BEFORE THE NATIONAL GREEN TRIBUNAL,
PRINCIPAL BENCH, NEW DELHI
ORIGINAL APPLICATION NO. 35/2013 (THC)

In the matter of:

1. Parminder Singh, s/o Pritam Singh
   Balad Kalan Village, Bhawanigarh Tehsil,
   Sangrur District.

2. Hoshiar Singh, s/o Harbhajan Singh
   Toori Village, Bhawanigarh Tehsil,
   Sangrur District.

3. Narindre Singh, s/o Inder Singh
   Balad Kalan Village, Bhavanigarh Village,
   Sangrur District.

4. Surjit Singh, s/o Harnek Singh
   Bhavangarh, Sangur District.

5. Ranjit Singh, s/o Satpal Singh
   Balad Kooti Village, Bhavangarh Tehsil,
   Sangur District.

6. Angrej Singh, s/o Surjir Singh
   Toori Village, Bhavanigarh Tehsil,
   Sangrur District.

7. Harnek Singh, s/oGujjar Singh
   Sarpanch, Gram Panchayat Toori,
   Toori Village, Bhavanigarh Tehsil,
   Sangrur District.

8. Jagnahar Singh, s/o Nikka Singh
   Toori Village, Bhavanigarh Tehsil,
   Singrur District.

9. Paramjit Singh, s/oSharan Singh
   Toori Village, Bhavanigarh Tehsil,
   Singrur District.

10. Sukhwinder Singh, s/oMohinder Singh
    Toori Village, Bhavangarh Tehsil,
    Singrur District.

---- Applicants

Versus

1. Punjab Pollution Control Board through its
   Chairman, Vatavaran Bhawan,Nabha Road, Patila.

2. Environmental Engineer, Punjab Pollution Control Board,
Thruogh its Regional Office, Sanrur District, Sangrur.

3. Assistant Environmental Engineer,
Punjab Pollution Control Board, through its Regional Office,
Sangrur District, Sangrur.

4. M/S Matharu Steel Pvt. Limited having its Registered Office at
Plot No. 4, Near Airport, Jhalanpur Road, Kota Rajasthan
thru. Its Director Shri. Chander Shekhar Dhawan.

5. M/S Mahalaxmi Orgochem Industries, c/o Matharu Steels
Pvt. Limited, Nabha Road, Tehsil Bhavanigarh,Distict Sangrur,
Through Shri. Chander Shekhar Dhawan.

6. Chander Shekhar Dhawan, Director, M/S Matharu Steels
Pvt. Limited, resident of 110-A, Sarabha Nagar, Ludhiana.

7. Sunil Ahuja, Director of M/S Matharu Steels Pvt. Limited,
Resident of E-14, Sector-14, Noida, U.P.

8. Tara Singh, S/o Swaran Singh.
Village Nauhra, Nabha, Patiala Distict.

9. Gurcharan Singh Matharu
s/o Surjit Singh Matharu
Director, Matharu Chemicals Industries
Nabha Road, Bhawangarh Tehsil
Sangrur District.

10. Central Pollution Control Board represented by
The Member- Secretary, New Delhi.

--- Respondents

<u>Counsel for Applicants:</u>

Mr. Ritwick Dutta, Amicus Curie

<u>Counsel for the Respondents:</u>

Counsel for Respondent 1, 2 &3: Mr. A.R Takkar, Ms. Gurinderjit, Mr. Ankur Sharma, Advocates Ms. Garima Huda and Mr. Rajkumar, Advocate
Counsel for Respondent 4 to 6: Mr. Jeevesh Nagrath, Mr. Nitheesh Kr. Sharma and Mr.V. Kashvap Advocate
Counsel for Respondent 7: Mr. Rajat Navet and Mr.Ritwick Navet, Advocates
Counsel for Respondent 9: Mr. Sunil Gupta, Advocate
Counsel for Respondent 10: Mr. Rajkumar, Advocate with Mr. S.L.Gundli, S.L.O, C.P.C.B.

Present:

HON'BLE MR. JUSTICE DR. P. JYOTHIMANI (JUDICIAL MEMBER)

HON'BLE MR. JUSTICE U. D. SALVI (JUDICIAL MEMBER)

HON'BLE PROF. A. R. YOUSUF (EXPERT MEMBER)

HON'BLE MR. BIKRAM SINGH SAJWAN (EXPERT MEMBER)

ORDER

Reserved on: 27th February, 2015
Pronounced on: 23rd September,2015

1.) Whether the Judgment is allowed to be published on the net?
2.) Whether the Judgment is allowed to be published in the NGT reporter?

Prof. A. R. Yousuf (EM)

1. The applicants have filed Civil Writ Petition no. 3481/ 2007 on the file of the High Court of Punjab & Haryana, alleging that Respondents 4 to 7 were polluting the environment by not complying with the provisions of Hazardous Wastes (Management and Handling) Rules 1989, affecting their Fundamental Rights guaranteed under article 14 and 21 of the Constitution of India. All the ten petitioners are residents of different villages in Tehsil Bhawanigarh, Dist. Sangrur (PB), which are in the proximity of 1-2 kilometres from the area where the industrial unit "M/S Matharu Chemical Industries" (later on renamed as M/S Mahalaxmi Orgochem Industries) of respondents No. 4 and 5 was situated.
2. According to the petitioners the said unit was manufacturing H-acid, i.e. Sodium Salt, which is highly toxic in nature and the waste material, from the process of manufacturing is highly hazardous to the environment. The petitioners are

aggrieved from the fact that the said respondents did not dispose of the waste material from the manufacturing process, including by-products, all of which is hazardous in nature in accordance with the provisions of 'the Environment (Protection) Act, 1986', 'Hazardous Wastes (Management and Handling) Rules, 1989' as amended in May 2003, The Water (Prevention and Control of Pollution) Act, 1974 and 'The Air(Prevention and Control of Pollution) Act, 1981 and dumped the same at the site in violation of the said rules.

3. According to petitioners Respondent No. 4, viz., M/S Matharu Steel Pvt. Ltd., having its registered office in Rajasthan, set up the Industrial unit by the name "M/s Matharu Chemical Industries" in a piece of land measuring 41 bighas 13 biswas in Village Toori, Tehsil Bhawanigarh, District Sangrur and started manufacturing H-acid (Sodium Salt) in 1997. Later on, name of the unit was changed to M/s Mahalaxmi Orgochem Industries i.e. Respondent No. 5. As per the petitioners, Respondent No. 6 and 7 are the directors and occupiers of respondent No. 4 and 5 respectively and were therefore, responsible for the safe custody, storage, handling etc. of the hazardous waste material lying at the premises of respondent No. 5. As per the complaint these respondents continued manufacturing H-Acid till March, 2005, after which the unit was closed. According to the petitioners following raw material inputs are used for the manufacturing process of H-acid.

1.	Naphthalene	600 kg
2.	Sulphuric Acid	3039 kg
3.	Oleum	1790 kg
4.	Nitric Acid	372 kg
5.	Calcium hydroxide (Calcium Carbonate)	1637 kg
6.	Hydrochloric Acid	751 kg
7.	Soda Ash	900 kg
8.	Caustic Soda	860 kg
9.	Iron powder	650 kg
10.	Common Salt	2700 kg

4. According to them the above mentioned quantity of the raw materials (listed as items 1-10 in Para 3 supra) was used to produce 580 kg of Sodium Salt of H-acid and during the manufacturing process following 06 by-products, besides waste material, were also produced.

1.	Gypsum	3503 kg
2.	Iron Oxide	852 kg
3.	Sodium Bisulphite	550 kg
4.	Sodium Nitrite and Nitrate	110 kg
5.	Common Salt	3005 kg
6.	Glaubers Salt	1636 kg

5. The contention of the petitioners was that the waste material from the above said manufacturing process, which remained unused, was highly toxic and contained acid content, is harmful to the life of the inhabitants of the surrounding areas. The said waste material also caused wide spread pollution of ground water, air, etc. According to them it was the duty and responsibility of these respondents to keep such hazardous

waste under safe custody till it was not disposed of as per the provisions contained in Environmental rules.

6. The petitioners alleged that the said H-Acid manufacturing unit was closed on 01.03.2005 and the respondents dismantled the over ground portion including the roof of the hazardous waste storage facility and the hazardous wastes were lying in the open in violation of the concerned environmental rules. According to them, as the waste material was lying in open area it had started showing its impact on the environment and the ground water of the nearby area got polluted and had already turned dark red in colour which is unfit to be used by human being. The seepage of rain water through this highly hazardous waste material had also been polluting the ground water thus rendering the same unfit for human consumption. Further, the soil of the nearby area had turned dark brown in colour and the cultivation in the surrounding areas, if consumed by the human being would cause risk to their life and liberty.
7. In this backdrop the petitioners prayed that:
    i) Directions be issued to the respondents to store, dispose of the hazardous waste material lying in the premises of respondent No. 5 in an environmentally safe manner.
    ii) That the provisions of the Environment (Protection) Act 1986, Hazardous Wastes (Management and Handling) Rules, 1989 as amended in May 2003, The Water

(Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) act, 1981 be complied with so as to protect the health of the petitioners and the inhabitants of the nearby areas.

iii) Respondents 1 – 3 be directed to take water samples of the nearby area.

8. The above writ petition was being heard by the Hon'ble High Court of Punjab & Haryana at Chandigarh till 2013, when it was transferred to the NGT vide HC order dated 29.01.2013 and was registered in NGT as Application No. 35/2013 (THC).

9. After hearing the parties, the Hon'ble High Court on 2nd April, 2009 directed the Punjab Pollution Control Board to inspect the site and analyse the samples taken from there and submit the status report to it.

> *"In the circumstances, therefore, we direct that the Punjab Pollution Control Board shall depute a team for inspection of the site and for taking samples and also for examining whether any dump of hazardous waste material is lying concealed under the surface. The team shall visit the site on 26.04.2009 at 10:00 a.m. One of the petitioners and respondent no. 6 shall remain personally present at the spot on the date and the time given above. Respondent nos. 4 to 6 shall also deposit with the Punjab Pollution Control Board a sum of Rs. 2 lacs towards testing charges. The Punjab Pollution Control Board shall file a status report along with test reports received in the meantime, on or before the next date of hearing."*

10. As per Status Report-Affidavit submitted by Sh. A.K. Kalsi, Environmental Engineer, Punjab Pollution Control Board, Regional Office, Sangrur dated 15.07.2009, in compliance to the Hon'ble Punjab & Haryana High Court orders dated

2/4/2009, the Punjab Pollution Control Board constituted a team comprising of following officers for inspection of the site and for taking samples and also for examining whether any dump of hazardous waste material was lying concealed under the surface.

i) Er. A. K. Kalsi, Environmental Engineer, Regional Office, Sangrur.

ii) Er. S. S. Matharu, Asstt. Environmental Engineer, Zonal Office-II, Patiala.

iii) Er. Om Parkash, Asstt. Environmental Engineer, Regional Office, Sangrur.

iv) Dr. Sat Pal Verma, Asstt. Scientific Officer, Head Office Laboratory, Patiala.

The team inspected the site in question on 26/4/2009 at 10.00a.m. onwards along with Sh. Narinder Singh S/o Sh. Bhinder Singh resident of Village Baladkalan (Petitioner) and Sh. C. S. Dhawan, Director of M/s Mahalaxmi Orgochem Industries, Nabha Road, Bhawanigarh. Soon after starting the inspection, Sh. Tara Singh, present owner of the land in question came there. The team made the following observations:

i. It was observed by the team that the site of the industry had been levelled mechanically by the present owner of the land S. Tara Singh. Sh. Narinder Singh S/o Sh. Bhinder Singh resident of Village Baladkalan (Petitioner) showed three sites (S-1, S-2 & S-3) within the premises of the previous industrial unit, where he apprehended that the waste generated by the industry has been dumped. After digging out about 2-3 feet at site S-1, red coloured waste was found dumped. At site 2, after digging out about 2-3 feet, black coloured waste was found dumped.

ii. When the digging at site S-3 started, the soil cover on this site was observed in loose state up to 4-5 feet, this may probably be due to recent levelling of the said land area. After digging out about 4-5 feet of this spot, black coloured waste was found dumped**.** A sample of this waste was collected in the presence of petitioner as well as the then occupier of the industry, which was sealed after packing into polythene bag. The petitioner claimed that the industry has dumped waste in huge quantity beyond 10' from the top level of the area at this site and he emphasized that JCB is required to dig out up to the aforesaid required depth for taking samples of waste. However, the present owner of the land S. Tara Singh raised the objection that he has made heavy expenditure to level the site and he restrained the team to dig out at spot S-3 with the help of any mechanical excavator (JCB) to take the sample of waste as apprehended by the petitioner. He suggested that the samples of waste may be taken with the help of any kind of boring machine, but the petitioner denied to do so.

iii. The petitioner also showed a site outside the premises of the previous industry, where he apprehended that the waste has been dumped. This site has been marked as S-4 in the site plan, when this site started digging out, light brown coloured waste was found dumped at this site after removing soil cover 5-6”. A sample of this waste was collected in the presence of petitioner as well as the then occupier of the industry, which was sealed after packing into a polythene bag.

iv. All the aforesaid samples collected from the site in question, were sent to M/s Shri Ram Institute for Industrial Research, Delhi for analysis, the analysis results of which have been received from the said laboratory on 21.5.2009. The waste constituents such as nitrates and nitrites belong to class ‘C’ of the Schedule-II appended to the Hazardous Waste (Management, Handling & Trans-boundary Movement) Rules, 2008, but the concentration of these parameters in all the four samples i.e. S-1, S-2, S-3 & S-4 is much less than the prescribed concentration of class ‘C’. However, as per analysis results of waste sample marked as S-3, this sample is not free from acute toxicity, as such the said waste is covered under class ‘E’ of Schedule-II appended to the said Rules. Thus, the waste dumped at site S-3 is hazardous in nature and is required to be disposed off in an environmentally sound manner.

v. During the said visit and inspection of the site on 26/4/2009, seven ground water samples from various tube wells/bore wells, marked as G-1 to G-7 on the site plan, were also collected from the surrounding vicinity of the industry.

   a. The results of above parameters show that ground water sample G-1 & G-2 are affected with reference to the parameters viz Colour, TDS, Chloride & Sulphate.

vi. In the affidavit the said PPCB officer also informed the Hon'ble High Court that the Board has already engaged Thapar University vide letter no. 11604 dated 1.4.2009 to carry out a detailed investigation regarding the length, breadth and depth of ground water contamination as well as hazardous waste. The study is likely to be completed within 3 months.

11. On 17.8.2009 the Hon'ble High Court, after perusing the proposal of Thapar Centre for Industrial Research & Development for preparation of a comprehensive report on the pollution related angle of the said industrial unit and remedial measures thereof, allowed the PPCB to go ahead with the proposed 3 month long study. Further, Mr. Tara Singh S/O Mr. Swaran Singh R/O Nauhra (Nabha), the present owner of the said industrial unit site, was impleaded as a party respondent No, 8.

12. Respondent No. 9 submitted, through reply affidavit dated 19.11.2013, that he was associated with the said industrial

unit as one of the directors of the unit only up to March, 2003 and during this period (1991 – 2003) he was meticulous to ensure that all the relevant approvals and consents relating to the various environmental laws, particularly under the Water (Prevention & Control of Pollution) Act, 1974 ("Water Act"), the Air (Prevention and Control of Pollution) Act, 1981 ("Air Act") and the Hazardous Waste (Management & Handling) Rules 1989 ("HW Rules") were valid at all times and were renewed from time to time after official inspections of all the concerned Departments. It is submitted that all compliances were made and, amongst others the following valid approvals/ consents were obtained and got renewed to ensure that the said company was in compliance with all applicable environmental legislation/ requirements to the satisfaction of the Punjab Pollution Control Board, the Regulatory Authority.

Legislation	Approval/NOC No.	Date of Approval/ NOC	Period of validity of Approval/ NOC
Water Act	1.)SGR/WPC/ETP/1993-94/F-91 2.)SGR/ETA/95-10/F-173	7.10.1993 18.10.1995	30.09.1994 17.10.2010
Air Act	1.)SGR/APC/ECD/93-94/R-75 2.)SGR/APC/97-09/R-157	02.02.1994 08.10.1997	30.06.1994 30.06.2009
HW Rules	Letter No. 4580 renewed periodically last by Letter No. 16987 DT. 09.08.2004	06.05.1997 23.04.2002 05.08.2004	18.03.1999 22.04.2004 04.08.2005

13. It was pointed out by Respondent No. 9 that he was involved in the affairs of the company only till 28.03.2003 and at the time of transfer of the said Company all the records including the licences/NOCs under the relevant environmental laws were handed over to the new owners/ Management of the said manufacturing unit for the smooth running of their unit and for necessary action including renewals thereof by the persons who had taken over the said Company and who are impleaded as Respondent Nos. 6 and 7 in the Writ Petition.

14. In his letter to the Member Secretary, PPCB vide No. 593 dated 4.3.2002 in respect of the application of **M/s Matharu Chemical Industries, Nabha Road, Bhawanigarh, Distt, Sangrur** for renewal of **authorisation under the Hazardous wastes (Management & Handling) Rules 1989 as amended in 1/2000, t**he concerned Environmental Engineer has commented thus "The Industry generates gypsum @1500TPA from filtration ii) and iron oxide @400TPA from reduction process. These both are by-products of the industry and are sold in the market. As per hazardous Waste (Management & Handling) amended Rules, 2000 both these bye-products are not hazardous in nature. The industry generates mother liquor from filtration iii) which is incinerated in the incinerator and thereby generating ash @50kg/day. This ash is hazardous in nature and is covered under waste stream no. 41.1 of Schedule I appended with said rules. The

industry is maintaining the record of ash generated from incineration of Gypsum & Iron Oxide. As per record, the industry has stored 76.63Tonnes ash inside the storage pit after packing into H.D.P.E bags. The industry was visited by AEE on 22.2.2002 and during visit it was observed that the industry has constructed an impervious pit made of (R.C.C) having size 20mX12mX5m for the storage of incinerator ash. Thus the total volume of storage pit is 1200m^3 and hence 1200 Tonnes of ash can be stored in the pit. The industry is producing 15 T of ash in a year and hence the balance capacity of storage pit is sufficient more than five years. The industry has constructed 2 no pits having size 20mx12mx5m in addition of above to store Gypsum & Iron oxide before selling it outside. The industry has fixed danger sign outside the pit & fenced the pit with fencing wire."

15. The Industrial Unit in question was issued a show cause notice on 5th April, 2004 by Environmental Engineer, PPCB, for Violation of the provision of Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981. The deficiencies /violations observed included particularly:

    i. The effluent from the lab section is discharged on to land for stagnation without any treatment.
    ii. The cooling water from the fusion process and the boiler blow down was also being discharged onto land for stagnation.

iii. The scrubber water from scrubbers attached to boiler furnace & thermopac was not being completely re-circulated and a part of that was being discharged onto land for stagnation. The scrubber water from the scrubbers attached to control SOx & NOx emissions is discharged onto land for stagnation.

iv. The house-keeping of the industry was very poor and there is no proper system for drainage of waste water from different sections. Although the quantity of waste water generated from different sections is small, but it is going for stagnation from most of the section. The Industry has not provided any facility for measurement of its effluent.

v. The gypsum sludge and the iron sludge generated from the process was lying in the open in the form of heaps and it was not stored under the shed.

vi. The industry has added the fusion process without obtaining any NOC from the Board. The representative of the industry told that this process has been added only about 3 months back and with the help of this process, they can use lesser quantity or raw material for producing a particular quantity of their product.

vii. The industry has not provided the sampling facilities for collection of NOx & SOx emission samples.

viii. The industry was using rice husk as fuel in its non-fluidized bed boiler furnace & thermopac furnace.

ix. The main stack of the boiler and thermopac was found broken along with the ladder.

x. The duct connecting the exhaust from thermopac furnace to the stack was found broken.

xi. The industry has not provided proper stack height on its two no. D.G. sets of 125 KVA each.

16. The said industry was visited by the officials of the PPCB on 24.5.2004 in connection with the renewal of authorisation under the H.W. (M& H) Rules. During the visit "It has been observed that the H.W. is being stored in the H.W pit after packing in gunny bags. The bags are being replaced with fresh bags and much of the work remains to be done. The H.W pit is covered with AC sheets from top & two sides, third side of this pit is a storage shed where gypsum was stored. The fourth side is not covered with AC sheets. The fencing around the H.W. pit has not been done. The incinerator is not operational. As per representative of the industry it is not required to be used as sodium sulphate is extracted from the mother liquor by the cold process and reused in the process, the remaining mother liquor is re-used in process. As per the industry, the concentrated mother liquor requires to be incinerated after 2-3 months. However as per record of the H.W maintained by the industry, no H.W has been shown as generated after 27.12.2003. The final record on 27.12.2003 shows 1973 bags containing 98.650 MT of H.W. As per the representative of the industry the manufacturing process has

been changed from earlier but detailed changed process yet to be submitted."

17. As is apparent from the letter No. HMC/2005/SGR/2235 Dt. 16.2.06 issued by Member Secretary, Punjab Pollution Control Board to M/S Maha Laxmi Orgochem Industries (Prop. Matharu Steel (P) Ltd.), formerly known as M/s Matharu Chemical Industries, Nabha Road, Distt. Sangrur, the over ground parts of the Industrial unit were dismantled right during 2005. This is clearly evident from the contents of this notice.

"And whereas the industry was visited by officer of the Board on 10.1.2006 and observed that the industry has dismantled the over ground portion including the roof of the hazardous waste storage facility and hazardous waste was lying in the open.

And whereas the industry has violated the provisions of the rule 5 of the Hazardous Waste (Management & Handling) Rules, 1989 as amended in May, 2003.

Now, therefore, the Chairman, Punjab Pollution Control Board in exercise of the power conferred upon the Board u/s 5 of the Environment (Protection) Act, 1986, after going through the details of the case, has decided to direct as follows:-

The industry will not dispose of its hazardous waste lying in the premises and will store the same in environmentally sound manner till the same is disposed in common treatment, storage and disposal facility.

In case you fail to comply with the above said directions, the industry and its Managing Director/Directors and officer concerned/responsible to comply with the provisions of the Hazardous Waste (Management & Handling) Rules, 1989 as amended in May 2003 shall be liable for action under Section 15 & 16 of the Environment (Protection) Act, 1986."

18. As per No. HMC/SGR/2004-2005/R-2060 Sh. C.L. Dhawan of M/s Mahalaxmi Orgochem Industries (Prop. Matharu Chemical Steel Pvt. Ltd.) previously known as M/s Matharu Chemical Industries was granted an authorization by the PPCB under Rule 5 of the Hazardous Wastes (Management & Handling) Amendment Rules, 1989 as amended in 2003 of Environment (Protection) Act, 1986 to operate a facility for collection and storage of hazardous waste on the premises situated at Nabha Road, Bhawanigarh, Distt. Sangrur for a period of one year from 05.08.2004, the date of issue of the authorization. The Terms and Conditions of Authorization included, besides many other things, in particular the following conditions.

    i. The person authorised shall not rent, lend, sell, dispose, transfer or otherwise transport the hazardous waste without obtaining prior permission of the Board.
    ii. Any unauthorized change is personnel, equipment and working conditions as mentioned in the application by

the person authorized shall constitute a breach of his authorization.

iii. It is the duty of the authorized person to take prior permission of the state Pollution Control Board to close down the facility.

iv. The occupier generating hazardous waste/operate of a facility for collection and storage of hazardous waste shall maintain records of such operations in Form-3.

v. An occupier who is generating hazardous waste shall store his waste category wise on site in environmentally sound manner.

vi. An occupier/generator shall not store hazardous wastes in open ground. It must be stored in an isolated site away from plant operational area.

vii. The storage tank/container of the hazardous waste should be in good condition and made of (or lined with) an appropriate material which does not react with the waste contained in it and can withstand the physical and environmental conditions during storage and handling.

viii. The occupier generating hazardous waste shall mark each container holding hazardous waste with the marking "HAZARDOUS WASTE" both in English and Punjabi.

ix. The storage area should be fenced properly and a sign Board indicating "DANGER" and "HAZARDOUS

WASTE” sign & nature of the waste shall be placed at storage site.

x. The industry shall store the hazardous waste in environmentally sound manner and pack the hazardous waste sludge in impervious bags/containers strong enough to sustain rigour of handling, storage, transportation and weather conditions. The storage facility must be covered from upper side.

xi. The occupier and operator of a facility shall also be liable to reinstate or restore damaged or destroyed elements of the environment at his cost, failing which the occupier or the operator of a facility, as the case may be, shall be liable to pay the entire cost of remediation or restoration and pay in advance an amount equal to the cost estimated by the State Pollution Control Board.

19. It may be pointed out that Respondent 3 (Assistant Environmental Engineer, PPCB, Regional Office, Sangrur, has stated in his reply affidavit dated 7th August, 2007 on behalf of Respondent 1 – 3, that “the respondent industry no. 5 vide letter dated 18.3.2005 informed the answering respondents that due to adverse market condition they have stopped production temporarily and also added that as and when the production will start they will inform the Board. The fact was verified by the answering respondents when the

industrial unit was found closed during visit by the officers of respondents on 21.3.2005...... The Industrial unit was again visited by the officers of the answering respondents on 2.1.2006 and it was found that the industry has dismantled the plant up to plinth level. But the hazardous waste was lying in bags in the storage pit."

20. Respondent 1 – 3 in the aforementioned affidavit also state that the premises of the respondent 5 (Industrial unit site) were visited by respondent no. 3 on 26.2.2007 on the directions of the Hon'ble Court of Sh. Harash Mehta, PCS, Addl. Civil Judge (Senior Division), Sangrur in a civil case .... During inspection, no chemical/raw material/product of the industry was found lying within the premises and the hazardous waste was found stored in storage pit in safe manner by the visiting officers." However, they are silent about the manner of storing of the iron oxide and gypsum on the site.
21. During its pendency in the Honble HC, the PPCB asked the Thapar Centre for Industrial Research & Development (TCIRD), Thapar University, Patiala (Pb) to have a detailed investigation into the length, breadth and depth of the ground water contamination problem of the concerned unit. The said centre completed the job during the course of one year, November, 2009 – November, 2010. The final report was submitted and taken on the record by the Hon'ble High Court on 10.01.2011.

22. The TCIRD Report spread over 44 pages and titled "Assessment of the Length, Breadth and Depth of groundwater Contamination by Matharu Chemical Industries, Bhawanigarh" indicated that M/S Matharu Chemical Industries (later on Mahalakshmi Organochem Industries), Nabha Road, Bhawantigarh, Sangrur, Dist., Punjab was established in 1991. The industrial unit is located on the Bhawanigarh-Nabha Road at 4 km distance from Bhawanigarh on the right side. Except for the two rice shellers, one pipe factory, one punsup godown, one petrol pump and one very small human settlement, the industrial unit is surrounded by agricultural fields. As per the TCIRD Report 41 Bhiga and 13 Biswa of land was under the industrial site. It was manufacturing H-acid and its design capacity was 580 kg H-acid per batch and 35 batches per month. The production of H-Acid was commissioned at the site in July 1991 and continued till the end of February 2005.

23. The TCIRD Report has provided details about the process employed by the concerned industrial unit for the manufacturing of H-acid from Naphthalene. The details have been (as mentioned in the report) based on the information submitted by the proponents of the said industrial unit to the Punjab Pollution Control Board for the purposes of obtaining of No Objection Certificate (NOC), Consent to Operate and

authorization to handle hazardous, supplemented by review of literature on the manufacturing of H-acid.

24. According to the report the H-acid is 1-amino, 8-napthol, 3, 6-disulfonic acid with empirical formula $C_{10}H_8NO_7S_2Na_2$. It is used in the manufacturing of dyes. It is usually manufactured as a sodium salt. It is grey powder soluble in water, alcohol and ether. Its manufacturing involves the following steps:

    i. Sulfonation of naphthalene ($C_{10}H_8$) with 65% oleum ($H_2S_2O_7$) and sulphuric acid (H_2SO_4). It might have emitted sulphur oxide fumes.

    ii. Nitration with 60% nitric acid (HNO_3). It might have emitted nitrogen oxide fumes.

    iii. Neutralization of the resultant mixture of acids and the sulfonation and nitration product with lime slurry (10%). It might have consumed water for the lime slurry preparation.

    iv. Filtration of the neutralized mixer in nutch filters for separating the gypsum ($CaSO_4$) sludge (neutralization product at 70% consistency!) formed. Gypsum sludge (solid waste) is generated.

    v. Reduction of the filtrate by Iron. Involves addition of iron powder, hydrochloric acid (HCl), soda ash (Na_2CO_3) and acetic acid (CH_3COOH).

    vi. Filtration of the mixer, of the reduced product, the residual chemicals and the by-products formed, in a filter press for separating the iron oxide (Fe_2O_3) sludge (at 30% consistency). Iron oxide sludge (solid waste) is generated.

vii. Concentration of the filtrate. Was it in a multiple effect evaporator and did it generate foul condensate? If a multiple effect evaporator was used then it might have demanded significant quantities of circulating cooling water.

viii. Cooling the concentrated solution (circulating cooling water system might have been used), mixing with HCl and NaCl and filtering in nutch filters to obtain Koch cake. It must be generating wastewater (mother liquor) rich in naphthalene based compounds, sodium and chloride.

ix. Charging the Koch cake with caustic lye/caustic flakes (NaOH) and then fusing (in an autoclave!).

x. Diluting the fused mass with water, treating with sulphuric acid and boiling off to remove sulphur dioxide. Must be emitting sulphur dioxide fumes.

xi. Cooling the boiled off mass and filtering through nutch filters to get the cake of sodium salt of H-acid. It must be generating wastewater (discarded liquor) rich in phenolic compounds and residual H-acid.

xii. Washing the H-acid cake in water, centrifugal dewatering of the cake, drying and milling the cake to obtain powder of sodium salt of H-acid. It must be generating the wastewater (product wash water) containing H-acid and phenolic compounds.

25. H-acid was manufactured in batches (35 batches per month) from naphthalene (600 kg/batch). Each batch of manufacturing produced 580 kg of sodium salt of H-acid. Raw material inputs of the manufacturing were as shown in Table 1. The by-products and wastes generated from the manufacturing were as indicated by the industry as presented in Table 2.

Table 1: Material inputs of H-acid manufacturing

S. No.	Input material	Quantity (kg/batch)	Quantity (ton/year)*	Consumption for 1994-95 tons/year)
1.	Naphthalene	600	252	345
2.	Sulphuric acid	3039	1276	1703
3.	Oleum (65%)	1790	752	1000
4.	Nitric Acid	372	156	518
5.	Lime stone	1637	689	1464
6.	Hydrochloric acid (100% purity)	72	30.2	120
7.	Soda ash(sodium carbonate)	900	378	554
8.	Sodium hydroxide	860	361	560
9.	Iron powder	650	273	291
10.	Common salt	2700	1134	??
11.	Acetic acid	10.4	4.383	6

* 35 batches of H-acid manufacturing per month for 12 months a year is assumed.

Table 2: By-products/wastes generated from the H-acid manufacturing

S. No.	Product/by-product/waste	Quantity (kg/batch)	Quantity (ton/year)@
--	Sodium salt of H-acid (product)	580 (681)*	243.6(286)*
1.	Gypsum on dry weight basis	3082	1294
2.	Iron oxide on dry weight basis	1109	466
3.	Sodium bisulphate lost in wastewater	----	---
4.	Sodium nitrite and nitrate lost in wastewater	----	---
5.	Common salt lost in wastewater	~ 2750	~1155
6.	Glauber salt lost in wastewater	----	---
7.	**Naphthalene lost in the wastewater**	**396 (360.5)***	**166 (151)***

@ 35 batches of H-acid manufacturing per month for 12 months a year is assumed

* values given in the parentheses are for the 681 kg product recovery per batch.

26. The industrial unit was consuming water for the following purposes:

    i. Preparation of the lime slurry used in step-3 for neutralization.
    ii. Washing of nutch filters and filter presses used in the filtration in steps 4, 6 and 11.
    iii. Dilution of fused mass in step 10.
    iv. Washing of H-acid cake in step 12.

v. In addition to this, water was also used as boiler feed water in the 1 ton/hr capacity boiler and as makeup water in the cooling tower and circulating cooling water system. PPCB records indicate consumption of about 34 m^3/day of water.

27. The H-acid manufacturing process might have generated the flowing wastes:

i. **Gypsum (calcium sulphate) sludge:** Removed from the reaction mixer through filtering in step-4 of the manufacturing process.

ii. **Iron oxide sludge:** Removed from the reaction mixer through filtering in step-6 of the manufacturing process.

iii. **Foul condensate:** Generated (if concentrated in multiple effect evaporator) at the multiple effect evaporator in step-7 of the manufacturing process. It might have been the least polluted wastewater stream.

iv. **Mother liquor:** Discarded after the filtration removal of Koch cake in step-8 of the manufacturing process. It is high strength waste and was apparently disposed off in the solar evaporation ponds (and then incinerated).

v. **Discarded liquor:** Discarded after the filtration removal of the H-acid in step-11 of the manufacturing process (high strength wastewater).

vi. **Product washwater**: Generated from the washing of the H-acid cake in step-12 of the manufacturing process (moderate strength waste and can be reused for dissolving the fused mass in step-10).

28. Material balance calculations by the TCIRD/Thapar University team (TCIRD Report) indicate that only <40% of the naphthalene used in manufacturing process became integral part of the product (H-acid) and the rest >60% was lost mostly in the waste water (generated at step-8, step-11 and step-12) may be as naphthalene based compounds, sulfonated phenolic compounds and condensation products of fusion. The report points out that “because of limited water solubility and higher sludge consistencies, gypsum and iron oxide sludges might have very little of these organic substances”. At the same time it also notes that “because of the higher boiling point, very little of the organic matter might have been actually lost into the atmosphere as organic vapours.’

29. This report further observes that “the by-products, sodium sulphate, sodium bisulfite, sodium chloride, sodium nitrite and the added sodium chloride, because of their high solubility, might have been mostly present in the wastewaters generated. Very little of these might have been lost in the gypsum and iron oxide sludges (may depend on the sludge consistency). It also notes that “it is not clear whether and how much of the sodium sulphate was actually recovered from the wastewater (mother liquor) during

treatment (neutralization, filtration, concentration and filtration) and reused in the H-acid manufacturing process (in place of soda ash!).”

30. By quantifying the raw material used and the products and by-products obtained from the manufacturing process, the TCIRD team concluded that the total input of the unit was 12,640 kg/batch. There was a total production of 681 kg/batch of H-acid, besides Iron oxide and gypsum sludge generated was 4,191kg/batch. According to them rest of the material, i.e., 7,768 kg/batch might have been mostly lost into the wastewater generated and a small portion of it might have been lost into the atmosphere as sulphur oxides and nitrogen oxides.

31. According to the TCIRD team the Wastewater generation might have been around 20 m^3/batch of H-acid processed or 23-24 m^3/day. Generation rates of different wastewaters per batch have been assessed as follows:
    i. Mother liquor (assessed at about 3-4 m^3/batch)
    ii. Foul condensate (assessed at about 5-6 m^3/batch)
    iii. Nutch filters’ and filter presses’ washwater (about 1 m^3/batch)
    iv. Discarded liquor (assessed at about 5 m^3/ batch)
    v. H-acid washwater (assessed at about 5 m^3/batch)

32. In addition to these process wastewaters, the industrial unit might also have generated the following wastewaters:

i. Steam condensate that could not be recovered and allowed to flow into the drain
ii. Cooling tower blow down water
iii. Regeneration wastewater from the boiler feed water plant (soft water plant!)

33. The industrial unit used an incinerator since late 1996 for the disposal of the mother liquor. Waste water discharge by the industrial unit beyond its premises was zero. The industrial unit, as per the records, used lined shallow solar evaporation ponds of 200 m^2 area each (20 m x 10 m) for the disposal of the wastewater. For enhancing the evaporation rates, the industrial unit, according to records, used forced spray evaporation. Information furnished by the PPCB also indicates use of 4 evaporation ponds, each of 24 m x 24 m x 1.5 m, and one tank of 50 m x 26 m x 2m.

i. Crystallization and subsequent problems associated with the pumping for the forced spray evaporation might have forced the industrial unit to continually expand the evaporation ponds and shift to newer ponds.
ii. Once usage of an evaporation pond was stopped, the residual low density crystalline organic material (the residual organic matter) present in the pond content might have formed a thick hard crust layer on the top of the pond contents.
iii. Soil core sampling by the TCIRD team in the evaporation pond area showed presence of a hard but water soluble

layer of 3 to 5cm and even more thickness over the concentrated liquid. It is pointed out that this crystalline layer might have almost stopped further evaporation from the concentrated liquid of the abandoned pond. As a consequence the industrial unit might not have been in a position to dispose off all the wastewater in the solar evaporation ponds.

- iv. As per the information available in the PPCB records, the industrial unit had installed an incinerator in 1996 for the disposal of the mother liquor generated in step-8.
- v. Further, the records say that 100 kg/day (at certain other places indicated as 50 kg/day) of ash was generated from the incineration of the mother liquor. 100 kg/day ash is grossly understated. Almost all the chloride used in the manufacturing process, both as NaCl and HCl, is expected to get into the mother liquor and then become part of the incineration ash. The assessment is that the mother liquor might have been almost a saturated salt solution.

34. The solid and hazardous waste generated by the said industrial unit has been stated to include:

    i. **Gypsum sludge:** 3,082 kg/batch on dry weight basis. About 1850 tons per year (dry weight basis) of gypsum sludge was generated. It was assumed to contain 30% moisture.

ii. **Iron oxide sludge:** 1,109 kg/batch on dry weight basis. About 466 tons per year (dry weight basis) of iron oxide sludge was generated. It was assumed to contain 70% moisture.

iii. **Incineration ash:** 100 kg/batch or 30 tons per year. This is grossly understated and may be possible if glauber salt can be used in place of common salt, and if the used glauber salt can be recovered from the wastewater and reused. Sodium chloride use might have generated about 2.7 tons/batch of incineration ash.

35. Three sludge tanks/pits, each of 20 m x 12 m x 2 m dimensions (480 m^3 volume), were apparently used for the storage of the generated gypsum sludge, iron oxide sludge and incineration ash. Apparently some of the organic sludge accumulated in the solar evaporation ponds was also collected and stored in the tank meant for the incineration ash storage.

36. The unit was storing all the wastes, generated by it, on-site except for selling of some iron oxide and gypsum sludge to outside parties. The unit installed an incinerator in 1996 for incinerating of the organic waste. The unit disposed the waste water it generated in solar evaporation ponds within premises and disposed no wastewater beyond its boundaries.

37. According the TCIRD report the profile of the salt level (sum of iron, sodium, sulphate, nitrate and chloride) in the

groundwater indicates that the groundwater has been contaminated by the following two sources.

i. Percolation and leaching of contaminants from the onsite solid/hazardous waste storage and disposal and from the solar evaporation ponds.

ii. Direct injection of wastewater into the groundwater at 150ft depth (liquor discarded in the H-acid manufacturing step 11 after filtration recovery of the sodium salt of H-acid appears to be the wastewater discharged into the groundwater through direct injection).

38. It is stated that as of now contribution made by the percolation/leaching from the solid /hazardous waste storage tanks and from the solar evaporation ponds is relatively lesser and the ground water pollution is mainly from the direct injection of wastewater into the groundwater (which was apparently discontinued by 2005). Total salt level in the top layer of the groundwater (1435mg/L at 105ft depth) is higher than that at 120ft depth (1133mg/L). This could be because of the contributions through percolation and leaching from the overburden soil, the solar evaporation ponds and from the solid/hazardous waste storage. Beyond 120ft depth, the total salt levels are increasing up to 140ft depth (to 3178mg/L) and then decreasing (2012mg/L at 160ft). The latter might be from the direct injection of the wastewater might be at 140 – 150ft depth.

39. The TCIRD team reported the presence of the Sulfonated Phenolic compounds in two groundwater samples collected from two sampling stations located just outside the premises of the industrial unit. According to them the phenolic compounds however, could not be measured by routine Colorimetric method for phenols given in 21st Edition of APHA. As these samples were reddish brown in colour in spite of the absence of iron in them, presence of higher order phenolic compounds in these samples was suspected. The evaporative concentration, methanol extraction and chromatography of all the groundwater samples collected by the team with 1:1 methanol and chloroform and with methanol resulted in the isolation of two sulfonated phenolic compounds in samples from st.1 and st.2 (see Table No. 5 and 6 of TCIRD Report reproduced below). Analysis of the isolated sulfonated compounds on FTIR indicated the presence of functional groups N–H, O–H and S=O in both the compounds. Analysis of all the other 7 groundwater samples indicated that these have the methanol extractables below detectable levels.

Table No. 5: Sulfonated phenolic compounds in the samples from Stn. 1 and stn. 2

Compound	Sample 1	Sample 2
Methanol extractables (mg/L)	149	173

Compound A (mg/L)	60	75
Compound B (mg/L)	48	32

Table 6: Characterization of Ground Water Samples for presence of Sulfonated Phenolic Compounds by FTIR

Sample	**IR bands observed**	**Remarks@**
Compound A	3430, 1635, 1384, 1047 and 669 cm^{-1}	IR bands at 3430, 1635 and 1384 cm^{-1} confirms the presence of functional groups N-H or O-H. IR bands at 1047 and 669 cm^{-1} confirms the presence of sulphony1 group.
Compound B	3416, 1089 and 630 cm^{-1}	IR bands at 3416 cm^{-1} confirms the presence of functional groups N-H or O-H. IR bands at 1089 and 630 cm^{-1} confirms the presence of sulphony1 group.

40. TCIRD report maintained that the presence of sulfonated phenolic compounds in the ground water together with other circumstantial evidences (like water solubility) indicated that the ground water in question was contaminated with the industrial wastes, specially those generated beyond the Koch cake fusion step (step-9 of the manufacturing process). ”

41. In response to the TCIRD Report, the Respondents 4 – 7 presented before the Hon’ble High Court the comments offered

on this Report (on their request) by Prof. Barun Kumar Guha (Retired) Chemical Engineering Department, Environmental Engineering Group Indian Institute of Technology, Delhi dated September, 2012, which is on the record at pages 445 – 461. Prof. Guha's review is titled "*Comments on the Report on Assessment of Ground Water Contamination at the Plant Site of M/S Mahalaxmi Organochem Industries Thapar Center for Industrial Research and Development*". In the said review Prof. Guha has commented not only on the Report prepared by TCIRD but also on the Analysis of water samples done by M/S Eco-Laboratories & Consultants Pvt. Ltd.

42. In case of solid wastes he states "The solid wastes generated within the plant mostly from process steps and they included, gypsum sludge, iron sludge and incinerator ash". According to Prof. Guha "the first two types of sludge (gypsum sludge and iron sludge), from the manufacturing process for H – Acid, were produced directly from the process steps involving filtration and were quite wet. These were dewatered and then further dried by exposing to sun. All these sludge are classified as hazardous in nature because of the contamination of toxic organic compounds." He further states about gypsum sludge that "the product after drying was not of pure white colour and free of these matters, as is desired by these users. Hence it was difficult to sell it to such users. He talks about the use of iron sludge in brick kilns as well as agriculture lands. He also states that the gypsum was taken by brick kiln owners free of

cost and even transportation charges were borne by M/s Mahalaxmi Organochem Industries. In case of solar evaporation ponds, the said expert notes that these were lined and "whatever small amount that might have percolated was due to the drift loss occurring from the spraying of the liquid within the pond to enhance the evaporation rate. The drift loss gets deposited on the surrounding areas and subsequent rainfall or irrigation for the crop cultivation has resulted in its percolation to the soil." A perusal of Prof. Guha's review, however, indicates that he has not questioned any details given by the TCIRD about the manufacturing process, including the quantity of raw material used, quantities of by-products (gypsum and iron sludge) and waste material (mother liquor) generated and the quantum of the final commercial product (H-Acid) produced. Therefore the reliance placed by respondent 4 to 6, on the comments made by Prof. Guha is of no help to them in dispelling the strong view expressed by the TCIRD in its report.

43. According to the learned counsel appearing for the said respondents, there are number of inconsistencies with regard to soil and ground water analysis in TCIRD study. There is no balance between the anion (SO4 and Cl) and cation (Na) concentration in soil. The soil samples collected from the solid waste dumping area show no sign of any contamination with the level of sulphate, nitrate, chloride, sodium and others

which show that they are within the limits which are normal for many of the soils.

44. Prof. Guha questions the necessity of testing the water samples for the methanol extract value. According to him "it is quite strange that the soluble components needed the methanol extraction. Particularly the COD values should have been the indicator of the presence of organic components. However, there is no clear relationship between the methanol extract and COD values".

45. In Civil Misc. No. 14527 of 2012 in CWP No. 3481 of 2007, Mr. Om Parkash, Environmental Engineer, PPCB, filed a counter affidavit on behalf of R1 – 3 on the comments of Prof. B. Guha as submitted by R 4 – 6 . The main contention of R 1 – 3 was that Prof. Guha never visited the site in question and his comments were based only on the perusal of the TCIRD report.

46. In the said affidavit of Mr. Om Parkash, rebuttal of Dr. Akepati S. Reddy, author of the TCIRD Report on Prof. Guha's comments was also reflected as under. "Ground water pollution, by polycyclic aromatic organic compounds of naphthalene origin, under the industrial site and presence of highly concentrated effluents in the then evaporation ponds (presently covered by about 6 feet thick layer of soil), as reported in the TCIRD report, are the ground realities and proven beyond any doubt. And these ground realities cannot be doubted either by the respondents 4 – 6 or by the report of

Prof. B. K. Guha." Dr. Reddy reiterates the stand that the "ground water pollution in the concerned area is most likely due to intentional injection of the effluent in to the ground water. The ground water pollution problem and the concentrated effluent in the solar evaporation ponds should be treated as two unrelated problems."

47. The comments given by Dr. Reddy were negated by Mr. C. S. Dhawan, R6 on behalf of R 4 – 6 vide Reply Affidavit file in Civil Misc. No. 17279 of 2012. In this affidavit even the expertise of TCIRD with respect to the study conducted was challenged on the premise that the main scope of working of TCIRD relates to Paper Industry and that the said Center stands derecognized by the PCB itself in the year 2009, inferring there from that they are not competent to submit the report.

48. On 4th July, 2013 the NGT Bench directed the CPCB to depute an expert or a team of experts to examine the locations of the sites and to give a report on the following points:

a. Whether the water is contaminated/ polluted at the place shown in the Application?

b. Whether the characteristics of the soil are affected due to the dumping of the chemical wastes at the place in question?

c. Whether the ground water is polluted due to the effluent discharge or the discharge in to the bore wells?

d. Whether the crops or orchards in the proximity of the sites have been damaged due to the pollution allegedly caused due to the effluent discharged.

e. The expert team of CPCB may suggest the methodology for restoration/ reclamation of the contaminated environment.

49. In compliance to the directions of NGT, the CPCB team collected samples of groundwater and soil in the affected area (near M/S Mahalakshmi Organochem Industry, Nabha Road) in Sangrur during 24 – 26 July, 2013. The Final report of the survey was submitted by the CPCB in September, 2013. A perusal of the said report reveals that in respect of the groundwater the CPCB focused its attention on the parameters:

> pH, conductivity, TDS, Ca, Mg, K, total Hardness, Na, F, Cl, SO4, Nitrate, total alkalinity, COD, BOD, heavy metals, TC and FC,

While in case of soil the parameters analysed included:

> pH, conductivity, organic carbon, organic matter, Na, K, Mg, CEC, Cl, Heavy metals.

50. The team mentioned in the report that production of H-acid commenced at the site in July 1991 and continued till end of February 2005. Presently there was no industrial activity at the site as the plant has been dismantled and cultivation is

being done at the site by the purchaser Sh. Tara Singh S/o Sh. Subaran Singh R/s Village Nauhra (Nabha), District Patiala.

51. As per the CPCB report, during the field survey, it was observed that the colour of surface soil was red at many places within the premises of the closed industrial unit. Soil of black colour was found at 4 feet depth near the so called solar evaporation pond. **The report further observed that coloured water was pumped out of the tube well installed in the premises of the unit (Depth of the tube well 280 feet) even after continuous flow for 105 minutes.** The report inferred that the groundwater quality exceeds the desirable limits of drinking water with respect to TDS, total alkalinity, total hardness, colour, calcium and iron. It further reported that black liquor was found at the depth of 5 feet near the site of solar evaporation pond which depicts that leftover industrial process waste is still lying. On the basis of the above findings, the CPCB suggested that:

    i. the leftover industrial process waste lying at the depth of 4 feet should be removed and disposed to approved Treatment, Storage and Disposal Facility.
    ii. The voids be filled with clayey soil.
    iii. Use of land for any other purposes including cultivation should be avoided till remediation is completed.
    iv. Access to the site be restricted with the help of fencing.

v. The leaching from site may be minimized by laying a compacted clay layer of 30-60cm depth with proper slope.

52. Prof. B. K. Guha (Retired), IIT, New Delhi, engaged by Respondent Industry, gave his "Comments on the Report on Assessment of Groundwater Contamination at the Plant site of M/S Mahalakshmi Organochem Industries by Central Pollution Control Board, Delhi" on 25.09.2013. His main objection to the report is regarding the non-existence of background water quality. Further, he points out the absence of details about agricultural activities being carried out on the land in question. In reference to "the soils samples were black at depth of 6 inches to 4 feet. At the site of solar evaporation pond is not very clear. As there was no quantification to indicate whether the colour intensity was increasing or decreasing with depth."

53. Respondent 9 through his counter affidavit dated 31.7,2013, besides other facts, inter alia submitted that

> "8. that the annual report also gives the details of the by-products lying at the site as on 31st March, 2003 and as per the said report only the following quantities appear in the same :-
>
> Gypsum: 26023 kg
> Iron sludge: 21242 kg. ____ Rs. 47,264.00
>
> Both these commodities constitute only about 2 truck loads each and these figures confirm the fact that the by-products generated till March, 2003 were being regularly disposed off".

It may be noted that the quantity reflected above by the said respondent are actually wrongly reported as is evident from the details presented in the Balance Sheet at page 628. The figures reflected above in kilograms are actually amount in Rupees, the total amount on account of Industrial wastes being Rs. 47,264.00 with the break up:

3. Industrial Wastes

(a) Gypsum	Rs. 26,023.00	
(b) Iron Sludge	Rs. 21,241.00	Rs. 47,264.00

54. On 8th May, 2014, while pleading on behalf of the Punjab Pollution Control Board (PPCB), Mr. A.R. Takkar, learned Counsel pointed out that earlier a report was submitted before the Hon'ble Punjab and Haryana High Court by Thapar Center for Industrial Research & Development (TCIRD) and the said report showed that between July 1991 and February 2005 the industrial unit manufactured over 3000 tons of H-acid and generated over 17,000 tons of gypsum sludge, over 6,000 tons of iron oxide sludge and over 40,000 tons of inorganic salts, together with wastewater containing over 2,000 tons of naphthalene based organic compounds. Except for selling out a small fraction, the industrial unit retained all the gypsum sludge and the iron oxide sludge within the premises.

55. The TCIRD report prepared by Dr. A. S. Reddy further inferred as under "it appears that the industrial unit segregated the filtrate (discarded liquor) of the H-acid manufacturing step-11 (and even the H-acid wash-water of the H-acid manufacturing step-12, if not reused) and

disposed off through injecting into the groundwater at about 140-150 feet depth. Over the 14 years period the industrial unit might have injected about 28,000 m^3 of wastewater into the groundwater. This has heavily polluted the local groundwater.” In support of this inference it was pointed out that “the groundwater samples from at least two sampling stations (Stn. 1 and Stn. 2) have been found contaminated with the industrial waste. This is evident from the high sulphate, chloride, COD and TDS levels observed and from the indication of presence of phenolic compounds. Contamination of the ground water appears to be limited in extent and apparently not spreading. Discontinuity of groundwater contamination (since 2004) and continual pumping out of ground water for irrigation at the sampling stations have apparently arrested the speed of the groundwater contamination.”

56. The samples from station 1 and 2 (which were located in the plot of land adjacent to the Unit on its eastern side) showed the concentration of Methanol extractables as 149 mg/L and 173 mg/L respectively. The report indicates that “the phenolic compounds however could not be measured by the routinely used standard method. The groundwater samples from these two sampling stations (1 & 2) were reddish brown in colour and both the samples were not having any iron in them (iron can also impart reddish-brown colour to water). This led to the suspicion of presence of higher order phenolic

compounds in the water samples and imparting the colour, and to the further investigation of the samples in the direction of extraction, isolation and characterisation of the substances imparting colour to the water. Evaporative concentration, methanol extraction and column chromatography (of the samples), both with 1:1 methanol and chloroform and with methanol resulted in the isolation of two sulphonated phenolic compounds… Analysis of the isolated compounds on FTIR indicated presence of functional groups N-H, O-H and S-O, in both the compounds.”

57. From these findings it was inferred by Dr. Reddy that “Identification of sulphonated phenolic compounds in the ground water and other circumstantial evidences (like water solubility) indicate that the ground water in question is contaminated with the industrial wastes, especially those generated beyond the Koch cake fusion step (step 9 of the manufacturing process).”

58. It was further pointed out by the Learned Counsel that the Central Pollution Control Board (CPCB) did not conduct any test to identify the presence of sulfonated phenolic compounds and as such the CPCB Report is incomplete. In view of this deficiency the CPCB was directed vide NGT order dated 8th May, 2014 to conduct test for identifying the presence of sulfonated phenolic compounds in the groundwater and for assessment and also to suggest

methodology for restitution/remediation of the contaminated water.

59. In response to this direction, the CPCB filed a report titled "Report on Assessment of groundwater Contamination (near erstwhile M/S Mahalaxmi Organochem Industry, Nabha Road) District Sangrur, Punjab" dated June, 2014. The report reveals that the CPCB team visited the site on 24.06.2014 and collected ground water samples from 8 locations, which were analyzed for following parameters.

> "pH, conductivity, TDS, Ca, Mg, K, Total Hardness, Na, K, F, Cl, SO4, Total alkalinity, Total Phenols, COD, Heavy metals (As, Cd, Cr, Cu, Fe, Mn, Ni, Pb and Zn)"

60. The said CPCB report reveals that "phenolic compounds were analyzed based on 5530-D, direct photometric method (after distillation) of Standard Method for Examination of Water and wastewater" 22nd edition published by American public health Association (APHA) and is adopted by National Accreditation Board for Laboratories (NABL)". Based on analytical results it was observed that samples are found within prescribed limits of BIS drinking water standards IS 10500:2012 (desirable limit) with respect to phenolic compounds, pH, Total Dissolved Solids, Calcium, Sulphate, cadmium, Copper, Nickel and total Chromium. Iron concentration was found exceeding the prescribed limits in

tube well installed in industrial premises. Groundwater quality exceeds the desirable limits of drinking water with respect to total alkalinity and total hardness.” Accordingly it was concluded from the study and analytical results that the impact of erstwhile M/S Mahalakshmi Organochem Industries unit was not found in the 8 tube wells of the area.

61. Learned Counsel appearing for the industry disputed the findings in TCIRD report and according to him the report of the CPCB clearly shows that the Sulfonated Phenolic compounds were below the detection limits. However, the Learned Counsel for the PPCB disagreed with this view and submitted that the CPCB carried out analysis by APHA method which is less sensitive than FTIR method and, therefore, if the findings of the CPCB are to be comfortably relied upon then the findings ought to have been arrived by the sensitive FTIR method and not by APHA method alone. He, therefore, suggested carrying out of the fresh sampling and analysis of the ground water from the sources collected from the same sites as those collected by the CPCB at the hands of reputed specialised institution like NEERI (National Environmental Engineering Research Institute) by employing FTIR method for analysis of the ground water to assess the presence of sulfonated phenolic compounds.

62. After hearing the rival contention, the NGT Bench directed the NEERI to undertake the analysis of the ground water at the disputed site. Accordingly it was directed thus:

i. NEERI shall depute a team of Experts to collect the underground water samples from the same locations from where the earlier water samples were collected by CPCB and to analyse those samples for ascertaining the presence of Sulfonated Phenolic compounds by APHA as well as FTIR methods and any other better method that may be available with NEERI. Quantitative analysis of the sulfonated phenolic compounds shall also be undertaken by NEERI.

ii. NEERI shall also give its opinion as regards the possible sources of such Sulfonated Phenolic compounds, if detected in the samples, at the said locations.

iii. NEERI shall also suggest the methodology for remediation of the underground water if found contaminated with Sulfonated Phenolic compounds.

63. NEERI filed its report titled "Assessment of Ground Water Contamination in and Around Mahalaxmi Organochem Industries, Bhawanigarh" in the NGT on 13.11.2014. As per the report the CSIR-NEERI team collected ground water samples on 17th October, 2014 from the same tube wells wherefrom CPCB had collected samples earlier in June, 2014. The NEERI report reveals that "However, during sampling it was observed that the original tube well GW-1 was blocked and a newly drilled tube well was noticed about 100 to 150 ft away from GW-1 located in the same premises.

Hence, water sample was collected from the newly drilled tube well considering it as GW-1.”

64. The team analyzed the samples for Iron, Carbonate, Sulphate, Chloride, Nitrate and Phenolic compounds. According to the data collected by the team, concentrations of carbonates, sulphates, chlorides and nitrates were found to be within the acceptable limits of IS:10500 2012. Iron concentrations were observed to be below the detectable limits. The phenolic compounds, however, could not be measured by the routinely used standard APHA method.

65. According to the NEERI team, the presence of reddish brown colour in the two groundwater samples collected by the TCIRD team (in the absence of any iron) had led them to suspect the presence of higher order phenolic compounds in the water samples. However, the water sample collected by NEERI team at GW-1 was observed to be muddy, while all others were colourless and odourless. The team observed that the concentration of sulfonated phenolic compounds in the ground water sources, especially GW-1 and GW-2, where their presence was expected in view of possible contamination, could not be measured by the routine testing method for phenols, i.e. Spectrophotometric method (21st Edn. APHA). Accordingly in view of non-availability of reference standards for sulfonated phenolic compounds, extraction of ground water samples was carried out by the team by chloroform followed by characterisation of the

extract using FTIR for its determination as total sulfonated phenolic compounds, present if any. Analysis of the chloroform extract on FTIR indicated presence of the functional groups N-H, O-H and S=O in samples GW-1 and GW-2 which confirmed presence of sulfonated phenolic compounds (see Table 6 of the NEERI report on page 905; reproduced below). In the remaining 6 samples the level of the functional groups N-H, O-H and S=O in the chloroform extract was insignificant.

Table 6: Characterization of Ground Water Samples for presence of Sulfonated Phenolic Compounds by FTIR (NEERI Report p/13)

Sample	IR bands observed	Remarks *
GW-1	3430, 1635, 1384, 1047 and 669 cm^{-1}	IR bands at 3430, 1635 and 1384 cm^{-1} confirms the presence of functional groups N-H or O-H. IR bands at 1047, 669 cm^{-1} confirms the presence of sulphony1 group.
GW-2	3416, 1635, 1089 and 630 cm^{-1}	IR bands at 3416, 1635 cm^{-1} confirms the presence of functional groups N-H or O-H. IT bands at 1089 and 630 cm^{-1} confirms the presence of sulphony1 group.

66. The NEERI report concluded that “Identification of sulfonated phenolic compounds in the ground water indicate that the

ground water in question is contaminated with the industrial wastes, especially those generated beyond the Koch cake fusion step i.e. step-9 of the manufacturing process.” This conclusion drawn by the NEERI Report was objected to by the learned Counsel appearing for the project proponent on the ground that the NEERI has not found in the entire report any fault on the part of project proponent in support of the conclusion drawn. This argument was countered by the learned Counsel for the applicant on the ground that different tests are carried out.

67. On 19.12.2014 a scientist from CPCB was asked by the NGT Bench to explain the basis on which CPCB team had termed the ground water not to be contaminated. The said scientist stated that they had arrived at the conclusion “that the water was not contaminated” on the basis of APHA method. According to him the said APHA method is the most modern one and CPCB does not have any other facility, except APHA method.

68. On the direction of the Bench, three scientists from NEERI, who prepared the NEERI Report of November, 2014, also appeared before the Tribunal on 7th January, 2015 and explained that their study had been able to establish conclusively the presence of sulfonated phenolic compounds in the ground water samples by the FTIR method, although only qualitatively.

69. It may be pointed out that “the analytical procedure **5530 D. Direct Photometric Method** uses the 4-aminoantipyrine colorimetric method that determines phenol, ortho- and meta-substituted phenols, and, under proper pH conditions, those para-substituted phenols in which the substitution is a carboxyl, halogen, methoxyl, or sulfonic acid group. This method, however, does not determine those para-substituted phenols where the substitution is an alkyl, aryl, nitro, benzoyl, nitroso, or aldehyde group. The 4-aminoantipyrine method is given in APHA (1999) in two forms: Method C, for extreme sensitivity, is adaptable for use in water samples containing less than 1 mg phenol/L. It concentrates the color in a non-aqueous solution. Method D retains the color in the aqueous solution. Because the relative amounts of various phenolic compounds in a given sample are unpredictable, it is not possible to provide a universal standard containing a mixture of phenols. For this reason, phenol (C6H5OH) itself has been selected as a standard for colorimetric procedures and any color produced by the reaction of other phenolic compounds is reported as phenol. Because substitution generally reduces response, this value represents the minimum concentration of phenolic compounds.

5530 D. Direct Photometric Method

i. *Principle:* Steam-distillable phenolic compounds react with 4-aminoantipyrine at pH 7.9± 0.1 in the presence of potassium ferricyanide to form a colored antipyrine dye. This dye is kept in aqueous solution and the absorbance is measured at 500 nm.

ii. *Interference:* Interferences are eliminated or reduced to a minimum by using the distillate from the preliminary distillation procedure.

iii. *Minimum detectable quantity:* This method has less sensitivity than Method C. The minimum detectable quantity is 10 µg phenol when a 5-cm cell and 100 mL distillate are used.

70. The learned counsel for respondents 4 – 6 and Respondent 9 contend that as per BIS, the testing methodology to be applied for analysing phenolic compounds is IS 3025 (Part 43). This testing method also been adopted by National Accreditation Board for Laboratories (NABL). According to them the test conducted by CPCB and its report filed along with the affidavit dated 18.07.2014 is as per this very method and based on this method it was observed that samples are within prescribed limits of BIS drinking water standards IS 10500:2012 (desirable limit) with respect to phenolic compounds. According to these respondents the study has concluded that “the impact of erstwhile M/s Mahalakshmi Orgochem Industries unit was not found in existing 08 tube wells. They further submit that three independent laboratories, namely M/S Skylab Analytical laboratory, M/S ITL Labs Pvt. Ltd. And M/S Shriram Institute of Industrial Research, all approved by the Ministry of

Environment and Forests have confirmed that the test method to be used for quantitative analyses of phenolic compounds in water sample is IS 3025 (part 43) and the minimum detectable limit of the said method is 0.001mg/l.

71. The learned counsel for Respondent No. 4-6 further contend that FTIR method is not the method prescribed by the Bureau of Indian Standards, Furthermore, by applying the FTIR method the quantitative analysis cannot be done. They allege that the report of NEERI is the repetition of the contents of the report by Thapar Institute. In fact the mistakes contained in the report of Thapar Institute are also contained in the report by NEERI. It is contended that in Table 5 of NEERI's report they have wrongly stated that the minimum detection limit for phenols by application of 22nd APHA spectrophotometric method is 0.02mg/l. It is submitted that as is clear from IS 3025 (part 43) by applying 5530D direct photometric method which is based on standard method for examination of water and wastewater 22nd Edition published by APHA and adopted by NABL, the desirable limit of phenolic compound in water is 0.001mg/l is to be tested by applying this method.

72. It is also contended on behalf of the said respondents that the FTIR method is sensitive only for the qualitative assessment. Furthermore, the FTIR method for GW-1 sample mentions the following IR bands

3430, 1635, 1089, 1047 and 669.

And for GW-2 it mentions the following IR bands

3416, 1635, 1089 and 630.

According to them band 3430 and 3416 are for alcohol and phenols. Band 1635 is for amines. Bands 1047 and 1089 are for aliphatic amines. Bands 669 and 630 are for alkyl halides. They submit that FTIR method itself uses methanol, which itself contains alcohol. The conclusion in NEERI's report alleging contamination is only because presence of phenols have been detected by FTIR method. However, NEERI's report does not state that there is any contamination which is beyond the desirable or prescribed limit of drinking water as specified by BIS.

73. In this context we are not impressed by the reasoning forwarded by the respondent Industry. It is true that the CPCB has prescribed 5530D direct photometric method (based on standard method for examination of water and wastewater 22nd Edition published by APHA) for the determination of phenols in the water samples, but in the preamble of the said method it is clearly mentioned that "This method, however, does not determine those para-substituted phenols where the substitution is an alkyl, aryl, nitro, benzoyl, nitroso, or aldehyde group" and the minimum quantity that can be detected through this method is 0.01mg/L, which is far higher than the desirable limit set by the BIS, that is 0.002mg/L. Further, it may be pointed out that the FTIR method used by TCIRD and NEERI has been reported to be far more sensitive

and advanced than the simple “5530D direct photometric method” adopted by BIS.

74. **Fourier Transform infrared spectroscopy** (**FTIR**) is a technique which is used to obtain an infrared spectrum of absorption, emission, photoconductivity or Raman scattering of a solid, liquid or gas. An FTIR spectrometer simultaneously collects high spectral resolution data over a wide spectral range. This confers a significant advantage over a dispersive spectrometer which measures intensity over a narrow range of wavelengths at a time [Griffiths, P. & de Hasseth, J.A. (2007) *Fourier Transform Infrared Spectrometry* (2nd ed.), Wiley-Blackwell]. As per the introductory note published in 2001 by Thermo-Nicolet Corp. (USA), the manufacturers of FT-IR spectrometers, FT-IR stands for Fourier Transform Infra-Red, the preferred method of infrared spectroscopy. In infrared spectroscopy, IR radiation is passed through a sample. Some of the infrared radiation is absorbed by the sample and some of it is passed through (transmitted). The resulting spectrum represents the molecular absorption and transmission, creating a molecular fingerprint of the sample. Like a fingerprint no two unique molecular structures produce the same infrared spectrum. This makes infrared spectroscopy useful for several types of analysis.

- It can identify unknown materials

- It can determine the quality or consistency of a sample
- It can determine the amount of components in a mixture

Why Infrared Spectroscopy? An infrared spectrum represents a fingerprint of a sample with absorption peaks which correspond to the frequencies of vibrations between the bonds of the atoms making up the material. Because each different material is a unique combination of atoms, no two compounds produce the exact same infrared spectrum. Therefore, infrared spectroscopy can result in a positive identification (qualitative analysis) of every different kind of material. In addition, the size of the peaks in the spectrum is a direct indication of the amount of material present. With modern software algorithms, infrared is an excellent tool for quantitative analysis.

75. The objection raised by the Expert engaged by the Respondents that the TCIRD has used methanol, which is an alcohol and as such must have interfered with the results also does not hold the ground. Had this been the case then the FTIR would have shown similar values in all the water samples tested by this (TCIRD) team as the methanol was used as the solvent in all of them. Further, the presence of the sulfonated phenolic substances has also been confirmed by the FTIR test done by the NEERI although they used chloroform in place of methanol. It may also be noted that CPCB have accepted that

the facility available with them is only for “5530D direct photometric method”.

76. A perusal of the four study reports, i.e., TCIRD Report of 2011, CPCB Report of 2013, CPCB Report of 2014 and CSIR-NEERI Report of 2014 and submissions made by rival parties at different stages of the case first in the Hon’ble High Court of Punjab & Haryana at Chandigarh and later on before the NGT Principal Bench at New Delhi, would clearly lead to the following facts.

a. The industrial Unit was running for almost fourteen years (to be precise, 13 years and 8 months, i.e., from July 1991 to February 2005) at the site.

b. The unit had obtained the requisite permission for the establishment of the said industrial unit. However, NOCs/Consent to operate were not obtained for the whole period and for some period the unit was run without proper consents.

c. The unit was using naphthalene as the raw material for the production of the H-acid.

d. The unit was storing the iron oxide slurry as well as gypsum slurry on the site itself.

e. The unit had constructed a pond for storing of the final waste material generated in the manufacturing process, i.e., mother liquor.

f. The unit didn’t have any incineration process for the first five years of manufacturing and the mother liquor was simply stored in the pond and passed through the evaporation process only.

g. The solid waste left over after incineration process was stored in a tank covered by tin shed.

h. Except for a small quantity of gypsum, which was sold to some third party, gypsum as well as iron oxide remained dumped on the site. There is no record to show that the gypsum and iron oxide has been disposed off properly or shifted to any other place when the unit was dismantled and the land previously occupied by the unit was put to agriculture.

i. The industrial unit closed in March, 2005 and later on dismantled completely and even the shed covering the hazardous waste was dismantled, leaving the hazardous wastes exposed to the vagaries of the weather at least for four years (March, 2005 – August 9, 2009).

j. The estimate provided by the TCIRD regarding the quantum of raw materials used, product and by-products as well as waste materials produced have not been questioned by any party, including the expert engaged by Respondents 4 - 7.

k. The calculations made by the TCIRD have revealed the utilization of less than 40% of the naphthalene processed for the manufacture of H-acid. This leads to the inference that about 60% of the unutilized naphthalene remained either in the mother liquor and/or got mixed with the iron oxide and gypsum slurry.

l. The incinerated ash, which was stored in the ash pond got ultimately shifted to TSDF facility at Nimbua during 7th – 9th August, 2008 and as such remained without any cover for the period January, 2006 – August, 2008, as the dismantling of the sheds was first noticed on 2nd January, 2006 by PPCB.

77. Based on the above narration of facts, contentions of the learned counsel on both the side, perusal of the entire records including various reports and on application of mind we frame the following issues and answer them.

a. Did the Respondents 4 - 7 have necessary approvals of competent authorities to establish and operate the said unit as mandated under various Environment related acts?
b. If the unit was having the consent to operate, did it run as per the conditions set in the consent to operate?
c. Was the unit producing any hazardous substances? If so,

   was the disposal of such wastes as per the Hazardous Wastes (Management and Handling) Rules, 1989 as amended in 2003?
d. Did the environment get affected by the said acts of the respondents and to what extent? What is the relief ?

78. Issues:

a. **Did Respondents 4 - 7 have necessary approvals of competent authorities to establish and operate the said unit as mandated under various Environment related acts?**

The answer to this question is given in the reply affidavit filed by Respondent 9 on 19.11.2013. According to him M/S Matharu Chemical Industries was given the No Objection Certificate by the Punjab Pollution Control Board vide letter No. 16708 dated 12.07.1990 for the manufacture of H - Acid @ 600kg per day. This would mean that the respondents had the consent to establish. As per his reply affidavit the following valid approvals/ consents were obtained and got renewed from time to time to ensure that the said company was in compliance with all applicable environmental legislation/requirements to the satisfaction of the Punjab Pollution Control Board, the Regulatory Authority.

Legislation	Approval/NOC No.	Date of Approval/ NOC	Period of validity of Approval/ NOC
Water Act	1.)SGR/WPC/ETP/1993-94/F-91 2.)SGR/ETA/95-10/F-173	7.10.1993 18.10.1995	30.09.1994 17.10.2010
Air Act	1.)SGR/APC/ECD/93-94/R-75	02.02.1994	30.06.1994

	2.)SGR/APC/97-09/R-157	08.10.1997	30.06.2009
HW Rules	Letter No. 4580 renewed periodically last by Letter No. 16987 DT. 09.08.2004	06.05.1997 23.04.2002 05.08.2004	18.03.1999 22.04.2004 04.08.2005

A perusal of the above tabulated list reveals that although the unit had obtained the requisite permissions under the Water and Air Act at different points of time, the unit didn't have NOC/consent to operate for the period from July, 1991 (start of manufacture) to 6.10.1993 and again from 1.10.1994 to 17.10.1995 under Water Act. Similarly it didn't have permission for the period from July, 1991 to 1.2.1994 and again from 1.7.1994 to 7.10.1997 under Air Act. The unit didn't have permission to store the Hazardous wastes for the period from July, 1991 to 5.5.1997, from 19.3.1999 to 22.4.2002, from 23.4.2004 to 4.8.2004 and from 5.8.2005 to 7.8.2008 under Hazardous Wastes Rules. So, it is quite evident that the industrial unit violated the Air Act, Water Act as well as Environment Protection Act during the periods mentioned above. The issue is answered accordingly.

b. If the unit was having the consent to operate, did it run as per the conditions set in the consent to operate?

As is revealed by the details given in the above issue, the unit didn't have Consent to operate for a considerable period of time under both Air Act and Water Act. The unit worked without any consent under Air Act for 05 years and 10 months (July, 1991 to 1.2.1994 and 1.7.1994 to 7.10.1997) and under Water Act for a period of 3years and 3 months (July, 1991 (start of manufacture) to 6.10.1993 and 1.10.1994 to 17.10.1995).

Even when the consents were in place, the Industrial Unit in question violated the conditions of the consent as is amply clear from the following two facts. The Unit was issued a show cause notice on 5th April, 2004 by PPCB for Violation of the provision of Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981. The deficiencies/violations observed included particularly:

i. The effluent from the lab section is discharged on to land for stagnation without any treatment.

ii. The cooling water from the fusion process and the boiler blow down was also being discharged onto land for stagnation.

iii. The scrubber water from scrubbers attached to boiler furnace & thermopac was not being completely re-circulated and a part of that was being discharged onto land for stagnation. The scrubber water from the scrubbers attached to control SOx &

NOx emissions is discharged onto land for stagnation.

iv. The house-keeping of the industry was very poor and there is no proper system for drainage of waste water from different sections. Although the quantity of waste water generated from different sections is small, but it is going for stagnation from most of the section. The Industry has not provided any facility for measurement of its effluent.

v. The gypsum sludge and the iron sludge generated from the process was lying in the open in the form of heaps and it was not stored under the shed.

vi. The industry has added the fusion process without obtaining any NOC from the Board. The representative of the industry told that this process has been added only about 3 months back and with the help of this process, they can use lesser quantity or raw material for producing a particular quantity of their product.

vii. The industry has not provided the sampling facilities for collection of NOx & SOx emission samples.

viii. The industry was using rice husk as fuel in its non-fluidized bed boiler furnace & thermopac furnace.

ix. The main stack of the boiler and thermopac was found broken along with the ladder.

x. The ducting connecting the exhaust from thermopac furnace to the stack was found broken.

xi. The industry has not provided proper stack height on its two no. D.G. sets of 125 KVA each.

The points raised in this show cause notice bring to fore two important deficiencies, which had remained unattended by the said industrial unit and the unit was violating the norms and was continuously polluting the environment. First, as per the conditions set in the Consent to Operate granted to the Industrial Unit under section 25/26 of Water (Prevention and Control of Pollution) Act, 1974 all trade effluents was mandated to be disposed off through solar incineration only. However, as indicated in (i) and (ii) above the effluent from the lab section as well as the cooling water from the fusion process and the boiler blow down was simply discharged onto land for stagnation. Second, the industry did not provide the sampling facilities for collection of NOx & SOx emission samples and had been polluting the air throughout its existence at the site. These facts amply prove that the project proponent, even during the short period of consent has not complied with the conditions.

c. Was the concerned industrial unit producing any hazardous substances? If so, was the disposal of such wastes as per the Hazardous Waste

(Management and Handling) Rules, 1989 as amended in 2003?

As per the Hazardous Wastes (Management and Handling) Rules, 1989 (as amended in May, 2003) "Hazardous Waste" is defined as any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances, and shall include- (a) wastes listed in cloumn (3) of Schedule-1; (b) wastes having constituents listed in Schedule-2 if their concentration is equal to or more than the limit indicated in the said Schedule; and (c) wastes listed in Lists 'A' and 'B' of Schedule-3 (Part-A) applicable only in case(s) of import or export of hazardous wastes in accordance with rules 12, 13 and 14 if they possess any of the hazardous characteristics listed in Part-B of Schedule-3. Explanation: For the purposes of this clause- (i) all wastes mentioned in column (3) of Schedule-1 are hazardous wastes irrespective of concentration limits given in Schedule-2 except as otherwise indicated and Schedule-2 shall be applicable only for wastes or waste constituents not covered under column (3) of Schedule-1; (ii) Schedule-3 shall be applicable only in case(s) of import or export."

The TCIRD Report points out that the following by-products/waste materials were generated during the production of H-Acid in the said industrial unit.

1.	Gypsum on dry weight basis
2.	Iron oxide on dry weight basis
3.	Sodium bisulphate lost in wastewater
4.	Sodium nitrite and nitrate lost in wastewater
5.	Common salt lost in wastewater
6.	Glauber salt lost in wastewater
7.	***Naphthalene lost in the wastewater***
8.	***Mother liquor***
9.	***Incinerated ash***

Item No. 7, 8 and 9 readily fall under the hazardous waste category and none of the parties in the present dispute question the inclusion of these three items as hazardous wastes.

Although gypsum and iron oxide in their pure form are not treated as hazardous in nature, but in the manufacture of H-acid they are formed as by-products and are not in pure form and contain a significant quantity of naphthalene based intermediate compounds as impurities. This is explained by Venkatesan & Saksena (1995) very clearly. According to them “in order to separate the nitro naphthalene sulphonic acid from sulphuric acid, lime and soda ash were used to precipitate the sulphuric acid as calcium and sodium sulphate respectively. This resulted in

11-12 tonnes of gypsum sludge generation per tonne of H-acid manufactured. **Gypsum sludge contained 0.5-1 per cent nitro naphthalene compounds**." **The nitro naphthalene compounds are toxic in nature.** Their study further indicates that "Iron powder and HCl were used for the reduction of nitro to amino group, resulting in the generation of 3 – 3.5 tonnes of iron sludge (Fe_20, sludge) per tonne of H-acid. **The concentration of amino compound in iron sludge was analysed to be about 4 – 5 per cent. The amino naphthalene compounds are toxic and carcinogenic in nature.**" ***Venkatesan, N & Saksena, A. K. (1995). Pollution prevention strategy at an H-acid manufacturing unit. UNEP Industry and Environment January - March 1995: 51 – 53.].***

The study conducted by Venkesan & Saksena (1995) leaves no doubt in treating the gypsum sludge as well as iron oxide sludge produced as by-product in the manufacture of H - Acid to be hazardous waste as a significant quantity of naphthalene intermediate compounds is present in them. The hazardous nature of these by-products has also been confirmed by Prof. Guha, the expert engaged by respondents 4 to 7. In his comments on the TCIRD Report Prof. Guha states thus "*the first two types of sludge (gypsum sludge and iron sludge), from the manufacturing process for H – Acid, were produced directly from the process steps involving filtration* *and were quite wet. These were dewatered and then further dried by exposing to sun. All these sludge are classified as hazardous in nature because of the contamination of toxic organic compounds."* He further states about gypsum sludge that "the product after drying was not of pure white colour and free of these matters (sic organic matters), as is desired by these users. Hence it was difficult to sell it to such users. The intermediate compounds formed during the manufacture of H-Acid include Naphthalene-di,-tri- and tetra sulphonic acids, nitronaphthalene-mono,di and tri-sulphonic acids, naphthylamine-mono and di-sulphonic acids eg. 1-naphthylamine-3,6- and 5,7-disulphonic acid, and dinaphthylsulphone-sulphonic acid and their amino and nitro derivatives. All these by- products are non-biodegradable **[Schossler et al (1979), United States patent US4166826; 1979 for discovery of H Acid manufacturing process**]. Any or all of these intermediate compounds could find its way in to the environment along with the waste products Gypsum (calcium sulphate), Iron oxide and mother liquor.

The simple answer to the consequential question as to whether the project proponent disposed of such waste as per the rules is no. The Industrial Unit didn't follow the norms set for the collection and ultimate disposal of the hazardous wastes although the unit produced a large quantity of such material. First of all it may be pointed out that the industrial unit did not even apply for the requisite NOC for the handling of hazardous wastes for six long years of H-Acid production, i.e., July, 1991 to May, 1997. And when they did apply and were given the permission to store the hazardous wastes as per the norms, the Industry just dumped the gypsum and iron oxide within the premises in a very casual manner. Only the Incinerator ash was kept in a shed covered on three sides and having a roof of sheets. However, this shed was completely dismantled in 2005 by the respondent industry and the hazardous wastes were left unattended in the open. The respondent 8,later on levelled the said land with the help of mechanized equipment (as has been clearly shown through several photographs by the petitioners. During this process the whole quantity of contaminated gypsum and iron oxide was spread on the concerned land and covered by several feet of soil used for the levelling process. This resulted in the complete exposure of the toxic naphthalene intermediates mixed with these two by-products to the rain and irrigation water as the land was put to agriculture by the respondent 8.

The incinerated ash was left open in the ash pond without any proper rain cover. It may be pointed out here that the incinerated ash could be disposed off from the site only on 7th – 9th August, 2008. This is revealed by the affidavit of Col. (Er.) Surinder Jit Singh Sandhu (Retd.) D. G. M Ramky Enviro Enginners Ltd. Opp. Vardhman Chemtech Ltd., Vill Nimbua, , Tehsil Dera Bassi Distt, Mohali, dated 29.04.2009 which is placed on record . In his affidavit, Col. Sandhu submits that he is operating the Treatment Storage Disposal Facility (TSDF) Nimbua on behalf of Nimbua Greenfield Punjab Ltd. as operator and that the waste from the site of the Mahaluxmi Orgochemicals Industries was collected by his own transport i.e. Ramky Enviro Engineers Ltd. In all, 7 trips were made for collecting 101.830 M.T. of waste from 7th to 9th August, 2008 as per details given below.

S. No.	Manifest No.	Qty. of Waste lifted & transported to TSDF, Nimbua
i)	2245	10.30 MT
ii)	2246	9.610 MT
iii)	2247	16.065MT
iv)	2248	19.290MT
v)	2249	18.545MT
vi)	2250	15.500MT
vii)	2251	12.520MT
	Total	101.830MT

Accordingly this leads to the conclusion that the said toxic ash was there in the uncovered ash pond for at least two years and seven months [at least, from first week of January, 2006 (PPCB official noticed it on 10.01.2006) to 7th August, 2008]. During this period the ash passed three monsoons and many of the toxic ingredients must have dissolved in rain and got dispersed to the adjoining areas.

As per No. HMC/SGR/2004-2005/R-2060 Sh. C. L. Dhawan of M/s Mahaluxmi Orgochem Industries previously known as M/s Matharu Chemical Industries was granted an authorization by the PPCB under Rule 5 of the Hazardous Wastes (Management & Handling) Amendment Rules, 1989 as amended in 2003 to operate a facility for collection and storage of hazardous waste on the premises on the Terms and Conditions, which inter alia included, the following conditions.

i. ----
ii. .....
iii. The person authorised shall not rent, lend, sell, dispose, transfer or otherwise transport the hazardous waste without obtaining prior permission of the Board.
iv. Any unauthorized change in personnel, equipment and working conditions as mentioned in the

application by the person authorized shall constitute a breach of his authorization.

v. It is the duty of the authorized person to take prior permission of the state Pollution Control Board to close down the facility.

vi. The occupier generating hazardous waste/operate of a facility for collection and storage of hazardous waste shall maintain records of such operations in Form-3.

vii. ……

viii. …….

ix. An occupier who is generating hazardous waste shall store his waste category wise on site in environmentally sound manner.

x. An occupier/generator shall not store hazardous wastes in open ground. It must be stored in an isolated site away from plant operational area.

xi. The storage tank/container of the hazardous waste should be in good condition and made of (or lined with) an appropriate material which does not react with the waste contained in it and can withstand the physical and environmental conditions during storage and handling.

xii. The occupier generating hazardous waste shall mark each container holding hazardous waste with the marking “HAZARDOUS WASTE” both in English and Punjabi.

xiii. The storage area should be fenced properly and a sign Board indicating “DANGER” and “HAZARDOUS WASTE” sign & nature of the waste shall be placed at storage site.

xiv. ……

xv. …..

xvi. The industry shall store the hazardous waste in environmentally sound manner and pack the hazardous waste sludge in impervious bags/containers strong enough to sustain rigour of handling, storage, transportation and weather conditions. The storage facility must be covered from upper side.

xvii. ……

xviii. …….

xix. The occupier and operator of a facility shall also be liable to reinstate or restore damaged or destroyed elements of the environment at his cost, failing which the occupier or the operator of a facility, as the case may be, shall be liable to pay the entire cost of remediation or restoration and pay in advance an amount equal to the cost estimated by the State Pollution Control Board.

xx. …….

xxi. ……

xxii. …….

xxiii. ……

xxiv. …….

xxv. …….

xxvi. …….

xxvii.……

The Industry in question violated all the above mentioned terms and conditions, more or less for the whole period of its operation at the site. No record was maintained in respect of Gypsum and Iron oxide, which because of the presence of quantities of naphthalene based compounds qualified to be treated as hazardous wastes and neither of these materials was stored properly and laid on the premises in a scattered manner without proper cover. Even the most hazardous incinerated ash was kept in the open for more than two years.

The land on which the industry-produced hazardous wastes were lying was sold without proper permission of the PPCB as was mandated by the terms and conditions governing the consent to store hazardous wastes. The issue is answered accordingly.

d. Did the environment get affected by the said acts of the respondents and to what extent? What is the relief?

According to the TCIRD report the profile of the salt level (sum of iron, sodium, sulphate, nitrate and chloride) in the groundwater indicates that the groundwater has been contaminated by the following two sources.

i. Percolation and leaching of contaminants from the onsite solid/hazardous waste storage and disposal and from the solar evaporation ponds.
ii. Direct injection of wastewater into the groundwater at 150ft depth (liquor discarded in the H-acid manufacturing step 11 after filtration recovery of the sodium salt of H-acid appears to be the wastewater discharged into the groundwater through direct injection).

TCIRD concluded that the contribution to the ground water pollution by the percolation/leaching from the solid /hazardous waste storage tanks and from the solar evaporation ponds is relatively lesser and the ground water pollution is mainly from the direct injection of wastewater into the groundwater (which was apparently discontinued by 2005). Total salt level in the top layer of the groundwater (1435mg/L at 105ft depth) is higher than that at 120ft depth (1133mg/L). This could be because of the contributions through percolation and leaching from the overburden soil, the solar evaporation ponds and from the solid/hazardous waste storage. Beyond 120ft depth, the total salt levels are increasing up to 140ft depth (to 3178mg/L) and then decreasing (2012mg/L at 160ft). The latter might be from the direct injection of the wastewater might be at 140 – 150ft depth.

As per the CPCB July 2013 report, during the field survey, it was observed that the colour of surface soil was red at many places within the premises of the closed industrial unit. Soil of black colour was found at 4 feet depth near the so called solar evaporation pond. It was found that black liquor was present at the depth of 5 feet near the site of solar evaporation pond which depicts that leftover industrial process waste is still lying there.

The report further observed that coloured water was pumped out of the tube well installed in the premises of the unit (Depth of the tube well 280 feet) even after continuous flow for 105 minutes. The report inferred that the groundwater quality exceeds the desirable limits of drinking water with respect to TDS, total alkalinity, total hardness, colour, calcium and iron. Therefore it is crystal clear that the environment got affected grossly by the lethargic attitude of the project proponents.

79. As we have concluded that the project proponents have not obtained consent for a considerable number of years and even during the period of consent they have not acted as per the terms contained therein and that there is a clear breach in respect of handling of hazardous waste, we have to decide about the relief which includes remediation process. The first step that requires to be done is the removal of hazardous

waste stored in the form of sludge created during the manufacturing process. Then comes the purification of water in the area surrounding the unit with all precautionary steps to be taken in the meantime.

80. The Central Pollution Control Board, in its report of August 2013, while assessing the ground water contamination near M/S Mahalaxmi Organochem Industry, namely the 5th respondent, arrived at a conclusion that the coloured ground water was observed from the deep tube well within the premises of the unit in the depth of 280 ft and the ground water quality exceeded the desirable limit of drinking water with respect to TDS, total alkalinity, total hardness, colour, calcium and iron, and suggested the following recommendations:

A. Ground water and soil sampling of erstwhile unit were conducted during monsoon season i.e July, 2013. There is need to carry out post monsoon monitoring preferably during November in order to have representative sample.

B. Immediate measures and controls

    i. The leftover industrial process waste lying at the depth of 4ft should be removed and disposed to approved Treatment, Storage and Disposal facility.

    ii. The voids filled with clayey soil.

iii. Use of land for any other purposes including cultivation should be avoided till remediation is completed.

iv. Access to the site be restricted with the help of fencing.

v. The leaching from site may be minimized by laying a compacted clay layer of 30- 60 cm depth with proper slope.

C. Remediation of contaminated site

The following methodology shall be followed for remediation of contaminated site of M/S Mahalaxmi Organochem Indusries, Nabha Road, Bhawanigarh, Sangrur District Punjab.

i. Preliminary site verification supported with data/ background information of contaminated site and development of conceptual plan with monitoring protocol for detailed site investigation.

ii. Undertaking detailed site investigation by conducting studies which include-

- drilling of sampling borewells in & around the site for assessment of soil &ground water quality
- conducting geo-technical studies comprising hydro- geological investigations

- delineate the boundaries of contaminated site and quantification of contaminated soil.
- Evaluation of the results to identify potential Sources, pathways and receptors

iii. Risk assessment study of the site based on socio- economic and environmental assessment of contaminated area by using appropriate risk assessment model.

iv. Identification of remediation goals/ objectives based on reduction of risk and also the intended future land use and selection of remedial option.

v. Design of remediation plan for the approved remediation option.

vi. Preparation of DPR for selective remediation based on the investigation details.

vii. Execution of actual remediation work.

viii. Assessment and validation of remediation work.

ix. Future monitoring of the remediated work.’

81. The Thapar Center for Industrial Research and Development (TCIRD) in its report dated 04-01-2011, concluded that there was (1) localised contamination of ground water through injection of about 28000 m3 of industrial wastewater at about 140-150 depth, (2) the

presence of about 10000 m3 industrial waste was found concentrated to different levels in the solar evaporation ponds, (3) heavy contamination of about 600 m^2 land with the thick black liquor of the solar evaporation ponds on the northern side (4) presence of iron oxide sludge in the north – eastern corner of the industrial site and buried organic waste on the south- western side of the solar evaporation pond and (5) contamination of top soil within the industrial premises specially with iron oxide and gypsum sludge, has opined that the contaminated water needs treatment atleast to remove the methanol extractable organic compounds. According to the said Center, the treatment can include

- raising pH to > 11 with lime to precipitate the colour imparting

  methanol extractable organic matter

- settling/ clarification to remove the precipitated organic matter

- neutralizing the clarified water with sulphuric acid to about 7 pH.

82. It is also observed by the Center that the liquor and other waste present in the solar evaporation ponds may be treated as hazardous waste and lifted and transported as it is or after sufficient treatment like neutralization, concentration and filtration to TSDF for disposal. It is also stated that contamination of top soil within the premises of the unit,

specially with iron oxide and gypsum sludge may be taken care of by steps like:

- Avoid run on of the storm water from the surrounding areas through creating berns/barriers and diverting the storm water specially on the eastern and southern sides.
- Avoid flood irrigation of the land within the industrial unit premises and impose restrictions on the crops to be grown. Fiber and energy plantation crops may be most the appropriate. Food and fodder yielding crops may be avoided.

83. The CERD Instruments and Consultants, Noida, who appears to have been consulted by the PPCB to effect a study regarding the remediation of ground water contamination has submitted a report in the form of an offer in July 2012, stating that a detailed analysis would be carried out and inference would be drawn on the basis of scientific results. While explaining the data required for such study, the said consultant has also stated that the remediation work can be completed in a period of seven months as per the schedule annexed. They have also given the schedule of payments for undertaking the work stating that the expenses may be around Rs.29,89,000/ with Service Tax. Therefore it is clear from the above particulars that remediation is possible and the hazardous waste lying in the form of sludge in the premises of the unit must be removed. Further, the unit which is found to have not only committed breach but also caused

environmental disaster is liable to be penalised under the principle of ‘Polluter Pays’.

84. It is to be noted that the 8th respondent, Tara Singh, who is a resident of the village was impleaded in the Hon’ble High Court on 17-08-2009 to assist the court. He is the purchaser of the land of the company, the 4th respondent through the 6th respondent on 28-02-2007. The Hon’ble High Court in the order dated 29-08-2011has directed the 8th respondent to deposit the expenses for restoration of damages. The said 8th respondent filed C.M.P. No.12551/2011for discharging him from the liability, as he was a bonafide purchaser. By an order dated 20-12-2011, the Hon’ble High Court, while discharging the said 8th respondent, directed the 4th to 7th respondents to deposit the said amount. Therefore, it is clear that the High Court has also found him as a bonafide purchaser. Therefore, we hold that the said 8th respondent cannot be made responsible for the pollution caused by the other respondents.

85. The 9th respondent Shri. Gurcharan Singh Matharu who was impleaded subsequently, was a director of Matharu Steel Private Ltd, the 4th respondent, till 2003. He also acted as a director of Matharu Chemical Industries since 1991 till 2003. Even though he takes a stand that he sold his rights in the company to the 6th respondent under an agreement dated 28-03-2003 and therefore the vendee should take up the responsibility, in our view, he cannot disown his obligation by merely transferring his interest in the unit. The respondents

who have polluted the ground water eversince the date of their industrial activities from 1991 till 2005 and even now continuously, as it has been found by the experts that traces of phenolic compounds, carbonate,sulphate and nitrate are found in the lands and water around the 5th respondent unit, are liable to compensate under ‘Polluter pays ’principle. Taking note of the fact that the pollution caused has serious implication on the living condition of the people and that the process of remediation will take some more years, we are of the view that they should be directed to pay atleast an amount of Rs. Two crores to be used for providing safe drinking water and better solid waste management facilities to the people of the petitioner’s villages.

86. Accordingly, we pass the following order:

1. The Application No. 35/2013 stands allowed.
2. It is declared that the Respondent 4 , 5 units also represented by Respondent 6 & 7 as the directors of the 4th and 5th respondent company and respondent 9, by their industrial activities have polluted the air, land and water including the ground water and produced and stored hazardous waste unauthorisedly and without any proper disposal.
3. The Respondent 4 to 7 and 9 shall remove all hazardous waste still lying in the premises of M/S Mahalaxmi Orgchem Industries under the joint supervision of the Central Pollution Control Board and the Punjab State

Pollution Control Board at their cost and within a period of three months from today. To effect such speedy removal both the Boards shall do all necessary assistance, guidance both expertise and otherwise and shall also be entitled to obtain any further opinion/ opinions at the cost of the 5th respondent and its Directors.

4. The Respondent 4 to 7 and 9 shall effect remediation of water contamination in the premises of the unit and all the surrounding areas polluted by the activities of the unit at their cost. This shall be done under the joint supervision of the CPCB and PPCB, who shall suggest the suitable method through appropriate agency/agencies. The steps shall include prevention of agricultural activities in the surrounding area as suggested by the Boards and all other precautionary methods. The said process shall be completed in a period of eight months from today.
5. The CPCB and PPCB shall file periodical report about the progress in the Registry of the Principal Bench of the NGT, once in a month commencing from 01- 11- 2015.
6. That apart, the Respondents 4 and 5 along with their Directors Respondent no. 6 and 7 and 9 shall pay an amount of Rs. Two crores under the principles of 'Polluter Pays' in the following proportion i.e Respondent no. 4 along with all its Directors including Respondent no. 6

and 7 to the extent of 40% jointly, Respondent no. 5 and all its Directors to the extent of 30% jointly and the remaining 30% by the 9th Respondent. The said amount shall be deposited within 8 weeks from today with the Principal Secretary, Ministry Environment, State of Punjab, who shall keep the said amount in a separate account and spend for providing safe drinking water and better solid waste management facilities to the people of Village Toori, BaladKalan and BaladKooti, Tehsil Bhawanigarh, District Sangrur with prior approval of the N.G.T.

7. The Respondents 4 to 7 and 9 shall be liable to pay cost of Rs. 25000/ to be payable to the learned counsel for the applicant/Amicus and another amount of Rs.50000/ to the applicants as cost.
8. M.A. No. 21 of 2014 does not survive as the main application No. 35/2013 (THC) has been finally disposed of.

Justice Dr. P. Jyothimani
Judicial Member

Justice U. D. Salvi
Judicial Member

Prof. A. R. Yousuf
Expert Member

Mr. Bikram Singh Sajwan
Expert Member

New Delhi
23rd September, 2015