the process of public hearing. The suspected problems leading to the filing of the application are not due to Titanium Sponge Plant and environmental clearance has been obtained by the first respondent solely by giving correct information. ISRO being a prestigious institution of Government of India,

will also follow norms especially in waste disposal and management. The 15th respondent has been functioning without causing damage to the environment and it is not making any profit out of the production of Titanium Sponge nor did it engage in selling the products outside the market. There is no scope for pollution by the manufacturing process of the first respondent.

89. The respondent Nos.17 to 20 viz., The Director of Factories and Boilers, Chemical Inspector and Inspector of Factories have filed their statement dated 15th October, 2012 when the matter was pending before the High Court of Kerala as per the direction of the Hon'ble High Court. It is stated that the first respondent, KMML is a factory registered under the Factories Act, 1948 for manufacturing Titanium Dioxide pigment. The license issued under the Factories Act permits employing 2500 workers using 16,792 KW. The first respondent has also obtained permit for another unit viz., Titanium Sponge Plant for manufacturing of Titanium Sponge from the Director of Factories and Boilers and license has been issued by the Department for employing 144 workers using 795 KW. As per the records maintained in the office of 18th respondent, the process involved in the factory is for manufacturing of Titanium Dioxide pigment. Mining of mineral production activities of the Company are not covered under the purview of the Factories Act. Registering Factory viz.KMML Titanium Dioxide Pigment Unit , Titanium Sponge Plant, the company has taken approval from the Department in accordance with the provisions of the Factories Act, 1948. It is stated that Titanium Tetrachloride is the main raw material used for the Titanium Sponge Plant obtained from KMML Titanium Dioxide plant. The Titanium Sponge Plant factory has taken necessary precautions to prevent any possible leakage which was found

during inspection. In case of any leakage, there was safety arrangement provided for neutralising. There is no limitation of distance of 5 km from nearest human habitation in respect of the location of factories. The public consultations are conducted by the Board and objections raised are to be addressed by them. Department of Factories and Boilers has no role to play. It is also stated that Officers of the Department inspected the premises of School and the Factory and found that the alleged leakage has not occurred from the factory. The premises of the factory are being regularly inspected by the 18th respondent along with a team of Inspectors of various disciplines and necessary follow up actions are being taken. The Department of Factories & Boilers has a procedure of inspection of Major Accident Hazard (MAH) Units under the "Priority Inspection Scheme". The last such inspection by a team of Officers of the Department was conducted on 20.03.2012 and necessary directions were given to the first respondent for compliance report. It is informed by the first respondent that 19 out of 34 instructions were complied and actions have been initiated to implement other instructions. The discussions with Trade Union leaders were also done during inspection. It is stated that the said respondents are performing their statutory duties in accordance with law and the Department ensures health safety of workers in the factory by enforcing the beneficial legislations as stated above. The Board has filed a common report as per the direction of this Tribunal after conducting analysis of samples taken. The said Writ petition No.32842 of 2011 which was filed before Hon'ble High Court of Kerala was transferred to this Tribunal in 2014 and numbered as Application No.290 of 2013.

90. Application No. 453 of 2013 (SZ):

M/s.Kamalakshy Amma G. Rajendran Nair have filed a Writ Petition in W.P. No.26698 of 2010 on the file of the Hon'ble High Court of Kerala praying for a direction (a) against the first respondent KMML to abate the nuisance and pollution committed by it. (b) for a direction against 13th respondent NEERI to inspect the surroundings of the first respondent company and submit a comprehensive report as to the pollution and environment degradation committed by the first respondent and the remedial measures to be taken and compensation etc. to be paid to the affected parties, (c) to direct KMML to pay the compensation to the petitioners as determined by NEERI, (d) to direct the 6th respondent State of Kerala to acquire the land of petitioners by paying ample compensation since the lands are not fit for human habitation and also (e) to direct the 5th respondent, Union of India to constitute an Authority envisaged under Section 3 of the Environment (Protection) Act, 1986 for protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution in the area in and around the first respondent company and also to determine the manner of compensation and rehabilitation to the affected persons in the said area including the applicant. It is relevant to note that since the request for the Government to acquire land is not within the jurisdiction of this Tribunal, the prayer (d) regarding acquisition of land stood deleted as per the order of the Tribunal dated 02.12.2016 in the application filed.

91. The applicants while stating the facts that as in the Application No.290 of 2013, have reiterated that the first respondent company by virtue of its activities, is causing environmental pollution and that affected the fundamental right to life guaranteed under the Constitution of India. Even

though the applicants have not stated specifically as to the damages caused to them by the conduct of the first respondent, they have chosen to state that by virtue of the pollution caused because of the iron oxide sludge and ETP sludge which has percolated into the groundwater by applying the principles of strict liability as laid down in *Ryland vs. Fletcher* they are eligible for compensation under the Polluter pays principle.

92. The 11th respondent Panmana Panchayat has filed its reply dated 05.09.2015 in line with the reply filed in Application No.290 of 2013. Likewise, the 13th respondent NEERI has filed a statement dated 14.06.2015 before the Hon'ble High Court of Kerala through its Counsel. In so far as it relates to the prayer of the applicant to direct the 13th respondent to inspect the surroundings of the first respondent company and to submit a comprehensive report as to the pollution and degradation committed by the company, it is stated by the NEERI that it is only the Board which has got necessary infrastructure to inspect such an area and give its report. The NEERI, a constituent laboratory of CSIR, endeavours to provide leadership in environmental science and engineering for sustainable development. The Mandate of NEERI is

- a) *To conduct research and developmental studies in environmental science and engineering.*
- b) *To render assistance to the industries of the region, local bodies etc. in solving the problems of environmental pollution by S & T intervention.*
- c) *To interact and collaborate with academic and research institutions on environmental science and engineering for mutual benefit.*
- d) *To participate in CSIR thrust areas and mission projects*

With the above said object, it is not possible for NEERI to make a study in Kollam as the project study involving manpower and machinery would come to about Rs.75 lakhs. Therefore the applicant can avail the services

of the State Board which is equally efficient and having the environmental team and infrastructure. It is also stated that State PCB while making a study, can approach NEERI if any further help is required in which event it will always support. It is further stated that as per the pleadings, it is clear that the authorities concerned in Kerala are viewing the situation seriously and as a responsible institution, the matter would be taken to its logical conclusion. The said W.P.No.26698 of 2010 was transferred from the High Court of Kerala to this Tribunal and numbered as Application No.453 of 2013.

93. The learned counsel appearing for the applicant in Application No.142 of 2013 Mr.Babu Joseph Kuruvathazha relies upon Exhibit P5 which is an order of consent to operate /authorisation issued by the Board in favour of KMML dated 20.09.2010 wherein one of the general conditions viz., condition No.2.6 stipulates periodical monitoring report and returns to be submitted to the Board particularly relating to Hazardous Waste in Form 4 and auction and sale of hazardous wastes, which should be filed not later than 31st of January every year, it is not open to the KMML to turn around to say that the condition is not binding and therefore waste generated by it is not a hazardous. In any event, according to the learned counsel, KMML has submitted its Annual Return to the Board in Form No.5 and 8 for the period March 2011 and during October 2011 to March 2012 respectively as seen in Exhibit P7 wherein in Part D, it has specifically admitted the generation of hazardous wastes of 1,06,78,450 kg during the previous year namely 2010, the hazardous waste generated was actually 1,79,65,000 kg and during 2011 it was expected to be 1,81,70,200 and therefore under Exhibit P7 report the first respondent has specifically admitted that it is generating hazardous wastes. He would further submit that in fact the

CPCB in its direction issued under Section 5 of the Environment (Protection) Act, 1986 dated 27.04.2010 (Exhibit P 19) has clearly stated that on an inspection carried out by CPCB officials on 14.05.2009 it was observed in KMML unit that hazardous wastes are stored in 4 ponds which are single lined and therefore issued a show cause notice as to why the first respondent unit should not be closed and direct the authority concerned to disconnect the electricity supply. As a matter of reply to the said show cause notice, the first respondent KMML in the communication dated 14.05.2010 addressed to CPCB has given a clear undertaking in Paragraph 8 that it is planning to dispose of de-watering sludge to CTSDF viz. KEIL at Kochi and the process of agreement is on and all these communications, according to the learned counsel, show that the first respondent has admitted that, what is generated by it is a hazardous waste. In addition to that, the learned counsel also relies upon the proceedings of the Principal Secretary of Kerala dated 06.02.2010 forwarding the Minutes of the Meeting held on 27.01.2010 regarding Common TSDF at Kochi with various participants including various project proponents including that of KMML wherein a common direction has been given to the said Companies that they should start sending the waste without any further delay to KEIL. He also refers to a report of visit of SCMC to Kerala (Ex. P18) in which while referring to KMML, a specific finding has been given that the ETP acidic iron sludge of the first respondent has caused seepage and urgent step must be taken before the entire groundwater becomes permanently damaged and as of now the sludge pond of the first respondent is in violation of the HW Rules and authorisation must be withdrawn till the problem is resolved.

94. The learned counsel would further submit that for all the said communications, the KMML has never raised any objections and therefore the cumulative effect is that what is generated by KMML is a hazardous waste and the same has to be sent for treatment to common treatment facility and the only such facility available in Kerala is KEIL. The learned counsel would also refer to the stand taken by KMML and the Board that the Government of Kerala, Industries Department has issued an order dated 13.08.2014 to stop transportation of hazardous waste from KMML to KEIL. According to the learned counsel, the 2nd respondent, State Government has no jurisdiction to give such direction against the conditions of consent/authorisation issued by the Board in respect of the matters relating to the enforcement of environmental measures. Under no one of the environmental legislations viz., Water (Prevention and Control of Pollution) Act, 1974; Air (Prevention and Control of Pollution) Act, 1981; Environment (Protection) Act, 1986; Hazardous Wastes (Management and Handling Rules), 1989; Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, the State Government is empowered to interfere with the implementation of the pollution control measures by the Board. Therefore, the communication of the State Government dated 13.08.2014 has no legal force and in fact according to the learned counsel, for disobedience of the direction of Board the first respondent Company and its officials are liable for prosecution under Section 16 and 17 of the Environment (Protection) Act. The learned counsel also refers to the consent variation order issued by the Board dated 08.07.2014 wherein in one of the conditions viz. No.6.14 - it is clearly stated that the abandoned sludge lying in storage pond should be removed

to TSDF at Ambalamugal before 07.10.2014 failing which the consent would be automatically revoked without notice and in as much as the said condition has not been complied with by the first respondent, the consent given to first respondent automatically stands revoked since the above said condition is very clear. He also referred to another direction of the Chairman of the Board in the order dated 04.04.2016 to KMML to remove the entire iron oxide sludge on a day to day basis to KEIL within 3 months.

95. There was a direction on 25.09.2014 issued by the Chairman of the Board to the first respondent to remove the abandoned sludge to TSDF at Kochi before 07.10.2014 and in fact in the meeting of the Chairman of the Board held with the officials of the first respondent on 30.09.2014, it was agreed that the iron oxide sludge will be removed to the CTSDF, Kochi within 6 months time. He also would rely upon an inspection report filed by CPCB dated 07.07.2015 as per the directions of this Tribunal, directing the Board as well as CPCB to carry out the inspection of the first respondent premises on 02.06.2015 and in the report it has been clearly stated by CPCB that the waste generated by first respondent is hazardous. The said direction of the Chairman of the Board dated 04.04.2016 remains valid and it should have been implemented and therefore it is not proper for the Board, having given such direction, to take a different stand that the waste generated by the first respondent is not hazardous. Direction issued by the Chairman of the Board was after the report of NEERI dated 29.04.2015 wherein it was suggested Offsite Disposal of Hazardous Wastes clearly directing the first respondent to transport the entire hazardous wastes to CTSDF at Kochi within 3 months and it is not known as to how the Board has taken a different stand subsequently. The guidelines issued by CPCB regarding Hazardous Waste cannot be

deviated either by the Board or State Government particularly when the guidelines are based on a specific direction by the Hon'ble Supreme Court of India dated 14.10.2003. The learned counsel also submits that the soil at Chavara is unstable for making the treatment of hazardous waste generated by the first respondent since the ground water level is just 1 meter below the top soil. Even the proposal for storage of hazardous waste in elevated structure as proposed by NEERI is not as per the distance criteria.

96. He would also refer to the analysis report submitted by CPCB which clearly shows that in respect of Manganese which is brought under the category of hazardous waste and the concentration limit being 10.0 mg/l, the analysis report shows the concentration at 14.2 mg/lit which is more than the permissible limit. The learned counsel has taken enormous efforts to insist that the waste generated by the first respondent in its process is hazardous and it is directly discharged to the underground as well as sea adversely affecting the surrounding area of about 10 Sq. Km. He also points out the integrated consent order issued by the Board dated 01.03.2017 which is valid upto 31.08.2017 with one of the conditions that the first respondent should take measures to ensure maintaining of pH level of iron oxide sludge generated by it to above 3. By going through the analysis report, it is clear that the first respondent has never maintained the pH level with permissible limit viz., above 3 and atleast in two instances it clearly shows below 2. Regarding the supply of drinking water, the learned counsel would submit that the present supply is grossly below the actual requirement of the people in the area who require a minimum of 135 litres of water per person per day of every house within 5 km. from the plant of the first respondent. The present supply of water per person per day

which is 30 litre, is grossly inadequate. Further, the first respondent should be directed not to extract any groundwater for its day to day manufacturing activities. The stand taken by the first respondent as the iron sludge can be used for any other purposes according to the learned counsel, is not scientifically viable. The documents relied upon by the first respondent which are in the form of studies are hypothetical and are not applicable to the real and true situation and techno-economic viability and unless the functional technology is developed for utilising hazardous wastes, there is no alternative for the first respondent to handle the wastes generated except by transporting to CTSDF, Kochi. He would also submit that under the Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2016 particularly Rule 6(2) proviso that before granting authorisation the Board should be satisfied that there is no violation of the conditions specified in the authorisation earlier granted. The learned counsel would finally submit that the NEEERI's proposal of caustic purging of the contaminated land in and around the Company is only on the premises and focussing attention regarding the acidic nature of the contaminated soil. On the other hand, the NEERI's report shows the presence of metallic content like chromium and in such circumstances, caustic purging will only spread high toxic hexavalent chromium in the further areas and therefore the learned counsel submits that the first respondent should be directed to transport its hazardous waste for treatment and disposal to the specially designed Special Purpose Vehicle viz., KEIL which is the only Government of Kerala undertaking in the whole of Kerala for disposal of hazardous waste.

97. Mr.K.Shaj, learned counsel appearing for the applicant Society in Application No.290 of 2013 and Application No.453 of 2013 would submit

that while there is no controversy regarding the treatment of iron oxide sludge and ETP sludge generated by the first respondent, it is his client's case that it does not require transportation to KEIL for treatment which is 250 km away and according to him, Application No.142 of 2013 itself is filed with a basic motive to facilitate KEIL to have the hazardous waste generated by the first respondent transported to it and that is with an intention hatched out by one of the officials of the Board who retired. Therefore, according to the learned counsel any treatment required should be within the premises of the first respondent and by transporting the said long distance to KEIL, the first respondent will have to spend enormous amount of public money which should be avoided. He would rely upon strongly the report of the NEERI to contend that such treatment can be done in the premises of the first respondent itself. Mr.Shaj would further submit that as on date it is not known clearly as to whether the iron oxide sludge and ETP sludge generated by the first respondent is hazardous particularly in the light of the HW Rules which excludes ETP sludge and it is only after there is a clear finding that the sludge generated by the first respondent is hazardous the question of treatment under the KEIL can be considered. Therefore, he would insist the treatment within the premises of the first respondent as recommended by NEERI and he would also submit that the direction of the NEERI's report is that what is generated by the first respondent is not a hazardous waste as per the definitions of the HW Rules, 2008. In any event, it is his submission that an independent study should be made in respect of the entire issue to arrive at a conclusion and if it is found to be hazardous, the damages are to be ascertained and under the Polluter pays principle, the first respondent must be made responsible and individual persons who are affected should be paid

adequate compensation. According to the learned counsel, it is necessary because the NEERI in its report has not dealt with the compensation aspect. Mr.Shaj has also contended that KEIL itself has no proper authority for the purpose of handling and disposing hazardous wastes in as much as it has not obtained EC from MoEF. Therefore, according to the learned counsel, no useful purpose will be served in transporting huge quantity of hazardous wastes generated by the 1st respondent to KEIL.

98. Mr.P.Viswanathan, learned counsel appearing for the Trade Unions which were impleaded as parties in Application No.142 of 2013 would submit that the members of the Unions are the residents of the area. According to the learned counsel the old ponds were established in 1980 as per the norms prescribed by NEERI that were filled up. New ponds were created in 2008 and according to the learned counsel the new ponds confirm to various environmental norms and old ponds have been completely abandoned and therefore as on date what is lying in new ponds cannot be categorised as hazardous waste. He would also insist that as per the suggestions of the NEERI, the treatment of waste generated by first respondent should be within the premises of first respondent itself since there is a most advanced and effective technology in existence. He would also submit that to transport such huge quantity of waste to a long distance of 250 km to KEIL it will only result in unnecessary cost to the first respondent Company and ultimately if the first respondent company becomes financially weak, its employees, the members of respondent 6 to 9 union will be very much concerned. Such wasteful expenditure cannot amount to following sustainable development. He also submits that as on date no one of the respondents has filed any objection to the report of the NEERI and NEERI's report has to be followed.

99. Mr.Syed Nurullah Sheriff, learned counsel appearing for the MoEF would submit that even though the preliminary works relating to the establishment of KEIL as a Special Purpose Vehicle for handling and disposing of Hazardous Wastes was commenced before the EIA Notification, 2006, the activity of KEIL commenced only after the implementation of EIA Notification, 2006 and therefore KEIL should have obtained EC under EIA Notification, 2006 from MoEF. He has also referred to the circular of MoEF dated 21.11.2006 to substantiate his contention that KEIL should have obtained EC. His case is that even if there was MOU entered between three parties which includes Government of India for the purpose of establishment of KEIL and even Government of India has financed for the said project, it does not mean that KEIL should function without adhering to EIA Notification, 2006 viz. obtaining prior EC. He also submits that under EIA Notification, 2006, TSDF is a facility which requires prior EC. Even when MOU was entered in February, 2007, the EIA Notification has already come into existence.

100. Mr.D.S.Ekambaram, learned counsel appearing for the Central Pollution Control Board would submit that the CPCB as per the direction issued by this Tribunal, conducted the inspection by taking samples from old and new ponds of iron oxide sludge generated by the first respondent. As it is stated in the report of CPCB and for the reasons which are assigned in the report in categoric terms, the contents of the waste are confirmed to the definition of the Hazardous Waste under the Rules and therefore what is generated by the first respondent is hazardous in nature.

101. Mrs.VK.Rema Smrithi, learned counsel appearing for the State Pollution Control Board while explaining about the process of production in

any of the three units of the first respondent, has submitted that at the time when the old ponds were created in 1984-85 by the first respondent, it was based on the norms of the Board prevalent at that time and as per the guidelines of the NEERI and the old ponds are situated in and around 15 acres of area. Over a period of time, when the old ponds were filled up, new ponds were built by the first respondent according to the guidelines issued by the CPCB adopting seven liner system with sufficient capacity and the KMML has got three ambient air quality stations. By virtue of the HW rules, 2008 and taking note of the corrosive nature of waste generated by the first respondent, the sludge was categorised as hazardous. The chemical sludge from the wastewater pond was categorised as hazardous. When the Company on 09.11.2009 has requested for different categorisation of Iron Oxide sludge and ETP sludge from hazardous category, ETP sludge was collected on 15.05.2009 and parameters were found to be outside the limits stated in Schedule II of Hazardous Waste (Management Handling and Transboundary) Rules, 2008 and accordingly in the communication dated 17.03.2009, the Board has categorised ETP sludge as non hazardous waste.

102. In so far as it relates to Iron Oxide sludge, based on the complaints followed by meetings of the stakeholders, it was decided that the said Iron Oxide sludge should be transferred to CTSDf, Ambalamugal, Kochi within six months time. NEERI was engaged to make a study which in the report submitted in April, 2015, has stated that the Iron Oxide Sludge generated by KMML in the acid regeneration plant does not fall under the Hazardous Waste category as per HW Rules, 2008. Further, as per the direction of this Tribunal dated 28.05.2015 there was further inspection of first respondent on 02.06.2015 and Iron Oxide sludge were collected from old and new

ponds and on analysis it was found that out of four samples collected, one sample from old pond showed hazardous nature and therefore a firm conclusion regarding the hazardous nature could not be arrived at.

103. The counsel for the Board further stated that again eight samples were collected as per the direction of this Tribunal in different locations of the old Iron Oxide pond and the analysis found that Iron Oxide sludge in old pond did not have pH value of less than two and hence would not come within the definition of Hazardous Waste. However, the Iron Oxide sludge in new ponds was less than two and therefore the Board has categorised the same as hazardous waste and such hazardous waste as per Rules cannot be stored for more than 90 days and therefore the Board has insisted the first respondent to remove the Iron Oxide sludge from new ponds from the company premises expeditiously. According to the learned counsel appearing for the Board, the sludge was more of acidic in nature with very little quantity of heavy metals and it was because of acidic nature it is categorised as hazardous. The lower the value of pH, the greater the acidity. The pH should be above 5.5 in the top soil and 4.5 in the sub surface. Though the old ponds were constructed based on the Expert's reports viz., NEERI it turned out to be defective and as per the efforts made by the Board, the first respondent had to abandon the old leakage ponds and proceed to construct new ponds in the year 2008 and it was at the instance of the Board, the first respondent has stopped discharging the neutralised effluents and Iron Oxide slurry in the old ponds. Therefore, the seepage of acidic water through the ponds to the surrounding area ceased by abandoning the ponds even though damage was already caused. The Board has given repeated directions to the first respondent company to remediate the pollution problems and according to her the company has

taken steps for the purpose of improving the pH value from 1.93 and 3.02 to 3 to 8 as it was found in the analysis report on 3.12.2012 and 4.12.2012 and the scientifically constructed ETP is functioning. Therefore, the Board has taken a stand that sufficient steps have been taken by the first respondent and hazardous nature of the waste has ceased.

104. She would also refer to some of the possible solutions for disposal of waste sludge and remedial measures to be implemented. In fact, the condition in the Consent Variation Order dated 08.07.2014 passed by the Board directing the speedy removal of the slurry to CTSDF before 07.10.2014 was kept in abeyance by the Industries Department, Government of Kerala in the letter dated 13.10.14 because of some practical difficulties and NEERI was therefore requested to make a study. At the direction of the Tribunal a meeting was convened on 12.11.2014 and certain important decisions were taken regarding disposal of Iron Oxide sludge, to the effect that the NEERI report which is pending, will be implemented in a time bound manner and ETP sludge will be entrusted to cement manufacturing companies located in Faridabad and other places. The report of the NEERI on 29.04.2015 has given effective management plan for environmental protection. The pH value in old pond has now become non hazardous and it can be disposed on the spot in a phased manner as per latest proposal of NEERI since the transportation to KEIL is not practically viable because of the large quantity of 2,50,000 tonnes of accumulated waste. As per the new pond it is a temporary storage in conformity with the CPCB guidelines. However, the sludge has to be transferred to permanent storage facility. The locational criteria of CPCB was not considered since it is a temporary storage and at present the Board has given conditional consent and will take further action based on

inspection. She has also filed a chart showing the details of compliance made by the first respondent. In so far as it relates to the common hazardous waste disposal facility, KEIL, Kochi, while narrating the historical events of commencement of KEIL, she submits that it was granted consent to establish on 27.12.2005 and as per the circular issued by MoEF dated 21.11.2006, the project of KEIL was commenced earlier viz., before coming into effect of EIA Notification, 2006 and therefore prior EC is not required. She has also referred to various reports of the Board analysing the water samples taken from the vicinity of KEIL to state that the parameters regarding Chlorine Sulphide and TDS in summer season are high while the other parameters are within the limit. It is because the State Government has given direction not to permit the transport of Iron Oxide sludge to CTSDF at Kochi, the earlier Consent Variation Order directing to transfer was kept in abeyance. Therefore, according to her, it is the stand of the Board that in so far as it relates to Iron Oxide sludge in the abandoned old ponds as per the recommendations of NEERI, it should be disposed *in-situ* and that will be the only practical solution.

105. Mr.K.Anand, learned Senior Counsel appearing for the first respondent while referring to the historical development of leading to the formation of KMML, would submit that the mining activity of the first respondent is century old and submits that the present applications are filed with malafide intentions and in so far as it relates to Application No.142 of 2013, the intention is to make undue profit to KEIL which according to the learned Senior Counsel is a private company operating CTSDF. This is apart from the fact that a false allegation is made as if there is a pollution caused by the first respondent. According to the learned Senior Counsel, the Iron Oxide sludge generated by KMML is a

reusable byproduct and it is not a hazardous waste either as per HW Rules, 2008 or the present Hazardous Waste (Management, Handling and Transboundary) Rules, 2016. The iron oxide is abundantly available in the nature and the constituents are within the parameters prescribed under the HW Rules.

106. He would also refer to the report of NEERI filed in 2015 wherein it is stated that iron oxide sludge is non hazardous and does not require transfer to CTSDF. He would also refer to the provisions of HW rules to substantiate his contentions. While Titanium is not included in the Schedule II as Hazardous Waste ultimately it is the corrosive character which decides the nature of the wastes. The pH level even if it is below 2, it cannot be conclusive to decide that it is hazardous in nature. The samples taken by CPCB which is homogenous, cannot be termed as a proper sampling method unless it is heterogenous in character and therefore the procedure followed by CPCB in collecting samples is not proper and consequently the finding of CPCB in the report dated 07.07.2015 states that the waste generated by KMML is hazardous, is not as per rules. He would also refer to the sampling manual of the CPCB itself to substantiate his contention as stated above. It is his submission that KMML which is a first fully integrated Titanium Dioxide Plant in the world commissioned in the year 1984 at Sankaramangalam, Chavara, Kollam having the capacity of 40,000 tonnes per annum of Titanium dioxide is having three units namely (1) The Mineral Separation Plant (MS) (2) The Titanium Dioxide Pigment Unit (TDP) and (3) the Titanium Sponge Unit (TSU). The plant manufactures titanium dioxide pigment from Ilmenite ore present in the beach sand near Kollam and the said ore is rich in titanium apart from containing Iron Oxide. While the same samples taken are

distributed to CPCB, PCB and NEERI only CPCB has chosen to state that it is hazardous while NEERI's report has stated otherwise. The NEERI's report finds that the pH value is more than 2 while the CPCB report states it is less than 2 in certain cases and the mistake is due to random sampling.

The sampling method followed by CPCB is not in accordance with its guidelines which contemplate a composite sampling method to ensure that accurate composition of heterogeneous samples of hazardous waste is obtained. He has also referred to the general description of the manufacturing process and according to him the iron oxide is not a waste but it is a by-product and the waste defined under HW Rules excludes by products. The Board has also arrived at a conclusion that it is not hazardous. The iron oxide powder of KMML after treatment with 5% sodium hydroxide followed by water wash, is usable for its utilisation in secondary steel applications at NISST as per R & D investigations. He would also refer to various studies and engagement of various authorities for the same like National Metallurgical Laboratory (NML), Jamshedpur. That apart the KMML has entrusted the work to NEERI to evaluate the possibilities of by product generated by work order on 04.01.2017 and the study by NEERI is in progress.

107. Therefore, according to the Learned Senior Counsel, iron oxide sludge generated by first respondent cannot be classified as waste under HW rules and can be put to constructive use rather than dumping in landfill of CTSDf. He also referred to Schedule I and II of the HW Rules, 2016 that the critical criteria is inclusion of components in Schedule and if the constituents in Schedule II are below 2 pH, the concentration specified, the waste cannot be termed as hazardous. The main tailing and ore tailing

rejected are excluded from the category of hazardous wastes particularly as per Schedule I. That apart, it does not fall within the definition of hazardous waste. The comprehensive study of NEERI is very clear. In so far as it relates to the finding that the level of manganese is higher than the concentration referred to in Schedule II, it is his case that if the proper value is made, it will be apparent that all values are below mg/l stipulated in HW Rules, 2016 and therefore the contention of the learned counsel appearing for KEIL is not correct. The Manganese level in the soil in the area is higher than the concentration within the unit. Even the sludge generated at KMML does not show any characteristics specified in Schedule II and it is not corrosive. Its pH value is consistently above 2. Further, it is his submission that NEERI has found in its report dated 29.04.2015 that transportation of sludge over a distance of 250 km to KEIL is not environmentally safe and the capacity of CTSDF of KEIL to treat it is doubtful. He also has referred to the judgement of the Principal Bench in *Rayons Enlighting Humanity through its Secretary and Latif Beg vs. MoEF* in Application No.86 of 2013, that EC is necessary for all the projects which have not commenced operations before 14.09.2006 and KEIL has no EC and it has collected waste only in December, 2008 and therefore unless there is prior EC, KEIL is not entitled to transportation, handling and treatment of hazardous waste. It is sufficient that KMML has got valid consent under Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 renewed from time to time and in fact consent is valid upto 31.08.2017 and it has valid license to operate under Atomic Energy (Radiation Protection) Rules, 2004. The TP Unit as well as TS Unit of the first respondent has obtained valid EC as it is admitted in the affidavit of MoEF dated 09.05.2014. In so far as it relates

to the MS unit there is no violation of EIA Notification 2006, for the said unit mining lease was granted by the Government of Kerala in 1985 and thereafter EIA Notification came into force on 27.01.1994 which provides for prior EC only in respect of new projects and therefore under 1994 Notification the MS unit which was already in existence, does not require EC. This has been upheld by Hon'ble Supreme Court in (2000) 10 SCC 664 wherein it has been clearly held that EIA Notification is prospective and cannot have a retrospective effect to the projects which are already commenced before the Notification. The lease granted in 1985 was to expire in 2005 and KMML has applied for extension of lease in 2004 and as no orders were passed, as per the Mineral Concession Rules, 1960, the renewal of lease is deemed to have been granted. The amended EIA Notification which has come into existence on 14.09.2016, requires prior EC only for the new projects and expansion and modernisation of existing projects and therefore for MS Unit of the first respondent which is an existing project, EIA Notification, 2006 does not apply. This was also clarified by a Division Bench of the High Court of Kerala in *All Kerala River Protection Council vs. State of Kerala 2015 (2) KLT 78*. The mining lease which was operating under the deemed permit in fact was renewed on 12.08.2010 for a period of 20 years and therefore mining has been uninterruptedly going on from 1985 till date under a valid mining lease. Since it is an on-going process, only at the time of renewal of lease viz., in the year 2035 the requirement of EIA Notification, 2006 will arise. However, according to the learned Senior Counsel as a matter of abundant caution, the KMML has applied for renewal of EC in 2011 and MoEF has issued a TOR and the Board has also advertised on 22.02.2017 to conduct

a public hearing on 25.03.2017 and therefore there is no doubt that units of KMML have been functioning as per the provisions of law.

108. The learned Senior Counsel has also referred to various aspects of NEERI's report which has also taken up a comparative analysis of the methods of disposal of iron oxide sludge and ETP sludge within the campus of the first respondent and therefore it is not mandatory on the part of the first respondent to dispose of iron oxide sludge to CTSDF. All stakeholders have agreed in a meeting conducted as per the directions of this Tribunal to abide by the conditions of the NEERI. The learned Senior Counsel contends that there is no obligation on the part of the first respondent to transport the sludge to CTSDF, not only because of the reason that it is non hazardous but also that the Board in its order dated 17.03.2010 has de-categorised ETP sludge as non-hazardous. The contention of the learned Counsel appearing for the applicant in Application No.142 of 2013 placing reliance on the consent issued by the Board, is of no relevance as the Board itself has decategorised ETP sludge as non hazardous. He also controverted the contention made by the applicant in Application No.142 of 2013 placing reliance on Exhibit P19 which is a show cause notice issued by the Board based on the findings of the CPCB. There is no conclusive finding that even the hazardous wastes are to be transferred to CTSDF and in fact the first respondent has replied in Exhibit P20 stating that the process sludge and ETP sludge are presently discharged into two new ponds with seven liner system and KMML is evolving a scheme for reuse of the process sludge by converting the material to useful products and the statement made in the said letter is not an admission by the first respondent. He would also submit that during the hearing of the case before this Tribunal, the first respondent, the Board

and the applicant in Application No.142 of 2013 have agreed to refer the matter to NEERI on the nature of the iron oxide and the findings of NEERI shall be binding on KMML. That was also agreed in the meeting of all the stakeholders held on 11.07.2014 pursuant to the directions of this Tribunal. When the NEERI found that all the wastes generated including iron oxide are non hazardous, as per the undertaking and direction of this Tribunal, the said report has to be taken as conclusive.

109. A reference made to Exhibit P22 which is the direction issued to all the industrial units in the State generating hazardous waste to transfer the waste to KEIL, has no relevance in the light of NEERI's report. The learned Senior Counsel would also submit that the contention of the learned counsel appearing for the applicant in Application No.142 of 2013 against the order of the Government dated 13.08.2014 is misconceived since according to the learned Senior Counsel under Section 18 (1) (b) of the Water, the State Board is bound by the directions issued by the State Government. However, State Government can also draw powers under Section 5 of the Environment (Protection) Act by virtue of the delegation of powers by the Central Government to the State Government as per the Notification dated 10.02.1988. Therefore, the direction of the State Government dated 13.08.2014 cannot be said to be either illegal or outside the purview of its jurisdiction. The learned Senior Counsel submits that as on date the first respondent is functioning under the consent dated 01.03.2017 and there is no purpose in relying upon the Consent Variation Order dated 08.07.2014. There is no agreement entered by the first respondent to dispose of the iron oxide sludge to TSDF within six months. The Chairman of the Board during the meeting has issued various directions and therefore the allegation that there is no other way for the first

respondent except to transport the sludge to KEIL, has no meaning. It is not as if NEERI has suggested for off site disposal of hazardous waste in its report dated 29.04.2015 but on the other hand it has only suggested for *in-situ* and *ex-situ* treatment inside KMML premises itself since it was found that the iron oxide sludge was not hazardous. He again reiterated the report of NEERI to submit that the contention made on behalf of the applicant in Application No.142 of 2013 is not sustainable. The reliance made on the report of CPCB is also misconceived due to the reason that CPCB report itself cannot be relied since the analysis of samples is against the manual of sampling issued by CPCB itself. While reiterating that KMML is not discharging any effluents underground, it is stated by the learned Senior Counsel that in accordance with the prescription of the Board, the effluents are treated and discharged in the approved outlet to the sea. The KMML has already taken steps as a mitigation measure in meeting the performance of the neutralisation cum sludge dewatering facility suggested by NEERI. The other contentions raised by the learned counsel appearing for the applicant in Application No.142 of 2013 against caustic purging, are all denied by the learned Senior Counsel appearing for the first respondent. The learned Senior Counsel would also reiterate that the contentions raised by the learned counsel appearing in Application No.290 of 2013 are not fully correct. NEERI was appointed as per the directions of the Environment Department, Government of Kerala also for carrying out the assessment and present status of the environment and therefore no fresh report is required. The existing report of the NEERI is sufficient for deciding the issue. Therefore, the applications filed by the learned counsel appearing for the applicant in both the Applications are liable to be dismissed.

110. Mr.V.V.Siddharthan, learned Senior Counsel appearing for KEIL, while stating that KEIL is the only unit established in Kerala to collect, transport, store and for safe disposal of hazardous wastes generated in the entire State, submits that the facility has been established as per the provisions of HW Rules, 1989 and after implementation of HW Rules, 1989, all industries generating hazardous wastes must identify suitable site for proper treatment. Even though the Rule has come into effect in 1989 particularly with effect from 28.07.1989 many of the industries in Kerala have not taken steps to establish any common facilities. The Hon'ble Supreme Court in W.P.No.657 of 1995 in the order dated 14.10.2003 directed to close down the units which fail to establish the scientific system of storage and disposal of hazardous wastes and by that time the HW Rules were amended on 23.05.2003. MoEF has approached SCMC to advise the Ministry in respect of disposal of hazardous wastes and the SCMC itself was constituted by the Hon'ble Supreme Court and filed a report on 14.08.2004 recommending closure of industries operating without requisite facilities. The report also recommended for setting up of common disposal facility in Kerala. In order to avoid the closure of nearly 400 industrial units, the Government of Kerala constituted, in consultation with the Board, to set up a Common TSDF and KSIDC was appointed as a Nodal Agency and ultimately established KEIL as a SPV on 04.03.2005 by registering it as a Company. It is the submission of the learned Senior Counsel that the certificate issued by the Registrar of Companies shows that the commencement of business was on 20.05.2005. The learned counsel would also submit that for establishing KEIL a suitable site was identified based on EIA report prepared by FACT, a Government of India undertaking which submitted its report on 10.06.2005. There was a public

hearing conducted by the District Collector and the Board on 20.04.2005 and the project report along with EIA and details of public hearing was submitted. The Government of Kerala has accorded approval for the site on 08.07.2005 and notified. The Chairman of SCMC visited Ambalamedu, Kochi in May, 2005 and satisfied about the infrastructure. An Expert Committee was constituted by the Government of Kerala which conducted the meetings on 23.01.2006 and 10.05.2006 apart from 23.06.2006 which would show that KEIL commenced its project activities prior to 14.09.2006. The physical progress of works in the establishment of CSTDF, Ernakulam according to the learned Senior Counsel was before 15.03.2005. It was later the Board has granted Consent to Establish on 27.12.2005 and therefore according to the learned Senior Counsel even before the EIA Notification, 2006 came into existence from 14.09.2006, KEIL has been established in compliance with the HW rules.

111. The learned Senior Counsel would also submit that the factum of establishment of KEIL has been informed to Hon'ble Supreme Court by KMML and therefore there is no need for obtaining EC under the EIA Notification, 2006 particularly when under the EIA Notification dated 27.01.1994, the CTSDF was not included in the Schedule. The consent issued by the Board makes it clear that the hazardous wastes generated in the State of Kerala shall be sent to KEIL. In fact, the starting of KEIL as a CSTDF before commencement of EIA Notification, 2006 was as per stringent condition imposed by Hon'ble Supreme Court. He also would submit that no authority either Government of Kerala, MoEF, CPCB or SPCB has issued any directions to KEIL to obtain EC under EIA Notification, 2006 particularly when 193 industries generating hazardous wastes have been sending their hazardous wastes to KEIL. The very fact

that KMML is holding 17.5 lakhs shares in KEIL would show that KEIL is not a Private Limited Company and the Managing Director of KSIDC and representatives of FACT and KMML which are of Government undertakings and the shareholders and therefore according to the learned Senior Counsel, KEIL is a public limited company with participation of governmental agencies and in fact the MoEF has granted Rs.2 crores for establishing KEIL apart from State of Kerala contributing another Rs.2 crores. The learned Senior Counsel would submit that in the Agreement dated 28.10.2010 KMML has agreed to supply its hazardous wastes to the KEIL and therefore it is bound by its terms and the very contents of the agreement would show that what is generated by KMML is admittedly hazardous wastes. The learned Senior Counsel would also submit that the consent issued by the Board in its condition makes it clear that the first respondent generates hazardous wastes. He would also rely upon a Memorandum of Understanding dated 15.02.2007 between MoEF, Board and KEIL. The learned Senior Counsel would also submit that the Board being an independent body created under the Central Act, cannot breach its terms of contract in transporting hazardous wastes based on any order of the State Government which has no jurisdiction.

112. When the Board in its direction dated 25.09.2014 specifically directed KMML to remove the entire sludge in the abandoned storage ponds to CTSDF at Kochi in a time bound manner, it is the responsibility of the first respondent to complete the process and as per orders of the Board dated 25.09.2014 when KMML has not completed its obligation, the consent stands automatically withdrawn. The learned Senior Counsel would also submit that in Kerala for want of space, individual industries generating hazardous wastes could not have their own TSDF and that is

squarely the reason why the CTSDF was constituted by the State Government, particularly this is because the conditions imposed by CPCB for constituting TSDF are very stringent relating to the space to be left out and therefore there is no possibility for individual TSDF for each of the industries. Therefore, it is the obligation and duty on the part of all industries including first respondent to send their hazardous wastes for treatment to KEIL. The learned Senior Counsel would also refer to the report of NEERI which states that all wastes including iron oxide sludge from acid generation plant are mixed together and there is no possibility of settling and the entire hazardous wastes can be mixed with iron oxide and ETP sludge with rain water and it is hazardous in nature. The learned Senior Counsel also refers to the NEERI's estimation of 2.50 lakhs tonnes of iron oxide sludge and 2.50 lakhs tonnes of ETP sludge accumulated in KMML and only solution is to shift the source of pollution from the factory premises of KMML without any further delay. He also refers to the Hazardous and other Wastes (Management and Transboundary) Rules, 2016 which has brought the iron oxide sludge within the category of hazardous materials and in fact the report of CPCB dated 07.07.2015 clearly shows that the contents of manganese is beyond the permissible limit and therefore the first respondent cannot escape saying that still it is not a hazardous waste.

113. The learned Senior Counsel has also referred to the order of consent issued by the Board to KEIL on 27.12.2005 and the commencement of the project by KEIL which began on the said date and therefore there is no necessity on the part of the KEIL to obtain EC under EIA Notification 2006. KEIL has adequate and sufficient capacity for treatment and disposal of the entire hazardous waste generated by KMML and therefore on the issue of

environment also, KMML should be directed to transport its hazardous wastes to KEIL. The learned Senior Counsel also would submit that it can never be said that transportation of hazardous waste to KEIL will be economically not viable while law is well settled that any economic development will be environmental friendly. He would further submit that it is certainly not open to the workers or labourers of KMML to object the transportation on the economic aspect of KMML as under labour laws, their rights are well protected and therefore the labour unions which are only set up by KMML cannot object for sending its hazardous wastes for proper treatment. He would submit that when a Special Purpose Vehicle has been constituted by the Government for the entire Kerala for treatment of hazardous wastes, it is not known as to why KMML as well as some interested persons should oppose. He concluded his contention saying that for the observance of proper environmental atmosphere in the premises of first respondent and in the surrounding area, KMML must be directed to transport its hazardous wastes to KEIL.

114. We have heard the extensive arguments of the learned counsel appearing for all the parties including Mr.K.Anand, learned Senior Counsel for KMML, Mr.V.V.Sidharthan, learned Senior Counsel appearing for KEIL, M/s.Babu Joseph Kuruvathazha, learned counsel appearing for the applicant in Application No.142 of 2013, M/s.K.Shaj, Sajju S., learned counsel appearing for the applicant in Application No.290 & 453 of 2013, Mr.P.Viswanathan, learned counsel appearing for respondent Nos.6 to 9 unions, Mrs.A.S.Suvitha, learned counsel appearing for the State of Kerala, Mr.Syed Nurullah Sheriff, learned counsel appearing for the MoEF apart from Mrs.Rema Smrithi, learned counsel appearing for the SPCB and Mr.D.S.Ekambaram, learned counsel appearing for CPCB and referred to

the pleadings and volumes of documents in all these cases and given our anxious thoughts to the issues involved in this case. On an overall analysis of the entire factual situation, we are of the view that the following points are to be decided in this case.

1. Whether the waste generated by KMML in its unit at Chavara and Panmana are hazardous in nature as per Hazardous Waste Management Rules as amended from time to time?
2. If so, whether its treatment can be made within the premises of the first respondent or should be transported to the Special Purpose Vehicle KEIL at Kochi ?.
3. Whether KEIL at Kochi is competent to dispose hazardous waste in accordance with HWM Rules as amended from time to time and is having all necessary permissions/ authorisations from the Statutory Authorities competent particularly whether KEIL is bound to obtain EC under EIA Notification, 2006.
4. Whether the waste generated by the first respondent and the contents contained therein are radioactive affecting the conditions of life of people living in and around Chavara and Panmana.
5. Whether the quality of water in and around Chavara and Panmana is affected because of the iron oxide sludge and ETP sludge generated by KMML and if so what directions are required for supply of adequate quantity of potable water to the people in the area.
6. Whether people affected in the area are to be compensated by suitable direction to the KMML either under polluter pays principle or under any other category for causing environmental pollution.

Point No.1

Whether the waste generated by KMML in its unit at Chavara and Panmana are hazardous in nature as per Hazardous Waste Management Rules as amended from time to time?

115. The first respondent KMML was originally formed in 1932 as a factory in the name and style of F X Perira and Sons (Travancore) Pvt. Ltd. by a private entrepreneur. It was taken over by the Government of Kerala in 1956 and became a Public Limited Company in 1972 called as Kerala Minerals and Metals Ltd. It is India's first and only Manufacturer of Rutile grade Titanium Dioxide which is an ore harvested from beach sand and the

process for manufacture is by chloride process. It is stated to be situated in an approximate extent of 85 hectares of land. The first respondent is the world's first fully integrated Titanium Dioxide producing plant, the Plant having been commissioned in 1984 at Sankaramangalam in Chavara which is around 20 Km away from the north of Kollam District in Kerala. The plant has 3 units viz.,

1. Mineral Separation Plant (MS)
2. Titanium Dioxide Pigment Unit (TP)
3. Titanium Sponge Unit (TS)

The MS Unit is engaged in separation of Ilmenite, Rutile, Leucosene, Monazite, Sillimanite from beach sand and it employs gravitational magnetic and high tension electrostatic techniques for separation of minerals from sand. The Ilmenite ore is rich in Titanium and also iron oxide as a major gangue materials. The overall process includes sequential removal of iron oxide and other impurities through beneficiation process with hydrochloride, Titanium Dioxide to Titanium Tetrachloride, oxidation of Titanium Tetrachloride again back to Titanium Dioxide and finishing of Titanium Dioxide pigment. The first respondent has various processing units viz., Ilmenite beneficiation plant (IBP), Chlorination plant (CP), oxidation plant (OP), Finished pigment plant (FPP) and Acid regeneration plant (AGP).

116. The effluents generated in all these plants are pumped into common effluent neutralisation plant where the effluent is stated to be treated with lime to neutralise the slurry and after neutralisation the effluent slurry is pumped to storage tank. During the beneficiation process solid waste generated includes iron oxide at 50 tons per day from the acid generation

plant and chemical sludge otherwise called ETP sludge at 50 tons per day, from effluent treatment plant. The iron oxide sludge and ETP sludge as generated waste by the first respondent Company ever since the starting of production in 1984, was stored in open old sludge ponds constructed at 3 meter depth below ground level spread over an area of 15 acres within the industry premises. The said old ponds were constructed as per the advise of NEERI based on the then existing guidelines. The quantum of iron oxide sludge and ETP sludge stored in the old ponds till 2008 is stated to be 2.5 lakh tonnes in respect of each of iron oxide sludge and ETP sludge. The open sludge ponds situated within the premises of the first respondent became vulnerable particularly during heavy rain resulting in uncontrollable overflow and consequent seepage deteriorating the surroundings. There was also an incident of breakage of pipe by which effluents were carried by flood waters to nearby area.

117. The SCMC in its report on hazardous waste after visit to Kerala in its recommendations dated 14.08.2004 has observed in respect of the first respondent KMML as follows:

“The ETP acidic iron sludge of the Public Sector Unit has began to seep through the containment and contaminated the wells of the local residents making them all unpotable. All the respondents have been warned that the water should not be used for drinking, bathing, or even for toilet. Drinking water is now being supplied by the Company but it is hopefully inadequate. The Company is taking safety measures as directed for the other units inspected by SCMC. Containment of the breached sludge pond is an urgent necessity as the entire groundwater may become permanently damaged and unfit for use. As of now, the sludge pond violates the provisions of HW Rules. Authorisation must be withdrawn till the problem is resolved”.

It was thereafter the first respondent has constructed two new ponds to store iron oxide sludge and ETP sludge generated subsequently and the construction was above the ground level with seven liner system as per the guidelines of CPCB.

118. It is relevant to note that the first respondent was given authorisation under the Hazardous Wastes (Management and Handling) Rules, 1989 in respect of hazardous wastes mentioned therein viz. iron oxide – waste category 22.51 BIS of Schedule I. In addition to that ETP sludge which was category 22.2 BIS of Schedule I was also made as hazardous waste and authorisation granted under 1989 Rules. After the advent of Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008, the ETP sludge which is referred in Item No.34.3 of HW Rules, 2008 in its Schedule I, by virtue of the powers in the foot note of Schedule I enabling inclusion of such wastes contained in Schedule I to categories in Schedule II on demonstration that the waste is not hazardous, Kerala State Pollution Control Board after analysing the ETP sludge samples collected on 15.05.2009 which revealed that the TCLP results were below concentration limits in Schedule II of the Rules, in the order dated 17.03.2010 has decategorised ETP sludge of the 1st respondent Company from the group of hazardous wastes declaring that the ETP sludge of the first respondent Company as non hazardous. By virtue of the said order, the iron oxide sludge of the first respondent which was categorised as hazardous in HW Rules, 1989, continued to be hazardous waste under HW Rules, 2008 as evidenced from the order of the Board dated 17.03.2010. Regarding the new ponds it is stated,

“ The area of these new ponds are stated to be 35,000 m² each and constructed above ground (8m for ETP sludge pond and 4 m for iron oxide sludge pond) with a capacity of about 1,00,000 m³ for iron oxide sludge and 2,00,000 m³ for ETP sludge”

Therefore, it is clear that after 2008 when new ponds were created as per guidelines of CPCB, the ETP sludge and Iron Oxide sludge are kept in separate ponds which is not the case in so far as it relates to the old pond before 2008.

119. The ETP sludge is being treated in the campus of the first respondent by chemical treatment followed by sludge de-watering and sludge holding pond. ETP is designed to treat the combined waste water generated from five processing units stated above. In addition, the ETP comprises the unit operations and process viz., mixing tank, neutralisation tank, filter press and sludge holding pond. The process of ETP is by way of effluent received from Ilmenite Beneficiation Plant, Cyclone solid discharge, acid regeneration plant and Titanium Tetrachloride production plant which are pumped from the respective units to mixing tank. The combined effluent is routed to neutralisation tank where lime is dozed as neutralising agent. The slurry from the neutralisation tank is routed to filter press for sludge dewatering and, dewatered sludge is pumped to sludge holding pond for sludge settling and disposal. The neutralised supernatant from the sludge holding pond is pumped to sea for disposal through a pipeline. The chemical sludge settled in sludge ponds is allowed to settle in the pond with no periodical removal. These methods followed in respect of ETP sludge disposal process find place in the report of NEERI dated 29.04.2015. In this regard, NEERI has stated that during the monitoring period, the supernatant sample of ETP sludge pond outlet was found to have more suspended solid concentration than the sample from the inlet to the pond.

While the suspended solid parameter of the slurry pond inlet was 2056-19664 mg/l the parameter of slurry pond in the outlet was found to be 13576-24978 mg/l as against the KSPCB discharge standard of 100 mg/l. Likewise the parameter relating to Iron in the inlet it was 17.1 to 3429 mg/l and in the outlet it was 22.8 to 3307 mg/l as against the discharge standard of 3.0 mg/l. The higher suspended solid was attributed to the non functional leachate collection system provided in the ETP sludge pond and the heavy metal concentration in the supernatant are also found to be high.

120. NEERI has also recommended in this regard certain mitigation measures like;

- *“The neutralisation of combined process effluents in the effluent treatment plant should be optimised with proper dosing of lime considering the variation in the pH value of the combined process effluent. The optimisation of lime dosage and maintaining pH of the neutralised effluent around 7.0 will reduce chemical consumption and subsequent sludge generation after neutralisation.*
- *Proper monitoring and optimisation of lime dosage will enhance the performance of neutralisation system and give consistency in treated effluent quality being pumped to sea for discharge.*
- *Apart from online pH monitoring of inlet neutralisation tank, an additional system must be provided in supernatant collection tank for monitoring and control of pH in the effluent being discharged. It is also recommended to ensure correctness of pH by regular monitoring the parameter in the laboratory as this is the most important parameter on which the neutralisation facility is based.*
- *Routing of the neutralised slurry to filter press must be practiced for effective de-watering of the slurry. Thereafter the neutralised supernatant to be discharged into sea and the concentrated slurry disposed to new ETP sludge pond.*
- *The non functional leachate collection system of the new ETP sludge disposal must be made functional to improve the quality of neutralised effluent being discharged into sea.”*

Therefore, in so far as it relates to ETP sludge which has been decategorised from hazardous waste under HW Rules, 2008 NEERI has given various recommendations for treatment within the premises of the

first respondent. The fact remains that it is possible regarding the treatment of ETP sludge only in respect of new ponds where ETP sludge is separately placed. But it is an admitted position that in so far as it relates to the old ponds which are open, both Iron Oxide sludge and ETP sludge are mixed and the quantity is very huge to the extent of 5,00,000 MT put together. However, NEERI in its report stated supra, whose scope of study in respect of solid and hazardous wastes was related to :

- *Sampling, characterisation, classification of solid waste generated including ETP sludge as per HW Rules, 2008.*
- *Assessment of present status of solid/hazardous waste management systems.*
- *Status of old sludge storage ponds*
- *TCLP and water leachate tests of solid and hazardous waste generated*
- *Soil sampling and analysis from Sites within and outside the industry premises.*
- *Delineation of waste treatment and disposal options for solid waste generated including remediation plant for contaminated areas,*

has stated that from proximate analysis as well as concentration of heavy metals and other inorganic parameters in TCLP leachate that concentration of heavy metals and other inorganic parameters in none of the solid /semi solid wastes sampled and analysed exceeded the regulatory limit as specified in the Schedule II of HW Rules, 2008. Therefore, NEERI has come to a conclusion that solid/semi solid generated at the first respondent KMML is not falling under Hazardous Wastes category. However, since it was found that there was low pH value of many of the wastes and significantly high leachable concentration of inorganic matter like Chloride, Sulphates, Phosphates, Sodium, Potassium, Calcium and Magnesium, they pose significant risk of contamination of soil and water resources and they are to be disposed of in an environmentally sound containment system either onsite or off-site.

121. The NEERI while discussing about the management of old sludge ponds containing Iron Oxide sludge and ETP sludge has chosen to state that they are non hazardous as per HW Rules, 2008 and therefore it does not require disposal through hazardous waste TSDF. In this regard, having found that the old sludge ponds were constructed 30 years back and are in deteriorated condition leading to contamination of soil, surface and groundwater resources, it is recommended that the iron oxide sludge and ETP sludge from the old sludge ponds should be disposed off in a secured containment system giving two options viz.,

- Construction of an *in-situ* secure containment system within the existing old sludge ponds
- Construction of *ex-situ* secure containment system adjacent to the existing old sludge ponds.

Therefore, in effect, NEERI has suggested not only stating that the combined mixture of Iron Oxide sludge and ETP sludge in the old pond is non hazardous but the treatment can be either within the existing old sludge pond or adjacent to it stating as *in-situ* or *ex-situ*. While considering both the recommendations, NEERI opined that the *in-situ* construction is cumbersome, uneconomical from construction point of view, therefore recommended *ex-situ* containment system which is stated to be relatively easier for construction and operation and would provide an opportunity for remediation of contaminated subsurface under old sludge pond, as an immediate priority measure. However, while considering the remediation of contaminated soil and groundwater in and around M/s.KMML, the major concern found to be acidity (low pH) and high concentration of iron in the old sludge pond area and the downstream area which need to be remediated on priority basis. Considering the field condition, it is recommended to adopt *in-situ* site remediation approach

stating that among various available soil remediation technologies, in-situ soil flushing would be the most appropriate and effective technology for soil and surface and ground water remediation of the contaminated sites in and around M/s.KMML.

122. In conclusion NEERI report states as follows:

“The Kerala Minerals & Metals Limited is a fully integrated titanium dioxide plant manufacturing titanium dioxide pigment from ilmenite ore present in sea sand. Present production capacity of titanium dioxide pigment is 40,000 tonnes per annum. The integrated plant has mining, mineral separation, synthetic rutile and pigment production units, and also produces other products namely ilmenite, rutile, zircon, sillimanite, synthetic rutile, etc.

Study area:

Remote sensing satellite data have been used in effective mapping of two km and five km study area around M/s KMML. The study area is defined based on the center point of M/s KMML as traced physically using Global Positioning System (GPS) along the official boundary. The study area lies between 08° 58' 48" N to 09° 01' 09" N latitudes and 76° 30' 43" E and 76° 33' 03" E longitudes in Sankaramangalam, Chavara, District Kollam in Kerala State.

Effluent treatment plant:

M/s KMML has an effluent treatment plant comprising chemical treatment for neutralization of acidic effluents generated from unit processes, and the treated effluent (neutralized) of around 1200 m³/d is finally pumped for discharge into sea through a 1 km pipeline. Major solid wastes generated include iron oxide (50 tones/d) from acid generation plant and chemical sludge (50 tonnes/d) from effluent treatment plant. Presently both iron oxide sludge and ETP sludge are stored in two new ponds constructed above the ground level with seven liner system as per the guidelines of the CPCB.

However, M/s KMML earlier had 6 ponds for management of iron oxide sludge and ETP sludge which are now completely filled with sludge. These old ponds were constructed around 30 years back based on the norms of the statutory board that prevailed when constructed. The ponds were abandoned in 2008, once the storage space in the ponds exhausted. At present about 2.5 lac tones each of iron oxide sludge and ETP sludge are stored in open old sludge ponds of 3m depth constructed below ground level and spread over an area of 15 acres (~6.07 ha) within the industry premises.

Problem:

Acidic iron oxide sludge and ETP sludge disposed in old open sludge ponds within the industry premises of M/s KMML are vulnerable to flooding during heavy rains and overflow from these ponds is uncontrollable. In addition, possible seepage from these ponds cannot be ruled out as these ponds are more than 30 years old and deteriorated with time. This leads to surface overflow and infiltration of seepage from these ponds in to the nearby canals, drains and ponding in low lying areas downstream of the industry location including contamination of ground water.

Proximity of the residential areas (within 500m) to the industry pemises makes the situation worst during heavy rains, since the old sludge storage ponds are open ponds constructed below ground level. Flooding in and around company premises during heavy rains is uncontrollable due to the blocking of the natural rainwater flow gradient for the local development works and constructions in the water path.

Thus the accumulation of sludges in the old sludge ponds, and the seepage/overflow of acidic effluent from the ponds poses major threat to the environment. Therefore, the major problem is the disposal of the iron oxide and ETP sludges stored in old sludge ponds.

In addition, the new ETP sludge pond is unable to settle the neutralized slurry resulting in higher suspended solids concentration in the pond supernatant which is finally discharged into sea. This may be attributed to the non-functional leachate collection system provided in the ETP sludge pond. The heavy metal concentrations in the supernatant are also high.

Quality of treated effluent discharged into sea:

The physicochemical characteristics of the discharged effluent were observed to be highly variable, and did not conform to the stipulated discharged standards of the KSPCB with respect to the major critical parameters (pH, suspended solids, iron).

Sea water quality at point of discharge and locations around (200-400m) the discharge point indicates lower pH and higher iron concentration compared to the locations 1450-1800m away from the discharge point. Therefore, study of the diffusion pattern of sea discharge may be necessary to assess the impact, if any, of M/s KMML discharge in sea water.”

123. In addition to that, the NEERI has enclosed analytical results of four such samples in respect of proximate analysis of solid/semi solid waste, heavy metal concentration, concentration of leachable heavy metal,

Cation/Anion analysis in TCLP and gave its remark that the waste in iron oxide old and new pond do not fall under hazardous waste category. The analytical result submitted by NEERI is as follows:

Analytical results for solid/semi-solid waste samples received from M/s KMML

Sampled by M/s KMML

Date of receipt of samples at NEERI, Nagpur: June 8, 2015

Table 1: Proximate analysis of solid/semi-solid wastes

Sr. No.	Type of waste	Moisture Content (%)	Dry wt. basis			pH
			Volatile Matter (%)	Fixed Carbon (%)	Ash Content (%)	
1.	Iron oxide from old pond L (I)	31.04	1.14	0.66	98.86	2.98
2.	Iron oxide from old pond L (II)	36.64	2.03	1.18	97.97	2.4
3.	Iron oxide from old pond L (III)	35.57	1.32	0.76	98.86	2.77
4.	Iron oxide from new pond L (1)	38.92	0.92	0.54	99.09	2.21
	HWM Schedule II limit	N.S	N.S.	N.S.	N.S.	<2 or >12

N.S. – Not Stipulated; L – Location

Table 2: Heavy metals concentration in solid/semi-solid wastes (mg/kg)

Sr. No.	Type of Wastes	Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Ti	V	Zn
1.	Iron oxide from old pond L (I)	12.7	75	706	38.8	34886	3166	46	54	350	893	214
2.	Iron oxide from old pond L (II)	13.3	112	1130	21.6	34859	4268	65	80	620	1024	791
3.	Iron oxide from old pond L (III)	12.6	86	940	12.7	35567	3416	53	89	457	987	337
4.	Iron oxide from new pond L (1)	12.9	111	988	3.65	35716	4361	66	109	213	911	344

Table 3: Concentration of leachable heavy metal in solid/semi-solid wastes samples as determined by TCLP test (mg/kg)

Sr. No.	Type of Wastes	Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Ti	V	Zn
1.	Iron oxide from old pond L (I)	0.098	0.73	0.91	0.38	1.8	39.8	0.64	0.1	BDL	0.89	3.39
2.	Iron oxide from old pond L (II)	0.004	10.5	2.2	0.86	10.0	453	5.8	0.23	0.57	1.21	39.4
3.	Iron oxide from old pond L (III)	BDL	2.2	0.76	0.47	0.93	112	1.68	0.11	0.13	0.74	10.24
4.	Iron oxide from new pond L (1)	0.03	16.2	2.61	2.12	824	995	8.71	0.67	0.36	0.13	104
	HWM 2008 Rules, Schedule 2 Limites	50	5000	5000 (Cr III)	5000	N.S.	N.S.	5000	5000	N.S.	5000	20000

N.S. – Not Stipulated

Table 4: Cation/Anion analysis in TCLP extract of solid/semisolid wastes (mg/kg)

Sr. No.	Type of Wastes	Chloride	Sulphate	Nitrate	Phosphate	Sodium	Potassium	Calcium	Magnesium
1.	Iron oxide from old pond L (I)	8667	1661	70	2900	15640	70	220	720
2.	Iron oxide from old	14295	1277	77	5800	7500	84	1540	11960

	pond L (II)								
3.	Iron oxide from old pond L (III)	7796	1629	66	3102	12520	70	1220	7480
4.	Iron oxide from new pond L (1)	27991	1089	81	8357	7400	84	7840	7460
	HWM 2008 Rules, Schedule 2 Limits	N.S.	N.S.	20000	20000	N.S.	N.S.	N.S.	N.S.

124. On the other hand, the CPCB has filed a common affidavit through its scientist D in charge of Zonal Office (South) dated 7th July, 2015 which is actually in the form of a report on sampling and analysis of iron oxide sludge generated by M/s.KMML pursuant to a direction issued by this Tribunal. It is stated that the team of CPCB has collected four samples at 4 different locations out of which 3 were taken from old pond and one in new pond. Fresh sludge samples were not collected due to the reason that the plant was not in operation. It is stated that pH of iron oxide sludge samples collected during inspection is as follows:

S.No.	Parameters	Old Pond			New Pond
		Location-1	Location-2	Location-3	Location-4
1.	pH at 25° C	2.2	1.8	2.3	1.5

125. In addition to that the report states about the analysis results of total metals and TCLP in mg/kg which is as follows:

Analysis Results of Total Metals & TCLP in mg/kg

S. N.	Parameters	Old Pond						New Pond		Detect ion Limit (mg/l)
		Location-1		Location-2		Location-3		Location-4		
		Total Metals	TCLP	Total Metals	TCLP	Total Metals	TCL P	Total Metals	TCLP	
1.	Copper	18.5	6.8	20.8	4.00	28.7	0.86	26.5	21.7	0.01
2.	Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.01
3.	Iron	459300	2.31	513280	23	404700	1.4	429400	3241	0.
4.	Manganese	2413	158	3690	171	2952	29	3908	247	0.2
5.	Nickel	22.4	BDL	28.3	1.9	33.7	1.09	37.6	2.57	0.04
6.	Lead	58.5	BDL	53.5	BDL	70.0	BDL	65.0	1.25	0.2
7.	Zinc	245	0.32	275	5.7	304	1.7	333	36.27	0.01
8.	Cobalt	45.1	BDL	90	2.37	63	0.35	71.4	3.46	0.01
9.	Arsenic	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.1
10.	Titanium	507	BDL	781	BDL	635	BDL	188	BDL	0.01
11.	Vanadium	1262	BDL	1688	BDL	1300	BDL	1174	3.96	0.01
12.	Hexavalent Chromium	2.7	BDL	6.4	BDL	BDL	BDL	BDL	BDL	0.01
13.	Trivalent Chromium	42.6	0.54	40.8	1.61	609	BDL	544	7	-
14.	Mercury	0.29	-	BDL	-	0.19	-	1.20	-	20ng/l

15.	Chloride	-	1800	-	5080	-	2040	-	20560	-
16.	T. Phosphate	-	1.00	-	2.76	-	2.86	-	1	-
17.	Nitrate	-	0.90	-	0.85	-	1.2	-	58	-
18.	Sulphate	-	1000	-	1210	-	1500	-	480	-
19.	Sodium	-	1255	-	2078	-	897	-	1477	-
20.	Potassium	-	1.80	-	52	-	15	-	21	-
21.	Calcium	-	136	-	317	-	328	-	1985	-
22.	Magnesium	-	82.5	-	447	-	215	-	283	-

126. The report further enumerates the TCLP report in mg/l as follows:

S.No.	Parameters	Old Pond			New Pond
		Location-1	Location-2	Location-3	Location-4
		mg/l	mg/l	mg/l	mg/l
1.	Copper	0.4	0.2	0.05	1.2
2.	Cadmium	BDL	BDL	BDL	BDL
3.	Iron	0.13	1.34	0.08	186
4.	Manganese	8.8	9.87	1.62	14.2
5.	Nickel	BDL	0.10	0.06	0.15
6.	Lead	BDL	BDL	BDL	0.072
7.	Zinc	0.02	0.33	0.09	2.08
8.	Cobalt	BDL	0.13	0.02	0.19
9.	Arsenic	BDL	BDL	BDL	BDL
10.	Titanium	BDL	BDL	BDL	BDL
11.	Vanadium	BDL	BDL	BDL	0.22
12.	Hexavalent Chromium	BDL	BDL	BDL	BDL
13.	Trivalent Chromium	0.03	0.09	BDL	0.4
14.	Mercury	BDL	BDL	BDL	BDL
15.	Chloride	101	293.56	114	1183
16.	T. Phosphate	0.06	0.16	0.16	0.06
17.	Nitrate	0.05	0.05	0.07	3.32
18.	Sulphate	56.5	70.40	84	28
19.	Sodium	70	120	50	85
20.	Potassium	0.10	3.0	0.8	1.2
21.	Calcium	7.6	18	18	114
22.	Magnesium	4.6	26	12	16

The report further states that as per HW Rules, 2008 while defining the term hazardous waste it includes the waste specified in Column No.3 of Schedule I and waste having the constituents specified in Schedule II and waste specified in Part A or Part B of Schedule III. According to the report to categorise as to whether iron oxide sludge is hazardous, the constituents stipulated in Schedule II are to be compared with limit given in the schedule. The report further refers to the listing of various metals organic,

inorganic etc. under Classes A to D under Schedule II apart from Class E. The report stipulates that the characteristic of corrosivity has been explained under Para 2.3.1 of “Guidelines for Proper Functioning and upkeep of disposal sites” published by CPCB in September, 2005 which is as follows:

2.3.1 Corrosivity

A waste exhibits the characteristics of corrosivity if a representative sample of the waste has either of the following properties:

- a) *Any liquid which has a pH less than or equal to 2 or greater than or equal to 12.5 as determined by the standard test procedure or*
- b) *A waste, which can corrode steel at a rate greater than 6.35 mm per year at a test temperature of 55⁰C as determined by the standard test procedure.*

According to the report of the CPCB as per HW Rules, 2008, the waste should be categorised as hazardous even if it exhibits any of the characteristics listed under Class E of HW Rules which is as follows:

Class E

Regardless of concentration limit, classified as hazardous wastes, if the waste exhibits any of the following characteristics.

E1 Flammable

Flammable wastes with flash point 65.6 c or below

E2 Explosive

Wastes which may explode under the effect of flame, heat or photochemical conditions. Any other waste of explosive materials included in the Indian Explosive Act.

E3 Corrosive

Wastes which may be corrosive, by chemical action, will cause severe damage when in contact with living tissue.

E4 Toxic

Wastes containing or contaminated with established toxic and ecotoxic constituents.

E5 Carcinogenicity, Mutagenicity and Endocrine disruptivity

Wastes contaminated or containing established carcinogens, mutagens and endocrine.

As it is seen out of 4 samples taken in two samples, the pH of iron oxide sludge is found to be less than 2 and therefore it exhibits characteristics of corrosivity and by applying class E of Schedule II, the entire sludge has to be characterised as hazardous under HW Rules irrespective of constituents of metals, organic or inorganic etc. vis-a-vis. their limits prescribed under Class A, B, C & D of Schedule II. The metal concentration analysed in the 4 samples of iron oxide sludge also finds place in the analysis report as extracted above. Therefore, the CPCB concludes that in view of two out of 4 samples collected are showing pH value less than 2.0, by applying the concept of corrosivity in consonance with Class E of Schedule II, the entire sludge both old and new is to be characterised as hazardous waste. A comparative study of the report of NEERI of April, 2015 and that of CPCB of May, 2015 shows that these two organisations are taking different stand about the characteristics of waste in old and new ponds of KMML.

127. The Kerala State Pollution Control Board in its analysis report filed on 18.08.2015 has stated that pursuant to the direction of this Tribunal eight iron oxide sludge samples were collected from old pond adopting core sampling method. It is stated that five core samples from each sampling point at about 3 feet depth were collected and mixed well in a plastic tray and one portion was taken to Central Laboratory for analysis. All the eight samples were collected from different locations at the northern and eastern side of the pond. However, Southern and Western sides of the pond were not accessible. The pH and electrical conductivity of the sample analysis are given in the report which are as follows:

Sample No.	Sampling Location	Location (GPS data)	pH	Electrical Conductivity ($\mu\text{S/cm}$)
KMML-1	North side	9.00.276 N 76.32.078 E	3.18	364.4
KMML-2	North side at 6m towards east from 1 st point	9.00.276 N 76.32.086 E	3.15	406
KMML-3	Eastern side at 80m from 1 st point	9.00.276 N 76.32.122 E	3.05	1567
KMML-4	Eastern side at 88m from 1 st point	9.00.272 N 76.32.124 E	3.79	1392
KMML-5	Eastern side at 90m from 1 st point	9.00.269 N 76.32.125 E	3.52	734.4
KMML-6	Eastern side at 87m from 1 st point	9.00.266 N 76.32.125 E	3.33	586.6
KMML-7	North side at 7m towards west from 1 st point	9.00.275 N 76.32.074 E	3.22	454.4
KMML-8	At 68m towards west from 1 st point	9.00.272 N 76.32.038 E	2.63	1828

Based on the said analysis, the State Pollution Control Board has concluded that pH of all samples is above 2.0 and therefore they are not corrosive in nature and cannot be treated as hazardous. The overall position is that while NEERI and State Pollution Control Board on the basis of their analytical report take a stand that iron oxide sludge of the first respondent KMML is not hazardous, the CPCB which has collected 4 samples out of which 3 are from old pond and one from new pond, has relied upon corrosivity and class E of Schedule II to arrive at a conclusion that it is hazardous since atleast in two of the four samples, the pH is less than 2.0.

128. In the light of the above contradictory stand by three different Authorities, Mr. Anand, learned Senior Counsel appearing for the first respondent KMML would submit that while the samples taken for analysis by the State Pollution Control Board and NEERI are heterogeneous in character by following composite sampling method, the CPCB has collected samples on random basis and cannot be said to be the representative samples considering the heterogeneous nature of the sludge in the vast area. In fact, from the documents filed, according to the

learned Senior Counsel only one of the readings is less than 2.0 and all other are above 2.0 and that itself would demonstrate that the samples collected were not representative in nature. On the other hand, the samples collected by NEERI are on the basis of composite seasonal sampling method and therefore there is a possibility for more representative finding and such reading of characteristics of sludge would be more appropriate. Even the samples collected by CPCB were sent to NEERI and therefore there is a fault on the part of the CPCB in the manner of collecting samples and in as much as such collection is against the Manual of sampling, analysis and characterisation of hazardous waste, the finding of CPCB has to be rejected and ultimately it has to be held that the iron oxide sludge generated by the first respondent KMML cannot be termed as hazardous and consequently there is no necessity for sending the same to CTSDF.

According to the learned Senior Counsel, the sampling done by CPCB is against the procedure laid down by CPCB itself in the “Manual of Sampling, Analysis and Characterisation of Hazardous Wastes”.

129. The CPCB which has framed “Manual of Sampling, Analysis and Characterisation of Hazardous Wastes” while considering in Chapter II about the sampling considerations has stated in paragraph 2.2.4 under the caption “number of samples” which is as follows:

“2.2.4 Number of Samples:

Analysis of a large number of samples may, in general, be required to obtain meaningful compositional data since hazardous samples are typically heterogeneous. The number of individual samples that should be analysed will depend on the kind of information required by the investigation. If an average compositional value is required, a large number of randomly selected samples may be obtained, combined and blended to provide a reasonable homogeneous composite sample from which

a sufficient number of sub-samples are analysed. If composition profiles or the variability of the sample population is of interest, many samples will need to be collected and analysed individually.

In general, the number of samples and the quality of the sampling procedure must be planned to facilitate characterizing the population of interest and enhance reliability in the final results. If the sampling plan is not specified, the investigator will need to decide what error and confidence levels are tolerable. Once these are determined, the minimum number of samples necessary for specific confidence limits that satisfy the requirement of the measurement problem can be estimated. Several approaches for defining the number of such samples may be used.”

The sampling process as stated above itself is based on USEPA which is an acknowledged procedure worldwide for sampling consideration to analyse the quality of hazardous samples. A reference to the said manual in relation to the sampling shows that collection of samples in heterogenous way which is representative in character is most appropriate method for the purpose of identifying the hazardous nature of the waste collected. While this is the procedure as laid down by the CPCB in the Manual, we are unable to accept the stand of the CPCB in respect of the collection of 4 samples, three from old pond and one from new pond. Without any representative character, to collect samples at random cannot be said to be the proper method for identifying the hazardous nature of waste. On the other hand, the collection of sample by NEERI is composite sampling of representative character which is an approved procedure as per the CPCB guidelines. It is appropriate to compare the analysis made by CPCB and NEERI to show that the NEERI analysis is more in accordance with the prescribed sampling procedure.

“Analysis made by CPCB :

Sample date : 02-06-2015 pre monsoon	Sampling collection : Grab sampling
No. of samples : 4 (3- OP & 1-NP) Sample: sludge , leachate	Procedure : USEPA 1311, 3050A,3050B, IS 3025 part 2 Standards : APHA 22 nd edition
Result: Total metal concentration of samples obtained by direct digestion was found to be lower as per toxicity schedule II A, B, C, D HWM Rules (2008). Hence the sludge generated does not fall under hazardous waste category. pH at 25°C is OP(L1: 2.2, L2: 1.8 , L3 2.3) NP 1.5 . Since pH of samples (L2 and NP) is below 2 it is considered as hazardous waste under HWM Rules 2008 schedule (II) CLASS E, E3.	

OP- Old Pond; NP- New Pond;

Analysis made by NEERI:

Sample period : monsoon(AUG 2015) and post monsoon (FEB 2015)	Sample collection: composite sampling
Sample : iron oxide and ETP sludge (OP & NP) Spent pet coke, fluidized bed drain, solid from cyclone separator, spent sand.	Procedure: USEPA SW 846 Analysis : proximate, elemental, TCLP and water leachability test Standard : APHA 21 st edition
	Onsite procedure : DO, temp, pH and TDS Preserved sampling procedure: physiochemical parameters

OP- Old Pond; NP- New Pond

Observation: It is observed from proximate analysis as well as concentration of heavy metals and other inorganic parameters in TCLP leachates, that concentration of these parameters were below the regulatory limit as specified in the schedule II of HWM rules 2008. Hence the solid/semi-solid waste generated at KMML does not fall under hazardous waste category.

Sludge samples	pH	
	Monsoon	Post Monsoon
Fresh ETP sludge (new pond)	8.5	8
ETP sludge (old pond)	7.8	SNC
Fresh iron oxide sludge (new pond)	4.1	2.8
Iron oxide sludge (old pond)	4.7	SNC

SNC: Samples not collected

It also observed that pH of sludge samples are above 2, hence it cannot be considered as hazardous waste under schedule II HWM Rules (2008).”

For all these reasons, we are of the considered view that the report of CPCB in respect of hazardous nature of waste in the first respondent unit is not acceptable. On the other hand, NEERI Report which is appropriate for reasons stated above is more accurate. Accordingly, we conclude that the

iron oxide sludge generated by the first respondent KMML is not hazardous in nature.

130. Even though we have held that the iron oxide sludge generated by the first respondent KMML cannot be considered as hazardous waste, it remains a fact that the acidity in these iron oxide sludge ponds is enormous resulting in corrosivity and leachate contaminating the soil and groundwater in and around the premises of KMML. As it is stated by NEERI, in view of the low pH of many of the wastes and significantly high leachate concentration of inorganic parameters such as Chloride, Sulphate, Phosphate, Sodium, Potassium, Calcium and Manganese, the said waste poses significant risk of contamination of soil and water resources. It is true that a secured hazardous wastes landfill is not required but nevertheless it is incumbent on the part of the first respondent to dispose of the said waste with environmentally sound management system. A reference of the NEERI report shows that the iron oxide and ETP sludge stored in the old pond is found to be a major source of soil and groundwater pollution. The impact of pollution is observed from 2 km to 5 km around the KMML study area. The leachate coming from the pond should be arrested and in this regard the NEERI has suggested a methodology. The details of preliminary design are given by NEERI as follows:

Table 8.1: Estimated Details of the Preliminary Design

Item/Parameter	Quantity/Value	Remark
<i>Quantity of ferric oxide sludge available in abandoned solar ponds</i>	<i>2,50,000 tonnes</i>	-
<i>Quantity of ETP Sludge available in abandoned solar ponds</i>	<i>2,50,000 tonnes</i>	-
<i>Total quantity of sludge available for disposal</i>	<i>5,00,000 tonnes</i>	-

<i>Average density of the mixed sludge</i>	<i>4 tonnes/ cum</i>	<i>Assumed bulk density should be verified at the time of detailed engineering.</i>
<i>Total volume of sludge to be disposed off</i>	<i>1,25,000 cum</i>	<i>-</i>
<i>The proposed height of sludge disposal</i>	<i>5 m (average)</i>	<i>The maximum height should be around 7 meters with 1:3 (V:H) side slopes for better stability. However, dimensional details should be worked at the time of detailed engineering.</i>
<i>Total area required for sludge containment</i>	<i>25000 Sq.m</i>	<i>-</i>
<i>Additional area required for construction of containment bund, drain, road etc.</i>	<i>3750 Sq.m</i>	<i>15% of the total sludge disposal area</i>
<i>Total area required for secured containment system.</i>	<i>28,750 sq.m</i>	<i>-</i>

131. NEERI has given an Environmental Management Plan comprising of the controlling measures viz.,

1. Control of seepage/overflow from sludge ponds
2. Solid Waste Management
3. Remediation of contaminated areas in and around M/s.KMML.

In respect of the control of seepage/overflow from sludge ponds, in order to mitigate the impact on environment, the following plausible remedy has been suggested

- *Effective control of seepage discharges from both old and new ETP and iron oxide sludge ponds is recommended through provision of garland drains along the periphery of the ponds. The seepages are to be collected in seepage collection sumps of adequate capacity.*
- *Management of sludge ponds seepage collected in collection sump through garland drains must be pumped either to the existing ETP for neutralisation or to the site identified for implementation of a new chemical treatment system for neutralisation followed by sludge separation. The neutralised supernatant will be pumped for disposal into sea and dewatered sludge to be transferred to sludge ponds.*
- *In addition, the leachate collection system of the new ETP sludge and iron oxide sludge ponds are non functional resulting in poor sludge dewatering, and therefore these systems need to be made optimally functional for effective collection of seepage and leachate from these ponds.*

In so far as it relates to Environment Management Plan for solid waste, two options have been given by NEERI viz.,

Short Term Measure:

Environmental Sound Management of the old sludge ponds containing iron oxide and ETP sludge.

Long Term Measure:

Process modifications/technological intervention for reducing chloride contents in iron oxide sludge for making it suitable as a resource for Steel Industry.

132. Out of the two options, while dealing with the short term measures, it is recommended that the iron oxide sludge and ETP sludge content in the old ponds are disposed in a secured containment system. For the said disposal which is a major issue, again NEERI has given two options viz.,

- a) *Construction of an in-situ secured containment system within the existing old sludge pond*
- b) *Construction of ex-situ secured containment system adjacent to the existing old sludge pond. Again while carrying the in-situ secured contentment system, it is recommended to divide the disposal area into the number of containment cells with part by part excavation construction and disposal in secured containment cell. After the entire quantity of sludge in the old sludge pond are removed and disposed, the cells are recommended to be capped permanently.*

However, NEERI has stated that *in-situ* secured containment system is cumbersome and uneconomical from construction and operation point of view. It is also cautioned that the contaminated surface benefit the *containment* cells, if remain unattended, will continue to be potential source of contamination.

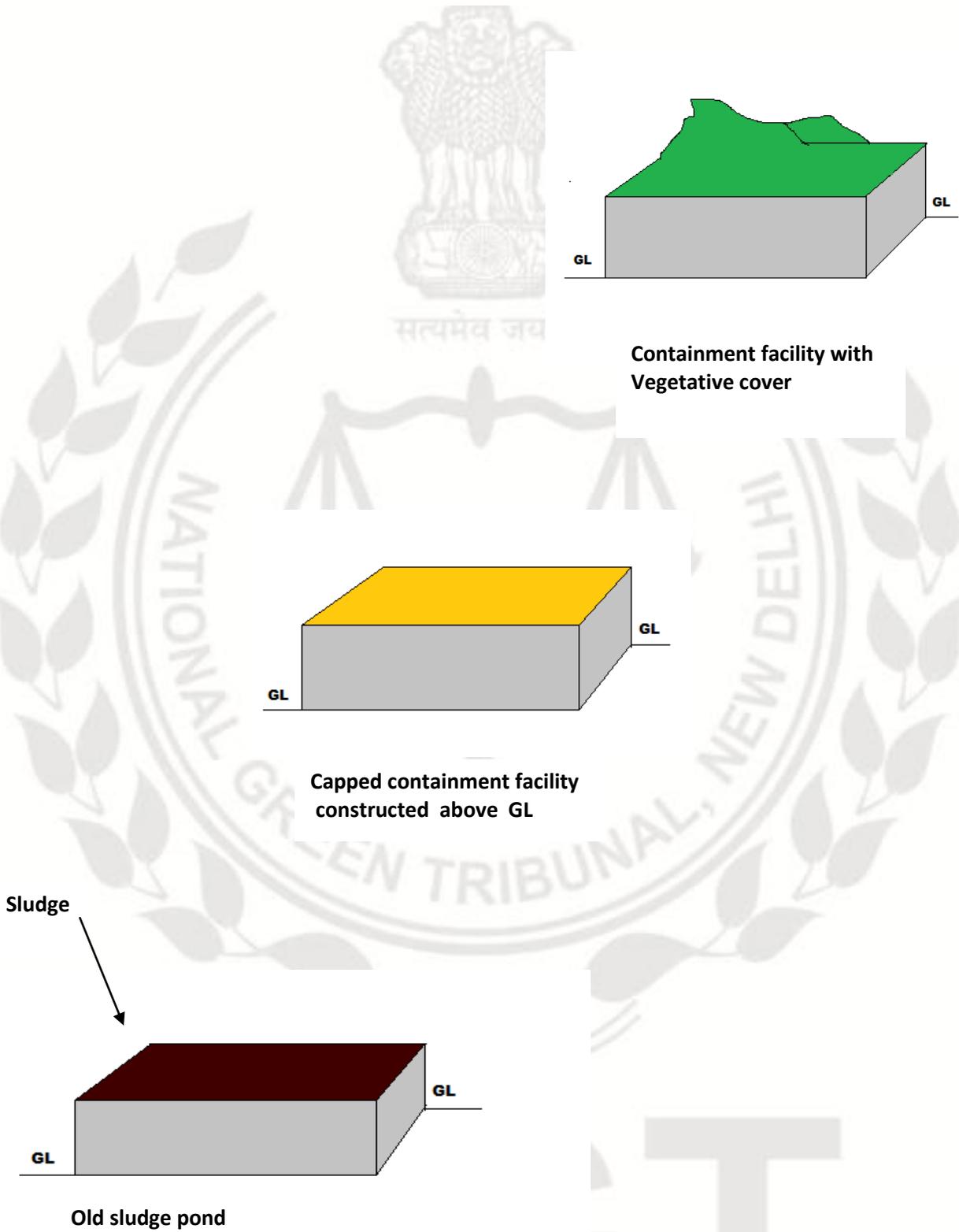
In respect of *ex-situ* containment system according to NEERI, it is relatively economical and easier for construction and operation and would provide for remediation of contaminated sub surface under old sludge pond.

Further, the remediated area under this system can be utilised for development of secured containment system for future generation and ultimately the NEERI has recommended *ex-situ* containment system as an immediate measure of priority basis. The design in respect of the recommended *ex-situ* secure containment system is given in the estimate details as enumerated above and in addition to that the NEERI has stated as follows:

In this particular case, since ground water table is shallow an above ground containment system as per the above mentioned estimated details is suggested. The system will essentially have a single high density polyethylene (HDPE) liner of 1.5 mm thickness at the bottom and sides, the supportive layers of clay/geosynthetic clay liners and suitable concrete bunds for containment and anchoring of HDPE liner. After the disposal of entire quantity of iron oxide and ETP sludges, the containment system should be capped with 1.5 mm thick HDPE liners, supportive layers and a vegetative soil cover.

It is recommended that M/s.KMML should engage a competent contractor for preparation of DPR and construction of secured containment system. As mentioned earlier iron oxide and ETP sludges are non-hazardous in nature and may be considered as "high volume-low effect wastes" as per Schedule 1 of HWM Rules. Since CPCB has not issued any guidelines for disposal of such wastes, the existing guidelines issued by CPCB for construction of hazardous wastes landfills may be followed, if required.

133. The system stated above given by NEERI in the diagram, is reproduced below :



***Ex-situ* secure containment system**

134. In addition to the above recommendation of NEERI regarding ex-situ secure containment system, in our view the KMML should also take steps to dewater the sludge while preparing to dispose of the same. In so far as it relates to long term measure, regarding Environmental Management Plan for solid wastes, the NEERI has suggested process modifications/technologically intervention for reducing the chlorine contents in iron oxide sludge for making it suitable as a resource for Steel Industry. It was found that during the inspection and field visit that the iron oxide sludge generated by KMML even though rich in iron content cannot be used as a resource for steel making or similar industry due to excessive concentration of chloride content in the waste sludge. The possible solution recommended in long term measure is:

- i) *Proper design of spray roasting system*
- ii) *Increasing the operating temperature to 700^o C*
- iii) *Efficient separation of roaster gases (HCl and water vapour)*

Since the recovery plant is quite old, it is suggested that KMML should consult the technology providers for modernisation of existing HCl recovery plant and that will minimise the iron oxide sludge and promote utilisation as a source for other industries.

In view of the above said circumstances and suggestion made by NEERI on short term and long term measures, we direct the KMML to prepare design both on short term and long term measures through competent and expert developers/ contractors and such process shall be completed within 3 months from the date of this judgement. After preparing such plan on both short term and long term measures for Environmental Management Plan regarding solid waste developed by KMML, the same shall be presented to Kerala State Pollution Control Board for its approval

and further direction etc. We make it clear that both short term measures as well as long term measures shall contain time frame for completing the entire process. The Pollution Control Board, on being satisfied about the technology suggested and in the event of the Board making some more recommendations, the same shall also be incorporated in appropriate order and such order shall be passed in respect of both measures by the State Pollution Control Board expeditiously in any event within 4 weeks from the date of submission of the said design by KMML. We also make it clear that in the event of KMML not implementing both the measures particularly short term measure within the time frame as approved by the Board, the Board shall take all necessary steps by passing appropriate orders against KMML which may even include closure of the unit. We are obliged to make such observation since after referring to various materials, photographs, and google maps, we are satisfied that the pollution caused by improper maintenance of the old sludge ponds by KMML is posing imminent threat to environment in and around the area which in normal course would result in order of closing the unit. We refrain from doing so due to the reason that it involves the national interest apart from the interest of large number of employees and also with a desire that KMML should be given one more opportunity to rectify and restore ecology to its original position.

Point No.1 is answered accordingly.

135. Point No.2 & 3:

If so, whether its treatment can be made within the premises of the first respondent or should be transported to the Special Purpose Vehicle KEIL at Kochi ?.

Whether KEIL at Kochi is competent to dispose hazardous waste in accordance with HWM Rules as amended from time to time

and is having all necessary permissions/ authorisations from the Statutory Authorities competent particularly whether KEIL is bound to obtain EC under EIA Notification, 2006.

We have arrived at a conclusion that waste generated by the first respondent KMML is not hazardous in nature and therefore there is no necessity for transporting the said waste to the Special Purpose Vehicle KEIL at Kochi. In view of the same, it is not necessary for this Tribunal at this point of time to decide as to whether KEIL at Kochi is competent to dispose hazardous wastes in accordance with HWM Rules and as to whether it is bound to obtain EC under the EIA Notification, 2006. The said issue is left open to be decided in future. Point Nos.2 & 3 are answered accordingly.

136. Point No.4

Whether the waste generated by the first respondent and the contents contained therein are radioactive affecting the conditions of life of people living in and around Chavara and Panmana.

While it is the case of the applicants that the waste generated by the first respondent contains radioactive material which in fact would affect the living condition of the people living in the surrounding areas, the 4th respondent viz., Atomic Energy Regulatory Board which is an authority constituted under Atomic Energy Act, 1962 and competent to decide about the effect of nuclear and radiation effects has stated that AERB has issued license to the first respondent KMML to carry out mineral separation based on a review made by the Expert, Beach Sand Minerals and Non Safety Committee. Since it was found that the percentage in the tailings is around 25-35%, the 4th respondent AERB has recommended for storage in trenches and topping with silica rich sand to avoid enhancement in the natural radiation pigment of the tailings disposal area. In the reply filed by AERB, it is clearly stated that the first respondent has been submitting

periodical reports in the years 2009, 2010, 2011 and 2012 about the quantity of monazite tailings stored in trenches and monazite contents in the tailings. It is also stated that AERB conducts inspection once in a year and it was found that there was no enhancement in background level noted due to shortage of monazite enriched tails. Since the applicants have chosen to state that there has been enhanced level of radiation the AERB has conducted a surprise inspection of the first respondent on 6th and 7th February, 2014 and found that there was no enhancement level. The inspection report of KMML, Chavara of the Industrial Plants Safety Division, Atomic Energy Regulatory Board dated 6th and 7th February, 2014 filed along with the reply of the 4th respondent shows that the team has visited the mining sites, back field areas, pre-concentration plant, wet mill, mineral separation plant, Titanium Dioxide Pigment Plant and carried out radiation survey collecting samples from various locations for analysis of monazite contents. The report of surprise inspection has made the following observations and recommendations:

“1.0 Backfilled Areas:

It was noted that only silica rich tailings generated from the pre concentration plant and wet mill are used for backfilling the mined out sites. The radiation level observed in the backfilled areas of Ponmana was found to be 0.2 to 0.4 micro Gray/hour and that of Kovilthottam was 0.3 to 0.5 micro Gray/hour which is lower than the natural background radiation level of the corresponding mining sites where radiation level is around 1.0 to 2.0 micro Gray /hour.

Sample collected from the mining and backfilled sites were analysed for monazite content and it was observed that monazite content in the mined out sand is around 0.03% - 0.21% whereas that in the silica rich tailings used for backfilling is below detectable level.

2.0 Storage of monazite enriched tailings:

AERB has stipulated that monazite enriched tailings generated from mineral separation plant shall be stored in trenches within the plant premises under institutional control and topped with silica

rich tailings so that there is no enhancement in the background radiation level. It was observed that the five trenches have already been filled up and sixth trench is being filled up. The seventh trench is under construction. Radiation level observed on the top of the filled up trenches topped with silica sand is 1.0 – 2.0 micro Gray /hour which is comparable to the natural background of the area.

It was noted that though the monazite dump pits were grossly marked with display boards, the boundaries were not clearly delineated. It is therefore recommended to clearly delineate the boundaries of all the monazite trenches (operating as well as closed). Further, access control to the operating dump pit shall be ensured with proper fencing.

3.0 Iron Oxide Sludge from Titanium Pigment Plant

Analysis report of iron oxide sludge sample collected from the landfill was checked during the inspection. It was noted that uranium and thorium levels were 185 – 237 Bq/kg and 713- 675 Bq/kg which is within the limit of 1000 Bq/kg specified by AERB for exemption.

4.0 Wet Mill and Mineral Separation Plant

Spillages of sand were noted a few locations within wet mill no.2 and mineral separation plant i.e. Fluidised Bed Dryer area, zircon drier area, below bucket elevator Nos. 1 and 7 and below conveyor carrying sand from Induced Roll Magnetic Separator of Zircon section. These spillages should be cleared immediately to avoid accumulation and measures to arrest spillages should be provided at the conveying equipments.

The results of radiation survey made during the inspection are annexed to this report.”

137. The annexure also contains the result of radiation survey conducted during inspection which is as follows:

Radiation Level Survey carried out during Inspection

<i>Location</i>	<i>Radiation Level (uGy/hr)</i>
<i>Back fill area at Ponmana mining site</i>	<i>0.2 – 0.4</i>
<i>Dredged out sand at Ponmana mining site</i>	<i>1.0 – 2.0</i>
<i>Kovilhottam Mining area</i>	<i>1.0 – 2.0</i>
<i>Back fill area at Kovilhottam mining site</i>	<i>0.3 - 0.5</i>
<i>Pre-Concentration Plant -2 (PCP-2) feed material</i>	<i>1.0 – 2.0</i>
<i>PCP-2 output (concentrate)</i>	<i>2.0 – 3.0</i>
<i>PCP-2 tailings for backfilling</i>	<i>0.2 - 0.4</i>
<i>Wet Mill -2 feed material</i>	<i>2.0 - 3.0</i>

<i>Wet Mill -2 output (concentrate)</i>	<i>6.0 – 7.0</i>
<i>Wet Mill – 2 tailings for backfilling</i>	<i>0.3 – 0.5</i>
<i>Magnetic fraction from zircon IRMS</i>	<i>20.0 - 30.0</i>
<i>On contact of Gunny bags with crude monazite concentrate</i>	<i>30.0 – 40.0</i>
<i>Product bagging area</i>	<i>0.5 – 1.0</i>
<i>On top of closed monazite dump pits</i>	<i>1.0 – 2.0</i>
<i>Outside the operating dump – 6 boundary wall</i>	<i>0.5 – 1.0</i>

Therefore, it is clear that the 4th respondent being the highly competent authority to decide about the radiation level, has concluded that the radiation level in the waste generated by the first respondent and in various places including back filled areas, storage areas, Titanium Dioxide Pigment Plant are all within the limits prescribed by the Authority and in fact it is found that when compared to the natural background area of Chavara, the radiation level observed on the top soil was comparatively less. In such view of the matter, it has to be necessarily held that the sludge generated by the first respondent KMML does not contain any radioactive material and there is no substance in the point raised on behalf of the applicants that the people in the area are likely to be affected. Further, there are absolutely no materials produced before this Tribunal to show that any persons living in and around the area of the first respondent have been affected by the radioactive or any other substance having the effect of radioactivity.

138. In view of the same, point no.4 is answered to the effect that the substance produced by the first respondent is not radioactive in nature. However, we make it very clear that as per the Report of the Atomic Energy Regulatory Board dated 18.04.2014 it shall be incumbent on the part of the first respondent to scrupulously implement those recommendations. We also further direct the 4th respondent to have not only the periodical report received from the first respondent KMML regarding monazite but also make

surprise visit to find out as to whether there is any radioactive emission and in the event of such findings, the 4th respondent shall pass appropriate orders so as to enable the Authorities Competent to take action against the first respondent.

139. Point No.5

Whether the quality of water in and around Chavara and Panmana is affected because of the iron oxide sludge and ETP sludge generated by KMML and if so what directions are required for supply of adequate quantity of potable water to the people in the area.

Our detailed discussion relating to the iron oxide sludge in Point No.1 is to be followed by this point which relates to the quality of water in and around Chavara and Panmana and remediation to be effected apart from interim measures to be continued for supply of adequate quantity of potable water for people living in and around the area of KMML. In respect of surface water analysis, NEERI has taken five samples in five places within 2 km from campus of KMML viz., Storm Water Drain (SWD), Old Irrigation Canal (OC), Temple Ponds, Accumulated Water Ponds (AW), Vatakayal lake (VK), Trivandrum Shoranur Canal (TS) and given in detail the analysis report. The said analysis and observation are tabulated for easy understanding as follows:

Statement I

Surface and Groundwater analysis by NEERI

Surface water sample (within 2km from KMML)	Observation
Storm water drain (SWD)	<p>The samples collected from various location in storm water canal are observed to have high concentration of iron and random low pH value (4.1-6.7)</p> <p>During the post winter season some lime bags were dumped in the drain as observed leading to alkaline pH of 10.4 and 9.3</p>
Old irrigation canal (OC)	<p>The samples appeared yellowish red in color at various locations due to concentration of iron (25.12-485 mg/L).</p> <p>The entire canal as sampled at various locations had low pH varying from 2.2 to 4.3.</p>

	<p>TDS conc. was also observed to be high (898-18616 mg/l).</p> <p>The magnitude of critical parameters in the old irrigation canal as sampled indicates possible intrusion/overflow of seepage water from the ponds into the canal as it flows through within the industry premises.</p>
Temple ponds	<p>The pond located to Panmana temple adjacent to AW-I as observed to be acidic in nature (pH 3.3-3.6) with iron conc. of 3.609-7.80 mg/l.</p> <p>The pond at Minnamthottil is a lotus pond used for washing temple utensils. The sample of pond was observed to have pH in the range 6.7-8.1 with iron conc. of 0.880-1.250 mg/l.</p> <p>The pond at Sreebhagwati temple located within 2km radius and east of KMML had pH 6.8-7.2 with iron conc. 1.038-1.24mg/l.</p> <p>Thus pond 1 located north of KMML and downstream of the old sludge ponds has low pH with high concentration of iron indicating possible seepage/overflow from the old sludge pond.</p>
Accumulated water ponds (AW)	<p>Representative samples from three such locations of AW were observed to be highly acidic (pH 2.0-2.4) having high concentration of TDS (4076-11972 mg/l) and heavy metals-iron (216-1650 mg/l) and manganese (7.175-54.7 mg/l).</p> <p>This indicates that water accumulated in low lying areas downstream (as per drainage pattern) of the KMML is either due to possible seepage from the sludge ponds/overflow of flood water during rains or during the instance of effluent pipe breakage which occurred in 2008.</p>
Vatakayal lake (VK)	<p>The water sample of lake was observed to have pH in the range 5.7-6.4 at location VL-4(OC discharge into surface water body) with iron concentration (3.328-4.200 mg/l).</p> <p>The OC discharge in Vattakayal lake is observed to influence the water quality lake at point of confluence.</p>
Trivandrum Shoranur canal (TS)	<p>TS canal water quality at point of discharge of storm water canal and upstream of point showed some minor impact of the discharge from storm water canal (M&PM pH 6.6 & 6.4 with iron conc. 0.582 and 1.539 mg/l respectively and PW pH 8.6)</p> <p>The water quality of the TS canal water in terms of pH 6.4-8.5 and iron conc. 0.270-1.670 mg/l in location other than storm water discharge.</p>

M- Monsoon; PM-Post Monsoon; PW- Post Winter

140. Therefore, from the said analysis it is clear that there is high concentration of acidic iron oxide in the surface water and the domestic discharge and seepage from KMML has affected the quality of water in old irrigation canal as it flows from KMML through old and new ETP sludge

ponds. Likewise, in respect of groundwater quality, monitoring of 13 Piezometric wells located around old and new sludge ponds was done by NEERI and the entire statement given is again tabulated for better understanding which is as follows:

Statement II

Ground water sample	Observation
Piezometric wells	<p>13 piezometric wells located around the old and new sludge ponds were monitored.</p> <p>OLD SLUDGE POND It was observed that both the wells located north of old ETP ponds had acidic pH (3.0-4.6) and high iron concentration (3.502-118.60 mg/l) indicating contamination due to seepage of pond leachate. TDS conc. was high in OPEW 2. The TDS was recorded 2151 mg/l (PM) and 7492 mg/l (PW)</p> <p>The characteristics of well water from OEPW-1 indicate better water quality than OEPW-2 and OEPW-3</p> <p>New ETP sludge pond</p> <p>Samples from all the wells around new ETP sludge pond have low pH(1.6-3.6) except in well NEPW-5. The iron concentration was also high (3.518-834.0 mg/l). NEPW -2, 3, 4 and 6 have high TDS conc. (2033-19524mg/l).</p> <p>IOWP-2 west of new iron oxide sludge pond were found to have high conc. of iron (349-1050 mg/l) TDS (14071-15900 mg/l) and manganese (15.97-36.50 mg/l) chlorides (7492-7948 mg/l) as compared to samples from well IOWP-1.</p> <p>The pH of water samples indicate acidic pH (IOWP-2: 1.9-2.0 and IOWP-1: 2.4-4.0)</p> <p>The sample analysis clearly depicts that low pH value and high iron, TDS, and chloride conc. in majority of the piezometric well water samples indicating the possible impact of seepage from the respective ponds on the water quality of piezometric located adjacent to the pond.</p>

OEPW- Old ETP Pond Piezometric well; PM- Post Monsoon; PW- Post Winter
NEPW- New ETP Pond Piezometric Well; IOPW- Iron Oxide Pond Well

Open dug well	Observation		
Parameters	Zone II	ZONE III	ZONE IV
pH	6.0-8.4	3.0-7.9	5.8-6.9
Iron, mg/l	0.088-1.972	0.003-74	0.21-11.99
TDS mg/l	104-5130	100-1910	144-723
Chloride mg/l	15-2450	10-850	24-177

(4 Zones each of 500 m width from east to west of KMML)

141. A study as stated above in a tabulation form would make it very clear that the water in open dug wells towards north and north west of canal contain low pH with iron concentration above the drinking water standard (ISDW 10500-2012). Further, the manganese concentration was found to be higher than the drinking water standard. The water samples from tube wells were observed to have pH in the range 5.9-7.6, the concentration of iron was in the range of BDL – 2.300 mg/l, except in (Tubewell) TW-16. The samples from the TW-10 and TW-12 showed high concentration of total hardness, chlorides and total dissolved solids. Except in one place, the water quality data shows that there is no major impact on water quality of ground water due to the industrial activity in so far as it relates to tubewells. As the water level of Piezometric wells, open dug wells and tube wells at the depth of 1.5 – 2.8 m, 1.5-2.0 and above 28.5 meter, it can be said that the groundwater is contaminated only to a shallow depth. Therefore, it can be deduced that areas towards north, north east, north west and west of industrial location are affected due to seepage/ overflow from the sludge pond and there is also a chance for percolation of contamination even below this water level as found out by the NEERI as follows since the water sources are shallow.

“Impact of Contaminants on Environment:

- In the presence of such contamination particularly presence of Fe (II) can cause gut corrosion which may pass through lungs and liver damaging mitochondria. Fe (II) oxide when binds with hemoglobin reduces the affinity for unbound oxygen in blood resulting in breathing difficulty and that is called methemoglobinemia.
- The essential micronutrients like sodium and magnesium which are necessary for plant growth make it deficit due to high acidity. Further the soil acidity can lead to elemental toxicity for plants by metal aluminium, iron and zinc which are soluble in acidic medium.
- Soil acidity can prevent the availability of micronutrients such as phosphorus.”

The contamination of old irrigation canal may affect the vegetation in Chavava apart from the high TDS in water affecting stability and growth of plants. Further excess quantity of manganese in the human body may turn into toxic by affecting the respiratory tract and brain of human beings. Many research studies on Impact of earth mining particularly in respect of soil and water in Chavara also support the above view.

142. In this regard, NEERI has given methodology for remediation of contaminated soil and groundwater which is as follows:

“Methodology for remediation of contaminated soil and Groundwater

Methodology for remediation of contaminated soil and groundwater:

- *As delineated in previous sections the major concern of contamination in and around M/s KMML is acidity (low pH). It would therefore be appropriate to use a mixture of water and base as a flushing solution. In order to neutralize the acidity it is recommended to use a mixture of water and lime or water and sodium hydroxide (NaOH).*
- *The process begins with drilling of injection wells and extraction wells in the contaminated area. Alternatively, instead of using injection wells the flushing solution may be introduced by spraying/flooding the entire contaminated area.*
- *The number, location, spacing, diameter and depth of the injection and extraction wells depend on extent of contaminated area. It is therefore recommended that the industry management should first install few samples extraction wells and monitor their performance.*
- *To begin with, M/s KMML may install 6 extraction wells (2 to 3 m dia and 5 m depth), 3 in each row as shown in Figure 9.1. The wells in two rows may be spaced about 50 meters apart whereas the wells in a single row may be spaced about 25 meters apart. Figure 9.2 presents the cross-section of the soil flushing system that may be adopted by M/s KMML.*
- *After the installation of extraction wells, the flushing solution may be prepared using a mixture of water and lime or water and NaOH. The flushing solution must then be pumped and spread on the contaminated land. The solution passes through the soil, reacting with the contaminants (pH and metals) along its way as it moves toward the extraction wells. The elutriate (the flushing solution mixed with the contaminants) shall be collected in the extraction wells.*
- *The elutriate is pumped out of the ground through the extraction wells. The elutriate may be treated and reused for preparing the flushing solution. The circular process of passing the flushing solution through the contaminated strata and its extraction through extraction well may be repeated till the desired results are obtained. The number of wells may be increased to cover the entire contaminated areas.”*

143. In view of the above discussion particularly the finding of NEERI which we are unable to ignore due to the reason that it contains the

technical as well as scientific inputs, we direct the KMML to prepare an appropriate scientific scheme through Expert/ Contractor with specific time frame and submit the same to the Kerala State Pollution Control Board for approval and such preparation process shall be completed within 3 months from the date of the judgement. On receipt of such scheme, the Board shall study the same and make necessary approval with further suggestions, if any, directing the KMML to initiate and complete the remediation process as per time schedule given in the scheme. We reiterate that in the event of failure of KMML in adhering to such direction, the Board shall pass appropriate orders in the manner known to law which it may even include closing of the unit itself. We also make it clear that until such scheme for soil remediation and ground water remediation is completed fully, it shall be the bounden duty of KMML to continue to supply adequate potable water to the people residing in and around its industrial premises which they are doing as on date as per the direction of this Tribunal. It is only after completion of the entire process to the satisfaction of the Board and on the direction of the Board which should be completely satisfied that the ground water has fully restored its original position, the present obligation of KMML in supplying potable water to the people living in the area shall come to an end. Point No.5 is ordered accordingly.

144. Point No.6

Whether people affected in the area are to be compensated by suitable direction to the KMML either under polluter pays principle or under any other category for causing environmental pollution.

The said claim of compensation cannot be decided in this case particularly when the applicants have not chosen to indicate any individual cases of suffering because of discharge of effluents by KMML. In the absence of any such material, it is certainly not possible for this Tribunal to come to a

conclusion regarding payment of compensation to individual persons affected. Moreover, if such persons affected are continue to suffer even as on date, they are certainly entitled to claim compensation in accordance with the provisions of the NGT Act subject to fulfilment of conditions laid down therein. The learned counsel appearing for the applicants are also unable to produce any acceptable material before this Tribunal to arrive at a conclusion regarding compensation to individuals or crop loss. Therefore, we leave it to any of the individuals who are affected by the effluents discharged by the first respondent and due to the environmental damage, to work out their remedy in the manner known to law. This is particularly also due to the reason that any one of the employees who are working in the first respondent Company and residing in and around KMML have not chosen to complain about their ill-health. However, taking note of the extraordinary situation of water leachate and acidity, presence of various contaminants in water as well as soil, this Tribunal exercising environmental jurisdiction cannot simply brush aside stating that the claim is unsustainable.

145. Large number of people who are silently undergoing the pain of such environmental damage, certainly may not be in a position to individually approach the Tribunal substantiating their claim. Therefore, in our considered view it is necessary that the Government of Kerala, Department of Health and Social Welfare, 7th respondent in Application No.290 of 2013 must be directed to conduct an elaborate health survey in and around the area of Chavara wherein KMML is situated and prepare a report to find out the health condition of people living in the area and also the cause of such deterioration of health condition, if any. Such finding shall be after conducting proper enquiry through appropriate Experts in medical and

other fields and such findings shall be put in public domain so as to enable the affected persons to work out their remedy in the manner known to law while claiming compensation. It may be true that first respondent is discharging its statutory obligation of Corporate Social Responsibility (CSR) by contributing amounts for social welfare of the people living in the area. But that does not mean that the first respondent should be exonerated from being made liable for the pollution already caused in this area.

The facts and circumstances in this case elaborated above including pleadings and our findings, irresistibly show the callousness on the part of the first respondent in not maintaining proper environment and ecology in the area and that in our view is sufficient to invoke the principle of “polluter pays”. The invocation of this principle on the factual matrix of this case is not only punitive in nature against KMML to realise the mistake of a corporate entity in ignoring environmental concern but also for creating a corpus to enable people in the area who are affected by such pollution to be compensated apart from other remediation processes other than what we have stated in the body of the judgement making it very clear that remediation process we have stated shall be the independent responsibility of KMML. Accordingly, we direct the first respondent KMML to deposit a sum of Rs.1,00,00,000/- (Rupees One Crore only) under “polluter pays” principle in favour of “Chairman, Kerala State Pollution Control Board” who shall keep the said amount in a separate account named as “Environment relief fund for remediation of Chavara Region due to pollution caused by KMML”. The said amount which shall be managed by the Chief Secretary, Government of Kerala and Chairman, Kerala State Pollution Control Board jointly, shall be utilised for remediation and /or for distribution to affected

persons either as per the direction of this Tribunal or as per the decision of the State Government.

The KMML and the State Pollution Control Board shall file their periodical compliance report to the Registry of National Green Tribunal, Southern Zone once in three months beginning with quarter ending on 30.11.2017 followed by quarter ending with 28.02.2018, 31.05.2018 and 31.08.2018 by the 10th of every succeeding month which shall be placed before the Bench for further directions. The KMML and the Kerala Pollution Control Board shall also display the quarterly compliance reports on their website. The point No.6 is ordered in the above terms.

With the above said directions, all applications stand disposed. There shall be no order as to cost.

.....,JM
(Justice Dr. P. Jyothimani)

.....,EM
(Shri P.S. Rao)

NGT