

BEFORE THE NATIONAL GREEN TRIBUNAL PRINCIPAL

BENCH

ORIGINAL APPLICATION NO. 619/2022

IN THE MATTER OF:

MAST RAM & ANR.

...APPLICANT

VERSUS

STATE OF HIMACHAL PRADESH AND ORS

...RESPONDENT

INDEX

S. NO.	PARTICIULARS	PAGE NOS.
1	ADDITIONAL COMPLIANCE REPORT ON BEHALF OF THE RESPONDENT NO.5 IN COMPLAINCE WITH ORDER DATED 19 TH OCTOBER 2023 BY THE HON'BLE TRIBUNAL ALONG WITH SUPPORTING AFFIDAVIT	1-9.
2	LIST OF DOCUMENTS	10-49.

 THROUGH
COUNSEL FOR THE PROJECT PROPONENT

Office- 406, 4th Floor Antriksh Bhawan,

22, K.G. Marg, New Delhi- 110001

Email- officeofsrijantiwari@gmail.com

Mobile:9899966225

PLACE: NEW DELHI

DATE: 15.01.2024

BEFORE THE NATIONAL GREEN TRIBUNAL PRINCIPAL

(1)

BENCH

Original Application No. 619/2022



IN THE MATTER OF:

MAST RAM & ANR.

...APPLICANT

VERSUS

STATE OF HIMACHAL PRADESH AND ORS ...RESPONDENT

ADDITIONAL COMPLIANCE REPORT ON BEHALF OF THE
RESPONDENT NO.5 IN COMPLAINE WITH ORDER DATED
18TH OCTOBER 2023 BY THE HON'BLE TRIBUNAL

Most Respectfully Submitted:



Preliminary submissions and background:

- The Project Proponent in continuation of its responses filed on 02.06.2023 and 18.10.2023 is hereby filing an updated status of the compliances and action taken in reference to the recommendations of the Joint Committee as per its report dated 01.05.2023.

The same are as follows:

S. No.	Joint Committee Recommendations	Compliance Status	Completion Date
1.	<u>Recommendation No 1 & 2:</u> 1. The industry is neither meeting the norms/conditions of Recycle (ZLD) prescribed in the CTO issued by HPPCB and nor meeting the inlet norms of	<u>Response:</u> Project Proponent has successfully implemented the modification and upgradation of the ETP plant. The Stripper, Multi Effect	Completed (Jan 11 th 2024)

<p>CETP prescribed by the Himachal Government/PPCB for sending the effluent to CETP, in violation of the conditions of Consent to Operate.</p> <p>2. According to HPPCB Member <i>“though the ETP of the Industry has been found to be non-operational by the Joint Committee, the industry has been treating a part of effluent (10-15 m³/day) and sending the remaining untreated effluent without complying with the Inlet norms of CETP for the last 04 years, in violation of conditions of CTO”</i> The industry has been given ETP Upgradation Schedule to HPPCB, with a deadline of July, 2023 for achieving Zero Liquid discharge (ZLD), which is being monitored by HPPCB, which further confirm that ETP is not adequate to treat the entire effluent and recycle it i.e. ZLD. <i>It is recommended that the validity period of the CTO</i></p>	<p>Evaporator (MEE), Agitated Thin Film Drier (ATFD), Reverse Osmosis (RO) plant along with Activated Sludge Process (ASP) have been installed, commissioned and operational now.</p> <p>With the commissioning of Stripper, MEE, ATFD, RO, along with ASPs, the Project Proponent is treating its total effluent and able to recycle back to be used in the system.</p> <p>We are not sending the treated effluent to CETP. Hence, we are using all the treated water within the system and the facility is ZLD now.</p>	
---	---	--

	<i>granted to the industry by HPPCB, is linked with the deadline for the achieving Zero Liquid Discharge (ZLD) given by the industry.</i>		
2	<p><u>Recommendation No 3</u></p> <p>As per record shared with the Joint Committee, the industry is paying 60-80 lacs per month to CETP Baddi for the last 04 years, for the treatment of its effluent, despite having its own ETP. This indicates that either the ETP installed by the industry is not adequate or it is not operated efficiently. <i>It is therefore recommended that adequacy study of the ETP is done by some reputed institute, so as to find out the shortcomings and upgrade the same.</i></p>	<p>Based on the inputs from the industry experts, the ETP scheme has been successfully implemented and the progress of the same shall be validated by conducting adequacy study.</p> <p>We have signed the agreement with PU Chandigarh and IIT Ropar for conducting the ETP adequacy study (copy attached). A team from the said institutes had visited the plant site and work order for ETP adequacy study has also been awarded to them. Copy of work Order and scope of work is attached.</p>	<p>March 31st 2024</p> <p>Completed</p>
3	<p><u>Recommendation No 4</u></p> <p>In view of the fact that i) The industry has not obtained permission of CPCB for incineration of hazardous waste</p>	<p>i) The Project Proponent has shut down and isolated its incinerator due to not having proper SOP. hence it is no</p>	<p>NA</p>

<p>and therefore the incinerator installed by the Industry for incinerating the concentrated effluent is not in operation, ii) Industry is located at such a location without having any provision to contain contaminated storm/rain water passing through the plant, the discharge of untreated effluent is un-avoidable with the storm water and may lead to the contamination water. <i>It is therefore recommended that Industry is directed by HPPCB to: a) Obtain permission from CPCB for incineration of Hazardous waste; b) make arrangements to contain the storm water contaminated with industrial effluent while passing through the plant and treat it before discharging in the nearby drain; b) to strictly follow the “Guidelines for using treated effluent for irrigation” with regard to treated storm water (contaminated with industrial effluent), prepared by CPCB</i></p>	<p>longer in use. We had informed it in writing to the HPPCB in October 2022. The project proponent has applied for obtaining the SOP from State PCB in April’23.</p> <p>ii) The storm water drain is already in place and during rains the storm water within from the premises goes to the effluent treatment plant through a permanent pipeline.</p>	
--	---	--

	<i>under the directions of Hon'ble NGT dated 24/5/2019 in the matter of OA No. 348/2017; Shailesh Singh Vs Al-Dua Food Processing Pvt. Ltd.</i>		
4	<p>Recommendation No 5</p> <p>The bio-magnification study conducted by the Joint Committee on the soil and two crop growing in the area during period indicates that:</p> <ul style="list-style-type: none"> The concentration of Nickel and Zinc in the soil samples collected from downstream locations were found to be exceeding the limits specified by WHO. The high concentration of heavy metals (Zn and Ni) in the soil in the downstream locations despite low heavy metal concentration in the effluent samples collected by the Joint Committee, is an area of concern and indicates discharge to concentrated waste, although no discharge was observed by the Joint Committee at the time of visit. 	<p>The Project Proponent does not use Nickel and Zinc for manufacturing its products nor are Nickel and Zinc any of the by-product of part of the effluent. However, in public interest the Project Proponent agrees to conduct similar exercise for the other staple crops in that area since the absorption of heavy metal varies for crop to crop, to avoid the values of HRI exceeding 1 (>1) over a passage of time, in the interest of public health.</p> <p>Project Proponent has conducted the soil and crop testing in consultation with the local PCB office as per the season and availability of the crops.</p>	<p>Completed</p> <p>Soil and crop testing has been conducted by Thapar Institute, Patiala. The analysis of soil and crop samples shows no adverse impact for the industrial site and nearby</p>

	<ul style="list-style-type: none"> • The transfer Factor and Health Risk Index was also determined by the Joint Committee. The values of HRI less than 1(<1), as determined by the Joint Committee, is considered safe for intake of food/vegetables. However, it is necessary to conduct similar exercise for the other staple crops in that area since the absorption of heavy metal varies for crop to crop, to avoid the values of HRI exceeding 1 (>1) over a passage of time, in the interest of public health. 		<p>area. A copy of the report is attached.</p>
5	<p>Recommendation No 6</p> <p>It was observed during the site visit that industry has taken water connection from surface water supply meant for nearby villagers for irrigation, without obtaining any permission. It is recommended that Industry be directed to immediately disconnect this water connection till permission is</p>	<p>To meet the daily water requirements of the industry, the Project Proponent relies on its in-house borewell, and commercial water tankers supply from a third party and is not dependent on the surface water from the nullah. A Copy of water tanker bill is attached.</p>	<p>NA</p>

	obtained from the concerned authority.		
6	In compliance with the order dated 19.10.2023 by the Hon'ble Tribunal concerned officer duly authorized Dr. Vikas Thakur to present through VC on the N.D.O.H	Deputy General Manager- Dr.Vikas Thakur	

For Morepen Laboratories Limited

Authorized Signatory

FOR PROJECT PROPONENT

AUTHORIZED SIGNATORY

THROUGH

COUNSEL FOR THE PROJECT PROPONENT

Office- 406, 4th Floor Antriksh Bhawan,

22, K.G. Marg, New Delhi- 110001

Email- officeofsrijantiwari@gmail.com

Mobile:9899966225

PLACE: NEW DELHI

DATE: 15.01.2024

BEFORE THE NATIONAL GREEN TRIBUNAL PRINCIPAL

BENCH

ORIGINAL APPLICATION NO. 619/2022

IN THE MATTER OF:

MAST RAM & ANR.

...APPLICANT

VERSUS

STATE OF HIMACHAL PRADESH AND ORS ...RESPONDENT

AFFIDAVIT

I, Satish Pandey, S/o Late Shri B.D. Pandey aged about 47 years, authorized representative of The Project Proponent, having its office at 409, 4th Floor, Antriksh Bhawan, KG Marg, New Delhi-110001.

1. That I am the Authorized Representative of the Project Proponent and well conversant with the facts and circumstances of the present case as such and also fully competent to swear and affirm the present affidavit.

2. That I have read the additional Compliance Report submitted on behalf of the Project Proponent to the concerns raised regarding Project Proponent practices in the report dated 01.05.2023 the contents of the submissions have been read to me in my vernacular language.



My Commission expires on 22/12/2024

15 JAN 2024

9

3. That the contents thereof are believed to be true upon my knowledge received from the record maintained by the Project Proponent in the normal course of business. The legal advice received by me is believed to be true. I say nothing material is concealed therefrom.

[Handwritten Signature]

DEPONENT

VERIFICATION

15 JAN 2024

Verified at Delhi on this day of January, 2024 that the contents of the above affidavit are true upon my knowledge and that nothing material has been concealed there from.

[Handwritten Signature]
Identified by

My Commission expires on 22/12/2024

[Handwritten Signature]

DEPONENT



Regd. Entry No. 40
Date 15-1-2024
[Handwritten Signature]

WITNESSED

[Handwritten Signature]

NOTARY PUBLIC, DELHI FOR (INDIA)

15 JAN 2024

[Handwritten Signature]

BEFORE THE NATIONAL GREEN TRIBUNAL PRINCIPAL

BENCH

ORIGINAL APPLICATION NO. 619/2022

IN THE MATTER OF:

MAST RAM & ANR.

...APPLICANT

VERSUS

STATE OF HIMACHAL PRADESH AND ORS

...RESPONDENT

LIST OF DOCUMENTS

S. NO.	PARTICULARS	PAGE NOS.
1	Copy of Agreements - ETP adequacy study	11-24.
2	Copy of Work Orders	25-28.
3	Copy of Scope of work	29-31.
4	Copy of Soil study report	32-48.
5	Copy of water tanker bills	49.

THROUGH

COUNSEL FOR THE PROJECT PROPONENT

Office- 406, 4th Floor Antriksh Bhawan,

22, K.G. Marg, New Delhi- 110001

Email- officeofsrijantiwari@gmail.com

Mobile:9899966225

PLACE: NEW DELHI

DATE: 15.01.2024



Technology Enabling Centre (TEC)
 (Sponsored by Department of Science and Technology, Govt. of India)
PANJAB UNIVERSITY, SECTOR-14, CHANDIGARH-160014 (INDIA)
 (Established Under the Panjab University Act VII 1947 enacted by the Govt. of India)



11

**Consultancy Assignment Proposal and Agreement Form
PART-A**

TITLE OF THE CONSULTANCY (Kindly fill in BLOCK letters): EVALUATION OF ADEQUACY OF ETP OF MOREPEN INDUSTRY AT PARWANOO

PRINCIPAL INVESTIGATOR (PI):

Name: PROF. GANGA RAM CHAUDHARY
 Department /Centre: Department of Chemistry
 / SAIF & CIL
 Mobile: 98788-22323

Designation: Professor
 Designation: Director
 Email: grc22@pu.ac.in

Co- PI:

Name: DR. RAJEEV KUMAR
 Department /Centre: Department of Environmental Sciences
 Professor
 Mobile: 62803-13419

Designation: Assistant
 Email: rajeev@pu.ac.in

Name: DR. RAMESH K SHARMA
 Department /Centre: SAIF / CIL
 Professor
 Mobile: 98156-04963

Designation: Associate
 Email: ramesh@pu.ac.in

EXPECTED TIME SCHEDULE:

Duration: Years 0 Months 5 Weeks 0

Starting Date*:

CLIENT DETAILS (Kindly fill in BLOCKS):

Firm's Name: Morepen Laboratories Limited	Contact Person's Name: Dr. Vikas Thakur
Address: Village Masulkhana, Tehsil Kasauli, District Solan (Himachal Pradesh)	Designation:
Ph. +91-7807806700	Email: vikas.thakur@morepen.com
Ext.	
Fax	

TOTAL CHARGES AND PAYMENT DETAILS:

Mode of Payment: Cheque / DD / NEFT / RTGS

Currency: Indian Rupees Foreign Country: Currency:

Payment enclosed: → 11.284 Lakhs + GST as per the rules of GOI. Institute

Total Value (in figures):

Total Value (in words):

Banks Name and Branch: _____

DD/Cheque No.	DD/ Cheque Amount	DD/Cheque Date
RTGS Payment	INR	



Technology Enabling Centre (TEC)
 (Sponsored by Department of Science and Technology, Govt. of India)
PANJAB UNIVERSITY, SECTOR-14, CHANDIGARH-160014 (INDIA)
 (Established Under the Panjab University Act VII 1947 enacted by the Govt. of India)



SCOPE OF THE CONSULTANCY (attach separate sheet, if necessary):

Objectives: As per attached Annexure-II

Deliverable (with timeline) As per attached Annexure-III

PAYMENT TERMS: 70-30 payment schedule, 70% before start of the project work and 30% before publishing the first study report

AGREEMENT BETWEEN CLIENT AND CONSULTANT:

The signed agreement attached as annexure I is mandatory for undertaking consultancy projects.

Signature of the Principal Investigator:

Date: 10/01/2024

DIRECTOR
CIL/SAIF/UCIM/USIC
P.U. CHANDIGARH

10/01/2024

Dr. Vilas Thakur
DSM - Environment & Social Management
Morepen Laboratories Ltd.



Technology Enabling Centre (TEC)
 (Sponsored by Department of Science and Technology, Govt. of India)
PANJAB UNIVERSITY, SECTOR-14, CHANDIGARH-160014 (INDIA)
(Established Under the Panjab University Act VII 1947 enacted by the Govt. of India)



13

ANNEXURE I FOR CONSULTANCY PROJECT

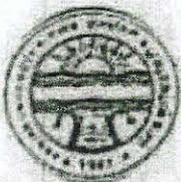
**AGREEMENT BETWEEN PRINCIPAL INVESTIGATOR AND CLIENT/CONTRACTOR THROUGH
 TECHNOLOGY ENABLING CENTRE (TEC) OF PANJAB UNIVERSITY FOR CONSULTANCY
 PROJECTS**

Title of the Consultancy Job: EVALUATION OF ADEQUACY OF ETP OF MOREPEN INDUSTRY AT PARWANOO

1. **Legal Name & Address of the Client (Required for issue of tax invoice): Morepen Laboratories Limited**
3. **GST Number of the Client (Please attach a certificate): Attached**
4. **TAN Number (Please attach a certificate):**
5. **PAN Number (Please attach a certificate): Attached**
4. **Name and Deptt. / Centre of the Principal Investigator: Prof. Ganga Ram Chaudhary, Department of Chemistry, Panjab University, Chandigarh**

The TEC-PU through the PI/Co-PI will plan the Project in consultation with the Client. These terms and conditions govern projects for the development of products, processes, field studies, model studies, calculations, economic and technical consulting and other forms of project of specific interest to the client. The conditions are binding unless otherwise agreed upon in a separate signed document.

1. **DECLARATION:** All work undertaken by the Principal Investigator (PI)/ Co-PI at PU as part of the project will be in good faith and based on material/data/other relevant information given by the client requesting for the work.
2. **RESPONSIBILITY/LIABILITY:** TEC-PU through PI/Co-PI undertakes to carry out the project as conscientiously as conditions allow, but accepts no economic responsibility whatsoever, should the work not lead to expected results. PU / TEC-PU shall not be held liable for any loss, damage, delay or failure of performance, resulting directly or indirectly from any cause, which is beyond its reasonable control (Force Majeure). The liability of TEC-PU shall be limited to the funds received for the project.
3. **DISCRETION:** The TEC-PU through PI/Co-PI undertakes to handle with discretion reports, results, the identity of the Client and all material specifically treated/marked confidential which the client places at the disposal of the PI/Co-PI in connection with the project at PU, subject to Right to Information rules/regulations.
4. **SUB-CONTRACTING:** Subcontracting will be as per the GOI norms.
5. **RESULT OF THE PROJECT:** The results of all work done at the PU by the PI/Co-PI in connection with the project, incorporated in written reports shall remain the property of the Client. Results arrived at with little or no involvement on the part of the Client are available free of charge for the Client's own use. However, the PI/Co-PI/PU/TEC-PU reserves the right to use such results in connection with activities outside the scope of the project. If the Client consists of several individuals, all questions of Client, rights between the Clients must be settled between such individuals, and are of no concern to the PI/Co-PI/PU/TEC-PU. Unless otherwise agreed, all reports are to be sent to the Client. The PI/Co-PI/Institute has the right to retain a copy.
6. **INTELLECTUAL PROPERTY RIGHTS:** All rights pertaining to any intellectual property generated/ created/invented in the due course of the project, will be the joint property of PU and the Client. Terms and conditions regarding transferring/assigning/selling these rights to the Client shall be governed by a separate written agreement if required.
7. **PUBLISHING THE RESULTS/OUTCOME OF THE CONSULTANCY:** The results/outcome of the



Technology Enabling Centre (TEC)
 (Sponsored by Department of Science and Technology, Govt. of India)
PANJAB UNIVERSITY, SECTOR-14, CHANDIGARH-160014 (INDIA)
Established Under the Panjab University, Act III 1947 enacted by the Govt. of India



consultancy shall not be exploited by the Client organization for its business interests by using TEC-PU / PU's name logo through press advertisement/publicity material or in any other manner. Manuscripts of academic papers, brochures, advertisements or other form of published material which refer to or quote the proprietary results of the project shall be vetted by both parties before publication.

8. **COMMUNICATION OF RESULTS TO A THIRD PARTY:** The PI/Co-PI may not, without the written agreement of the Client, communicate the results of the project to a third party. The Client shall arrange the necessary written agreement of all parties on the Client's side who may have publication rights with respect to the project.
9. **PROJECTS FOR OTHER CLIENTS:** The Institute may undertake other projects in the same field provided - to the best of its knowledge and belief - there exists no danger of information of a confidential nature coming into hands of a third party.
10. **APPARATUS:** Instruments and/or equipment obtained in connection with the project and charged to the client remain the property of PU, unless otherwise it is specifically agreed to by the Institute.
11. **TERMINATION OF THE PROJECT:** The Client has a right to terminate the project at any time, but shall be liable for all reasonable expenses incurred in connection with halting work already in progress according to the agreed work programme. The decision of TEC-PU / PU shall be final as far as reasonableness of the expenses is concerned. The Institute has also the right to terminate the project at any time except where otherwise agreed upon. The Client in this case will not be liable for any expenses incurred after the termination.
12. **PAYMENT:** The payment of consultation charges to PU are to be made in advance and in full before the start of the project, through a demand draft/crossed valid cheque drawn in favour of the Centre for Industry Institute Partnership Programme (CIIPP) and sent to the Consultant. The charges will also include any applicable tax as prescribed by the Government of India or the Government of Punjab (or any other statutory body) from time to time.
13. **DISPUTES:** In the event of any dispute or difference between the parties hereto, such dispute or differences shall be resolved amicably, by mutual consultation. If such resolution is not possible, then the unresolved dispute or difference shall be referred to a sole arbitrator to be nominated by the Hony. Director of CIIPP / Coordinator of TEC-PU for a reasoned Award. The seat of arbitration shall be within the campus of PU and the language of arbitration shall be English. The Award of the arbitrator shall be binding on the parties to the dispute.
14. **DISCLAIMER:** The report on the consultancy project is the technical opinion of the PI/Co-PI based on his/her expertise in the particular area of research and in no way reflects the view(s) of PU / TEC-PU. PU / TEC-PU is not responsible for the accuracy or completeness of the report and the role of the Institute is limited to providing administrative support to the project.
15. **Purchase:** All purchases will be in accordance with the relevant rules and regulations of the Government and PU.
16. **GOODS & SERVICE TAX:** As per Goods and Service Tax, the GST will be levied on total consultancy charges and this amount is to be borne by the Client (The GST applicable is 18%).
17. **ANY OTHER CLAUSE:** The project will start immediately after the receipt of payment for Phase-I (which is 70% of project cost). Phase 2 will start only after the receipt of remaining payment as a single and final instalment. The project related travel and accommodation if required for project work will be arranged / reimbursed by the client as per actual cost.

Date: 10/01/2024

Name & Signature of Principal Investigator
 (With office seal)

DIRECTOR
 CIL/SAI/ICMUSIC
 P.U. CHANDIGARH

Name & Signature of Client





Technology Enabling Centre (TEC)
(Sponsored by Department of Science and Technology, Govt. of India)
PANJAB UNIVERSITY, SECTOR-14, CHANDIGARH-160014 (INDIA)
(Established Under the Panjab University Act VII 1947 enacted by the Govt. of India)



Annexure-II

SCOPE OF WORK: PART 1: An adequacy Study of an Effluent Treatment Plant (ETP) comprises of a) **Capacity Audit** and b) **Performance Audit** and this typically involves a comprehensive assessment of various aspects to ensure that the plant is designed, operated, and maintained to meet the environmental and regulatory requirements. The adequacy study is crucial for evaluating the effectiveness and efficiency of the ETP. Here are key components that are commonly considered in an adequacy study of an ETP:

- **Hydraulic Design:** Evaluate the hydraulic capacity of the ETP to handle the expected volume of wastewater.
- **Treatment Process Design:** Review the design of each treatment unit and assess whether it meets the required standards for pollutant removal.
- **Process Performance:** Evaluate the performance of each treatment process in terms of pollutant removal efficiency.
- **Monitoring and Control Systems:** Assess the effectiveness of monitoring and control systems to ensure compliance with discharge standards.
- **Permit Compliance:** Check if the ETP is operating within the limits specified in its environmental permits.
- **Influent and Effluent Analysis:** Analyze the characteristics of the influent and effluent to ensure that the treatment processes are addressing the specific pollutants present. The scope will also includes testing of requisite parameters of all stages viz. MEE, ATFD, ASP, Clarifiers, Filtration system, RO etc. etc. from project starting to the end.
- **Chemical Usage:** Assess the efficiency of chemical usage and explore alternatives for cost-effectiveness and environmental impact.
- **Equipment Condition:** Inspect the condition of equipment and infrastructure to ensure they are well-maintained and functioning properly.
- **Safety Measures:** Assess the safety protocols and measures in place to protect workers and the surrounding environment.
- **Emergency Response Plan:** Evaluate the effectiveness of the emergency response plan in case of spills, leaks, or other unforeseen incidents.
- **Future Needs:** Consider any plans for upgradation or expansion based on changes in production capacity or regulatory requirements.

PART 2: The client is considering to install the anaerobic chamber to the ETP and during the tenure of this project; the technical team from IIT Ropar and PU Chandigarh will help to the client for technical audit of an anaerobic chamber



Technology Enabling Centre (TEC)
(Sponsored by Department of Science and Technology, Govt. of India)
PANJAB UNIVERSITY, SECTOR-14, CHANDIGARH-160014 (INDIA)
(Established Under the Panjab University Act VII 1947 enacted by the Govt. of India)



within an Effluent Treatment Plant (ETP); which will involve a comprehensive assessment of various components to ensure the efficiency, safety, and compliance of the anaerobic treatment system. The details of the work is presented below:

- **Design Parameters:** The client will provide the design parameters and the team will perform the evaluation of the design specifications of the anaerobic chamber, including the type of reactor (e.g., UASB - Upflow Anaerobic Sludge Blanket), size, and configuration. This will also include the Hydraulic Retention Time (HRT) and Organic Loading Rate (OLR): Assess whether the HRT and OLR are within the recommended range for optimal anaerobic digestion.
- **Operational Parameters:** Once the anaerobic chamber will be operational; the team will verify that the anaerobic chamber is maintained at the optimal temperature for the specific anaerobic digestion process. Different microbial consortia thrive at different temperature ranges. The team will also ensure that pH levels are within the optimal range for the specific anaerobic process to facilitate the activity of acid-forming and methane-forming microorganisms.
- **Biogas Production and Quality:** The team will measure and analyze the composition of biogas (methane, carbon dioxide, etc.) to ensure efficient digestion and assess the potential for energy recovery. The team will also evaluate the efficiency of biogas collection systems and assess whether the generated biogas is being utilized effectively.
- **Sludge Retention Time (SRT):** To analyze and assess the sludge retention time within the anaerobic chamber. Proper SRT is essential for maintaining an active microbial population and achieving effective treatment.
- **Mixing and Agitation:** To assess the effectiveness of mixing and agitation systems within the anaerobic reactor. Adequate mixing ensures uniform distribution of organic matter and facilitates microbial activity.
- **Gas and Odor Control:** To verify the implementation of gas and odor control measures to prevent the release of odorous compounds and potential safety hazards.
- **Monitoring and Control Instruments:** To evaluate the functionality of monitoring and control instruments, including sensors for temperature, pH, gas composition, and other relevant parameters.
- **Effluent Quality:** to assess the quality of the effluent from the anaerobic chamber. Ensure that it meets regulatory standards and is suitable for further treatment or discharge.



Technology Enabling Centre (TEC)
(Sponsored by Department of Science and Technology, Govt. of India)
PANJAB UNIVERSITY, SECTOR-14, CHANDIGARH-160014 (INDIA)
(Established Under the Panjab University Act VII 1947 enacted by the Govt. of India)



17

Annexure-III

Deliverable (with timeline): This project is concerned with the guidelines, protocols & technical know-how for the processing of wastewater treatment and therefore the CI is responsible to deliver the technical report highlighting the following points within 5 months of the start of the project. It is worth to mention here that the CI will provide the first report within the 2.5 months and once the anaerobic chamber (if required; on the basis of first report) will be ready at the client site and CI will complete the evaluation part within 2.5 months from the day CI receive the consent from the client to evaluate the anaerobic chamber along with other parts of ETP :

1. Evaluation report from the data provided by the industry.
2. Details of each experiment to be performed by the client.
3. Detailed report of the analysis of collected water samples.
3. Model development to exhibit the correlation of the various parameters.
4. Suggestions for the further processing of work for Pilot plant establishment.
5. Recommendations.

Scope of work for Client:

1. The transportation for each visit will be arranged by client.
2. Accommodation will be arrange by client (when required).
3. Design of anaerobic chamber.
3. Transportation required for sample movement will be arranged by client.
4. All the experiments will be conducted as per the details provided by the CI/PI form IIT Ropar and PU Chandigarh.
5. If any particular protocol is needed to perform; the client will provide the copy of the protocol

Indian Institute of Technology Ropar
Research & Development Section

18

Consultancy Assignment Proposal and Agreement Form
PART-A

TITLE OF THE CONSULTANCY (Kindly fill in BLOCK letters): EVALUATION OF ADEQUACY OF ETP OF MOREPEN LABORATORIES LIMITED AT MASULKHANA (PARWANOO) TO MAKE THE FACILITY ZLD

CONSULTANT INCHARGE:

Name: Dr. NARINDER SINGH
Department /Centre: Department of Chemistry
/ Department of Biomedical Engineering
Telephone: Direct: 01881-242062

Designation: Professor

Email: nsingh@iitpr.ac.in

CONSULTANT Co-INCHARGE:

EXPECTED TIME SCHEDULE:

Duration: Years 0 Months 5 Weeks 0

Starting Date*:

CLIENT DETAILS (Kindly fill in BLOCKS):

Firm's Name: Morepen Laboratories Limited	Contact Person's Name: Dr. Vikas Thakur
Address: Village Masulkhana, Tehsil Kasauli, District Solan (Himachal Pradesh)	Designation: Dy General Manager
Ph. +91-7807806700 Ext. Fax	Email: vikas.thakur@morepen.com

TOTAL CHARGES AND PAYMENT DETAILS:

Mode of Payment: → By Cheque By Draft Telegraphic Transfer

Currency: → Indian Rupees Foreign Country: Currency:

Payment enclosed: → 8.72 Lakh + Institute Overheads + GST as per the rules of GOI.

Institute Overheads: 30% (with use of IIT Ropar Labs) / 20% (without use of IIT Ropar labs)

Total Value (in figures):

Total Value (in words):

Banks Name and Branch:

DD/Cheque No.	DD/ Cheque Amount	DD/Cheque Date
RTGS Payment	INR	

SCOPE OF THE CONSULTANCY (attach separate sheet, if necessary):

Objectives: As per attached Annexure-II

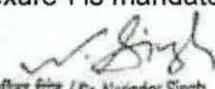
Deliverable (with timeline) As per attached Annexure-III

PAYMENT TERMS: 70-30 payment schedule, 70% before start of the project work and 30% before publishing the first study report.

AGREEMENT BETWEEN CLIENT AND CONSULTANT:

The signed agreement attached as annexure-I is mandatory for undertaking consultancy projects.

Signature of the Consultant Incharge:


 डॉ. नरिंदर सिंह / Dr. Narinder Singh
 प्राध्यापक / Professor
 रसायन विभाग / Department of Chemistry
 आई.आई.टी. रोपर, पंजाब / IIT Ropar, Punjab



Annexure-II

SCOPE OF WORK: PART 1: An adequacy Study of an Effluent Treatment Plant (ETP) comprises of a) **Capacity Audit** and b) **Performance Audit** and this typically involves a comprehensive assessment of various aspects to ensure that the plant is designed, operated, and maintained to meet the environmental and regulatory requirements. The adequacy study is crucial for evaluating the effectiveness and efficiency of the ETP. Here are key components that are commonly considered in an adequacy study of an ETP:

- **Hydraulic Design:** Evaluate the hydraulic capacity of the ETP to handle the expected volume of wastewater.
- **Treatment Process Design:** Review the design of each treatment unit and assess whether it meets the required standards for pollutant removal.
- **Process Performance:** Evaluate the performance of each treatment process in terms of pollutant removal efficiency.
- **Monitoring and Control Systems:** Assess the effectiveness of monitoring and control systems to ensure compliance with discharge standards.
- **Permit Compliance:** Check if the ETP is operating within the limits specified in its environmental permits.
- **Influent and Effluent Analysis:** Analyze the characteristics of the influent and effluent to ensure that the treatment processes are addressing the specific pollutants present. The scope will also include testing of requisite parameters of all stages viz. MEE, ATFD, ASP, Clarifiers, Filtration system, RO etc. etc. from project starting to the end.
- **Chemical Usage:** Assess the efficiency of chemical usage and explore alternatives for cost-effectiveness and environmental impact.
- **Equipment Condition:** Inspect the condition of equipment and infrastructure to ensure they are well-maintained and functioning properly.
- **Safety Measures:** Assess the safety protocols and measures in place to protect workers and the surrounding environment.
- **Emergency Response Plan:** Evaluate the effectiveness of the emergency response plan in case of spills, leaks, or other unforeseen incidents.
- **Future Needs:** Consider any plans for upgradation or expansion based on changes in production capacity or regulatory requirements.

PART 2: The client is considering to install the anaerobic chamber to the ETP and during the tenure of this project; the technical team from IIT Ropar and PU Chandigarh will help to the client for technical audit of an anaerobic chamber within an Effluent Treatment Plant (ETP); which will involve a comprehensive assessment of various components to ensure the efficiency, safety, and compliance of the anaerobic treatment system. The details of the work is presented below:

- **Design Parameters:** The client will provide the design parameters and the team will perform the evaluation of the design specifications of the anaerobic chamber, including the type of reactor (e.g., UASB - Up flow Anaerobic Sludge Blanket), size, and configuration. This will also include the Hydraulic Retention Time (HRT) and Organic Loading Rate (OLR): Assess whether the HRT and OLR are within the recommended range for optimal anaerobic digestion.
- **Operational Parameters:** Once the anaerobic chamber will be operational; the team will verify that the anaerobic chamber is maintained at the optimal temperature for the specific anaerobic digestion process. Different microbial consortia thrive at different temperature ranges. The team will also ensure that pH levels are within the optimal range for the specific anaerobic process to facilitate the activity of acid-forming and methane-forming microorganisms.

- **Biogas Production and Quality:** The team will measure and analyze the composition of biogas (methane, carbon dioxide, etc.) to ensure efficient digestion and assess the potential for energy recovery. The team will also evaluate the efficiency of biogas collection systems and assess whether the generated biogas is being utilized effectively.
- **Sludge Retention Time (SRT):** To analyze and assess the sludge retention time within the anaerobic chamber. Proper SRT is essential for maintaining an active microbial population and achieving effective treatment.
- **Mixing and Agitation:** To assess the effectiveness of mixing and agitation systems within the anaerobic reactor. Adequate mixing ensures uniform distribution of organic matter and facilitates microbial activity.
- **Gas and Odor Control:** To verify the implementation of gas and odour control measures to prevent the release of odorous compounds and potential safety hazards.
- **Monitoring and Control Instruments:** To evaluate the functionality of monitoring and control instruments, including sensors for temperature, pH, gas composition, and other relevant parameters.
- **Effluent Quality:** to assess the quality of the effluent from the anaerobic chamber. Ensure that it meets regulatory standards and is suitable for further treatment or discharge.

Annexure-III

Deliverable (with timeline): This project is concerned with the guidelines, protocols & technical know-how for the processing of wastewater treatment and therefore the CI is responsible to deliver the technical report highlighting the following points within 5 months of the start of the project. It is worth to mention here that the CI will provide the first report within the 2.5 months and once the anaerobic chamber (if required; on the basis of first report) will be ready at the client site and CI will complete the evaluation part within 2.5 months from the day CI receive the consent from the client to evaluate the anaerobic chamber along with other parts of ETP:

1. Evaluation report from the data provided by the industry.
2. Details of each experiment to be performed by the client.
3. Detailed report of the analysis of collected water samples.
3. Model development to exhibit the correlation of the various parameters.
4. Suggestions for the further processing of work for Pilot plant establishment.
5. Recommendations.

Scope of work for Client:

1. The transportation for each visit will be arranged by client.
2. Accommodation will be arrange by client (when required).
3. Design of anaerobic chamber.
3. Transportation required for sample movement will be arranged by client.
4. All the experiments will be conducted as per the details provided by the CI/PI form IIT Ropar and PU Chandigarh.
5. If any particular protocol is needed to perform; the client will provide the copy of the protocol.

368

FOR OFFICE USE ONLY

22

ANNEXURE I FOR CONSULTANCY PROJECT

Indian Institute of Technology Ropar
Rupnagar-140001 (Punjab)

AGREEMENT BETWEEN CONSULTANT AND CLIENT/CONTRACTOR FOR CONSULTANCY PROJECTS

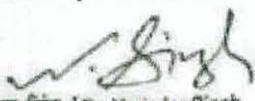
Title of the Consultancy Job: EVALUATION OF ADEQUACY OF ETP OF MOREPEN LABORATORIES LIMITED AT MASULKHANA (PARWANOO) TO MAKE THE FACILITY ZLD

1. **Legal Name & Address of the Client (Required for issue of tax invoice):** Morepen Laboratories Limited
2. **GST Number of the Client (Please attach a certificate):** Attached
3. **TAN Number (Please attach a certificate):**
4. **PAN Number (Please attach a certificate):** Attached
5. **Name and Dept. /Centre of the Consultant Incharge:** Dr. Narinder Singh, Professor, Department of Chemistry, IIT Ropar

The Institute through the CI/Co-CI will plan the Project in consultation with the Client. These terms and conditions govern projects for the development of products, processes, field studies, model studies, calculations, economic and technical consulting and other forms of project of specific interest to the client. The conditions are binding unless otherwise agreed upon in a separate signed document.

1. **DECLARATION:** All work undertaken by the Consultant Incharge (CI)/Co-Consultant Incharge (Co-CI) at IIT Ropar as part of the project will be in good faith and based on material/data/other relevant information given by the client requesting for the work.
2. **RESPONSIBILITY/LIABILITY:** The Institute through CI/Co-CI undertakes to carry out the project as conscientiously as conditions allow, but accepts no economic responsibility whatsoever, should the work not lead to expected results. IIT Ropar shall not be held liable for any loss, damage, delay or failure of performance, resulting directly or indirectly from any cause, which is beyond its reasonable control (Force Majeure). The liability of IIT Ropar shall be limited to the funds received for the project.
3. **DISCRETION:** The Institute through CI/Co-CI undertakes to handle with discretion reports, results, the identity of the Client and all material specifically treated/marked confidential which the client places at the disposal of the CI/Co-CI in connection with the project at IIT Ropar, subject to Right to Information rules/regulations.
4. **SUB-CONTRACTING:** Subcontracting will be as per the GOI norms.
5. **RESULT OF THE PROJECT:** The results of all work done at the Institute by the CI/Co-CI in connection with the project, incorporated in written reports shall remain the property of the Client. Results arrived at with little or no involvement on the part of the Client are available free of charge for the Client's own use. However, the CI/Co-CI/Institute reserves the right to use such results in connection with activities outside the scope of the project. If the Client consists of several individuals, all questions of Client, rights between the Clients must be settled between such individuals, and are of no concern to the CI/Co-CI/Institute. Unless otherwise agreed, all reports are to be sent to the Client. The CI/Co-CI/Institute has the right to retain a copy.
6. **INTELLECTUAL PROPERTY RIGHTS:** All rights pertaining to any intellectual property generated/created/invented in the due course of the project, will be the joint property of IIT Ropar and the Client. Terms and conditions regarding transferring/assigning/selling these rights to the Client shall be governed by a separate written agreement if required.
7. **PUBLISHING THE RESULTS/OUTCOME OF THE CONSULTANCY:** The results/outcome of the consultancy shall not be exploited by the Client organization for its business interests by using IIT Ropar's name/logo through press advertisement/publicity material or in any other manner. Manuscripts of academic papers, brochures, advertisements or other form of published material which refer to or quote the proprietary results of the project shall be vetted by both parties before publication.

8. **COMMUNICATION OF RESULTS TO A THIRD PARTY:** The CI/Co-CI may not, without the written agreement of the Client, communicate the results of the project to a third party. The Client shall arrange the necessary written agreement of all parties on the Client's side who may have publication rights with respect to the project.
9. **PROJECTS FOR OTHER CLIENTS:** The Institute may undertake other projects in the same field provided – to the best of its knowledge and belief – there exists no danger of information of a confidential nature coming into hands of a third party.
10. **APPARATUS:** Instruments and/or equipment obtained in connection with the project and charged to the client remain the property of IIT Ropar, unless otherwise it is specifically agreed to by the Institute.
11. **TERMINATION OF THE PROJECT:** The Client has a right to terminate the project at any time but shall be liable for all reasonable expenses incurred in connection with halting work already in progress according to the agreed work programme. The decision of IIT Ropar shall be final as far as reasonableness of the expenses is concerned. The Institute has also the right to terminate the project at any time except where otherwise agreed upon. The Client in this case will not be liable for any expenses incurred after the termination.
12. **PAYMENT:** The payment of consultation charges to IIT Ropar are to be made in advance and in full before the start of the project, through a demand draft/crossed valid cheque drawn in favour of the Registrar, IIT Ropar and sent to the Consultant. The charges will also include any applicable tax as prescribed by the Government of India or the Government of Punjab (or any other statutory body) from time to time.
13. **DISPUTES:** In the event of any dispute or difference between the parties hereto, such dispute or differences shall be resolved amicably by mutual consultation. If such resolution is not possible, then the unresolved dispute or difference shall be referred to a sole arbitrator to be nominated by the Director of the Institute for a reasoned Award. The seat of arbitration shall be within the campus of IIT Ropar and the language of arbitration shall be English. The Award of the arbitrator shall be binding on the parties to the dispute.
14. **DISCLAIMER:** The report on the consultancy project is the technical opinion of the CI/Co-CI based on his/their expertise in the particular area of research and in no way reflects the view(s) of IIT Ropar. IIT Ropar is not responsible for the accuracy or completeness of the report and the role of the Institute is limited to providing administrative support to the project.
15. **Purchase:** All purchases will be in accordance with the relevant rules and regulations of the Government and approved by the Board of Governors of IIT Ropar.
16. **GOODS & SERVICE TAX:** As per Goods and Service Tax, the GST will be levied on total consultancy charges and this amount is to be borne by the Client (The GST applicable is 18%).
17. **ANY OTHER CLAUSE:** The project will start immediately after the receipt of payment for Phase-1 (which is 70% of project cost). Phase 2 will start only after the receipt of remaining payment as a single and final instalment. The project related travel and accommodation (at Ludhiana) if required for project work will be arranged / reimbursed by the client as per actual cost.


 डॉ. नरिंदर सिंह / Dr. Narinder Singh

प्रध्यापक / Professor

रसायनशास्त्र विभाग / Department of Chemistry

आई.आई.टी. रोपर, पंजाब / IIT Ropar, Punjab

Date: _____

Name & Signature of Consultant Incharge

Place: _____

(with office seal)


 Dr. Vilas Thakur

Name & Signature of Client

(with office seal)





MOREPEN LABORATORIES LIMITED

Village & PO Masulkhana, Parwanoo, Distt. Solan
Himachal Pradesh, 173220, Contact No. : 01792-233283-88
DL No.: MB/93/6, MNB/93/5

25

GSTIN No.: 02AABCM1083B1ZA

PAN No.: AABCM1083B

PURCHASE ORDER

Capex : Capacity Enhancement of Existing ETF Masulkhan

Vendor Detail						Billing Address					
Name :	PUNJAB UNIVERSITY, CHANDIGARH					PO No :	MSL/2023-24/10178				
Address :	CHANDIGARH, ,					PO Date :	08/01/24				
State :	Chandigarh					Billing Add:	MOREPEN LABORATORIES LIMITED, Village & PO Masulkhana, Parwanoo,, Distt. Solan, Himachal Pradesh - 173220				
Country :	INDIA					Contact No. :	01792-233283-88				
Contact :	,										
GSTIN :	04AAAJP0325R2Z0										
PAN No. :	AAAJP0325R										
Email :						State Code :	04		State Code :	02	

S- N o	Item Name	UOM	Qty	Price	HSN	Disco unt %	Discount Value	Taxable Value	SGST %	SGST Amt	CGST %	CGST Amt	IGST %	IGST Amt
0	Evaluation of Adequacy of ETP of Morepen Laboratories Limited at Masulkhana (Parwanoo) to make the Facility ZLD As Ref.mail dt.8/1/2024	SET	1	1128400	9954			1128400.00	0	0	0	0	0	0
Total												0	0	

										Transaction Value		
										Less: Discount @ 0 %		
										Other Charges		
										Add : SGST		
										Add: CGST		
										Add: IGST		
										Total Amount :GST		2031
										Grand Total :		1331512

Payment Terms : Advance

Morepen Laboratories Limited

Delivery : As per discussed (Payment 70% advance&30%before publishing the first study report)

Freight : TO PAY

Delivery Through : BY ROAD

Special Instruction : (Invoice,Transporter copy & Eway bill should be as per our PO Address)

Authorised Signatory

GSTIN No.: 02AABCM1083B1ZA

PAN No.: AABCM1083E

PURCHASE ORDER

Capex : Capacity Enhancement of Existing ETF Masulkhan

Vendor Detail		Billing Address					
Name : PUNJAB UNIVERSITY, CHANDIGARH Address : CHANDIGARH, , State : Chandigarh Country : INDIA Contact : , GSTIN : 04AAAJP0325R2Z0 PAN No. : AAAJP0325R Email :	PO No : MSL/2023-24/10178 PO Date : 08/01/24 Billing Add: MOREPEN LABORATORIES LIMITED, Village & PO Masulkhana, Parwanoo,, Distt. Solan, Himachal Pradesh - 173220 Contact No. : 01792-233283-88	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">State Code :</td> <td style="width: 20%; text-align: center;">04</td> </tr> </table>	State Code :	04	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">State Code :</td> <td style="width: 20%; text-align: center;">02</td> </tr> </table>	State Code :	02
State Code :	04						
State Code :	02						

TERMS AND CONDITIONS OF PURCHASE

1. **ACCEPTANCE** : If no formal acceptance received with in 10 days from date of order, the same shall be deemed accepted
2. **SPECIFICATION** : Specifications stipulated must be adhered to otherwise we reserve the right to cancel whole/ part order.
3. **INSPECTION** : Company will not be liable for non performance, either in whole or in part of any contract, or any delay in performance there of, as a consequence of occurances beyond the control of the company.
4. **VALIDITY** : Delivery must be as per given schedule. Failing which, we reserve the right to cancel order, whole/part. We shall be compensated for losses for non compliance of order. Our assessment of losses shall be final.
5. **INVOICE** : All invoices shall be made as per prevailing Central Excise rules so that MODVAT can be avaiied of.
6. **FORCE MAJURE** : Company will not be liable for non performance, either in whole or in part of any contract, or any delay in performance there of, as a consequences of occurances beyond the control of the company.
7. **JURISDICTION** : All disputes arising out of this contract shall lie within the Solan Jurisdiction only.
8. Do not charge TCS on your invoices, We will deduct TDS as per section 194 Q, if applicable on you
9. **INSURANCE & TRANSIT RISKS**
 Unless otherwise stipulated, the goods shall be insured by the Supplier at his own cost. Notwithstanding the aforesaid any loss or damage during transit till delivery to the Buyer at the designated destination shall be to the Supplier's account.
10. **STATUARY COMPLIANCES**
 - Ensure compliance to below points:
 - Requirements of factories act.
 - Labour law related requirement applicable to my organization
 - Labour law requirements as listed below: Working hours / Forced Labour, Child Labour Policy, Holiday Compliance, ESI & PF compliance, Minimum wages & Overtime compliance, Payday compliance
 - All Policies of Morepen in our organization depending upon Nature and scale of our organization.
 - All safety norms applicable to our organization
 - Applicable Environment norms on Product and Material
 - In Transit Safety norms for Transport of Chemical, raw materials Hazardous material the consignor has to ensure the following points:
 - i The Goods carriage have valid Registration Certificate, PUC.
 - ii The goods carriage has a valid registration to carry the hazardous goods.
 - iii The vehicle is equipped with necessary First-aid, Safety equipment's and antidotes as may be necessary.
 - iv The transporter or owner of the goods carriage has full and adequate information about the dangerous or hazardous goods being transported.
 - v The driver of the goods carriage having valid driving license and should be trained in handling the dangers posed during transport of such goods.
 - vi Every consignor shall supply to the owner of the goods carriage full and adequate information about the dangerous or hazardous goods, being transported as to enable such owner and its driver:
 - vii To make aware of the safety rules for transportation of hazardous materials.
 - viii To make aware of the risks created by such goods to health or safety of any person.



MOREPEN LABORATORIES LIMITED

Village & PO Masulkhana, Parwanoo, Distt. Solan
Himachal Pradesh, 173220, Contact No. : 01792-233283-88
DL No.: MB/93/6, MNB/93/5

27

GSTIN No.: 02AABCM1083B1ZA

PAN No.: AABCM1083B

PURCHASE ORDER

Capex : Capacity Enhancement of Existing ETP Masulkhana

Vendor Detail		Billing Address	
Name : INDIAN INSTITUTE OF TECHNOLOGY ROPAR		PO No : MSL/2023-24/10179	
Address : ROPAR, ROPAR		PO Date : 09/01/24	
State : Punjab		Billing Add : MOREPEN LABORATORIES LIMITED, Village & PO Masulkhana, Parwanoo,, Distt. Solan, Himachal Pradesh - 173220	
Country : INDIA		Contact No. : 01792-233283-88	
Contact : ,			
GSTIN : 03AAATI7702D1Z8			
PAN No. : AAATI7702D			
Email :	State Code : 03		State Code : 02

S-NO	Item Name	UOM	Qty	Price	HSN	Discount %	Discount Value	Taxable Value	SGST %	SGST Amt	CGST %	CGST Amt	IGST %	IGST Amt
0	Evaluation of Adequacy of ETP of Morepen Laboratories Limited at Masulkhana (Parwanoo) to make the Facility ZLD As Ref.mail dt.8/1/2024	SET	1	1133600	9954			1133600.00	0	0	0	0	0	
Total												0	0	

Transaction Value		
Less: Discount @ 0 %		
Other Charges		
Add: SGST		
Add: CGST		
Add: IGST		
Total Amount :GST		20404
Grand Total :		1337648.0

Payment Terms : Advance

Morepen Laboratories Limited

Delivery : As per discussed (Payment 70% advance & 30% before publishing the first study report)

Freight : TO PAY

Delivery Through : BY ROAD

Special Instruction : (Invoice, Transporter copy & Eway bill should be as per our PO Address)

Authorised Signatory

GSTIN No.: 02AABCM1083B1ZA

PAN No.: AABCM1083B

PURCHASE ORDER

 Capex : Capacity Enhancement of Existing ETF
 Masulkhan:

Vendor Detail	Billing Address
Name : INDIAN INSTITUTE OF TECHNOLOGY ROPAR Address : ROPAR, ROPAR State : Punjab Country : INDIA Contact : , GSTIN : 03AAATI7702D1Z8 PAN No. : AAATI7702D Email :	PO No : MSL/2023-24/10179 PO Date : 09/01/24 Billing Add: MOREPEN LABORATORIES LIMITED, Village & PO Masulkhana, Parwanoo,, Distt. Solan, Himachal Pradesh - 173220 Contact No. : 01792-233283-88
State Code : 03	State Code : 02

TERMS AND CONDITIONS OF PURCHASE

1. **ACCEPTANCE** : If no formal acceptance received with in 10 days from date of order, the same shall be deemed accepted
2. **SPECIFICATION** : Specifications stipulated must be adhered to otherwise we reserve the right to cancel whole/ part order.
3. **INSPECTION** : Company will not be liable for non performance, either in whole or in part of any contract, or any delay in performance there of, as a consequence of occurances beyond the control of the company.
4. **VALIDITY** : Delivery must be as per given schedule. Failing which, we reserve the right to cancel order, whole/part. We shall be compensated for losses for non compliance of order. Our assessment of losses shall be final.
5. **INVOICE** : All invoices shall be made as per prevailing Central Excise rules so that MODVAT can be avaied of.
6. **FORCE MAJURE** : Company will not be liable for non performance, either in whole or in part of any contract, or any delay in performance there of, as a consequences of occurances beyond the control of the company.
7. **JURISDICTION** : All disputes arising out of this contract shall lie within the Solan Jurisdiction only.
8. Do not charge TCS on your invoices, We will deduct TDS as per section 194 Q, if applicable on you
9. **INSURANCE & TRANSIT RISKS**

Unless otherwise stipulated, the goods shall be insured by the Supplier at his own cost. Notwithstanding the aforesaid any loss or damage during transit till delivery to the Buyer at the designated destination shall be to the Supplier's account.

10. STATUARY COMPLIANCES

- Ensure compliance to below points:
- Requirements of factories act.
- Labour law related requirement applicable to my organization
- Labour law requirements as listed below: Working hours / Forced Labour, Child Labour Policy, Holiday Compliance, ESI & PF compliance, Minimum wages & Overtime compliance, Payday compliance
- All Policies of Morepen in our organization depending upon Nature and scale of our organization.
- All safety norms applicable to our organization
- Applicable Environment norms on Product and Material
- In Transit Safety norms for Transport of Chemical, raw materials Hazardous material the consignor has to ensure the following points:
 - i The Goods carriage have valid Registration Certificate, PUC.
 - ii The goods carriage has a valid registration to carry the hazardous goods.
 - iii The vehicle is equipped with necessary First-aid, Safety equipment's and antidotes as may be necessary.
 - iv The transporter or owner of the goods carriage has full and adequate information about the dangerous or hazardous goods being transported.
 - v The driver of the goods carriage having valid driving license and should be trained in handling the dangers posed during transport of such goods.
 - vi Every consignor shall supply to the owner of the goods carriage full and adequate information about the dangerous or hazardous goods, being transported as to enable such owner and its driver:
 - vii To make aware of the safety rules for transportation of hazardous materials.
 - viii To make aware of the risks created by such goods to health or safety of any person.

EVALUATION OF ADEQUACY OF ETP OF MOREPEN LABORATORIES LIMITED AT MASULKHANA (PARWANOO)
TO MAKE THE FACILITY ZLD

Preamble: The contamination of natural resources due to anthropogenic activities or through industrialization has contributed to the various kinds of pollution. Water is one of the most essential components which constitute the ecosystem. Water provides the basic amenities for the crops production and also supports the survival and development of human beings. The disposal of industrial waste without any treatment which majorly contains Pharmaceuticals and personal care products (PPCP) is one of the main causes for the water pollution. The water pollution is drastically increasing in agricultural land worldwide, and it affects sustainable development. Water, which serves as the ultimate sink for many organic/inorganic pollutants where they may persist for many years or remain at dynamic equilibrium. Furthermore, the pollution of agricultural land is related to the degree of industrialization and concentration of pollutants in the industrial waste that are being disposed off in the water. Water pollution in other words can be described as the removal of useful substances from the water or addition of harmful substances to it. In the present project, the level water quality parameters along with special reference to PPCP will be determined in the samples collected from the concerned industry. Further, the report will be prepared which will highlight the possible strategies to remove these PPCPs and also focus on the qualitative analysis of water quality parameters.

INVESTIGATORS:

	<i>IIT ROPAR</i>	<i>PU CHANDIGARH</i>
Name of CI/PI	Dr. Narinder Singh	Dr. GR Chaudhary
Organization	Indian Institute of Technology Ropar	Panjab University Chandigarh
Department	Chemistry	Chemistry
Title	Professor	Professor
Address of Institution	Indian Institute of Technology Ropar, Rupnagar, Punjab, India, 140001	Panjab University Chandigarh
Cell phone #	9815250731	9878822323
e-mail	nsingh@iitrpr.ac.in	grchaudhary@gmail.com

Details of Co-PI/Co-CI

1. Dr. Rajeev Kumar; Department of Environmental Sciences; PU Chandigarh
2. Dr. R.K. Sharma; SAIF/CIL; PU Chandigarh

SCOPE OF WORK:

PART 1: An adequacy Study of an Effluent Treatment Plant (ETP) comprises of a) **Capacity Audit** and b) **Performance Audit** and this typically involves a comprehensive assessment of various aspects to ensure that the plant is designed, operated, and maintained to meet the environmental and regulatory requirements. The adequacy study is crucial for evaluating the effectiveness and efficiency of the ETP. Here are key components that are commonly considered in an adequacy study of an ETP:

- **Hydraulic Design:** Evaluate the hydraulic capacity of the ETP to handle the expected volume of wastewater.
- **Treatment Process Design:** Review the design of each treatment unit and assess whether it meets the required standards for pollutant removal.
- **Process Performance:** Evaluate the performance of each treatment process in terms of pollutant removal efficiency.

- **Monitoring and Control Systems:** Assess the effectiveness of monitoring and control systems to ensure compliance with discharge standards.
- **Permit Compliance:** Check if the ETP is operating within the limits specified in its environmental permits.
- **Influent and Effluent Analysis:** Analyze the characteristics of the influent and effluent to ensure that the treatment processes are addressing the specific pollutants present. The scope will also include testing of requisite parameters of all stages viz. MEE, ATFD, ASP, Clarifiers, Filtration system, RO etc. etc. from project starting to the end.
- **Chemical Usage:** Assess the efficiency of chemical usage and explore alternatives for cost-effectiveness and environmental impact.
- **Equipment Condition:** Inspect the condition of equipment and infrastructure to ensure they are well-maintained and functioning properly.
- **Safety Measures:** Assess the safety protocols and measures in place to protect workers and the surrounding environment.
- **Emergency Response Plan:** Evaluate the effectiveness of the emergency response plan in case of spills, leaks, or other unforeseen incidents.
- **Future Needs:** Consider any plans for upgradation or expansion based on changes in production capacity or regulatory requirements.

PART 2: The client is considering to install the anaerobic chamber to the ETP and during the tenure of this project; the technical team from IIT Ropar and PU Chandigarh will help to the client for technical audit of an anaerobic chamber within an Effluent Treatment Plant (ETP); which will involve a comprehensive assessment of various components to ensure the efficiency, safety, and compliance of the anaerobic treatment system. The details of the work is presented below:

- **Design Parameters:** The client will provide the design parameters and the team will perform the evaluation of the design specifications of the anaerobic chamber, including the type of reactor (e.g., UASB - Up flow Anaerobic Sludge Blanket), size, and configuration. This will also include the Hydraulic Retention Time (HRT) and Organic Loading Rate (OLR): Assess whether the HRT and OLR are within the recommended range for optimal anaerobic digestion.
- **Operational Parameters:** Once the anaerobic chamber will be operational; the team will verify that the anaerobic chamber is maintained at the optimal temperature for the specific anaerobic digestion process. Different microbial consortia thrive at different temperature ranges. The team will also ensure that pH levels are within the optimal range for the specific anaerobic process to facilitate the activity of acid-forming and methane-forming microorganisms.
- **Biogas Production and Quality:** The team will measure and analyze the composition of biogas (methane, carbon dioxide, etc.) to ensure efficient digestion and assess the potential for energy recovery. The team will also evaluate the efficiency of biogas collection systems and assess whether the generated biogas is being utilized effectively.
- **Sludge Retention Time (SRT):** To analyze and assess the sludge retention time within the anaerobic chamber. Proper SRT is essential for maintaining an active microbial population and achieving effective treatment.
- **Mixing and Agitation:** To assess the effectiveness of mixing and agitation systems within the anaerobic

- reactor. Adequate mixing ensures uniform distribution of organic matter and facilitates microbial activity.
- **Gas and Odor Control:** To verify the implementation of gas and odour control measures to prevent the release of odorous compounds and potential safety hazards.
 - **Monitoring and Control Instruments:** To evaluate the functionality of monitoring and control instruments, including sensors for temperature, pH, gas composition, and other relevant parameters.
 - **Effluent Quality:** to assess the quality of the effluent from the anaerobic chamber. Ensure that it meets regulatory standards and is suitable for further treatment or discharge.

Deliverable (with timeline): This project is concerned with the guidelines, protocols & technical know-how for the processing of wastewater treatment and therefore the CI is responsible to deliver the technical report highlighting the following points within 5 months of the start of the project. It is worth to mention here that the CI will provide the first report within the 2.5 months and once the anaerobic chamber (if required; on the basis of first report) will be ready at the client site and CI will complete the evaluation part within 2.5 months from the day CI receive the consent from the client to evaluate the anaerobic chamber along with other parts of ETP:

1. Evaluation report from the data provided by the industry.
2. Details of each experiment to be performed by the client.
3. Detailed report of the analysis of collected water samples.
3. Model development to exhibit the correlation of the various parameters.
4. Suggestions for the further processing of work for Pilot plant establishment.
5. Recommendations.

Scope of work for Client:

1. The transportation for each visit will be arranged by client.
2. Accommodation will be arranged by client (when required).
3. Design of anaerobic chamber.
4. Transportation required for sample movement will be arranged by client.
5. All the experiments will be conducted as per the details provided by the CI/PI from IIT Ropar and PU Chandigarh.
6. If any particular protocol is needed to perform; the client will provide the copy of the protocol.

FUNDING FOR PROJECT: The following amounts will be transferred to both the institutes as per the account details provided by both the institutes.

Option a): As Indian Institute of Technology (IITs) are institutions of National importance established by an act under Ministry of Human Resource Development (MHRD), Government of India, imparting higher education in Engineering & Technology. The institute has been set up under the Act of Parliament as an educational research institution wholly funded by MHRD, therefore its income is unconditionally exempt from tax u/s 10(23C) (iii ab). The budget will be:

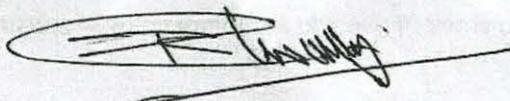
IIT Ropar: 7.85 Lakh + Institute Overheads + GST as per the rules of GOI.

PU Chandigarh: 7.81 Lakh + Institute Overheads + GST as per the rules of GOI.

Option b): If the client wishes to cut TDS at source; the budget will be expanded accordingly.

PAYMENT TERMS: 70-30 payment schedule, 70% before start of the project work and 30% before publishing the first study report.


 डॉ. नवींदर सिंह / Dr. Navinder Singh
 प्राध्यापक / Professor
 रसायनशास्त्र विभाग / Department of Chemistry
 आई.आई.टी. रोपर, पंजाब / IIT Ropar, Punjab


 DIRECTOR
 SAIF/CIL
 P.U. Chandigarh



378

Sophisticated Analytical Instruments Laboratories

Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

32

Report

Assessment of Soil Testing for Transfer Factor and Health Index Study

Site

Morepen Laboratories Limited,
Village Masulkhana, Tehsil Kasauli, District Solan (Himachal Pradesh)
India-173220

Conducted By

Sophisticated Analytical Instruments Laboratories Society
Thapar Technology Campus, Bhadson Road Patiala-147004



379

Sophisticated Analytical Instruments Laboratories

Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

Report on the

Assessment of Soil Testing for Transfer Factor and Health Index Study

At the site of Morepen Laboratories Limited

Village Masulkhana, Tehsil Kasauli, District Solan (Himachal Pradesh) India-173220

33

Morepen Laboratories Limited, Village Masulkhana, Tehsil Kasauli, District Solan, Himachal Pradesh contacted SAI LABS Patiala for above mentioned studies. The industry has the following facilities at the site:

1. Bulk Drugs(API) manufacturing facility
2. R &D center (Recognized by Govt. of India) with a focus on anti-diabetic, anti-depressant, and anti-coagulant

On an initiation to access the above-mentioned parameters, a team of SAI LABS visited the effluent treatment plant and its process facilities. The team comprised of following members:

1. Professor Raj Kumar Gupta
Department of Chemical Engineering
Thapar Institute of Engineering and Technology Patiala
2. Mr. Mukesh Agarwal
Technical Manager (SAI LABS)
Thapar Institute campus, Bhadson Road Patiala

The objective of the visit was to the impact of industrial activity on

1. The soil quality
2. The Crop for heavy metals transfer factor and soil health index

It is decided that the quality of soil and crop at the industry site would be compared with the soil and crop quality of nearby areas.

Therefore, the soil and crop samples were taken from the nearby industry site on 13 December 2023. Two samples of soil and three samples of tuber crops were taken from the downstream site of the industry and one sample of crop and soil each was taken from the upstream site for comparison.

The samples were collected as per the sampling procedure and protocol for the soil and crop samples (Annexure-I) and analyzed in SAI LABS the laboratory analysis report for soil and crop samples is attached herewith against this report. (Annexure-II)



Sophisticated Analytical Instruments Laboratories

Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

The following observations are made from the analysis reports:

34

The analysis reports of the soil samples show that there is no adverse impact on the soil and crop quality at the downstream site vis-a-vis the soil and crop quality of the upstream site for transfer factor and soil health index.

By *Raj Kumar Gupta* 8/11/2024

Dr. Raj Kumar Gupta
Department of Chemical Engineering
Thapar Institute of Engineering and Technology
Patiala

Mukesh Chand Agarwal
8/11/2024

Mukesh Chand Agarwal
Technical Manager (SAI LABS)
Thapar Institute campus
Patiala

Manmohan Chhibber

Dr. Manmohan Chhibber 8/11/2024
Professor in-Charge SAI LABS
Thapar Institute Campus Patiala



381

Sophisticated Analytical Instruments Laboratories

Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

35

ANNEXURE-I



Soil and Crop sampling

36

Principle

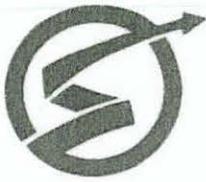
The samples collected must be a true representative of the area being sampled. In General, sampling is done at the rate of one sample for every two-hectare area. However, at least one sample should be collected for a maximum area of five hectares. For soil survey work, samples are collected from a soil profile representative of the soil of the surrounding area. For soil quality work for industries, at least two samples should be collected from nearby industry premises. In Hilly Area, if there is no soil found in the factory premises, at least three samples should be collected from nearby industry, here in the case of Morepen Laboratories Limited, Three samples were collected from nearby industry premises.

Materials Required

1. Spade or Auger (screw or tube or post hole type)
2. Khurpi
3. Core Sampler
4. Sampling Bags
5. Plastic tray or bucket if needed
6. Consideration points while soil sampling
7. Collect the soil samples during fallow period
8. In the standing crop, collect samples between rows
9. Sampling at several locations in a zigzag pattern ensures homogeneity
10. Collect separate samples from fields that differ in color, slope, drainage, past management practices like liming, gypsum application, fertilization, cropping system etc.
11. Avoid sampling in dead furrows, wet spots, areas near main bund, and manure heaps and irrigation channels.
12. For shallow rooted crops, collect samples up to 15 cm depth, for deep rooted crops, collect samples up to 30 cm depth, for tree crops, collect profile samples.
13. Always collect the soil sample in the presence of the farm owner who knows the farm better
14. For soil quality monitoring of the industry, collect the samples up to 6 inch depth of the soil

Procedure

1. Divide the field into different homogenous units based on the visual observation and farmers experience.
2. Remove the surface litter at the sampling spot
3. Drive the auger to a plough depth of 15 cm and draw the soil sample.
4. Collect at least 10 to 15 samples from each sampling unit and place in a bucket or tray.



383
Sophisticated Analytical Instruments Laboratories
Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)
Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

In the laboratory procedure for receiving samples

37

1. Mix the samples thoroughly and remove foreign materials like roots, stones, pebbles and gravel
2. Reduce the bulk to about half to one kilogram by quartering or compartmentalization
3. Quartering is done by dividing the thoroughly mixed sample into four equal parts. The two opposite quarters are discarded and the remaining two quarters are remixed and the process is repeated until the desired sample size is obtained.
4. Compartmentalization is done by uniformly spreading the soil over a clean hard surface and dividing it into smaller compartments by drawing lines along and across the length and breadth. From each compartment, a pinch of soil is collected. This process is repeated until the desired quantity of sample is obtained.
5. Collect the sample in a clean cloth or polythene bag
6. Label the bag with information like the name of the farmer, location of the farm, survey number, previous crop grown, present crop, crop to be grown in the next season, date of collection, name of the sampler, etc.

M. K. S.



384
Sophisticated Analytical Instruments Laboratories
Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)
Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

Sophisticated Analytical Instruments Laboratories Society Patiala

38

Tour/Visit Report

Name: Mukesh Chand Agarwal and Mr. Amit Kumar
Designation : Senior Research Scientist and Senior Technical Assistant
Division: SAI Labs
Date of Visit: 13.12.2023
Place of Visit: Morepen Laboratories Limited village Masulkahana,
Tehsil Kasauli, District Solan, Himachal Pradesh India-173220

Purpose of Visit: For quality parameter studies of soil, Transfer factor study of crop, and collection of representative samples.

I, Mukesh Chand Agarwal, and Mr. Amit Kumar started the visit on 13-12-2023 in the morning at 8.00 o'clock to Morepen Laboratories Limited village Masulkahana, Tehsil Kasauli, District Solan, Himachal Pradesh India-173220, for site assessment and collection of Soil and Crop samples for soil quality studies and crop transfer factor studies for soil health index. My Self and Mr. Amit Kumar met with Dr. Vikas Thakur and Mr. Naresh Sharma (Vice President) at the industry site. Collections of the samples were done in front of industry representatives. Three samples were collected for soil quality studies and another four Crops samples were collected for transfer factor studies along with soil samples.

Below are the details of collected samples: For soil and crop quality

Sample No.	Location for Soil Samples (Shalu Khurd and Masulkhana) nearby industry	Sample No.	Location for Crop Sample (Shalu Khurd and Masulkhana) nearby industry
1	Latitude/Longitude (Downstream Site) 30.8687/76.9438	1	Latitude/Longitude (Reddish) (Downstream Site) 30.8687/76.9438
		2	Latitude/Longitude (Potato) (Downstream Site) 30.8687/76.9438
2	Latitude/Longitude (Downstream Site) 30.8669/76.9504	3	Latitude/Longitude (Garlic) (Downstream Site) 30.8680/76.9495
3	Latitude/Longitude reference (Upstream Site) 30.8669/76.9525(Reference)	4	Latitude/Longitude (potato) Reference (Upstream Site) 30.8669/76.9525(Reference)

For soil quality monitoring of the nearby industry, the samples were collected at 10-15 cm depth. For shallow-rooted crop samples, crop and soil samples were collected as per the procedure.

Mr. Amit Kumar and I reached Patiala at 5.00 PM on 13-12-2023. The visit was very interactive and satisfactory

Mukesh Chand Agarwal



385

Sophisticated Analytical Instruments Laboratories

Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

39

ANNEXURE-II

M. K. Singh



386

Sophisticated Analytical Instruments Laboratories**Society** (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

40

TEST REPORT

Test Report No.:	NN(D)/23-24/586	Date:	20.12.2023
Service No.	NN(D)/23-24/586 (01-03)	Customer's Ref.	Sample Collected by Mr. Mukesh Agarwal on dtd 13.12.2023
Customer's name and address:			
M/s Morepen Laboratories Limited Village Masulkhana, Tehsil Kasuli, Distt. Solan, (HP) India-173220 Kind Attn.: Dr. Vikas Thakur			
Sample Description	Soil Located near by Industry (Shalu Khurd)		
Condition of the sample received	O.K.		
Customer's sample identification No. (if any)	Latitude	Longitude	
	01 – 30.8687	76.9438	
	02 – 30.8680	76.9495	
	03 – 30.8669	76.9525 (reference)	
Quantity/number of samples	100 – 200 gm each / 3		
Sampling Procedure (if any)/ Standard/Specification	IS:3025 (Part-I) 1987, Reaffirmed 2003, SAI/SOP/03/47		
Mode of Sampling/ Environmental Condition during transport	Grab Drawn		
Test parameters	pH, EC, Moisture, Texture (Sand, Silt, Clay), Water Holding Capacity, Porosity, Bulk Density, TOC, N, P, N, CEC, Zn, Ni, Pb, Cu, As, Cr, Cd, Hg		
Method followed	As mentioned below		
Deviations (if any)	--		
Documents constituting this report (if any)	--		
Date of Receipt of Job	Date of Completion of Job	Total Number of Pages	
14.12.2023	19.12.2023	2	

Page 2 of 2


M. Agarwal**Technical Manager**
(Authorized Signatory)

- Note:
1. The results listed refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied
 2. Samples will be destroyed after one month (except water, wastewater) from the date of issue of the test report unless otherwise specified
 3. This report is not to be reproduced wholly or in part and cannot be used as an evidence in the products is neither inferred nor implied. court of law and should not be used in any advertising media without special permission in writing.
 4. In case any reconfirmation of contents of the test report is required, please contact the authorized signatory of the test report within 15 days of the issue of test report

Page 9 of 17



387

Sophisticated Analytical Instruments Laboratories

Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

41

Test Report No.:	NN(D)/23-24/586	Date:	20.12.2023
Service No.	NN(D)/23-24/586 (01-03)	Customer's Ref.	Sample Collected by Mr. Mukesh Agarwal on dtd 13.12.2023
Customer's sample identification No. (if any)		Latitude	Longitude
		01 - 30.8687	76.9438
		02 - 30.8680	76.9495
		03 - 30.8669	76.9525 (reference)

TEST RESULTS

S. No.	Parameters	Test Method	Unit	Results		
				01	02	03
1	pH (1:2.5 Solution) @ 25°C (ARB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	--	8.3	7.8	8.3
2	Electrical conductivity @ 25°C (1:2.5 Solution) (ARB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	ds/m	0.163	0.079	0.117
3	Moisture @108°C (ARB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	%	11.2	6.64	6.96
4	Texture (ODB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	--	Sandy Loam	Sandy Loam	Sandy Loam
a	Sand (ODB)		%	69.3	71.5	73.3
b	Silt (ODB)		%	24.0	21.8	20.0
c	Clay (ODB)		%	6.72	6.66	6.72
5	Water Holding Capacity(ODB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	%	53.8	55.8	63.9
6	Porosity(ARB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	%	11.0	28.8	21.9
7	Bulk Density(ARB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	gm/cc	1.4516	1.4813	1.4874
8	Total Organic Carbon(ODB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	%	0.61	0.84	1.27
9	Available Nitrogen as N(ARB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	Kg/ha	281	269	495
10	Phosphorous as P(ARB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	Kg/ha	215	262	361
11	Cation Exchange Capacity(ODB)	Standard method of Soil Analysis, C.A. Black Wisconsin, USA	meq/100g	19.1	19.7	23.1
12	Zinc as Zn(ODB)	Digestion Followed By MP-AES	mg/kg	73.5	106	77.0
13	Nickel as Ni(ODB)	Digestion Followed By MP-AES	mg/kg	28.6	19.6	26.0
14	Lead as Pb(ODB)	Digestion Followed By MP-AES	mg/kg	19.6	17.6	19.2
15	Copper as Cu(ODB)	Digestion Followed By MP-AES	mg/kg	17.8	13.4	18.2
16	Arsenic as As(ODB)	Digestion Followed By MP-AES	mg/kg	0.99	0.93	1.05
17	Total Chromium as Cr(ODB)	Digestion Followed By MP-AES	mg/kg	27.6	27.7	15.1
18	Cadmium as Cd(ODB)	Digestion Followed By MP-AES	mg/kg	N.D	N.D	N.D
19	Mercury as Hg(ODB)	Digestion Followed By Mercury Analyzer	mg/kg	N.D	N.D	N.D

Page 2 of 2

Note : N.D (Not Detected)

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

M. Agarwal
M. Agarwal

Technical Manager
(Authorized Signatory)

- Note:
1. The results listed refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied
 2. Samples will be destroyed after one month (except water, wastewater) from the date of issue of the test report unless otherwise specified
 3. This report is not to be reproduced wholly or in part and cannot be used as an evidence in the products is neither inferred nor implied court of law and should not be used in any advertising media without special permission in writing.
 4. In case any reconfirmation of contents of the test report is required, please contact the authorized signatory of the test report within 15 days of the issue of test report



Sophisticated Analytical Instruments Laboratories

Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

TEST REPORT

42

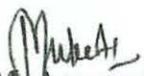
Test Report No.:	NN(D)/23-24/585	Date:	20.12.2023
Service No.	NN(D)/23-24/585 (01-04)	Customer's Ref.	Sample Collected by Mr. Mukesh Agarwal on dtd 13.12.2023
Customer's name and address:			
M/s Morepen Laboratories Limited Village Masulkhana, Tehsil Kasuli, Distt. Solan, (HP) India-173220 Kind Attn.: Dr. Vikas Thakur			
Sample Description	Crop Located near by Industry (Shalu Khurd)		
Condition of the sample received	O.K.		
Customer's sample identification No. (if any)	Latitude	Longitude	Type
	01 – 30.8687	76.9438	Reddish
	02 – 30.8687	76.9438	Potato
	03 – 30.8680	76.9495	Garlic
	04 – 30.8669	76.9525	Potato (reference)
Quantity/number of samples	100 – 200 gm each / 4		
Sampling Procedure (if any)/ Standard/Specification	IS:3025 (Part-I) 1987 , Reaffirmed 2003, SAI/SOP/03/47		
Mode of Sampling/ Environmental Condition during transport	Grab Drawn		
Test parameters	Zn, Ni, Pb, Cu, Cr, As, Cd, Hg		
Method followed	As mentioned below		
Deviations (if any)	--		
Documents constituting this report (if any)	--		
Date of Receipt of Job	Date of Completion of Job	Total Number of Pages	
14.12.2023	19.12.2023	1	

TEST RESULTS

S. No.	Parameter	Test Method	Unit	Results (Oven Dried basis)			
				01	02	03	04
1	Zinc as Zn	Digestion followed by MP-AES	mg/kg	33.0	17.6	21.3	23.3
2	Nickel as Ni	Digestion followed by MP-AES	mg/kg	2.95	3.13	3.41	2.77
3	Lead as Pb	Digestion followed by MP-AES	mg/kg	6.89	4.94	5.84	7.34
4	Copper as Cu	Digestion followed by MP-AES	mg/kg	2.30	5.44	2.43	4.89
5	Total Chromium as Cr	Digestion followed by MP-AES	mg/kg	2.46	N.D	3.89	N.D
6	Arsenic as As	Digestion followed by MP-AES	mg/kg	N.D	N.D	N.D	N.D
7	Cadmium as Cd	Digestion followed by MP-AES	mg/kg	N.D	N.D	N.D	N.D
8	Mercury as Hg	Digestion followed by Mercury Analyser	mg/kg	N.D	N.D	N.D	N.D

Note : N.D (Not Detected)

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


Mr. Agarwal

Technical Manager
(Authorized Signatory)

- Note:
- The results listed refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied
 - Samples will be destroyed after one month (except water, wastewater) from the date of issue of the test report unless otherwise specified
 - This report is not to be reproduced wholly or in part and cannot be used as an evidence in the products is neither inferred nor implied. court of law and should not be used in any advertising media without special permission in writing. Page 11 of 17
 - In case any reconfirmation of contents of the test report is required, please contact the authorized signatory of the test report within 15 days of the issue of test report

**389**

Sophisticated Analytical Instruments Laboratories

Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India) **43**

Interpretation of test report of soil sample collected from Morepen Laboratories Limited Village Masulkhana, Tehsil Kasauli, District Solan, HP, India-173220 as per report no. NN (D)/22-23/586(01-03) dated 20-12-2023

Sr. No	Parameters	01 (Downstream)	02(Downstream)	03 (Upstream)
1	pH(1:2.5) @25 degree C	Moderately Alkaline (8.4-9.0)	Moderately Alkaline (7.6-8.3)	Moderately Alkaline (7.6-8.3)
2	EC(1:2.5) @25 degree C(dS/m)	Good Soil (0-1)	Good Soil (0-1)	Good soil (0-1)
3	Moisture %	11.20	6.64	6.96
4	Texture	Sandy Loam	Sandy Loam	Sandy Loam
5	Water Holding Capacity	It shows the upper limit of plant-available soil moisture		
6	Bulk density (gm/cc)	Loam (1.4)	Silt Loam (1.3)	Silt Loam (1.3)
7	Total Organic Carbon (%)	Moderately high (0.61-0.80)	High (0.81 -1.0)	Very High (>1.0)
8	Nitrogen as N (Kg/ha)	Medium (281-420)	Low (140-280)	Moderately High (421-560)
9	Phosphorous as P (Kg/ha)	Very High (>35)	Very High (>35)	Very High (>35)
10	Cation Exchange Capacity (meq/100g)	Medium (10-25)	Medium (10-25)	Medium (10-25)

**390**

Sophisticated Analytical Instruments Laboratories

Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

44

Interpretation of test report of Soil and Crop samples collected from Morepen Laboratories Limited Village Masulkhana, Tehsil Kasuli, District Solan, HP, India-173220 as per report no. NN (D)/22-23/586(01-03) and NN (D)/22-23/585(01-04) dated 20-12-2023 for calculating the Transfer factor and the health risk index.

Elements/maximum permissible limit as per WHO)	Sample Number 1 Transfer factor (Reddish)	Sample Number 2 Transfer Factor (Potato)	Sample number 3 Transfer Factor (Garlic)	Sample Number 4 Transfer Factor Potato (reference)
or Zinc 50 mg/kg maximum	$(33.0/73.5) = 0.45$	$(17.6/73.5) = 0.24$	$(21.3/106) = 0.20$	$(23.3/77) = 0.30$
For Nickel 35 mg/kg maximum	$(2.95/28.6) = 0.10$	$(3.13/28.6) = 0.11$	$(3.41/19.6) = 0.17$	$(2.77/26) = 0.106$
For Lead 85 mg/kg maximum	$(6.89/19.6) = 0.35$	$(4.94/19.6) = 0.25$	$(5.84/17.6) = 0.33$	$(7.34/19.2) = 0.38$
For Copper 36 mg /kg maximum	$(2.30/17.8) = 0.13$	$(5.44/17.8) = 0.31$	$(2.43/13.4) = 0.18$	$(4.89/18.2) = 0.27$
For Arsenic 6 mg/kg maximum	$(\text{Nil}/0.99) = 0.0$	$(\text{Nil}/0.99) = 0.0$	$(\text{Nil}/0.93) = 0.0$	$(\text{Nil}/1.05) = 0.0$
For Chromium 100 mg /kg maximum	$(2.46/27.6) = 0.09$	$(\text{Nil}/27.6) = 0.0$	$(3.89/27.7) = 0.14$	$(\text{Nil}/15.1) = 0.0$
For Cadmium 0.8 mg/kg maximum	$(\text{Nil}/\text{NIL}) = 0.0$	$(\text{Nil}/\text{NIL}) = 0.0$	$(\text{Nil}/\text{NIL}) = 0.0$	$(\text{Nil}/\text{NIL}) = 0.0$
For Mercury 0.02 to 0.06 mg/kg	$(\text{Nil}/\text{NIL}) = 0.0$	$(\text{Nil}/\text{NIL}) = 0.0$	$(\text{Nil}/\text{NIL}) = 0.0$	$(\text{Nil}/\text{NIL}) = 0.0$

The health risk index indicates a transfer of heavy metals from soil to crop. Only tuber crops with shallow roots were found near the industry both upstream and downstream. Both tubers and soil were analyzed for transfer factor and health index. Mainly Zinc, Nickel, Lead, Copper, Arsenic, Chromium, Cadmium, and Mercury were studied to determine the health risk index and transfer factor.

Note:

1. The crops grown on metal-contaminated soils have the hazard of uptaking metal contaminants thereby entering our food chain.



2. A seasonal Nala flows along the industrial site from North(Upstream) to South(Downstream)
3. Collected soil and crop samples were dried at 60 degrees centigrade, digested in nitric acid and hydrogen peroxide, and the filtration part was used for the instrumental analysis.
4. A transfer factor of less than one is considered safe. Transfer Factor=[metal in crops/metal in soil]
5. Nickel, Lead, Cadmium Arsenic, and Mercury are toxic to the human body.
6. Both the parameters were evaluated for the Transfer Factor.

Estimated daily intake of metals is associated with the concentration of metal in vegetables, conversion factor for fresh green vegetable weight to dry weight, daily intake of vegetable kg/person/day, and average body weight.

Here we are taking a conversion factor of 0.085 for fresh green vegetable weight to dry weight and daily intake of vegetables 0.250 kg/person/day and average body weight of 58 kg.

Table 1

Elements	Sample Number 1 Estimated daily intake of metals (Reddish) (mg/kg)	Sample Number 2 Estimated daily intake of metals (Potato) (mg/kg)	Sample number 3 Estimated daily intake of metals (Garlic) (mg/kg)	Sample Number 4 Estimated daily intake of metals Potato (Reference) (mg/kg)
For Zinc	0.012	0.006	0.008	0.009
For Nickel	0.001	0.001	0.001	0.001
For Lead	0.003	0.002	0.001	0.003
For Copper	0.0008	0.002	0.0009	0.002
For Arsenic	0.0	0.0	0.0	0.0
For Chromium	0.0008	0.0	0.0	0.0
For Cadmium	0.0	0.0	0.0	0.0
For Mércury	0.0	0.0	0.0	0.0

Table 1 shows the estimated daily intake of metals in the human body. It has been assumed that a person of 58 kg consumes 250 gm of the vegetables grown on the above-mentioned site. It has been assumed that 1 gm of vegetable consumed has a dry weight of 0.085 gm.

The health risk index is estimated by the ratio of the estimated daily intake of metals and the reference dose of the metals. Reference doses are taken from the food safety and standards (Contaminants, Toxins, and residues) regulations 2011.



392

Sophisticated Analytical Instruments Laboratories**Society** (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

For sample No.1 Downstream side (Reddish)

46

Elements	Estimated daily intake of metals Sample no.1 (Downstream side) (mg/kg)	Reference dose as per food safety and standards(Contaminants, Toxins, and residues) regulations2011 (mg/kg)	Health Risk Index of Metals (Reddish)
Zinc	0.012	50.0	0.00024
Nickel	0.001	1.0	0.001
Lead	0.003	2.5	0.0012
Copper	0.0008	30	0.00003
Arsenic	0.0	1.1	0.0
Chromium	0.0008	1.0	0.0008
Cadmium	0.0	1.5	0.0
Mercury	0.0	1.0	0.0

For sample No.2 Downstream side (Potato)

Elements	Estimated daily intake of metals Sample no.2 (Downstream side) (mg/kg)	Reference dose as per food safety and standards(Contaminants, Toxins, and residues) regulations2011 (mg/kg)	Health Risk Index of Metals (Potato)
Zinc	0.006	50	0.00012
Nickel	0.001	1.0	0.001
Lead	0.002	2.5	0.0008
Copper	0.002	30	0.00007
Arsenic	0.0	1.1	0.0
Chromium	0.0	1.0	0.0
Cadmium	0.0	1.5	0.0
Mercury	0.0	1.0	0.0



393

Sophisticated Analytical Instruments Laboratories

Society (Registered as Society with Registrar of Firms & Societies, Punjab, Chandigarh)

Thapar Technology Campus, Bhadson Road, Patiala-147 004 (India)

For sample No.3 Downstream side (Garlic)

47

Elements	Estimated daily intake of metals Sample no.3 (Downstream side) (mg/kg)	Reference dose as per food safety and standards(Contaminants, Toxins, and residues) regulations2011 (mg/kg)	Health Risk Index of Metals (Garlic)
Zinc	0.008	50	0.00016
Nickel	0.001	1.0	0.001
Lead	0.001	2.5	0.0004
Copper	0.0009	30	0.00003
Arsenic	0.0	1.1	0.0
Chromium	0.0	1.0	0.0
Cadmium	0.0	1.5	0.0
Mercury	0.0	1.0	0.0

For sample No.4 Upstream side (Potato)

Elements	Estimated daily intake of metals Sample no.4 (Upstream side) (mg/kg)	Reference dose as per food safety and standards(Contaminants, Toxins, and residues) regulations2011 (mg/kg)	Health Risk Index of Metals Reference (Potato)
Zinc	0.009	50	0.00018
Nickel	0.001	1.0	0.001
Lead	0.003	2.5	0.0012
Copper	0.002	30	0.00007
Arsenic	0.0	1.1	0.0
Chromium	0.0	1.0	0.0
Cadmium	0.0	1.5	0.0
Mercury	0.0	1.0	0.0

Mishra



Summary of the Study Report

48

Elements	(Reddish) Sample no.1 (Downstream side)		Potato Sample no.2 (Downstream side)		Garlic Sample no.3 (Downstream side)		Potato Reference Sample no.4 (Upstream side)	
	Transfer Factor	Health Risk Index	Transfer Factor	Health Risk Index	Transfer Factor	Health Risk Index	Transfer Factor	Health Risk Index
Zinc	0.45	0.00024	0.24	0.00012	0.20	0.00016	0.30	0.00018
Nickel	0.10	0.001	0.11	0.001	0.17	0.001	0.10	0.001
Lead	0.35	0.0012	0.25	0.0008	0.33	0.0004	0.38	0.0012
Copper	0.13	0.00003	0.31	0.00007	0.18	0.00003	0.27	0.00007
Arsenic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chromium	0.09	0.0008	0.0	0.0	0.14	0.0	0.0	0.0
Cadmium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mercury	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The analysis of soil and crop samples for heavy metals transfer factor and health risk index shows no adverse impact for the industrial site (Morepen Laboratories Limited Village Masulkhana, Tehsil Kasauli, District Solan, HP, India-173220) in this report.

