

BEFORE THE NATIONAL GREEN TRIBUNAL, PRINCIPAL BENCH,
NEW DELHI

M.A. No. 103/2022

IN

Original Application No. 169/2021

H.C. Arora

Applicant

Versus

State of Punjab & Ors.

Respondents (s)

Status report of Punjab Pollution Control Board in compliance of order dated 02.01.2024

Respectfully Showeth

1. That briefly submitted, the Hon'ble National Green Tribunal has taken cognizance of the above-mentioned case / application filed by Sh. H.C Arora with grievances against failure of the State Authorities to take remedial measures against contamination of ground water in village Aloarakh, Block Bhawanigarh, Tehsil Sangrur. The Hon'ble National Green Tribunal has issued directions in the case from time to time and the Board in compliance had filed status reports.
2. That after consideration of the report filed by Punjab Pollution Control Board on 31.12.2023 (in compliance to order dated 05.12.2023), the Hon'ble Tribunal was pleased to issue further directions for compliance by the authorities vide order dated 02.01.2024. The Punjab Pollution Control Board was directed to file fresh report within a period of six weeks by e-mail at Judicial.ngt@gov.in preferably in the form of searchable PDF/OCR support PDF and not in the form of image PDF.
3. That in compliance to order dated 02.01.2024, fresh status report is being filed, summarizing the actions taken by the Board in continuation of the status report already filed on 31.12.2023. The actions taken by the Board may kindly be read as under: -

(Arora)

- i. Lifting of loose soil from site under question was carried out to an extent required to facilitate NEERI, Nagpur in carrying out Geo-Physical survey. Approximately, 4,80,000 cubic ft. of loose soil has been shifted from site to M/s A.R.Bricks, Village Turi, Tehsil Bhawanigarh, District Sangrur (lessee of the site).
- ii. The team from NEERI, Nagpur has carried out Geo-Physical survey at site from 31.12.2023 to 10.01.2024. The team also collected soil samples from different locations within the site and samples of loose soil shifted from site to M/s A.R. Bricks were also collected by the team. The team has also carried out ground water sampling in an area within 05 Km radius of site.
- iii. The Board vide letter no. 4888 dated 02.02.2024 has requested NEERI to submit a detailed conclusive report in the matter, latest by 05.02.2024 w.r.t geophysical survey, ground water and soil sampling carried out during course of monitoring at site, so as to enable the Board to take further remedial action. **A copy of letter no. 4888 dated 02.02.2024 is enclosed as Annexure-A.**
- iv. The Board vide letter no. 3865 dated 12.02.2024 has issued directions u/s 5 of the Environmental (Protection) Act,1986 to M/s A.R. Bricks for not to utilize soil shifted from site under question, for making bricks or other activities without obtaining permission of the Board. **A copy of letter no. 3865 dated 12.02.2024 is enclosed as Annexure-B.**
- v. The NEERI, Nagpur vide email dated 12.02.2024 has submitted a report on Environmental Site Assessment, February 2024 delineating history of the case, scope of work, activities carried out during course of investigation and planned future activities. **A copy of February, 2024 report of NEERI is enclosed as Annexure-C.**
NEERI vide said report has informed "*preliminary processing of the Geophysical survey has been done and will be refined after soil sampling is completed and the analysis of the soil samples*". Moreover, delineation of contaminated area and action plan for remediation has been scheduled by NEERI for future activities.

Werni

4. That the conclusive report of NEERI, Nagpur indicating extent and quantum of soil and ground water contamination & remedial action plan is still awaited. Remedial action will accordingly be initiated by the Board after the receipt of report from NEERI, Nagpur and examination thereof.
5. That the fresh status report in compliance to order dated 02.01.2024 is hereby submitted for kind perusal and consideration of the Hon'ble Tribunal.

Submitted by



(Er. Guneet Sethi)
Environmental Engineer,
Punjab Pollution Control Board,
Regional Office Sangrur

Date:21.02.2024

Place: Sangrur



ਪੰਜਾਬ ਪ੍ਰਦੂਸ਼ਣ ਕੰਟਰੋਲ ਬੋਰਡ

PUNJAB POLLUTION CONTROL BOARD

No. 4888
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Dated. 02/02/2024

Dr. Atul Narayan Valdiya (Director),
National Environmental Engineering Research Institute,
Nehru Marg, Nagpur-440020
Maharashtra

Subject Request regarding submission of detailed conclusive report in the matter of M/s Matharu Chemical Industries, Vill. Aloarakh, Tehsil Bhawanigarh, District Sangrur.

In reference to the subject cited matter, it is intimated that the Hon'ble NGT in the last hearing on 02/01/2024 passed an order (copy attached) and the relevant points of the said order are reproduced as under:

8. Learned Counsel for PPCB has submitted that survey by NEERI will be completed by 31.01.2024.
9. Learned Counsel for PPCB is not in a position to point out as to whether soil which is being lifted is also contaminated and reason requiring lifting of the soil from the site is required.
10. In the circumstance of the case, we deem it proper to issue notice to National Environmental Engineering Research Institute, Nagpur (NEERI) through its Director.
11. Applicant is directed to serve the newly added respondent and file affidavit of service on before the next date of hearing.
15. PPCB is also directed to file a fresh report within a period of six weeks by e-mail at judicial-ngt@gov.in preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF."

As directed in the said orders, NEERI Nagpur is also considered as one of the respondent by Hon'ble NGT and the Board has to file fresh report in the matter within a period of six weeks.

As such, you are requested to submit a detailed conclusive report in the matter, latest by 05/02/2024, w.r.t geo physical survey, ground water and soil sampling carried out during the course of monitoring at site, enabling the Board to include the same in its report to be submitted in the Hon'ble NGT as well as to take further necessary remedial action in the matter.
DA/ as above.


Member Secretary
AZ

Endst. No. 4889

Dated. 02/02/2024

A copy of the above is forwarded to the Environmental Engineer, Punjab Pollution Control Board, Regional Office, Sangrur for information & necessary action.


Member Secretary
AS

ਵਾਤਾਵਰਣ ਭਵਨ, ਨਾਭਾ ਰੋਡ, ਪਟਿਆਲਾ - 147001

Vatavaran Bhawan, Nabha Road, Patiala - 147001

Phone : Chairman. : 0175-2215793, Member Secretary : 0175-2215802 (O), 2215636 (FAX)

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Annexure - B

ਪੰਜਾਬ ਪ੍ਰਦੂਸ਼ਣ ਕੰਟਰੋਲ ਬੋਰਡ

PUNJAB POLLUTION CONTROL BOARD

No. 3865

Dated. ... 12/2/24

To

M/s A.R. Bricks,
Village Turi Bhawanigarh,
Sangrur.

Subject: Directions u/s 5 of the Environment (Protection) Act, 1986 for not to utilize loose soil shifted from the contaminated land at Village Aloarakh.

The Hon'ble National Green Tribunal has taken cognizance of an application filed by Sh. H.C Arora with the grievance against the failure to take remedial measures in respect of contamination of groundwater in Village Aloarakh, Block Bhawanigarh, District Sangrur. The application was registered as Original Application No. 169 of 2021 titled as H.C Arora v/s State of Punjab and Others;

Whereas, vide order dated 20.7.2021 passed in O.A No. 169 of 2021, the Hon'ble National Green Tribunal has constituted a five-member Joint Committee comprising of the Central Pollution Control Board; Regional Office; Ministry of Environment, Forest and Climate Change, Chandigarh; State Pollution Control Board, a nominee of Secretary Environment Department, Punjab and District Magistrate, Sangrur to visit the site, interact with the stakeholders, assess the ground situation and recommend the measures required to be taken and report was called by Hon'ble National Green Tribunal;

And whereas, the Joint Committee constituted by the Hon'ble National Green Tribunal had submitted the report on 30.03.2022 which was taken note of by the Hon'ble Tribunal in order dated 31.03.2022. The detailed report revealed the contamination of ground water and also remedial actions. As per the report, five tubewells in the area were found having Total Organic Carbon (TOC). Two out of five tubewells were found having significant concentration of Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD) and rest three tubewells were found having high nitrate concentrates, confirming contamination of ground water in these five tubewells;

And whereas, the Hon'ble National Green Tribunal had disposed of Original Application No. 169/2021 by an order dated 31.03.2022 by issuing the following directions:

"5. Having regard to the composition of the Committee and the material considered in the report and also in absence of any opposition by the State in spite of copy of report having been served on it, we accept the report of the Committee and issue directions in terms thereof. The Chief Secretary, Punjab, in coordination with the concerned authorities may ensure remedial action speedily to effectuate the guaranteed right of the citizens to clean potable water. The Chief Secretary may also take into account the suggestions in the additional report referred to above. The cost of remediation has to be borne by the State in the first Instance without prejudice to the recovery of the amount later from the violators/erring officers. Area in question be treated as

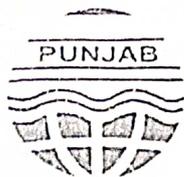
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'contaminated site' and remediation plan as per the Report of the Joint Committee may be executed within six months. If it becomes necessary, the Plan may be suitably modified in consultation with CPCB and any other Institution. Chief Secretary may constitute a credible executing/ monitoring Committee to get the remediation plan executed and to monitor its timely and proper execution. Status report of compliance as on 31.8.2022 may be forwarded to Registrar General, NGT on or before September 30, 2022 by email. District Magistrate, Sangrur may place the information in public domain and appropriately caution the inhabitants about contaminated water in the interest of public health. PPCB and State GWB may regularly monitor the quality of contaminated water."

And whereas, in compliance to the directions of the Hon'ble National Green Tribunal, status report was filed by the Punjab Pollution Control Board on the basis of which M.A. no. 103/2022 was registered. The Hon'ble Tribunal had considered the further report in the proceeding dated 06.02.2023 and had found that the issue relating to remediation of contamination of soil and supply of potable drinking water in the area required further consideration and had accordingly, issued the following directions vide order dated 6.2.2023:

"5. From the above, it is seen that the issue of remediation of the contaminated site and supply of potable drinking water in the area requires further consideration. It needs to be verified whether the contamination is confined to five wells or has further migrated to other wells. Since the issue has been pending for more than ten months, it is necessary to have personal interaction on the issue with nominees of the CPCB, District Magistrate, Sangrur, Chief Engineer, Public Health Engineering Department, Punjab and Member Secretary, State PCB after they deliberate upon the same. They may hold a joint meeting within one week and furnish a report to this Tribunal within two weeks by email."

Whereas, in compliance to the directions dated 6.2.2023 of the Hon'ble National Green Tribunal, the Joint Committee has filed a fresh report dated 13.04.2023, which reveals that fresh ground water sampling from 18 borewells from the area in question was taken and it was found that the contamination had spread significantly. The conclusion of the committee in respect of human health risk assessment is reproduced below:

"The site under reference has been declared contaminated site in the year 2016-17 by Ministry of Environment, Forests and Climate Change (MoEF&CC) and therefore needs to be remediated by following the procedure specified by MoEF&CC and CPCB in the Guidelines. In view of this and the fact that this contaminated site is currently being used for agriculture purpose, an immediate action in a time bound manner, is required by State Pollution Control Board to undertake detailed investigation by involving reputed institute/consultant having experience in the field. This investigation may take 04-05 months. The concentration levels in the samples collected during investigation must be compared with Canadian Screening Criteria for Soil/Sediment/ Ground Water/Surface-Water. One the above exercise is

Contd.--3



done; Human Health Risk Assessment may be required to find out remediation target level."

In respect of bio-magnification in agro-products, the conclusion of the Committee is reproduced below:

"The joint committee constituted earlier in the matter of OA No. 169/2021 conducted study on "the effect on agriculture crops and Biomagnification of contaminants in agro products" under the directions of Hon'ble National Green Tribunal. In view of the fact that now the contamination has been found to be migrating further, it is recommended that Biomagnification study with all the crops grown in the area, is conducted by SPCB in the entire catchment area of 18 borewells monitored by the Joint Committee, so that timely corrective action with regard to public health is taken based on the outcome of the study."

And whereas, the Hon'ble National Green Tribunal has considered the Joint Committee report and observed that the problem is aggravating with the passage of time and it is a serious problem which needs to be considered and appropriate remedial measures are required to be taken by the competent authorities without any delay. The Hon'ble National Green Tribunal vide order dated 5.9.2023 had directed that contaminated ground water sources may be declared 'unfit' for human consumption and agriculture and interim measures be adopted and commissioned to remediate contaminated well water/borewell. Also, proper arrangement of potable water supply be increased in effected villages;

And whereas, in order to conduct geo physical survey of the contaminated site the National Environmental Engineering Institute had requested the Board to get the site clear of the soil layer which has been laid over the hazardous waste at Village Aloarakh, Block Bhawanigarh, District Sangrur;

And whereas, the soil which was stored by M/s A.R. Bricks, Village Turi Bhawanigarh, Sangrur on the contaminated site of M/s Maha Laxmi Orgochem Industries (Proprietor M/s Matharu Steel Pvt. Ltd., (Bhawanigarh, Nabha Road, Bhawanigarh, District Sangrur, has been started to be shifted to the designated site of said brick kiln at Vill. Turi;

And whereas, in exercise of its powers and performance of its functions under the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, the Chairman, Punjab Pollution Control Board has been delegated powers by the Central Government to issue directions u/s 5 of the Environment (Protection) Act, 1986 to any person, officer or authority and such person, officer or authority shall be bound to comply with such directions;

And whereas, the status of contamination of the shifted soil is yet to be ascertained, as such could not be allowed to utilize in brick manufacturing or any other activities till adequate investigation is carried out by the Board;

And whereas, the case has been considered by the undersigned Chairman of Punjab Pollution Control Board and I am satisfied that the objective of the Board in carrying out the said action for prohibition of utilization of the shifted soil in any manner for the protection and preservation of the environment, which has been damaged by the industrial unit i.e. M/s Maha Laxmi Orgochem Industries (Proprietor M/s Matharu Steel Pvt. Ltd.,



(Bhawanigarh, Nabha Road, Bhawanigarh, District Sangrur, cannot be carried out except with the issuances of directions u/s 5 of Environment (Protection) Act, 1986;

And whereas, there is likelihood of grave injury to the environment in view of the prevailing facts and circumstances as has been explained above and as such it is not expedient to provide an opportunity either for personal hearing to the owner of the land or to file objections against the directions being issued;

Therefore, considering all the facts and circumstances of the case, I, Prof. Adarsh Pal Vig, Chairman, Punjab Pollution Control Board in exercise of the delegated powers and performance of functions of the Board under the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 hereby issue the following directions u/s 5 of the Environment (Protection) Act, 1986:

"That M/s AR. Bricks, Village Turi Bhawanigarh, Sangrur shall not utilize the shifted soil from the site of M/s Maha Laxmi Orgochem Industries (Proprietor M/s Matharu Steel Pvt. Ltd., (Bhawanigarh, Nabha Road, Bhawanigarh, District Sangrur to utilize in brick manufacturing or any other activities without the permission of the Board."

Any violation of the above direction shall be viewed seriously and action will be taken under the provisions of the Environment (Protection) Act, 1986.

Endst. No. 3866

Date: 12/12/24

ਮਿਤਲ ਮਿਲੇ
(Prof. Adarsh Pal Vig)
Chairman

A copy of the above is forwarded to the Chairman, Central Pollution Control Board, Parivesh Bhavan, East Arjun Nagar, Delhi-110032 for information please.

Endst. No. 3867-69

Date: 12/12/24

ਮਿਤਲ ਮਿਲੇ
(Prof. Adarsh Pal Vig)
Chairman

A copy of the above is forwarded to following information and necessary action please with instructions to implement the directions aforementioned:

- 1) The Chief Environmental Engineer, Punjab Pollution Control Board, Bathinda
- 2) The Senior Environmental Engineer, Punjab Pollution Control Board, Zonal Office-2, Patiala.
- 3) The Environmental Engineer, Punjab Pollution Control Board, Regional Office, Sangrur.

ਮਿਤਲ ਮਿਲੇ
Chairman

**Detailed Environmental Site Assessment and Action Plan for
remediation of contaminated groundwater and soil in vicinity
of M/S Matharu Chemicals Industries, Bhawani garh, Sangrur
District, Punjab**

Sponsor:

Punjab Pollution Control Board



**CSIR-National Environmental Engineering Research Institute
(CSIR-NEERI)**

(Under Council of Scientific & Industrial Research, New Delhi)

Nehru Marg, Nagpur – 440 020

February 2024

1.0 Introduction

M/s Matharu Steel Private Limited established the Industrial unit in July 1991 by the name “M/s Matharu Chemical Industries” in Village Toori, Tehsil Bhawanigarh, District Sangrur for manufacturing H-acid (Sodium Salt). H-acid is 1-amino, 8-naphthol, 3, 6-disulfonic acid with empirical formula $C_{10}H_8NO_7S_2Na_2$. The name of the unit was later changed to M/s Mahalaxmi Orgochem Industries.

M/s Matharu Chemicals Industries had obtained the requisite permissions/approvals/consents for the establishment and operations of the industrial unit from Punjab Pollution Control Board (PPCB). As per the industry representative’s reply affidavit filed on November 19, 2013, M/S Matharu Chemical Industries was given the No Objection Certificate (Consent to Establish) by PPCB on July 12, 1990 for the manufacture of H - Acid @ 600kg per day. Similarly, 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 of PPCB.

The production of H-Acid continued till March, 2005 and the unit was later closed in 2005. The sheds covering the hazardous waste were dismantled, leaving the hazardous wastes exposed to the vagaries of the weather at least for four years (March, 2005 - August 9, 2009).

Following quantity of raw material was used every day to produce 580 kg (~600 kg) of Sodium Salt of H-Acid:

- I. Naphthalene 600 kg
- II. Sulphuric Acid 3039 kg
- III. Oleum 1790 kg
- IV. Nitric Acid 372 kg
- V. Calcium hydroxide (Calcium Carbonate) 1637 kg
- VI. Hydrochloric Acid 751 kg

- VII. Soda Ash 900 kg
- VIII. Caustic Soda 860 kg
- IX. Iron powder 650 kg
- X. Common Salt 2700 kg

While manufacturing H-Acid, following quantity of by-products/waste is generated every day:

- I. Gypsum 3503 kg
- II. Iron Oxide 852 kg
- III. Sodium Bisulphite 550 kg
- IV. Sodium Nitrite and Nitrate 110 kg
- V. Common Salt 3005 kg
- VI. Glaubers Salt 1636 kg

It is mentioned that the unit had solar evaporation pans (4 nos) for the disposal of the treated effluent (PPCB communication-Annexure I). It is mentioned that approximately 150 tons/per day of effluent was generated, which was disposed on the Solar Evaporation Ponds (SEP). The monitoring data shared by PPCB (Annexure-II) mentions high TDS (approximately 7393 and 13469 mg/L in samples collected from the Solar Evaporation Pond-I and Solar Evaporation Pond-II respectively of the treated effluent).

2.0 Chronology of the critical events

An attempt is made to highlight following critical events since the inception of the industry till today based on available data with a disclaimer as included at the end of the report:

- I. M/S Matharu Chemicals Industries was granted NOC by Punjab Pollution Control Board (PPCB) for producing 580 kg (~600 kg) H-acid on July 12, 1990

- II. PPCB in respect of the application of M/s Matharu Chemical Industries renewed authorisation under the Hazardous wastes (Management & Handling) Rules 1989 as amended in 1/2000 on March 4, 2002
- III. PPCB issued a show cause notice to M/S Matharu Chemicals Industries for Violation of the provision of Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 on April 5, 2004
- IV. PPCB officials visited the industry on May 24, 2004 in connection with the renewal of authorisation under the Hazardous Wastes (Management and Handling Rules).
- V. PPCB granted an authorization under Rule 5 of the Hazardous Wastes (Management and 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 for a period of one year from August 05, 2004, the date of issue of the authorization.
- VI. M/S Matharu Chemicals Industries informed PPCB on March 18, 2005 that the industry is temporarily closed.
- VII. PPCB found that the industry is closed during the site visit on March 21, 2005.
- VIII. PPCB issued closure directions to M/S Matharu Chemicals Industries vide a letter dated November 9, 2005.
- IX. Letter issued by PPCB on April 16, 2006 mentioned that the over ground parts of the industrial unit were dismantled during 2005 as confirmed during the visit of PPCB officials to the site on January 10, 2006.
- X. PPCB issued further directions to the industry not to dispose hazardous waste lying in the industry premises vide a letter dated February 16, 2006.
- XI. Water quality analysis by PPCB on November 23, 2006 confirmed groundwater contamination
- XII. Mr Tara Singh, a resident of the same village where industry exists, purchased the land of the industry on February 28, 2007.

- XIII. **A petition (CWP 3481 of 2007) is filed in Punjab and Haryana High Court against M/S Matharu Chemicals Industries on 06.03.2007.**
- XIV. Hon'ble High Court directed the PPCB on April 02, 2009 to inspect the site and analyse the samples taken from there and submit the status report.
- XV. PPCB submitted an affidavit along with the report to Hon'ble High Court on July 15, 2009.
- XVI. PPCB engaged Thapar Centre for Industrial Research Development (TCIRD), Patiala on April 01, 2009 to carry out a detailed investigation regarding the length, breadth and depth of ground water contamination as well as hazardous waste.
- XVII. Hon'ble High Court, allowed the PPCB on August 17, 2009 to go ahead with the detailed investigations by TCIRD
- XVIII. TCIRD completed the study 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 January 10, 2011.
- XIX. **The Hon'ble High Court in the order dated August 29, 2011 has directed landowner Mr Tara Singh to deposit the expenses for restoration of damages. Mr Tara Singh filed C.M.P. No.12551/2011for discharging him from the liability, as he was a bonafide purchaser. By an order dated December 20, 2011, the Hon'ble High Court, while discharging Mr Tara Singh directed the industry to deposit the said amount.**
- XX. In response to the TCIRD Report, a submission was made in September, 2012 before the Hon'ble High Court by the industry through Prof. Barun Kumar Guha (Retired) Chemical Engineering Department, Indian Institute of Technology, Delhi
- XXI. PPCB subsequently filed a counter an affidavit on the comments of Prof. B. Guha.
- XXII. The industry submitted Reply Affidavit file in Civil Misc. No. 17279 of 2012.

- XXIII. Hon'ble Punjab and Haryana High Court transferred the case to National Green Tribunal on January 29, 2013
- XXIV. NGT directed the Central Pollution Control Board (CPCB) on July 4, 2013 to depute an expert or a team of experts to examine the locations of the sites and to give a report.
- XXV. CPCB team visited the industry and nearby area in Sangrur during July 24 - 26, 2013. CPCB submitted the final report to NGT in September, 2013.
- XXVI. Prof. B. K. Guha (Retired), IIT, New Delhi, engaged by Industry, gave comments on the Report of CPCB on September 25, 2013.
- XXVII. NGT directed CPCB vide order dated May 08, 2014 to conduct tests 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
- XXVIII. CPCB team visited the site on June 24, 2014 and collected ground water samples from 8 locations, which were subsequently analysed. CPCB filed a report in June, 2014.
- XXIX. NGT Bench directed the NEERI to undertake the analysis of the ground water at the disputed site.
- XXX. NEERI filed its report titled "Assessment of Ground Water Contamination in and Around Mahalaxmi Organochem Industries, Bhawanigarh" in the NGT on November 13, 2014 after collecting groundwater samples on October 17, 2014 from the same tube wells where from CPCB had collected samples earlier in June, 2014.
- XXXI. NGT asked a scientist from CPCB on December 19, 2014 to explain the basis on which CPCB team had termed the ground water not to be contaminated.
- XXXII. On the direction of the NGT, NEERI scientists also appeared before the Tribunal on January 07, 2015

- XXXIII. NGT Order in 2015 imposed penalty of Rs. 2 Crore on industry
- XXXIV. A complaint filed by Mr H C Arora in NGT in 2021 regarding failure to take remedial measures for contaminated groundwater
- XXXV. NGT order for the formation of an Executing cum Monitoring Committee by the Chief Secretary - 31-03-2022
- XXXVI. Executing cum Monitoring Committee decided to issue Letter of Award to CSIR-NEERI - August 09, 2023

Subsequently, PPCB engaged CSIR-NEERI for undertaking a study vide Work order No 19199 dated 18.8.23. The scope of work of CSIR-NEERI is as follows:

3.0 Scope of Work :

- Collection and review of all the reports pertaining to the Plant operations, characteristics of waste water and waste management practice
- Detailed Land-use Land cover (LULC) of the study area
- Inventorization of well network (existing wells with in the plant premises) and wells within 5 km of the study area. The well network will include shallow wells (open wells) and deep wells (bore wells)
- Deciphering the groundwater flow direction
- Sampling and analysis of groundwater samples from the well network for different parameters (major cations, anions, heavy metal, Organics, BOD, COD and colour) in pre-monsoon and post-monsoon seasons
- Geophysical investigations (GPR, ERT) in the plant premises for near sub surface characterization (spread of plumes/ buried drums) and aquifer geometry
- Sampling of soil samples (at different depth from pit up to 2-3 m depth) and analysis for different parameters for relevant contaminants of concern (cations, anions, heavy metals, organics etc.) in pre-monsoon and post-monsoon seasons

- Assessment of extent, quantum and volume of soil and groundwater contamination
- Delineation of remedial action plan

4.0 Methodology:

The study was planned after detailed online meeting with the official of PPCB. Reconnaissance visit was planned and accordingly CSIR-NEERI team visited the site on August 22, 2023.

4.1 Reconnaissance visit details: CSIR-NEERI team (Dr. Pawan K Labhassetwar, Chief Scientist and Dr.Paras R Pujari, Senior Principal Scientist) visited the site on August 22, 2023. The team reached the site around 11 AM. The PPCB team was also at the site. The PPCB team was represented by Mr.G.S.Gill, Senior Environmental Engineer, Zonal Office-2, Patiala and Mr Harinder Singh, Environmental Engineer, Regional Officer Sangrur and other staff. The team visited the site (Plate 1) of the Industry and found that part of the site is used for agriculture purpose. A large part of the site, which was earlier reported to be the place of storage of waste disposal is now covered with soil. The PPCB officials also briefed about the wells in the vicinity of the site, which are having coloured water and the water is also used for irrigation purpose.



Plate 1: CSIR-NEERI and PPCB officials at the premises of the industry

It was reported to the visiting team by the representative of the current landowner that Mr Bhupendra Pal Singh purchased the land from Mr Tara Singh in 2019. The land is currently rented out for stocking of soil for making bricks other than agriculture purposes (This information is purely based on discussion at the site and veracity need to be checked by PPCB using land records).

The site (occupied by erstwhile M/S Matharu Chemicals Industries) has only two bore wells, which are being used. One bore well (Plate 2) at the site was installed by the land owner, and is now used for agriculture. After a quick reconnaissance of the site of the former industry, the team visited the site of other wells in its vicinity (Table 1). The wells having red coloured water were also visited (Plates 3-4).

After the site visit, the CSIR-NEERI and PPCB team met the Deputy Commissioner, Sangrur District and apprised him of the visit. Deputy Commissioner was also informed that certain tasks require data on the number of bore wells in the nearby villages and the data need to be collected from concerned Departments. Check list (Annexure 3)

has been shared with the PPCB for facilitating the collection of data from different line departments.

Subsequently, the team visited the Head Office of PPCB at Patiala and had meetings with the Member Secretary and Chairman of PPCB. It was pointed out by the CSIR-NEERI team that the industry site is now occupied partly by agricultural land and partly by overburden and dump material. The industry site is also used for making raw bricks which are transferred to nearby brick kilns after drying at the industry site. This area need to be cleaned for proper soil sampling and Geophysical survey during the dry season. CSIR-NEERI team was assured of all support by the PPCB.



Plate 2: Bore well (B2) at the site used for irrigation purpose



Plate 3: Bore well (B3) with coloured water at the site used for irrigation purpose at present



Plate 4: Bore well (B6) with coloured water at the site used for irrigation purpose at present

Table 1: Details of wells surveyed during the site visit (22.8.2023)

Sample Code	Latitude	Longitude	Clean /Colored	Depth of the well (ft)	Capacity of the pump installed (HP)	Remark
B1	30° 17'0.11"N	76° 4'48.06"E	Clean	300	1.5	Inside the premises. Plot size- 8 acre, Used for agriculture, 20-25 families, 24hrs supply,
B2	30° 16'56.79"N	76° 4'53.36"E	Clean	-	15	Used for agriculture, Installed by Tara Singh
B3	30° 16'56.97"N	76° 4'40.68"E	Colored (Red)	-	-	Near Transformer
B4	30° 17'3.30"N	76° 4'39.54"E	Clean			Village- Alo Arkh
B5	30° 16'59.89"N	76° 4'33.24"E	Clean	200	15	-
B6	30° 16'53.82"N	76° 4'39.93"E	Colored (Red)	230	20	4years old bore, Red water since 2008
B7	30° 17'6.34"N	76° 4'43.05"E	Clean	230	-	Near BPCL Petrol pump

Site Visit 2 (September 9-15, 2023): The team did inventORIZATION of the groundwater sources in the 5 km buffer for the monitoring. Groundwater samples were collected for analysis.

Site visit 3 (December 27, 2023 to January 12, 2024): CSIR-NEERI team carried out the Geophysical survey at the site which was perceived to be the location of the Solar Evaporation Pans.

5. Progress:

5.1 Land Use Land Cover Analysis: A land use Land cover (LULC) analysis was performed for the 5km buffer of the study area (Figure 1) and it is observed that the study area has predominantly agricultural land.

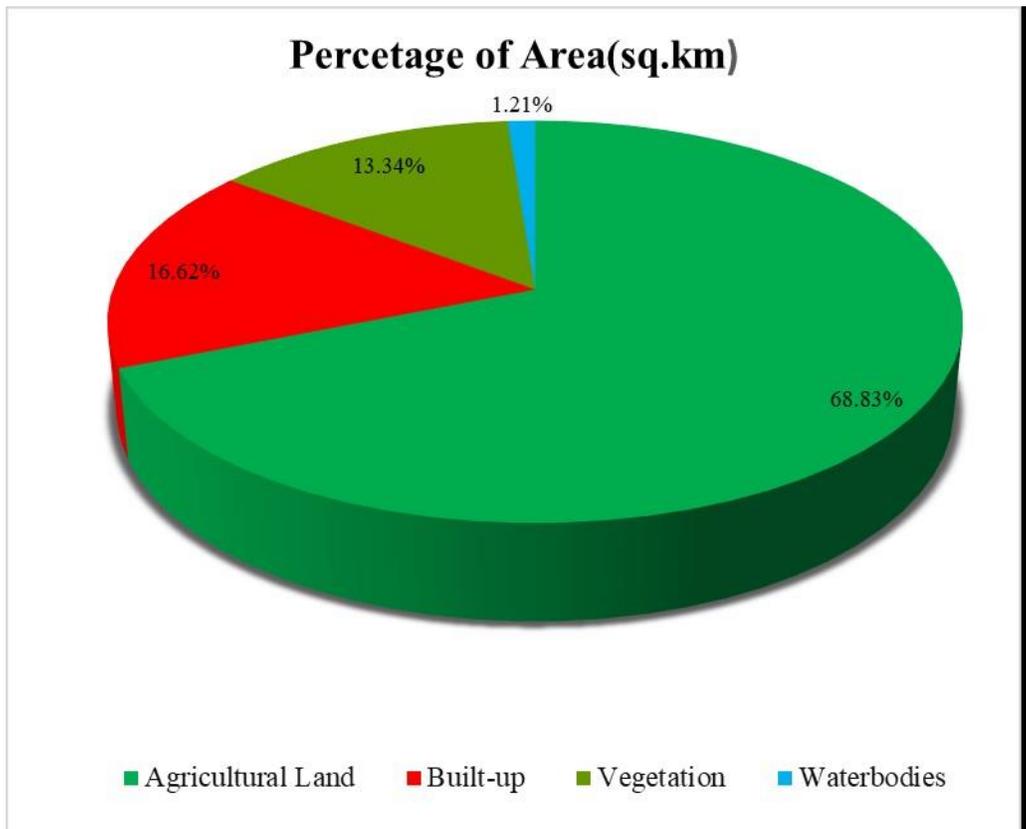


Figure 1: Percentage of different Land use classes in the study area

5.2 Groundwater level Scenario: A network of observation wells has been set up in the study area (5 km buffer of the M/S Matharu Chemicals). The observation wells

(Figure 2, Table 2) are scattered around the premises of the plant. The observation well network includes the wells which give coloured water at present. The groundwater level (below ground level-bgl) has been obtained by water level indicator. The ground water level was taken during the static condition (when the pump was not in operation for 5-6 hours).

Table 2: Observation well locations of the study area (M/S Matharu Industries)

Sr. No	Sample Code	Type of Source	Latitude	Longitude	Remark/Location details
1	MG-1	BW	30° 17'0.8"N	76° 4'48"E	Bhagwanigarh village; temporary settlement nearby, near Matharu plant
2	MG-2	BW	30° 16'57.0"N	76° 04'53.2"E	Bhagwanigarh village; Back side of Matharu plant
3	MG-3	BW	30° 16'57.1"N	76° 04'41"E	Bhagwanigarh village; at Mr, Kulvinder Singh farm
4	MG-4	BW	30° 17'3.6"N	76° 04'40"E	Bhagwanigarh village; Paddy field nearby
5	MG-5	BW	30° 17'4"N	76° 04'33.4"E	Bhagwanigarh village; At Mr.Dilbrang Singh farm
6	MG-6	BW	30° 16'54.5"N	76° 04'40"E	Bhagwanigarh village; At Mr.Amritpal Singh; Paddy field nearby
7	MG-7	BW	30° 17'3.5"N	76° 04'43.3"E	Alourkh village; At Bharat petrol pump (Randhawa filling station)
8	MG-8	BW	30° 16'50.7"N	76° 04'38.3"E	At Mr.Amritpal Singh farm; Paddy field nearby
9	MG-9	BW	30° 16'38.3"N	76° 04'9.6"E	Alorkh village; at Gurudwara (Shi ManjiSaheb)

10	MG-10	BW	30° 16'59.6"N	76° 03'56.6"E	Alorkh village; Water supply department (water works)
11	MG-11	BW	30° 16'50.7"N	76° 04'38.3"E	Alorkh village; at Mr.Kewal Singh house, paddy field nearby
12	MG-12	BW	30° 18'8.5"N	76° 04'50.9"E	Bakhtri village; Water supply department (water works)
13	MG-13	BW	30° 17'57"N	76° 04'26"E	Bakhtri village; Mr.Manprit Singh, paddy & cauliflower vegetation nearby
14	MG-14	BW	30° 17'19.4"N	76° 04'4.8"E	Alourkh village; Mr.Hardevsingh farm
15	MG-15	BW	30° 18'10.3"N	76° 04'17.2"E	Bakhopir village; Mrs.Lakhveer Kaur (Sarpanch, Bakhopir)
16	MG-16	BW	30° 18'42.7"N	76° 04'05.8"E	Bhaktara village; Water supply department (water works)
17	MG-17	BW	30° 18'20.3"N	76° 03'5.7"E	Dayalpur village; Water supply department (water works)
18	MG-18	BW	30° 15'56.7"N	76° 02'29"E	Bhawanigarh village; Mr.Nirmal Singh, House no. 520
19	MG-19	BW	30° 14'57.8"N	76° 04'44.3"E	Baladkalan village; Water supply department (water works)
20	MG-20	BW	30° 15'29.9"N	76° 05'1.3"E	Balabkala village; government primary school

21	MG-21	BW	30° 16'37.3"N	76° 05'20.3"E	Turi village; Government primary school
22	MG-22	BW	30° 16'42.8"N	76° 06'24.6"E	Nakte village; Water supply department (water works)
23	MG-23	BW	30° 17'14.1"N	76° 06'13.9"E	Majhi village; Water supply department (water works)
24	MG-24	BW	30° 17'35.5"N	76° 05'49.5"E	Majha village; Water supply department (water works)
25	MG-25	BW	30° 18'10.4"N	76° 07'01."E	Bimber village; Water supply department (water works)
26	MG-26	BW	30° 16'58.87"N	76° 3'55.69"E	Sh.KashmirSinghS/oSh . JogaSingh,Aloarkh
27	MG-27	BW	30° 17'8.63"N	76° 3'50.00"E	Sh. Devinder SinghS/oSh.Jaspal Singh,Aloarkh
28	MG-28	BW	30° 17'14.60"N	76° 4'5.16"E	Darsan Singh, S/oSh. Lal Singh,Aloarkh
29	MG-29	BW	30° 17'15.94"N	76° 4'12.72"E	Farm tubewell of Sh. Karam Singh S/o Sh. Bachan Singh, Aloarkh,
30	MG-30	BW	30° 17'15.47"N	76° 4'18.44"	Farm tubewell of Sh. Diplreet Singh S/oSh.HarminderSingh ,Aloarkh
31	MG-31	BW	30° 18'7.34"N	76° 4'48.07"E	Sh.Gurjant Singh, S/oSh.Bachan Singh,Village Bakhtari
32	MG-32	BW	30° 18'9.65"N	76° 4'48.32"E	Sh. Asha Singh S/o Sh.Makand Singh,Village Bakhtari

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33	MG-33	BW	30° 18'6.73"N	76° 4'45.95"E	Sh.Gurjit Singh, S/o Sh. Bachan Singh, Village Bakhtari
34	MG-34	BW	30° 17'13.78"N	76° 5'36.28"E	Farm tubewell of Sh. Mahinder Singh (Pardhan), Village Majhi
35	MG-35	BW	30° 17'6.43"N	76° 4'42.20"E	Tubewell of Randhawa Filling Station, Aloarkh from Behind Petrol Pump

BW: Bore well

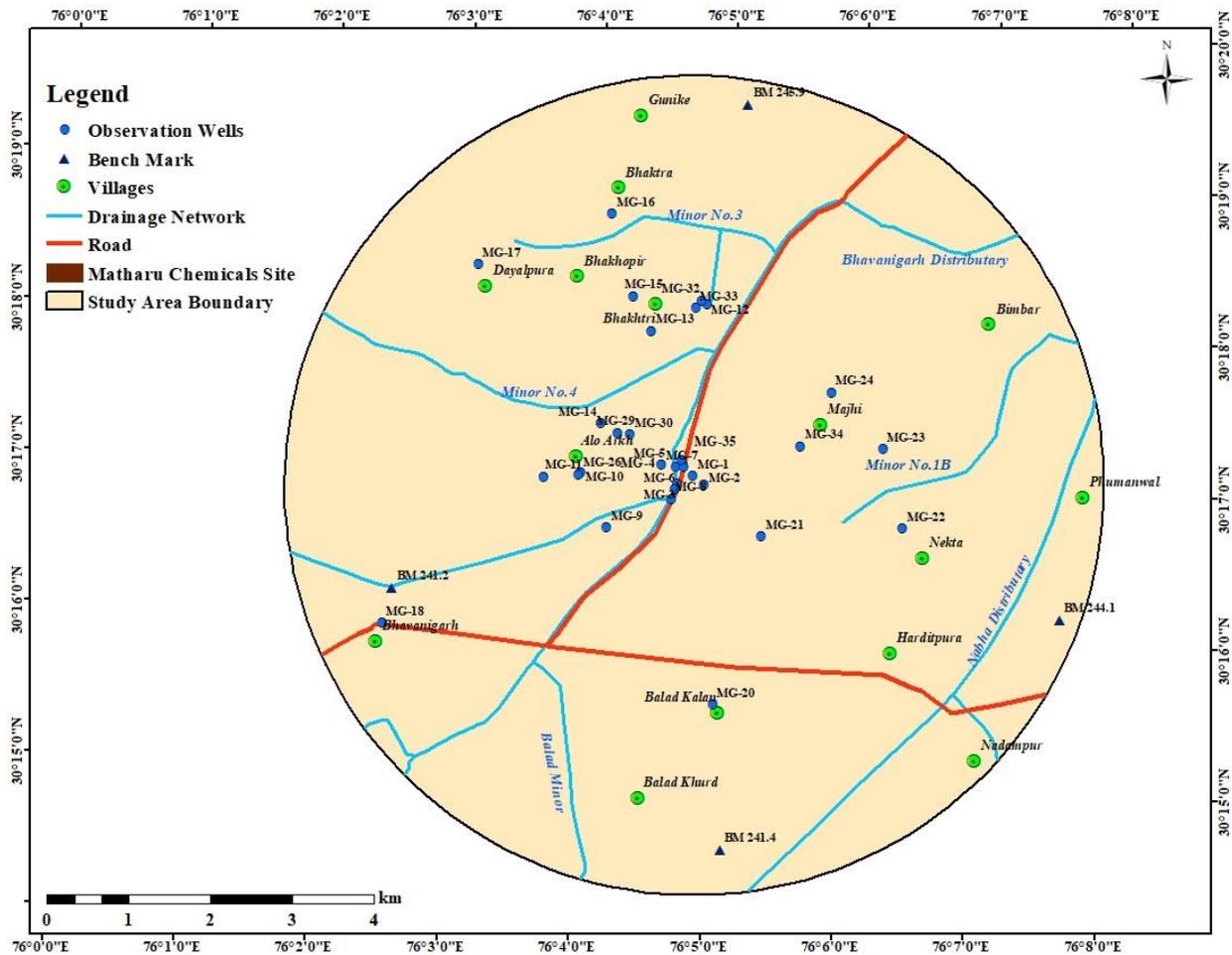


Figure 2: Base map of the study area (5km buffer of the premises of M/S Matharu Chemicals)

5.2 Groundwater Quality:

To assess the impact of industry on the ground water quality, the ground water samples were collected from the well network in the study area. Inventorization of well network (existing wells within the plant premises) and wells within 5 km of the study area was done. The water samples were collected from the existing water sources (bore wells) within the radius of 5 km from the industry. Water sampling was done from the well network for various physicochemical and demand parameters (major cations,

anions, dissolved and suspended solids, heavy metals, Organics, COD and colour, etc.). Samples were collected in pre cleaned 1000 ml and 100 ml PPE bottles for physicochemical parameters and heavy metal analysis, respectively. Water sample preservation and analysis was done as per the standard protocol (APHA: 2015). Water samples were collected from 25 locations (in and around the industry site) within the 5km radius of the plant (Table 2, Figure 2) from 12th to 15th September 2023. In addition to the samples collected from 25 locations in September, on the request of PPCB, water samples were collected from additional observations wells (10 nos) on the 2nd and 3rd November 2023. Entire Water sampling was done in presence of PPCB and state water supply department officials (Plate 5).



Plate 5: collection of water samples and analysis of physical parameters at the filed during sampling

5.2 Geophysical survey: The reports prepared by the Thapar Centre of Industrial Research and Technology (TCIRD) and documents received from PPCB and were reviewed to get the likely locations of the Potential sources of contamination, namely the Solar Evaporation Pans and the Hazardous Storage sites. Based on the identified locations of Solar Evaporation Ponds and the Hazardous waste storage locations in the premises of the Matharu Chemicals, the geophysical field data campaign was planned accordingly. Accordingly, the Electrical Resistivity Tomography (ERT) profiles, were carried out at the probably demarcated locations of the Solar Evaporation Ponds and Solid/Hazardous waste storage sites. The literature of the TCIRD document and the documents shared by the PPCB indicated that the treated effluent had a Total Dissolved Solids (TDS) approximately 7693 mg/L and 13469 mg/L in the solar evaporation ponds (Annexure 2: monitoring reports of PPCB). In view of the significant contrast between the host medium (alluvium) and the effluent in the solar evaporation pond, the

Electrical Resistivity Tomography was undertaken to decipher the signature from the treated effluent on the host medium, i.e. alluvium. It is expected that the zone affected due to the disposal of high TDS treated effluent will show a lower conductive anomaly in the ERT survey.

ERT profiles (30 nos) were marked on the demarcated area of the Solar evaporation pond and the Hazardous waste disposal sites (Figure 3). The profiles were of varying length and each profile length covered the likely solar evaporation pond (SEP) area and the area outside the solar evaporation pond.

The preliminary processing of the Geophysical survey is done and will be refined after the soil sampling is completed and the analysis of the soil samples.

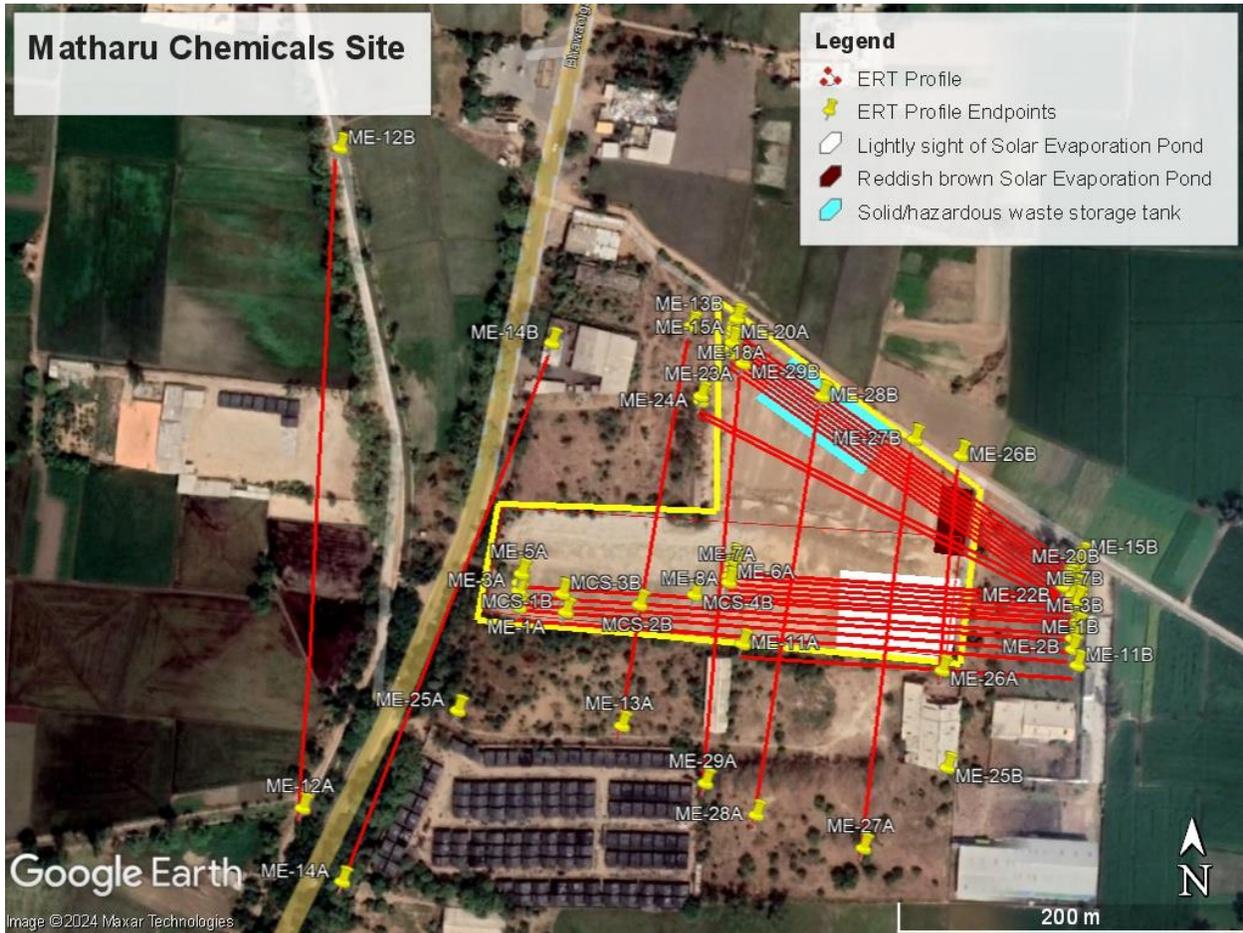


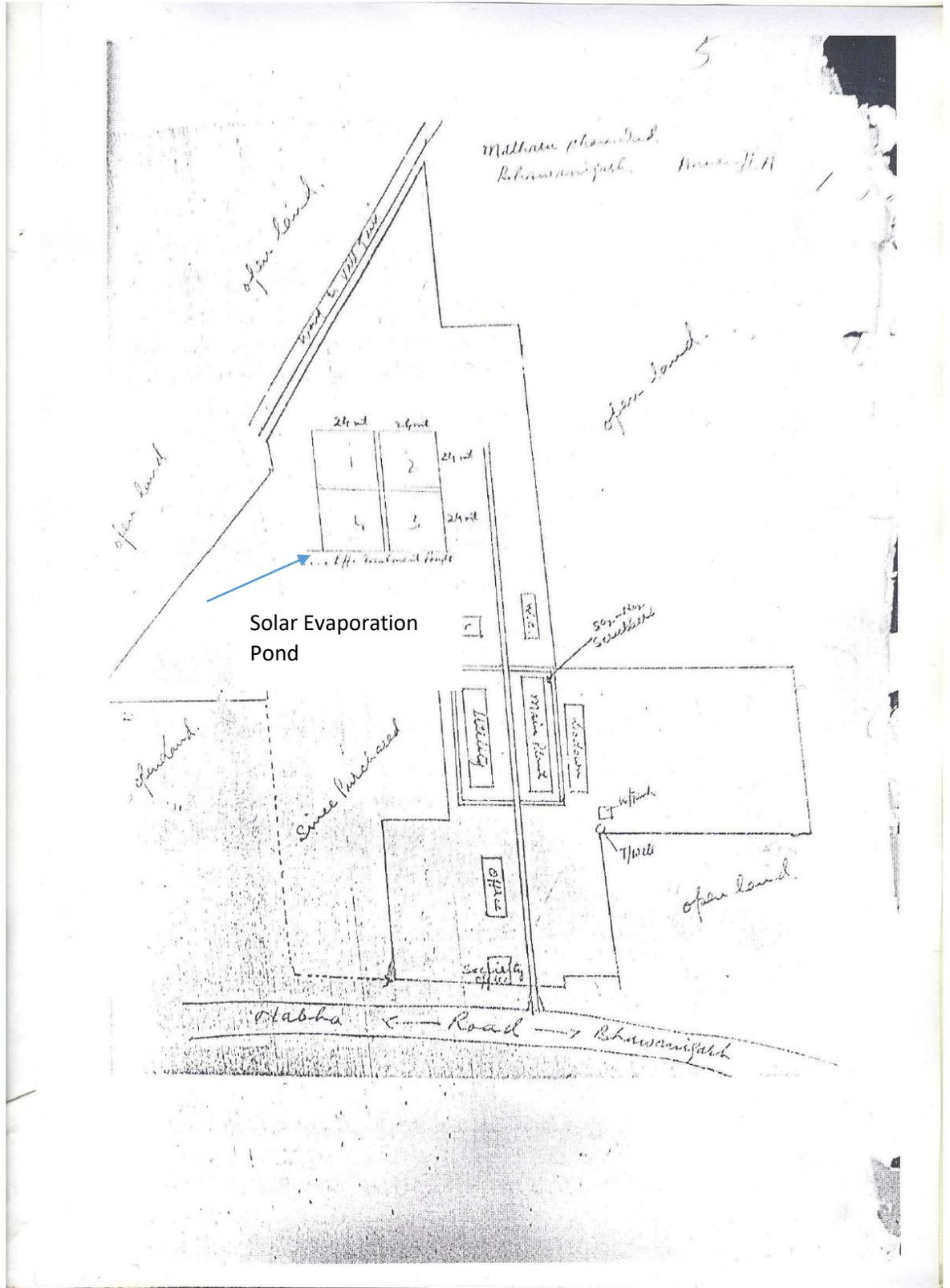
Figure 3: Electrical Resistivity Tomography profiles in the study area

6.0 Future activities

- Reduced Level Survey
- Soil sampling
- Pre-monsoon groundwater sampling
- Analysis of soil samples and Groundwater samples
- Delineation of contaminated area and Action Plan for remediation

Reference

APHA (2015), Standard methods for Water and Waste water Analysis



POLLUTION CONTROL BOARD, PUNJAB PATIALA
 INDUSTRIAL/ WASTE EFFLUENT SAMPLE ANALYSIS REPORT

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1. Laboratory sample No. : PTA/154-156/91
2. Source of sample : M/s Matharu Chemicals (P) Ltd
3. Type & Point of sample collection : Nabha Road Bhawanigarh.
4. Collected on date & time: 13.11.91
 4.4.1 - (154) Raw effluent (155) Evaporation Pond I (156) Evap. Pond II
5. Received in the Lab : 14.11.91

Sr. No.	Name of the Parameter	Results		
		(154)	(155)	(156)
		3.2	6.6	6.8
1.	pH	-	-	-
2.	Colour Units (Co. Pt Scale)	26	25	25
3.	Temperature °C			
4.	Total Suspended Solids	As per Sr. No 114		
5.	Dissolved Solids	6678	7693	13469
	a) Fixed	7338	21069	39673
	b) Volatile	14009	28762	53142
	c) Total	4770	260	220
6.	B.O.D. (5 days 20°C)	4960	2846	2832
7.	C.O.D.	1200	880	730
8.	Chloride as CL	779.89	347.55	352.65
9.	Sulphate as SO ₄	18.8	8.6	12.4
10.	Amm. Nitrogen as N	38	220	180
11.	Oil and grease	6.610	8.114	6.240
12.	Iron	7396	18248	39616
13.	Naphthalene		3262	3176
14.	Suspended Solids	5319	911	879
	a) Fix	1976	4113	4055
	b) Vol.			
	c) Total	7295		

Note: 1. All characteristics except Colour, Temperature and pH are expressed as mg/l.
 2. Entire sample consumed in testing.
 3. Tempo. as reported by collecting officer.
 4. N.D. - Not detectable by the method.

Asstt. Chemist

Remarks

Pb. State Board
 & Control

Signature
 Chemist