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**CYNO CLEAN PVT. LTD.
ENVIRONMENTAL BUSINESS EXCHANGE**

**United States of America
December 6-29, 1993**

Prepared for:

US - ASIA ENVIRONMENTAL PARTNERSHIP



WORLD ENVIRONMENT CENTER

DISCLAIMER

This project was sponsored by the U.S. Agency for International Development through WEC's Cooperative Agreement in support of the US - Asia Environmental Partnership (US-AEP). The opinions expressed herein are the professional opinions of the author and do not represent the official position of the Government of the United States of America or the World Environment Center.

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I. EXECUTIVE SUMMARY

For the past two decades Madras, India, has experienced immense growth in petrochemical, pharmaceutical, refineries, chemical process, fertilizers, and innumerable engineering industries. These industries' generation of huge quantities of hazardous waste in the course of their manufacturing processes pose a great threat to human health and the environment. In response to the need for reducing and/or eliminating this hazardous waste, Pure Tech Engineering Pvt. Ltd., a company experienced in project management and turn-key installation wastewater treatments, founded Cyno Clean Company Pvt. Ltd to install a centralized hazardous waste incineration plant.

After scrutinizing various proposals from U.S conglomerates, Cyno Clean entered into a "sole source" Memorandum of Understanding with IT Corporation. In the course of discussions, it was recommended that two engineers of Pure Tech Engineering Pvt. Ltd. should visit IT Corporation for hands-on operating experience at an incineration plant installed by that firm. The purpose of this Environmental Business Exchange (EBE) was for the two engineers, Messrs. Joseph and Narasimhim to visit the plant installed by IT Corporation, evaluate the reliability of the equipment, assess the extent of the operation and maintenance needs, and have discussions with U.S. company officials regarding the cost issues relevant to the installation of the plant in Madras.

Among the activities arranged for the participants was a workshop on hazardous waste management given by the Occupational Safety and Health Agency (OSHA). Mr. Joseph and Mr. Narasimhan's discussions with IT Corp. on the incineration plant for Madras produced a cost-effective proposal to design, supply, construct, and commission an industrial waste incinerator to treat between 20,000 and 30,000 tons per year of liquids and sludges.

The Industrial Credit and Investment Corporation of India Ltd., (ICICI) is assisting Cyno Clean's incineration project under the Trade in Environmental Engineering Science and Technology (TEST). Funding for this project was provided through a Cooperative Agreement between the World Environment Center (WEC) and the United States-Asia Environmental Partnership (US-AEP).

II. INTRODUCTION

Cyno Clean Company Pvt. Ltd., founded and promoted by Pure Tech Engineering Pvt. Ltd., is a company experienced in project management services and turn-key installation wastewater treatment projects. The purpose of this trip, sponsored by the U.S.-Asia Environmental Partnership (US-AEP) through its Cooperative Agreement with the World Environment Center (WEC), was to provide formal training and hands on experience in the operation of a hazardous waste incineration facility to two Pure Tech engineers in order that they may operate such an installation in Madras, India. Messrs. A. Goldwin Joseph and R. Narasimhan traveled to the U.S. December 6 through 29, 1993 to obtain this training and discuss the Cyno Clean plant size and technology.

The Occupational Safety and Health Agency (OSHA) training program is conducted for the benefit of people working in areas prone to accidents. This program helps employees (i) identify hazardous areas, (ii) handle equipment safely, (iii) prevent accidents, and (iv) take appropriate actions when accidents occur. The participants obtained further experience on their visit to the superfund waste site at Sikes, Houston, Texas.

Finally, the participants met with IT Corporation to discuss the design of the hazardous waste incinerator for Madras. This report describes the participants' trip activities and resulting conclusions.

III. DISCUSSIONS AND FINDINGS

The participants began their U.S. trip by attending a four-day program in Harriman, Tennessee given by the Occupational Safety and Health Agency (OSHA) on Hazardous Waste Management and Emergency Procedures (December 6-10, 1993). This was followed by a visit to a superfund site (December 13-17, 1993) and discussions with IT Corp. regarding a hazardous waste incinerator for Madras, India (December 20-22, 1993).

A. OSHA PROGRAM ON HAZARDOUS WASTE MANAGEMENT AND EMERGENCY PROCEDURES

An OSHA training workshop on Hazardous Waste Management and Emergency Procedures was held at OSHA's Waste Management Training Center in Harriman, Tennessee. The program was conducted by Mr. Daniel J. Steller, Interim Director, Waste Management Training Center; Mr. Tony King, Hazardous Waste Operations, Training Coordinator; and Mr. Russ Schubert, Associate Dean, Environmental Sciences. The four-day program consisted of a combination of lectures and hands-on exercises on the following topics:

- Hazard recognition
- Air monitoring instruments
- Levels of protection
- Air purification
- Self-contained breathing apparatus
- Site entry and reconnaissance
- Radiation survey
- Toxicology and exposure
- Respiratory protection
- Dressout, including fully encapsulating suit
- Response organization
- Site safety/work alarm
- Abandoned chemicals
- Superfund sites

B. SITE VISIT TO SIKES SUPERFUND PROJECT

From December 13th through the 17th, the participants visited the IT/Davy Joint Venture Decontamination of Soil Project, also known as the Sikes superfund project, at Crosby, Houston, Texas. They met with Mr. Michael Gust, Project Director; Mr. Al Berman, Laboratory Manager; and Mr. Vince Fredrick, Site Safety Officer. They also met with Mr. Pakash Acharya, Staff Consultant for IT Corp., and Mr. Michael Gust of

IT/Davy who gave a presentation of the most significant aspects of the IT/Davy Joint Venture Central Incineration Plant. IT/Davy set up the project to decontaminate the soil at Crosby, Houston, Texas in response to an order by the Texas Water Commission (TWC) and Environmental Protection Agency (EPA). The Sikes Superfund project is supervised by a representatives of TWC and EPA who monitoring the operation of the plant, as well as air and decontaminated soil quality. The project has been established at a cost of US \$35 million. The operation of the plant has to conform to USEPA regulatory conditions, and adhere to OSHA safety standards.

In a video presentation of the facility, the participants were informed that the facility collects about \$150 per ton of soil decontaminated from EPA and TWC. Charges depend on its toxicity, caloric value, and throughput. Some projects in the U.S. charge up to \$1000 per ton.

Mr. Acharya, staff consultant for IT Corporation, talked about the incineration plant, describing it section by section. At every stage, discussion was held in the actual areas of operation, and included process control, air monitoring control, safety, maintenance, laboratory analysis methods, etc. The discussions included the persons directly concerned with each plant operation.

The plant was shut down for a routine maintenance for the first two days of the visit, providing the participants an opportunity to observe, in detail, the maintenance procedure as well as the dismantling of certain equipment. The plant was restarted on Wednesday, and by Friday the plant operation had returned to its normal operating condition.

C. IT CORPORATION DISCUSSIONS

Beginning on December 20th the participants held three days of discussions with representatives of IT Corporation, including:

- Mr. Charles S. Parmele, Physical/Chemical Systems Manager
- Mr. Richard T. Greene, CHP, Environmental Health and Safety Manager
- Mr. Alan Baker, Business Development Manager, Pollution Control Engineering Division
- Mr. Prakash Acharya, Staff Consultant, Pollution Control Engineering Division
- Mr. Firoze Gaslightwala, Estimator

Mr. Baker gave a presentation on the concept of the scope of their work with respect

to the Indian project, and explained that the inclusion of a waste heat boiler and turbine in the scope of the project would enable the project to produce power and meet the captive requirements of the plant. He also indicated that excess power would be available for sale.

When it was explained that it is necessary to consider various alternatives to keep the project cost as low as possible, Mr. Baker and Mr. Acharya reviewed the scope and came forward with a suggestion for using a co-current rotary kiln instead of a counter current one. The counter-current rotary kiln, apart from being more efficient is also less expensive and can eliminate the use of ESTER (Environmentally Safe Temporary Emergency Relief). Based on a preliminary waste profile, using the information collected by Cyno Clean, IT Corporation confirmed that it would be preferable to use co-current kiln.

Discussion was also held with the Manager of the Electrical Department regarding the voltage and frequency of supply used in India to enable them to present the an appropriate system. Mr. Baker came forward with a suggestion that they would like to work with Fuller Corporation, located in Pittsburgh, which has an associate in India by the name of Fuller-KCP. Mr. Baker spoke to the person of concern in Fuller Corporation and asked him to advise their counter part at Fuller-KCP in India to contact M/s. Cyno Clean Company Pvt. Ltd. In this regard Mr. Baker made a conference call to Fuller, U.S.A., and had a detailed discussion about the project including the scope of the supply of equipment through Fuller, U.S.A. and Fuller KCP. The Fuller personnel stated that the Fuller KCP is fully capable of supplying all the major equipment. Mr. Baker set up a meeting with them for himself in the following week. At that time he would try to obtain a budgetary estimate for the equipment as per the specification and design of IT Corporation.

Ms. Emily Harwit, an associate with Sanders International, who had assisted in coordinating the meetings between Pure Tech (Cyno Clean Company Pvt.Ltd) and IT Corporation, took part in the discussions held on December 22, 1993.

Mr. Baker briefed Ms. Harwit about the discussions and also about the budgetary estimate of the cost for the project. Messrs. Joseph and Narasimhan explained to them that the cost of the project has to be reduced as much as possible in view of the fact that the proposed project is service oriented, not a product oriented. They indicated that the project estimate is on the basis of installed cost including land, site development, buildings, equipment, installation cost, supervision, site facilities , financing cost, import duties and local duties, miscellaneous assets, contingencies and working capital margin, and should, preferably, be less than US\$10 million.

In discussing possible means of financing the project, Ms. Harwit advised that ICICI may finance only up to fifty percent of the cost; the balance of funds has to come from the promoter, or from other sources. Possible sources of funding were

suggested as, the EXIM Bank of U.S.A., International Finance Corporation (IFC) or World Bank. Mr. Baker stated that he had an opportunity to meet with officials from U.S.-AEP who could possibly assist the participants in seeking financing from EXIM Bank. The EXIM bank financing can be used only for the supply of U.S. origin equipment and services. Mr. Baker later arranged a conference call with the officials of U.S.-AEP regarding Cyno Clean's project. They said that it may be possible, and requested more details.

IV. CONCLUSION AND RECOMMENDATIONS

Conclusion 1: The visit to the Sikes superfund site introduced participants to knowledge of applicable equipment.

The visit to each division of the plant at Sikes, and the detailed discussion about the facility provided the participants with good information about the facility. In particular, the first two days of the visit, while the facility was under maintenance, provided the participants with an opportunity to look closely at the equipment and become more familiar with it. Participants were able to view equipment such as the rotary kiln and venturi scrubber in operation.

Conclusion 2: OSHA training workshop on hazardous waste management was useful.

The OSHA training in Harriman, Tennessee was quite useful in introducing the participants to the logistics of hazardous waste management. The workshop gave the participants further understanding of the U.S. procedures of dealing with hazardous materials and the dangers associated with the mishandling of such wastes.

Recommendation 1: Viewing the decontamination operations of facilities would be helpful.

It would be helpful if organizers could have arranged a video presentation on the operation of a decontamination facility such as the incinerator at the Sikes superfund site.

Recommendation 2: Visits to other superfund sites would be useful.

Visitation to other superfund sites in Louisiana and Puerto Rico could provide better awareness about operations of incinerators for different purposes.

APPENDIX A

ITINERARY

OSHA TRAINING PROGRAM - 12/6/93 -12/10/93
OSHA Waste Management Training Center
Harriman, Tennessee

IT- DAVY, TEXAS - 12/13/93 - 12/17/93

IT CORPORATION - 12/20/93 - 12/22/93.

APPENDIX B

LIST OF PERSONS AND ORGANIZATIONS VISITED

OSHA TRAINING PROGRAM:

Mr. Daniel J. Steller, Interim Director, Waste Management Training Center
Mr. Tony King, Hazardous Waste Operations, Training Coordinator
Mr. Russ Schubert, Associate Dean, Environmental Sciences

SIKES SUPERFUND VISIT

Mr. Michael Gust, Project Director
Mr. Al Berman, Laboratory Manager
Mr. Vince Fredrick, Site Safety Officer
Mr. Pakash Acharya, Staff Consultant for IT Corporation, Engineering Division

IT CORPORATION

Mr. Charles S. Parmele, Physical/Chemical Systems Manager
Mr. Richard T. Greene, CHP, Environmental Health and Safety Manager
Mr. Alan Baker, Business Development Manager, Pollution Control Engineering Division
Mr. Firoze Gaslightwala, Estimator

APPENDIX C

LIST OF DOCUMENTS RECEIVED

1. Emergency Materials incident response Training Program - course material - Occupational Safety and Health Administration program.
2. **LAB SAFETY SUPPLY - 1994** - a general catalogue published by Personnel of Environmental Safety.
3. **NIOSH POCKET GUIDE TO CHEMICAL HAZARDS** published by U.S Department of Health and Human Services Public Health Services - National Institute for Occupational Safety and Health.
4. Standard Operating Safety Guides - By United States Environmental Protection Agency (EPA)
5. **IT Corporation :**
 - a. Scoping document for Cyno Clean's project at Madras.
 - b. IT Corporation's catalogue giving details of their experience, capabilities.
6. United States - ASIA Environmental Partnership (US-AEP) Program Organization Brochure enlisting their activities.
7. General Company Brochure of Sanders International Environmental Consultants, Washington giving details of activity and services.
8. Documents and brochure of World Environment Center.



WEC/US-AEP

Environmental Business Exchange (EBE) Trip Reports

February 22, 1995

Trip Reports as per Cooperative Agreement (CA) AEP-0015-A-00-2055-00 in Support of the U.S.-Asia Environmental Partnership

<u>EBE ID#</u>	<u>EBE DATES</u>	<u>TITLE OF TRIP REPORT</u>
INDI-1I	11/7-23/93	Oil Absorbent Demonstration
INDI-1K	12/6-29/93	Review of Incinerator Operations, Indian Thermal and Cyno Clean
INDI-2	4/23 - 5/6/94	Review of Pollution Prevention Control Technology in the Textile Industry
INDI-5	4/30 - 5/10/94	Clean Coal Technology Evaluation
INDI-1P (1&2)	5/94-8/94	Clean Technology for Paper Mills - Esvin - Parts 1&2
INDI-1R	6/18-30/94	Evaluation of Biological Formulations for Industrial Wastestreams Treatment (Premier Ziba)
INDI-1Q	6/18-7/1/94	Indian Boilers Manufacturers' Association Trade Mission
PHIL-8	9/27-10/6/94	Technical Assistance on H ₂ S Gas Abatement Systems (PNOC)
HONG-1	10/23-11/9/94	Coleman Energy and Environmental Systems Technology Transfer
KORE-1	12/9-22/93	Fuel Gas Desulfurization Technology Assessment (KEPCO)
INDI-1L	1/17-2/23/94	Corporate Environmental Mission (IT Corporation Exchange)
INDI-4	3/11-30/94	Evaluation of CS ₂ Recovery in Rayon Mills