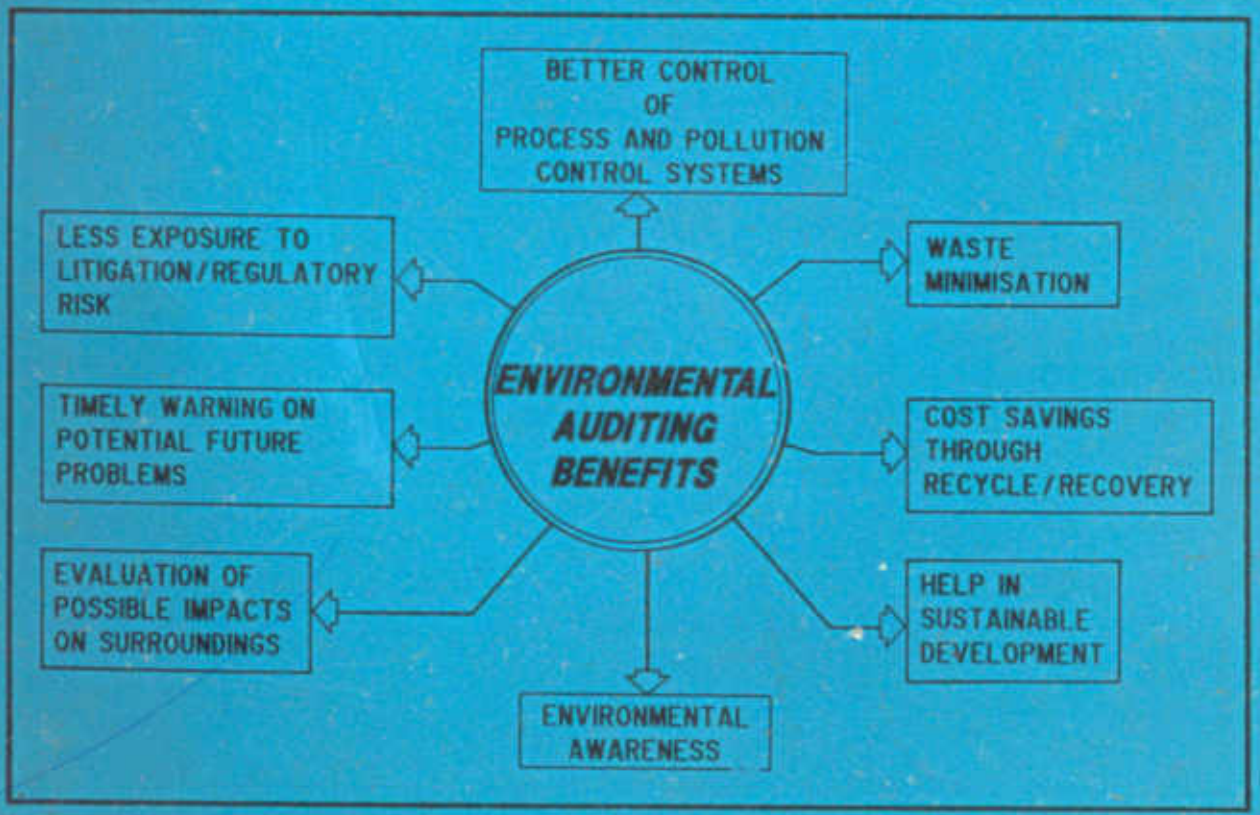
PROBES/51/1993-94

# ENVIRONMENTAL AUDITING IN POLLUTING INDUSTRIES




CENTRAL POLLUTION CONTROL BOARD

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# FOREWORD

The Govt. of India, by way of its notification of March 13, 1992, has made it mandatory for the industries to provide annual report of environmental auditing of their activities/operations, each year, beginning with 1992-93. This requires the industries to regularly develop, update, and report information on the environmental performance of its operations including raw materials, process, products etc. Implementation of this scheme is expected to promote proper monitoring of industrial activities, adoption of low waste technology and minimisation of resource consumption.

The Central Pollution Control Board has carried out studies in major polluting industries. The studies were conducted by different task teams, comprising Central and State Pollution Control Boards' personnel, and concerned industry officials. Reports of the studies in respect of selected industries are presented in this document.

It is hoped that the document will be useful for those concerned with environmental pollution control.

**December 31, 1993**

(DILIP K. BISWAS)
CHAIRMAN

# STUDY TEAM

| | | |
|---|---|---|
| *Dr. R.S. Mahwar* | : | Data collection,collation, compilation and report writing |
| *Sh.B.L.Chawla* | : | Assistance in data collection, and compilation |
| *Dr. R.N. Bhattacharyya & Dr.S.P.Chakrabarti* | : | Report review and editing |
| *State Pollution Control Boards and Pollution Control Committees for the Union Territories* | : | Assistance in the indepth studies |
| *Pollution Control Implementation Division I,II & III, Zonal Office, Central,East,West and South and Sectional Office Pondicherry* | : | Indepth studies in the concerned industries and preparation of their respective brief audit reports |
| *Sh. R.N. Jindal* | : | Publication |
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| *Sh.Subhash Chand* | : | General Assistance |

# CONTENTS

## APPENDICES

# 1.0 INTRODUCTION

## 1.1 History and Definition

Environmental health and safety auditing dates back to the early 1970s when some companies developed audit programmes on their own, for reviewing and evaluating environmental problems associated with their operations. This concept got projected under the guise of a number of different approaches and names such as environmental reviews, survey assessments and quality controls, environmental diagonostic studies etc., depending upon the audit programmes of the company concerned. There has been a steady growth in this discipline since then. Today the term ' Environmental Auditing (EA)' is usually accepted and several countries have in fact formalised such programmes designed to ensure that industrial operations comply with the established environmental standards and good industry practices. The term 'EA' though accepted in general, there appears to be no universally agreed definition or system of environmental audits. However, the definition adopted by the International Chamber of Commerce (ICC) is as follows :

"A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organisation, management systems and equipments are performing with theaimof(i) facilitating management control of environmental practices, and (ii) compliance with company policies, including meeting regulatory requirements. It may be noted that the process of auditing as seen here is an internal process that should become a necessdary and routine part of most, if not all industrial management, irrespective of the size of the company".

## 1.2 Need for Environmental Information

The need for environmental information could be two main types namely, (i) internal, and (ii) external, as far as an industry's perspective is concerned. The internal needs are to ensure that the industry has accurate, up-to-date information at hand on the environmental performance of its construction contractors, plants, technologies, waste contractors, products, raw materials and all related activities.Such a need has in fact made environmental auditing in atleast some of the developed countries, a part of the industry's overall drive for quality assurance.

The growing concern for the protection of human resources is making this area, increasingly useful and interesting even to the external agencies (i.e. other than the industry).

Among these, who are seen demanding or requesting such information are:

- national and international regulatory agencies and research institutions;
- environmental crime investigation, environmental courts etc.;
- insurers and risk managers, particularly those involved in environmental impairment liability insurance field;
- employees and trade unions;- share holders;
- local, communities and environmental officers/planners;
- environmentalists; and
- ethical investment funds wanting priority investments in companies with ecofriendly products

## 1.3 Purpose and Advantages of Studies

The environmental audit studies serve atleast the following three basic purposes:

i) Compilation of the complete information on the operation of the industrial facility and its potential sources of pollution through technical inspection. This inspection, which is conducted at a facility allows the activities that are programmed and entrusted to the operational branches to be carried out in order to correct the different problems detected at their source or to forsee conservation and maintenance measures need to prevent major pollution problems.

ii) Evaluation of the conditions surrounding the industrial facility in order to estimate possible impacts which may be caused and the suggested recovery measures for such situations.

iii) Preparation and implementation of action plans for better control of the environment, and the environmentally related industrial activities, including further developmental activities of the areas.

The primary and obvious advantage of environmental auditing is to help safeguard the environment and to substantiate compliance with local,

regional and national laws and regulations, and with the company policy and standards. There can be several other benefits, the importance of which may vary from situation to situation. These benefits include :

- Reduced exposure to litigation and regulatory risk (e. g. prosecutions, penalities, etc.); -facilitating comparison and interchange of information between operations or plants;

- increasing employer awareness of environmental policies and responsibilities;

- identifying potential cost-savings including those resulting from waste minimisation;

- evaluating training programmes and providing data to assist in training personnel;

- providing an information base for use in emergencies and evaluating the effectiveness of emergency response arrangements;

- assuring an adequate, up-to-date environmental data base for internal managment awareness and decision making in relation to plant modification, new plants etc;

- enabling managment to give credit for good environmental performance;

- helping to assist relations with authorities by convincing them that complete and effective audits are being undertaken;

- facilitating the obtention of insurance coverage for environmental impairment liability.

## 1.4 General Approach of Environmental Auditing

The general approach followed for environment audit studies cover three main phases,namely collectionof information, evaluation of information collected, and formulation of conclusions,including identification of aspects needing improvement. These phases cover, pre-audit preparation, a site visit normally involving interviews with personnel and inspection of facilities and post-visit ctivities. A team of experts and assisting officials, generally completes the site signments which involve gathering all the required data/information, analysing

these, drawing conclusions regarding the status of the industrial facility a... ed with respect to specific criteria/objectives, and reporting the conclusions.

These activities are conducted within a formal structure in a sequence that is repeated in each location audited to provided a level of uniformity of coverage and reliability of findings. A typical set of steps involved in environmental audit is illustrated in Fig.1.1 Although, programmes may vary from audit to audit, the design of each programme generally makes provision for each of the activities mentioned in the above cited illustration. These activities are briefly described in the following paragraphs.

### 1.4.1 Pre-Audit activities

This covers a number of activities including, selection and review of the site and audit team, development of an audit plan which defines the technical, geographic and time scope, arranging for the expected sample collection, preservation, transport and analysis, and obtaining background information on the plant, as well as the criteria to be used for evaluating the programme. Questionnaires are preferably prepared to cover maximum data collection and wide coverage of the industrial activity as well as its surroundings and the industrial area. Depending upon the need arrangements for assistance from the local environmental authorities/laboratories may have to be also made before the team leaves for the audit studies.

### 1.4.2 Activities at the site

The site activities include, identification and assessment of the management control systems, data collection and their evaluation, and reporting audit findings. The various arrangements existing for environmental management and related aspects are identified and understood. This is followed by evaluation of the arrangements with respect to the requirements in the sense of meeting the standards regulations. The data collection include almost every aspect of the facility which may be related directly or indirectly to the emissions/discharges, as well as the details regarding the location's surroundings i.e. other industries in the vicinity, weather, soil and rain- data, ground water quality in immediate vicinity and little away. Wastewater, sludges, air quality samples, are taken depending upon the type of the industrial activity and possible impacts. The data collected are collated, compiled and evaluated, and findings are finalised on the basis of the evidence collected, some of the findings may require transportation, for analysis of the samples collected in a laboratory, before the same are finalised.

### 1.4.3 Post - audit Activities

The activities that follows after visit to the site is completed, mainly include (i) preparation of the final report, and (ii) development and follow-ups for implementation of a corrective action programme.

### 1.4.4 Problems encountered during the audit

Problems which the audit team may face are likely to vary from facility to facility. However, what could be generally expected and needs attention, are as follows:

- The prior history of the site.
- The age of the relevant equipment.
- Lack of records related to the relevant equipment.
- The attitude of the concerned personnel on site towards such audit studies.
- Problems as well as responses of the concerned management for implementation the corrective measures.

## 1.5 The Audit Programmes in India

The concept of environmental auditing in industrial facilities in India, appears to have first got into meaningful discussions in the beginning of nineties. Efforts were initiated to see the practicability of this programme before it could be made mandatory. This area gained further movement with the Govt. of India's action plan for pollution control in the critical areas including heavily polluting industries. The Central Pollution Control Board accordingly initiated a programme of such audit studies in 18 major polluting industries (list provided in Appendix I), in 1991-92. Meanwhile a discussion paper on "Outline of Environmental Auditing" was prepared by the Ministry of Environment & Forests (MOEF) and circulated for comment. This process finally resulted intoissuing of a gazette notification on March 13, 1992 through which submission of theenvironmental audit reports has been made mandatory. The term 'Audit report' has also been changed to 'Statement'through a revised notification (Appendix II) of April 22,1993.The industries are now supposed to submit their auditing reports to the concerned State Boards on or before 30th day of September every year beginning 1993.The audit studies conducted by the Central Pollution Control Board during 1991-93 and related details are presented in this report.

## 2.0 AUDITING PROGRAMME IN MAJOR POLLUTING INDUSTRIES

### 2.1 Background

A nationwide comprehensive programme for carrying out environmental audits in 18 major polluting industries was prepared by the Central Board in the beginning of the year 1991. These audit studies were not intended for completing any regulatory requirements, but with the basic philosophy that atlesast those industries which need priority attention in the sense of pollution control, have a feel of what it is, as well as why and how it is to be done, before the industries actually arrnage to get it done on their own as a mandatory requirement. Details of this programme and industries audited, are given in the following paragraphs.

### 2.2 Audit Studies of 1991-93

#### 2.2.1 Objective

Although, the purpose for which such audit studies are done has been dealt in details in Chapter 1, the broad objective of conducting such studies by the Central Board involved identification of industries with good pollution pollution control systems thus identified may be used as a demonstration for beginning effective controls in other similar industrial activities.

#### 2.2.2 Selection criteria for industries

The selection of units for conducting such indepth studies was based on the following criteria :

i) Industries which claim to be complying with the effluents/ emissions standards and having proper environmental management.

ii) Industries adopting clean technologies or practising recycle/reuse to minimise waste production which can be demonstrated to other non-compliant industries.

iii) Industries which have not yet provided pollution control systems, in order to study their problems.

#### 2.2.3 Methodology

Audit team members were first of all identified in respect of each of the units studied. A detailed discussion in this connection was held among the concerned

officials of the Central Board's Head Quarters as well as the various Sectional/ Zonal Offices. Audit responsibilities in respect of each of the units were assigned among the various divisions/offices of the Central Board. Arrangements were also made in such a way that the people at the head office could assist to the Zonal Office team and vice-versa in conducting audit studies depending upon the proximity of site to be audited. Laboratory and monitoring facilities wherever available with the Central Board's office were utilised. Depending upon the need such facilities if available with the industries were also utilised. Central Board's mobile laboratories were also utilised for remote places where stationary facilities were not available.

Each audit team submitted the report of the units audited by them for a final compilation at the Central Board's Head Quarters.

### 2.2.4 **Aspects covered**

Although,there were common aspects as well little variations from industry to industry or category to category, the aspects which got covered during the studies are as follows:

A. **Status of Pollution Control**

i) **Information collection on the following**:

- Products and capacity;
- Consent conditions (air & water);
- Raw material consumption;
- Water consumption (Process, cooling, boiler feed, gardening etc. separately);
- Fuel and power consumption (sulpher content of fuel);
- Chemicals (including catalysts) used in the manufacturing process/treatment systems;
- Manufacturing process(es) with flow diagram;
- Inplant measures to minimise pollution including recovery & recycling;

Lay-out plan showing collection system for effluent, storm water, sewage, position of stacks etc.;

- Details of effluent treatment plant;
- Details on air pollution control systems;
- Solid waste generation (type, quantity & disposal);
- Hazardous waste/sludge generation, storage, treatment and disposal; and
- Receiving body of water (name, flow and quality data)

ii) Waste stream identification and measurement of their flow and characteristics also for the combined streams going to ETP and other drains for separate disposal;

iii) Monitoring of ground water quality near effluent storage and land disposal site;

iv) Monitoring of receiving water quality before and after discharge of effluent;

v) Stack emissions:

- Details of stacks with respect to height and diameter, arrangement for monitoring of emission such as port hole and platform.
- Stack emission - monitoring

vi) Monitoring of fugitive emissions, wherever necessary, measurement of relevant parameters for air quality at boundary limit of the industry.

vii) Monitoring of ambient air quality with respect to concerned parameters which are relevant to the industry; and

viii) Analysis of sludge and solid waste in case of leachable and toxic constituents.

B) **Performance Study**

i) Performance study of the effluent treatment system provided for individual sections within the complex with respect to influent and effluent characteristics and also observation of operating parameters which are relevant.

ii) Performance study of combined effluent treatment system each unit processwise for relevant parameters including measurement of operating parameters, measurement of flow and collection of details on design criteria.

iii) Performance study of air pollution control system in specific cases by conducting emission measurement before and after control device(s) for the relevant parameters.

## 2.3 Reports of the Environmental Audits Studies

Environmental Auditing reports for each of the units studied were prepared by the respective task teams. The reports are quite elaborate and it is not possible to present the complete details of the each audit study in this report, for obvious reasons. A format was, therefore, developed (provided in Appendix III) to prepare a brief report of each of the units studied in a uniform manner for a systematic presentation. A total of about 120 such studies were conducted during 1991-93. Some of these brief reports are provided (categorywise) in the following chapters.

## 3.0 ALUMINIUM SMELTERS

### 3.1 Indian Aluminium Co. Ltd. Hirakud

1. Name and Address of the Unit : Indian Aluminium Co.Ltd. Hirakud, Orissa.

2. Cateogry : Aluminium Smelter

3. Dates on which auditing was conducted : 19th - 21st Jan. 1993.

4. Audit Team : Shri B. R. Naidu, EE.
   Shri J. K. Moitra,SSA
   Shri K. N. Nandi, SLA
   Shri K. K. De, Tech.I
   Shri D. Sengupta, FA

5. Production Details :

| S.No. | Name of the Product | Capacity of Production (per year) |
|---|---|---|
| 1. | Virgin aluminium metal | 24,000 T |

6. Water Consumption :

   i) Boiler feed 240 KLD

7. Raw Material Consumption :

| S.No. | Name of the Raw Material | Consumption per year |
|---|---|---|
| 1. | Pet coke | 8960 T |
| 2. | Pitch | 3400 " |
| 3. | Alumina | 45,720 " |
| 4. | Cryolite | 360 " |
| 5. | Aluminium fluoride | 768 " |

8. Fuel Consumption :

| S.No. | Type of Fuel | Sulphur Content | Consumption per day |
|---|---|---|---|
| 1. | Furnace oil | 3.5 - 4.5 | - |
| 2. | Electricity | - | 50 MW |

9. Final Effluent :

This process of aluminium making is a complete dry basis and is not required any water for process and or cooling. All the cooling water emerging from the plant is recycled through a captive pond.

10. Final Emission :

| Stack no. and attached to | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| Smelter battery | SPM | 150 mg/Nm$^3$ | 40 mg/Nm$^3$ |

11. Solid Wastes :

| S.No. | Solid Waste | Total Quantity (Per year) | Mode of Disposal |
|---|---|---|---|
| 1. | Spent pot lining | 650 T | Sent to CRP Belgaum for recovery of values. |

12. Assessment/Recommendation :

The unit is operating with dry process having zero discharge of effluent. The emission from the stack of smelter battery has been monitored to assess the performance of pollution control measures taken by the unit. The particulate matter emission as measured is within the limit prescribed in the consent conditions.

## 3 National Aluminium Co. Ltd., Damanjodi

1. Name and Address of the Unit : National Aluminium Co. Ltd., Damanjodi, Orissa.
2. Category : Aluminium Smelter
3. Dates on which auditing was conducted : 30th & 31st Jan.,1993.
4. Audit Team : Shri B. R. Naidu, EE
   Shri K. N. Nandi, SLA
   Shri K. K. De, Tech.I
   Shri D. Sengupta, FA
5. Production Details :

| S.No. | Name of the Product (Per year) | Capacity of Production |
|---|---|---|
| 1. | Calcined Alumina | $8 \times 10^5$ T |

6. Water Consumption :

| | | |
|---|---|---|
| i) | Cooling | 4100 KLD |
| ii) | Process | 7000 " |
| iii) | Domestic | 9600 " |
| iv) | Others | 2000 " |

7. Raw Material Consumption :

| S.No. | Name of the Raw Material | Consumption per month |
|---|---|---|
| 1. | Bauxite | 1,95,000 T |
| 2. | Caustic Soda | 4,200 " |
| 3. | Coal | 50,000 " |
| 4. | Fuel Oil | 6,300 " |
| 5. | Lime | 3,800 " |
| 6. | Wheat Bran | 270 " |

8. Fuel Consumption :

| S.No. | Type of Fuel | Sulphur Content | Consumption per year |
|---|---|---|---|
| 1. | Fuel Oil | 0.36 % | 76,000 Kl. |
| 2. | Electricity | - | $2.8 \times 10^8$ KWH |

9. Final Effluent :

i) Quantity : $100 m^3/hr.$

ii) Quality :

| S.No. | Parameter | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 6.5 - 8.5 | 8.09 |
| 2. | TSS | 100 mg/l | 75.0 mg/l |
| 3. | COD | 250 " | 43.0 " |
| 4. | Zn | 1.0 " | 0.06 " |
| 5. | Cu | 1.0 " | 0.006" |

10. Final Emission :

The emission from the stacks could not be measured as the stacks were not having proper arrangement for monitoring.

11. Solid Wastes :

| S.No. | Solid Waste | Total Quantity (Per day) | Mode of Disposal |
|---|---|---|---|
| 1. | Red Mud (15-20% solid) | 2600 T | Stored in a large red mud pond outside the plant. |
| 2. | Fly ash (10% solid) | 600 T | Pumped in the form of a slurry to the pond. |
| 3 | Lime Grit | 40 T | Land filling in low lying areas. |

12. Assessment/Recommendation :

The effluent from the unit through ash pond has been monitored and the oveflow which is meeting the river Kerandi is within prescribed standards as laid down in consent. The emission from the stacks could notbe measured as the stacks were not having proper arrangement for monitoring.

## 4.0 CAUSTIC SODA INDUSTRIES

### 4.1 Gujarat Alkalies & Chemicals Limited., (GACL), Baroda.

1. Name and Address of the Unit : M/S Gujarat Alkalies & Chemicals ltd., P.O. Petrochemicals Dist. Baroda 391 346

2. Category : Chloro-Alkali

3. Dates on which auditing was conducted : 13 - 16 January, 1992

4. Audit Team (Names) : Dr. I. Haque, Scientist C
Dr. S.S. Bala, Scientist C
SH. H.V. Gurudutt, Asst. Env.Eng.
SH. S. Jaypaul, S.L.A.
SH. Mustag Alam, SR. Tech
SH. Dayma, J.S.A.
SH. T.K. Parmar F.A.

5. Date of Commencement : October, 1976

6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | Caustic Soda | 400 T/day | 400 T/day |
| 2. | Chlorine | 350 T/day | 350 T/day |
| 3. | Hydrogen | | 10 T/day |
| 4. | Hydro chloric Acid | | 156 T/day |
| 5. | Sodium hypochlorite | | 10.77 T/day |

7. Water Consumption, KLD :

i) Process : 1010

ii) Cooling : 2200

iii) Domestic : 450

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | Common salt | Caustic soda | 1.5 T/T |
| 2. | Power(Electric) | Caustic soda | 3300 KWH/T for mercury cell process<br>2700 KWH/T for membrance cell process |
| 3. | Water | | 1.5 M3/T |

9. Fuel Consumption :

---Not applicable---

10. Final Effluent :

i) Quantity, KLD :

| | | |
|---|---|---|
| Domestic | : | 54 |
| Industrial | : | 551 |

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1 | pH | 5.5-9 | 10.65 |
| 2 | TDS | - | 5704 |
| 3 | SS | 100 | 204 |
| 4 | COD | - | 406 |
| 5 | Chloride | - | 1755 |
| 6 | Residual Chlorine | 1 | 11.9 |
| 7 | Mercury | 0.01 | 0.008 |

All values in mg/l except pH

11. Final Emission :

| Stack No. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| Chlorine - stack | Chlorine | - | 0.09 ppm |
| | HCl | - | NT |
| | Mercury | - | NT |
| HCl Stack | Chlorine | - | 0.08 ppm |
| | HCl | - | 2.0 " |
| | Mercury | - | 0.007 " |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | 14 M/day |
| 2. | From pollution control facility | — |
| 3. | Quantity recycled or reutilised | Nil |
| 4. | Mode of Disposal | Disposed off at Kotarland 3 Km. away from the locality. |

13. Assessment/Recommendation :

a) Cooling water can be re-used for gardening. This will reduce waste water generation.
b) House keeping needs to be upgraded.
c) Sludge disposal arrangements is not satisfactory M/s. G.A.C.L. is in the process of procuring land and making suitable arrangements as per detaills given by GPCB for disposal of solid waste.

## 5.0 CEMENT

### 5.1 Orissa Cement Ltd., Rajgangpur

1. Name and Address of the Unit : Orissa Cement Ltd.
   Rajgangpur, Orissa.
2. Category : Cement
3. Date on which auditing was conducted : 16th Jan., 1993
4. Audit Team : Shri A. Chattopadhyay,AEE
   Shri U. Mukherjee, Sc.B
5. Production Details :

| S.No. | Name of the Product | Capacity of Production (Per Month) |
|---|---|---|
| 1. | Ordinary Portland Cement | |
| 2. | Portland Slag Cement | 54,000 T |
| 3. | Special Cement | |

6. Water Consumption :

   Being a complete dry process cement manufacturing plant does not require any process water. Water consumption in the plant for cooling, boiler feed, gardening etc. is only 1100 KLD.

7. Raw Material Consumption :

| S.No. | Name of the Raw Material | Consumption per day | |
|---|---|---|---|
| 1. | Limestone | 2500 - 3000 | T |
| 2. | Clay | 100 | " |
| 3. | Morrum | 50 | " |
| 4. | Gypsum | 100 | " |
| 5. | BF Slag | 485 | " |

8. Fuel Consumption :

| S.No. | Type of Fuel | Sulphur Content | Consumption per month |
|---|---|---|---|
| 1. | Coal | 0.2 - 0.4% | 9000 - 15,000 T |
| 2. | Oil (H.F.O) | - | 1000 KL |
| 3. | Electricity | - | 120 KWH/T of Cement |

9. Final Effluent :

This unit is operating with complee dry process of cement manufacturing and does not generate any effluent.

0. Final Emission :

| Stack no. and attached to | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| Kiln | SPM | 250 mg/Nm$^3$ | 217 mg/Nm$^3$ |
| Cement Mill | SPM | 250 " | 181 " |

1. Assessment/Recommendation :

This unit is operating with complete dry process of cement making and therefore water pollution is not significant. The emissions from the stacks are within limits and complying with the consent conditions.

## 6.0 DISTILLERIES

### 6.1 Bajaj Hindustan Sugar Ltd., Lakheempur

1. Name and Address of the Unit : M/s Bajaj Hindustan Sugar Ltd. Golagokaran Nath, Lakheempur (Distillery Division)

2. Category : Distillary

3. Dates on which auditing was conducted : 6 - 14th January, 1992

4. Audit Team (Names) : Sh. P.M. Ansari SEE
   Sh. B.V. Babu AEE
   Sh. R.K. Singh SSA
   Sh. V.K. Sachan JSA
   Sh. R.P. Mishra JSA
   Sh. S.K. Sharma Sr. Tech.
   Sh. R.C. Rajpoot SLA
   Sh. Dev Prakash SLA
   Sh. R.M. Prasad JLA

5. Date of Commencement : Since 1932

6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | Industrial Alcohol | 25000 KL/Yr | 21337 KL/Yr |

7. Water Consumption, KLD :

   i) Process :
   ii) Cooling : } 4312
   iii) Domestic :

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | Molasses | Ind. Alcohol | 7.50 T |
| 2. | Urea | -do- | 4.60 Kg. |
| 3. | Sulphuric Acid | -do- | 1.5 kg. |

9. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| | Steam is supplied from sugar plant | |

10. Final Effluent :

i) Quantity, KLD :

Domestic : —

Industrial : 1080

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | COD mg/l | — | 4255 |
| 2. | BOD mg/l | 100 | 370 |
| 3. | SS mg/l | 100 | 150 |

11 al Emission

| ack No. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| | Sugar plant boilers are meeting the requirement of steam | | |

12 olid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | 07 TPD |
| 2. | From pollution control facility | 15 TPD |
| 3. | Quantity recycled or reutilised | NIL |
| 4. | Mode of Disposal | USED AS MANURE |

12. Assessment/Recommendation :

a) Anaerobic digestion may be proposed in place of anaerobic lagoons for methane recovery.

b) Necessary spares of aerators may be procured in advance to avoid delay in repairing of aerators so that desired level of D.O. can be maintained in the aeration tank.

## 6.2 Mc Dowell & Co. Ltd., Hathidah

1. Name and Address of the Unit : McDowell & Co. Ltd., Hathidah, Bihar.

2. Category : Distillery

3. Dates on which auditing was conducted : 9th - 12th Jan., 1993.

4. Audit Team : Shri A. Chattopadhyay,AEE
   Shri U. Mukherjee, Sc.B
   Shri A. K. Sen, JSA
   Shri K. N. Nandi, SLA
   Shri D. Sengupta, FA

5. Production Details :

| S.No. | Name of the Product | Capacity of Production (per day) |
|---|---|---|
| 1. | Extra Neutral Alcohol (ENA) | 13500 Lits. |
| 2. | Malt Spirit | 2000 PL. |
| 3. | India Manufactured Foreign Liquor (IMFL) | 3000 Cases |

6. Water Consumption :

| | | | |
|---|---|---|---|
| i) Process | : | 30 | KLD |
| ii) Cooling/Boiler feed | : | 600 | " |
| iii) Gardening/general purpose | : | 450 | " |
| iv) Domestic purpose | : | 80 | " |

7. Raw Material Consumption :

| S.No. | Name of the Raw Material | Consumption per day |
|---|---|---|
| 1. | Molasses | 60 T |
| 2. | Barley Malt | 4 T |

8. Fuel Consumption :

| S.No. | Type of Fuel | Consumption per day |
|---|---|---|
| 1. | L.D.O. | 8 KL |
| 2. | Electricity | 4000 KWH |

9. Final Effluent :

i) Quantity : 170 KLD

ii) Quality :

| Sampling Point | Concentration of Pollutants | | | | |
|---|---|---|---|---|---|
| | pH | TSS mg/l | TS mg/l | COD mg/l | Oil & Grease mg/l |
| Raw effluent | 3.6 | 8100 | 53,398 | 56,140 | - |
| After bulk volume fermenter | 7.0 | 10,560 | 43,084 | 35,965 | - |
| After secondary (aerobic) | 8.3 | 4,720 | 34,024 | 23,684 | - |
| Effluent before mixing with cooling water etc. | 8.6 | 1,640 | 19,214 | 12,719 | - |
| Bottle washing effluent | 7.1 | 8.4 | 365 | 9.0 | - |
| Condensate water | 6.4 | 2.4 | - | - | - |
| Final effluent after dilution with cooling water, washing liquid etc. | 7.6 | 118 | 3,362 | 1,667 | 16 |
| Prescribed Limits | 5.5-9.0 | 100 | 2200 | 250 | 10 |

10. inal Emission :

| Stack no. ɛ ıd attached to | Parameters | Emission Standard | Actual Emission |
|---|---|---|---|
| Oil-fired Boiler | $SO_2$ | | 333 mg/Nm$^3$ |

11. Solid Wastes :

| S.No. | Solid Waste | Mode of Disposal |
|---|---|---|
| 1. | Spent grain | Used as cattle feed |

12. Assessment/Recommendation :

The treatment plant is not functioning properly and is running with poor efficiency. The final effluent after large dilution with bottle wash liquid and condensate water also is not meeting the standard laid down in the consent.

## 7.0 DYES AND DYE INTERMEDIATES INDUSTRIES

### 7.1 Malwa Vanaspati & Chemicals, Indore

1. Name and Address of the Unit : M/s Malwa Vanaspati & Chem. Ghata Billod, Dhar, MP
2. Category : Dyes & Dye Intermidiates
3. Dates on which auditing was conducted : 14 - 15th Dec., 1991
4. Audit Team (Names) : Dr. D. Saha, Sh. P.K. Mirashe, Sh. P.Gargava, Sh. D. Prakash Sh. V.K. Sachan, R.M. Prashad
5. Date of Commencement : June, 1983
6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | H-acid | 175 T/Yr | 175 T/Yr |
| 2. | Tobious acid | 120 T/Yr | NIL |
| 3. | J-acid | 60 T/Yr | NIL |

7. Water Consumption, KLD :

| | | |
|---|---|---|
| i) Process | : | 20 |
| ii) Cooling | : | 5 |
| iii) Domestic | : | - |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | Napthaline | | 765 kg |
| 2. | H2SO4 | | 3750 kg |
| 3. | Oleum | | 2200 kg |
| 4. | HNO3 | | 800 kg |
| 5. | Lime stone | | 3000 kg |
| 6. | Soda ash | | 1000 kg |
| 7. | Iron | | 700 kg |
| 8. | HCL | | 200 kg |
| 9. | Caustic | | 2000 kg |
| 10. | Water | | 14000 kg |
| 11. | H-acid | | 1300 kg |

9. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| 1. | Coal | 96 kg/kg of H-acid |

10. Final Effluent :

i) Quantity, KLD :

Domestic : NIL
Industrial : 25 KLD

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| Batch -I | pH | 6.0 - 9.0 | |
| | Colour | 400 H.Unit | |
| | SS | 100 mg/l | |
| | BOD | 100 mg/l | |
| | O & G | 10 mg/l | |
| Batch-II | pH | | |
| | Colour | | |
| | SS | | |
| | BOD | | |
| | O & G | | |

11. Final Emission :

| Stack No. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| 1. Boiler | PM | | 1013 mg/Nm3 |
| | SO2 | | 1281 mg/Nm3 |
| | NO2 | | 123.32 mg/Nm3 |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | Iron Sludge 1 T/Batch<br>Gupsum Sludge 3.5 " |
| 2. | From pollution control facility | Nil |
| 3. | Quantity recycled or reutilised | Nil |
| 4. | Mode of Disposal | Dumping & Selling |

13. Recommendations (In brief) :

a) The unit should develop good house-keeping.

b) The industry should have complete knowledge of the ning of ETP and also chemical dosing.

c) The floor wash should also to be treated.

d) The industry should discharge their treated effluents in l ons for evaporation and concentration. The concentrate astes may be subsequently be dried and used for brick-manuf uring if suitable.

e) No water should percolate to contaminate ground water as such they may be asked to have polythene lined evaporation pond.

f) For measurement of flow/discharge, 'V' notch be provided at each point.

g) Sludge generarted from the process may be used for brick manufacturing. The rain water may wash the dumped sludge and may lead to further ground water contamination.

h) The industry may be asked to provide pollution control equipment for the stack.

## 8.0 FERTILISER INDUSTRIES

### 8.1 Jai Shree Chemicals & Fertiliser Ltd., Gurgaon

1. Name and Address of the Unit : M/s Jai Shree Chem. & Fertl Ltd., Bhora Kalan Road, Vill. Pataudi,Distt. Gurgaon, Haryana

2. Category : Sulfuric Acid & SSP Fertiliser Unit

3. Dates on which auditing was conducted : 16th to 18th December, 1991

4. Audit Team (Names) : V.K. Minocha, AEE
   Sh. Surinder Singh (Air Lab)
   Sh. Jagdish Bhatia (Water Lab)

5. Date of Commencement : October, 1986

6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | Single Super Phosphate Fertiliser (SSP) | 200 TPD (6600 TPA) | 41, 100 TPA* |
| 3. | Sulphuric acid (33000 TPA) | 100 TPD | 21, 000 TPA* |

* Capacity utilisation = 63-64%

7. Water Consumption, KLD :

| | | | |
|---|---|---|---|
| i) | Process | : | 15 |
| ii) | Cooling | : | 65 |
| iii) | Domestic | : | - |
| iv) | Boiler feed | : | 70 |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | Sulpher | Sulphuric Acid | 0 336 T/T of acid produced |
| 2. | Rock phosphate Phosphate Fert. | Single Super (SSP) | 5.7 T/T of SSP produced |

9. Fuel Consumption :

| S.No. | Type of Fuel | Name of Product | Consumption of Fuel |
|---|---|---|---|
| 1. | Furnace oil | 275 KL | 158 KL |
| 2. | HSD | 281 KL | 107 KL |

10. Final Effluent :

i) Quantity, KLD :
Domestic : —
Industrial : NIL, As the process has negative water balance. Entire wastewater is recycled after normal treatment

11. Final Emission :

| Stack No. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| No. 1 | SO2 | 4 kg/T | 2.983 kg/T |
| Acid Mist | 50 mg/m3 | | 44.5 mg/m3 |
| No. 2 (SSP plant) | P.M., Fluoride | Closed/shut down | |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | --- |
| 2. | From pollution control facility | Silica & lime sludge(100 kg/day) kg/day frim SSP scrubber & ETP |
| 3. | Quantity recycled or re-utilised | Entire solid waste is used as filler in SSP |

13. Recommendations (In breif) :

a) The Ambiant Air Quality (AAQ) Monitoring Station needs to be relocated as there is no station on the side of theaverage prevailing down-wind direction.

b) To faciltate comparison of A.A.Q standards, the down-wind A.A.Q. Station may be fixed so as to compare the results with A.A.Q standards. Average value of particulate matter at A.A.Q Station No. 3 (near lab) and No. 4 (near S.S.P. plant) were 242 and 379 ug/mg compared to A.A.Q standard of 200 ug/mg for residential and rural areas.

## 3.2 Pyrites Phosphates & Chemicals Ltd., Amjhore

1. Name and Address of the Unit : Pyrites Phosphates & Chemicals Ltd., Amjhore, Bihar.

2. Category : Fertilizer

3. Dates on which auditing was conducted : 7th & 8th Jan., 1993

4. Audit Team : Shri A. Chattopadhyay, AEE
   Shri U. Mukherjee, Sc.B
   Shri A. K. Sen, JSA
   Shri K. N. Nandi, S.L.A.
   Shri D. Sengupta, F.A.

5. Production Details :

| S.No. | Name of the Product | Capacity of Production (per day) |
|---|---|---|
| 1. | Pyrites ore | 650 T |
| 2. | Sulphuric acid | 320 " |
| 3. | Single super phosphate | 800 " |

6. Water Consumption :

| | | | |
|---|---|---|---|
| i) | Process | - | 47,775 KL/month |
| ii) | Cooling | - | 35,458 " |
| iii) | Mines | - | 21,050 " |
| iv) | Boiler feed | - | 3,000 " |
| v) | Gardening | - | 1,500 " |

7. Raw Material Consumption :

| S.No. | Name of the Raw Material | Type | Consumption per day |
|---|---|---|---|
| 1. | Iron Pyrites | 22% S | 50 T |
| 2. | Rock Phosphate | 32% $P_2O_5$ | 448 " |
| 3. | Sulphuric acid | - | 288 " |

8. Fuel Consumption :

| S.No. | Type of Fuel | Consumption per month |
|---|---|---|
| 1. | L.D.O. | 32 KL |
| 2. | Electricity | 2,253.000 KWH |

9. Solid Wastes :

| S.No. | Solid waste | Total Quantity | Mode of Disposal |
|---|---|---|---|
| 1. | Red colour cinder | 15 - 16 T/hour | Disposed in low lying areas. |

10. Assessment/Recommendation :

Performance study could not be conducted as the unit was having their annual shut down of full plant during the time of Environmental Auditing.

## 9.0 IRON AND STEEL

### 9.1 Rourkela Steel Plant, Rourkela

1. Name and Address of the Unit : Rourkela Steel Plant,Rourkela, Orissa.
2. Category : Integrated Iron & Steel.
3. Dates on which auditing was conducted : 14th Jan. - 18th Jan., 1993.
4. Audit Team : Shri A. Chattopadhyay,A.E.E.
   Shri U. Mukherjee, Sc.B
   Shri A. K. Sen, J.S.A.
   Shri K. N. Nandi,S.L.A.
   Shri D. Sengupta, F.A.
5. Production Details :

| S.No. | Name of the Product | Capacity of Production (per day) |
|---|---|---|
| 1. | Ingot Steel | 3381 T |
| 2. | Saleable Steel | 3083 T |
| 3. | Plates | 768 T |
| 4. | H R Coils | 549 T |
| 5. | C R Sheets & Coils | 566 T |
| 6. | Electric Steel Sheets | 41 T |
| 7. | Galvanised Sheets | 413 T |
| 8. | E R W Pipes | 119 T |
| 9. | Spiral Welded Pipes | 124 T |
| 10. | Electirc Tin Plates | 73 T |
| 11. | CRGO/CRNO Sheets | 90 T |
| 12. | Pig Iron | 198 T |
| 13. | Granulated Slag | 542 T |
| 14. | Can | 527 T |

6. Water Consumption :

| | | |
|---|---|---|
| Makeup water drawal from river Brahmani | : | 10,000 KL/hr. |
| Water used in area other than Steel Plant | : | 3700 KL/hr. |
| Total makeup water used in Steel Plant | : | 6300KL/hr. |
| Water consumption per ton of crude steel | : | 40 KL/hr. |
| Makeup water used in once through system | : | 3500 - 4000 KL/hr. |

7. Raw Material Consumption :

| S.No. | Name of the Raw Material | Consumption per day |
|---|---|---|
| 1. | Iron Ore | 2790 T |
| 2. | Lime Stone | 736 T |
| 3. | Manganese Ore | 258 T |
| 4. | Dolomite | 513 T |
| 5. | Quartzite | 22 T |
| 6. | Iron Ore Fines | 2825 T |
| 7. | Lime Stome Fines | 95 T |
| 8. | Dolomite Fines | 477 T |
| 9. | Ferro Manganese | 49 T |
| 10. | Ferro Silicon | 13 T |
| 11. | Aluminium | 2 T |
| 12. | Copper | 0.4 T |
| 13. | Flour Spar | 0.5 T |

8. Fuel Consumption :

| S.No. | Type of Fuel | Sulphur Content | Consumption per day |
|---|---|---|---|
| 1. | Coal | 0.4 % | 11,963 T |

9. Final Effluent :

i) Quantity : 5000 KL/hr.

ii) Quality :

| Sampling Point | Flow KL/hr. | Concentration of Pollutants | | | | |
|---|---|---|---|---|---|---|
| | | pH | TSS mg/l | TDS mg/l | COD mg/l | Chloride mg/l |
| Outlet-I | 600 | 7.10 | 352 | 40 | 15 | - |
| Outlet-II | 350 | 7.20 | - | - | 26 | - |
| Outlet-III | 20 | 7.14 | 26 | 200 | 97 | 24 |
| Outlet-IV | 350 | 8.80 | 89 | - | 26 | - |
| Outlet-V | 800 | 8.08 | 1906 | 102 | 66 | 39.7 |
| Outlet-VII | 1000 | 7.42 | 37 | 81 | 26 | 14.0 |
| Outlet-VIII | 300 | 5.25 | 130 | 328 | 138 | 20.0 |
| Outlet-IX | 700 | 8.23 | 18 | - | 36 | - |
| Outlet-X | 600 | 7.10 | 39 | 29 | 15 | 18.9 |
| Inlet to lagoon | - | 8.40 | 56 | 176 | 66 | 25 |
| Outlet to lagoon | - | 7.18 | 18 | 197 | 40 | 28.3 |
| Effluent before mixing with Brahmani River | - | 7.60 | 20 | 230 | 5 | 34.9 |
| Upstream of River Brahmani | - - | 7.29 | 14 | - | 5 | 10.0 |
| Prescribed Limits | | 6.5-8.5 | 100 | 2100 | 250 | 1000 |

| Sampling | Flow KL/hr. | Concentration of Pollutants | | | | |
|---|---|---|---|---|---|---|
| | | Oil & Grease mg/l | $CN^-$ mg/l | Iron mg/l | $Cr^{+6}$ mg/l | $NH_3$-N mg/l |
| Outlet_I | 600 | - | - | - | - | - |
| Outlet-II | 350 | 5.8 | - | - | - | - |
| Outlet-III | 20 | 13.8 | - | - | - | - |
| Outlet-IV | 350 | - | - | - | - | - |
| Outlet-V | 800 | 12.0 | 1.02 | - | - | - |
| Outlet-VII | 1000 | 8.0 | - | 84 | - | - |
| Outlet-VIII | 300 | 13.0 | - | 30 | - | - |
| Outlet-IX | 700 | - | - | - | - | - |
| Outlet-X | 600 | 6.2 | - | 6.2 | 0.74 | - |
| Inlet to lagoon | - | 22.8 | 0.11 | 112 | 0.06 | 20.0 |
| Outlet to lagoon | - | 10.0 | 0.063 | 30 | 0.04 | 17.0 |
| Effluent before mixing with Brahmani River | - | 8.0 | 0.053 | 15 | 0.032 | 14.5 |
| Upstream of River Brahmani | - | - | 0.012 | 4.0 | - | 0.162 |
| Prescribed Limits | | 10 | 0.2 | 3.0 | 0.1 | 50 |

10. Final Emission :

| Stack No. and attached to | Parameters | Emission Standards $mg/Nm^3$ | Actual Emission $mg/Nm^3$ |
|---|---|---|---|
| Sintering plant with multicyclone | Particulate matter | 150 | 153 |
| Sintering plant with new ESP | -do- | 150 | 55 |
| Sintering plant with old ESP | -do- | 150 | 1349 |
| Medium pressure Boiler of CPP-I Captive Power Plant-II | -do- | 150 | 896 |
| Path A | -do- | 150 | 500 |
| Path B | -do- | 150 | 720 |

11. Solid Wastes :

| S.No. | Solid Waste | Total Quantity (Ton per year) | Mode of Disposal |
|---|---|---|---|
| 1. | Blast Furnace Slag | 49,52,774 | Presently the existing slag granulation plant is utilising 40-45% of the slag.The cast house slag granulation in BF-4 and BF-1 will take care of an additional 40% of slag. The remaining 20% slag will be processed for making slag aggregate for use in road making with collaboration of Central Road Research Institute. |
| 2. | Flue Dust | 70,000 | This will be utilised as sinter base mix in Sinter Plant 2 during modernisation. |
| 3. | Steel Slag | 1,42,829 | Used for making Rail Ballast and being considered for road making. |
| 4. | L.D. Dust | 15,000 | L.D. dust is being used in Sinter Plant partly and remaining portion will be utilised in Sinter Plant base mix during phase 2 modernisation. |

12. Assessment/Recommendation :

Though some of the outlets of Rourkela Steel Plant are containing effluent of high pollutional load, the overall final outlet through the lagoon is more or less stabilized. The effluent which is meeting the river Brahmani is high in iron content with oil and grease.

From the stack monitoring results it is seen that none of the stacks except sintering plant with new ESP are meeting the emission limit and the concentration of particulate matter emission are much above the prescribed standards.

The work on new BOD plant for dephenolisation of effluent water at source, change of four open hearth furnaces and three small converters in SMS plant along with the change of packing materials in 5 nos. of towers and alkali washing of last four numbers of towers in the fertilizer plant should be expedited.

## 10.0 LEATHER PROCESSING INDUSTRIES

### 10.1 Tata Tanneries, Dewas

1. Name and Address of the Unit : M/s Tata Exports Ltd., Dewas, MP
2. Category : Tannery (Large Scale)
3. Dates on which auditing was conducted : 13 - 16th December, 1992
4. Audit Team (Names) : Mr. P.K. Mirashe, AEE
   Dr. D. Saha, Sc-B
   Mr. V.K. Sachan, JSA
   Mr. M. Pandey, JSA
   Mr. Dev Prakash, SLA
   Mr. R.M. Prasad, JLA
   Mr. Bhagwan Din, Driver
5. Date of Commencement : November, 1975
6. Production Details :

| S.No. | Name of the Product | | Capacity | Actual Production |
|---|---|---|---|---|
| 1. | Finished leather | (sq F/yr) | $21 \times 10^6$ | $23.09 \times 10^6$ |
| 2. | Leather garment | (Pcs/yr) | 120000 | 66865 |
| 3. | Shoe upper | (Pairs/yr) | 1440000 | 36888 |
| 4. | Full Shoe | (Paors/yr) | 960000 | 86341 |

7. Water Consumption, KLD :

| | | |
|---|---|---|
| i) Process | : | 135 |
| ii) Cooling | : | Negligible |
| iii) Domestic | : | 15 |
| iv) Boiler Feed | : | 110 |
| v) Other | : | 20 |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material |
|---|---|---|---|
| i. | Tanned Leather (wet blue) | Finished Leather, Leather garments, Shoes etc. | |

.....Cont..

ii. M in Chemicals Required :

| | | |
|---|---|---|
| 1. Chromopal UFBW | — | 2090 kg/month |
| 2. Wattle Extract | — | 5329 kg/month |
| 3. Basic Chrome Sulfate | — | 2987 " |
| 4. Formic acid | — | 4786 " |
| 5. Liquor Ammonia | — | 2352 " |
| 6. Lime Powder | — | 7510 " |
| 7. Butyl Acetate | — | 2551 " |
| 8. Formaldehyde | — | 6148 " |
| 9. Binders, Pigments etc. | | |

9. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| 1. | Coal | 17.0 MT/day |
| 2. | Oil | 5.5 Kl/day |

10. Final Effluent :

i) Quantity, KLD :

| | |
|---|---|
| Domestic | : 13 |
| Industrial | : 132 |

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 5.5 - 9.0 | 8.0 |
| 2. | COD | 250 | 1165 mg/l |
| 3. | BOD | 30 | 285 " |
| 4. | CL | — | 1244 " |
| 5. | SO4 | — | 1162 " |
| 6. | Sulphide | — | 1.04 " |
| 7. | Total Solids | — | 6952 " |
| 8. | S.S | 100 | 989 " |
| 9. | TDS | — | 5963 " |
| 10. | Phenol | — | 0.16 " |
| 1. | Flow | 150 KLD | 200 KLD |

11.Final Emission :

| Stack No. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| 1. | SPM | 1200 mg/Nm3 | 842 mg/Nm3 |
| | SO2 | — | 1153 mg/Nm3 |
| | NOX | — | 855 mg/Nm3 |

12.Solid Wastes

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | Nil |
| 2. | From pollution control facility | ETP sludge |
| 3. | Quantity recycled or reutilised | Soids waste generated from Shavings,Bugging dust are sold in market. |
| 4. | Mode of Disposal | Inorganic solid waste is used for land fill. |

13.Recommendations (In brief) :

a) Industry should immediatly start the recovery and reuse of Spent Chrome from Tanning bath.

b) Necessary steps should be taken by Industry to increase the performance of Secondary Effluent Treatment Plant.

c) To reduce the hydraulic loading on the ETP, Industry should segregate the effluents from Boiler blowdown, Cooling tower, and D.M. Plant and treat them separately.

d) To control the emission from the Boiler stack, industry should provide necessary pollution control device.

e) Industry should provide flow measuring device in the drain leading to ETP.

f) Industry should make proper arrangements for safe disposal of Chrome sludge in a lined pit.

## 10. Bata India Ltd., Batanagar

1. Name and Address of the Unit : Bata India Ltd., Batanagar, West Bengal

2. Category : Tannery

3. Dates on which auditing was conducted : 18th to 20th May, 1993

4. Audit Team : Shri A.Chattopadhyay, AEE
   Shri U.Mukherji, Sc.B
   Shri K.N. Nandi, SLA
   Shri D.Sengupta, F.A.

5. Production Details :

| S.No. | Name of the Product | Capacity of Production per year |
|---|---|---|
| 1. | Rubber/Canvas footwear | 28 Million pairs |
| 2. | Finished leather | 5.184 Million sq.ft |
| 3. | Leather footwear | 8 Million pairs |

6. Water Consumption :

| | | | |
|---|---|---|---|
| i) | Process | - | 622 KLD |
| ii) | Cooling | - | 2100 " |
| iii) | Boiler feed | - | 90 " |
| iv) | Domestic and gardening | - | 2780 " |

7. Raw Material Consumption :

| S.No. | Name of the Raw Material | Consumption | per week |
|---|---|---|---|
| 1. | Leather for upper and lining | 2,75,000 | KVT |
| 2. | Leather for insole | 5 | T |
| 3. | Vibox for upper | 1,800 | Sq.m |
| 4. | Nylon upper | 1,500 | Sq.m |
| 5. | Different texile | 10,000 | Sq.m |
| 6. | Different lace | 75,000 | pairs |
| 7. | Different thread | 30,000 | m |
| 8. | Eyelets and buckles | 8,50,000 | pcs |
| 9. | Riveto | 2,62,000 | Sets |
| 10. | Thermo plastic counter & POC Puff | 2,500 | Sq.m |
| 11. | Composition board | 3,800 | Sq.m |
| 12. | Sponge socks | 10,000 | pairs |
| 13. | Rubber solid sole | 45,000 | pairs |
| 14. | PVC solid sole | 90,000 | pairs |
| 15. | Microcellular sheet for sole & mid sole | 4,000 | Sq.m |
| 16. | P.V.Adhesive | 3.5 | T |
| 17. | Neoprenfor Adhesive | 4.0 | T |
| 18. | Hardner for Adhesive | 290 | Kg |
| 19. | Primer for sole washing | 600 | Kg |
| 20. | Laquer & Polish | 3.0 | T |
| 21. | Latex - 60% | 6.0 | T |
| 22. | Solvent different | 14.0 | T |

8. Fuel Consumption :

| S.No. | Type of Fuel | Sulphur Content | Consumption per day |
|---|---|---|---|
| 1. | High speed Diesel | 0.2 % | 36 KL |
| 2. | Coal | 0.4 % | 21 T |
| 3. | Furnace oil | 2.5 % | 2 KL |
| 4. | Electricity | - | 52 KL |

9. Final Effluent :

i) Quantity : 615 KLD

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 6.0 _ 9.08.58 | |
| 2. | TSS | 100 mg/l | 115 mg/l |
| 3. | COD | 250 " | 224 " |
| 4. | BOD | 30 " | 36 " |
| 5. | Sulphide | 2.0 " | 4.46 " |
| 6. | Oil & Grease | 10 " | 10.4 " |

10. Final Emission :

| Stack no.and attached to | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| Boiler | Particulate matter | 150 mg/Nm$^3$ | 253 mg/Nm$^3$ |
| | $SO_2$ | _ | 126 " |
| Generator | $SO_2$ | _ | 32 " |
| Thermopac Boiler | $SO_2$ | | 1056 " |

11. Solid Waste :

| S.No. | Solid Waste | Mode of Disposal |
|---|---|---|
| 1. | Tannery : | |
| | i) Shaving Dust<br>ii) Split Trimming | |
| | iii) Wet Blue Trimming | |
| | iv) Setting Scrap | |

| | | |
|---|---|---|
| | v) Staking Scrap | Used in the process after required treatment |
| | vi) Big Trimming in Crust | |
| | vii) Buffing Dust | |
| | viii) Trimming in finishing | |
| | ix) Tannery Effluent Sludge | |
| 2. Leather Factory : | | |
| | i) Chemical Waste | |
| | ii) Dust collected from roughing of leather, sole, midsole, insole. | Used in leather board making |
| | iii) Leather cuttings, Leather Board cuttings, Nylon cuttings | |
| | iv) Polypropylene dust | |
| 3. Machinery Workshop : | | |
| | i) Steel scrap | |
| | ii) C.I. Scrap | Sold outside as scrap |
| | iii) Aluminium Scrap | |
| | iv) Bronze Scrap | |
| . Moulding Workshop : | | |
| | i) Zamak Scrap Sold outside as scrap | |
| | ii) M.S. Scrap | |
| 5. Rubber Factory : | | |
| | i) Upper production Scrap | Reused in the process after treatment |
| | ii) Sponge Scrap | |
| | iii) Other mixed scrap | |

.....Cont...

6. Boiler House :

| | | |
|---|---|---|
| i) | Coal Ash | Stored in ash. pond |

12. Assessment/Recommendations :

Though the unit is having a full-fledged effluent treatment plant, the effluent from the unit does not conform to the standards. A better operational control is required.

The stack emission from different units shows that particulate matter from main Boiler is high. The sulphur dioxide concentration from the monitored stacks is within limits except for the Generator-on the basis of stack height and sulphur dioxide generation relationship.

## 11.0 OIL REFINERIES

### 11.1 IOC, Haldia

1. Name and Address of the Unit : Indian Oil Corporation Ltd., Haldia, West Bengal

2. Category : Oil Refinery

3. Dates on which auditing was conducted : 11 - 15 th May, 1992

4. Audit Team (Names) : Sh. A. Chattopadhyay, A.E.E.
   Sh. U. Mukherjee, Scientist B
   Sh. A.K. Sen, JSA
   Sh. D. Banerjee, SLA
   Sh. A. Naskar, SLA
   Sh. S. Bhattacharya, F.A.

5. Date of Commencement : January, 1975

6. Production Details :

| S.No. | Name of the Product | Capacity of Production (000 T/Yr) |
|---|---|---|
| 1. | L.P.G | 27.5 |
| 2. | Naptha | 160.4 |
| 3. | Gasoline | 157.0 |
| 4. | Mineral Tompentine oil | 20.0 |
| 5. | Aviation turbine fuel | 150.0 |
| 6. | Superior kerosene | 35.4 |
| 7. | High speed diesel | 919.4 |
| 8. | Jute Batching oil | 76.0 |
| 9. | Fuel oil | 469.0 |
| 10. | Bitumen | 237.0 |
| 11. | Slack wax | 10.1 |
| 12. | Carbon Block stock | 91.8 |
| 13. | Lube Base Stock | 146.0 |

7. Water Consumption, KLD :

   i) Process & Domestic : 3880
   ii) Cooling : 7000
   iii) D.M. Plant : 3770

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | Crude | | 283.5 |

9. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| 1. | Fuel gas | 25700 T |
| 2. | Internal fuel oil | 175200 T |
| 3. | Electricity | 125760.4 KWH |

10. Final Effluent :

i) Quantity, KLD :

Domestic :
Industrial : } 15,300

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 6.0 - 8.5 | 7.54 |
| 2. | COD | 250 mg/l | 231.0 mg/l |
| 3. | B.O.D. | 15 mg/l | 22.0 mg/l |
| 4. | T.S.S. | 20 mg/l | 25 mg/l |
| 5. | Sulphides | 0.5 mg/l | 0.32 mg/l |
| 6. | Phenol | 1.0 mg/l | 0.11 mg/l |
| 7. | Oil & Greas | 10 mg/l | 1.8 mg/l |

11. Final Emission :

| Stack no. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| No. 2 | Sulphur Dioxide | 1200 mg/Nm3 | 1368 mg/Nm3 |
| No. 5 | | 1200 " | 2396 " |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | Solid sludge from ETP | 2000 - 3000 |
| 2. | Bio sludge from ETP | m3/yr |
| 3. | Oily sludge from ETP & Tank bottom | |

13.Assessment/Recommendation :

At the time of study, the industry was having their annual shut down and only the catalytic reformer unit (CRU) of lube Oil Block and Propane deasphalting unit (PDU) of lube oil block was found to be in operation. The overall performance of liquid effluent treatment plant is satisfactory but the emission from the stack is high due to high Sulphur content of crude process. The unit is in the process of installation of sulphur recovery system, after which the Sulphur dioxide level is expected to come down.

## 1. HPCL, Visakhapatnam

1. Name and Address of the Unit : M/s Visakha Refinery, HPC Ltd.,
2. Category : Oil Refinery
3. Dates on which auditing was conducted : 23rd - 25th January, 1992
4. Audit Team (Names) : Sh. A. Sudhakar, AEE
   Sh. S. Suresh, AEE
   Dr. P. Mani. JSA
   Sh. D.R.R. Sharma, SLA
5. Production Details :

| S.No. | Name of the Product | Average Production (T/Annum) |
|---|---|---|
| 1. | LPG | 96,000 |
| 2. | Naphtha | 600,000 |
| 3. | MS | 300,000 |
| 4. | MTO | 12,000 |
| 5. | SKO/ATF | 480,000 |
| 6. | HSD/HFHSD | 1560,000 |
| 7. | LDO | 60,000 |
| 8. | FO/LSHS | 1200,000 |
| 9. | Bitumen | 48,000 |

6. Water Consumption, KLD :
   i) Process : 9792
   ii) Cooling : 300000
   iii) Domestic : 600

7. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | 4500,000 T/A of Crude oil | LPG | 96,000 |
| | | Naphtha | 600,000 |
| | | MS | 300,000 |
| | | MTO | 12,000 |
| | | SKO/ATF | 480,000 |
| | | HSD/HFHSD | 1560,000 |
| | | LDO | 60,000 |
| | | FO/LSHS | 1200,000 |
| | | Bitumen | 48,000 |

8. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| 1. | Furnace oil | 390 - 420 T/day |
| 2. | Fuel gas | 120 - 150 T/day |
| 3. | Coke | 108 T/day |

9. Final Effluent :

i) Quantity, KLD :

Domestic : 600

Industrial : 2638

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 6 - 8.5 | 6.34 |
| 2. | TDS | - | 12.0 mg/l |
| 3. | TSS | 20 mg/l | 12.0 mg/l |
| 4. | BOD | 15 mg/l | 38.0 mg/l |
| 5. | Oil Grease | 10.0 mg/l | 19.0 mg/l |

10. Final Emission :

| Stack no. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| Crude Furnace (2 F1) | SO2 | - | 1093 mg/Nm3 |
| BHVP Boiler | SO2 | - | 1078 mg/Nm3 |

11. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From crude oil storage tanks and API gravity separaters. | 400 TPA |

12. Assessment/Recommendation :

a) The Refinery should provide port holes in all the 12 stacks.

b) The Refinery should provide sour water stripper for the old Refinery and convert Barometric condenser to surface condenser

c) Sulphur recovery unit project should be completed.

d) Refinery should install continuous stack monitoring equipments to monitor emission from FCC unit and also from SRU on it's commissioning.

## 11.3 IOC, Guwahati

1. Name and Address of the Unit : Indian Oil Corporation Ltd., Guwahati, Assam.
2. Category : Refinery
3. Dates on which auditing was conducted : 19 - 21th June, 1992
4. Audit Team (Names) : Sh. B.R. Naidu, EE
   Sh. U. Mukherjee, Sc. B
   Sh. M.K. Chowdhuri, AEE
   Sh. J.K. Moitra, SSA
   Sh. Mishill, JLA
   Sh. Lyngdoh, JLA
5. Date of Commencement : January, 1962
6. Production Details :

| S.No. | Name of the Product | Capacity of Production (T/year) |
|---|---|---|
| 1. | L.P.G. | 9,000 |
| 2. | Reformer Naptha | 30,000 |
| 3. | Motor spirit | 89,900 |
| 4. | Aviation turbine fuel | 6,000 |
| 5. | Superior kerosene | 118,600 |
| 6. | High speed diesel oil | 330,100 |
| 7. | Light diesel oil | 117,700 |
| 8. | Tomex | 4,800 |
| 9. | Low sulphur heavy stock | 57,700 |
| 10. | Fuel oil | 5,000 |
| 11. | Petroleum coke | 52,500 |

7. Water Consumption, KLD :

| | | |
|---|---|---|
| i) | Process | : 4296 |
| ii) | Boiler feed | : 720 |
| iii) | Drinking/Domestic | : 4920 |
| iv) | Miscellaneous | : 2400 |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Consumption (T/year) |
|---|---|---|
| 1. | Crude oil | 9,00,000 |
| 2. | Ammonia | 4.95 |
| 3. | Ahuralan | 1.8 |
| 4. | Alum | 470.00 |
| 5. | Chlorine | 26.3 |
| 6. | Dye | 0.3596 |
| 7. | Ethyl Mercaptan | 0.27 |
| 8. | Cetane improver | 132.08 |
| 9. | Hydrochloric Acid | 176.00 |
| 10. | Morpholine | 3.2 |
| 11. | Rock Salt | 6.2 |
| 12. | Silicon | 1.3196 |
| 13. | Sodium Hexa Meta Phosphate | 48.00 |
| 14. | Stability Improver for diesel | 3 31 |
| 15. | Sulphur Dioxide | 257.00 |
| 16. | Tetra Ethyl Lead | 143.84 |
| 17. | Ferrous Sulphate | 230.00 |
| 18 | Lime | 390.00 |

9. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| 1. | Fuel oil | 960 T/month |
| 2. | Fuel gas | 1950 T/month |
| 3. | Electricity | 3600 W/month |

10. Final Effluent :

i) Quantity :

Domestic :
Industrial : } 17,500 KLD

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 5.5 - 9.0 | 7.6 |
| 2. | T.S.S. | 100.0 | 9.0 mg/l |
| 3. | Oil & grease | 10.0 | 5.0 mg/l |
| 4. | C.O.D. | 250 | 34.0 mg/l |
| 5. | Sulphide | 2.0 | 0.05 mg/l |

11. Final Emission :

| Stack No. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| C.D.U. | S.P.M. | 150 mg/Nm3 | 59.0 mg/Nm3 |
| | SO2 | 1200 mg/Nm3 | 597.0 mg/Nm3 |
| | NO2 | — | 1.0 mg/Nm3 |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity | Mode of Disposal |
|---|---|---|---|
| 1. | Chemical sludge | 7 T/month | Land filling inside |
| 2. | Oily sludge | 90 m3/month | the factory |

13. Assessment/Recommendation :

From the performance study and analytical report, it is observed that the wastewater discharge and emissions from the stack are within the limits and complying with MINAS.

## 12.0 PULP AND PAPER INDUSTRIES

### 12.1 Hindustan Paper Corporation Ltd., Nagaon

1. Name and Address of the Unit : Hindustan Paper Corporation Ltd., Nagaon, Assam
2. Category : Pulp & Paper
3. Dates on which auditing was conducted : 17 & 18th June, 1992
4. Audit Team (Names) : Sh. B.R. Naidu, E.E.
   Sh. U. Mukherjee, Sc.B
   Sh. M.K. Chowdhuri, A.E.E.
   Sh. Mishill, JLA
   Sh. Lyngdhoh, JLA
5. Date of Commencement : —
6. Production Details :

| S.No. | Name of the Product | Capacity of Production |
|---|---|---|
| 1. | Superior quality writing and printing paper | $1 \times 10^5$ TPA |

7. Water Consumption, KLD :

| | | |
|---|---|---|
| i) Process | : | 64,000 |
| ii) Cooling | : | 13,500 |
| iii) Boiler feed | : | 200 |
| iv) Gardening | : | 5,000 |
| v) Fire services | : | 1,000 |
| vi) Drinking water and others | : | 6,000 |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Consumption per annum (T) |
|---|---|---|
| 1. | Bamboo | 2,50,000 |
| 2. | Caustic | 11,340 |
| 3. | Chlorine | 10,800 |
| 4. | Lime | 71,820 |
| 5. | Alum | 7,668 |
| 6. | S.S. Powder | 12,960 |
| 7. | Rosin | 1,296 |
| 8. | Salt Cake | 3,996 |

Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| 1. | Coal | 14550 T/month |
| 2. | Fuel oil | 115 KL/month |
| 3. | Electricity | |
| | a) From ASEB | 1582 MWH/month |
| | b) Captive power | 11970 MWH/month |

10. Final Effluent :

i) Quantity, :

Domestic :
Industrial : } 72,500 KLD

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | D.O. | More than 4.0 mg/l | Nil |
| 2. | pH | 6.5 - 8.5 | 7.6 mg/l |
| 3. | T.S.S. | 100 mg/l | 90.0 mg/l |
| 4. | C.O.D. | 350.0 mg/l | 320.0 mg/l |
| 5. | Sulphide | 2 mg/l | 14.4 mg/l |

11. Assessment/Recommendation :

The aerated lagoon is functionally developed into an anaerobic system. As the limited aerator placed in a big lagoon is insufficient to aerate the total mass of water, this leads to a septic condition and the effluent become deficient in dissolved oxygen content.

## 12.2 Straw Products Ltd. Rayagada, Koraput

1. Name and Address of the Unit : Straw Products Ltd. (J. K. Paper Mills) Rayagada, Koraput, Orissa.
2. Category : Pulp & Paper
3. Dates on which auditing was conducted : 27th - 31st Oct., 1992
4. Audit Team : Shri B. R. Naidu, EE
   Shri K. N. Nandi, SLA
5. Production Details :

| S.No. | Name of the Product | Capacity of Production |
|---|---|---|
| 1. | Writing, printing MG MF paper and board | 60,000 T/year |
| 2. | Coated papers and boards | 5,000 " |

6. Water Consumption :

| | | |
|---|---|---|
| i) | Process | 1,11,79,200 KL/year |
| ii) | Domestic | 19,64,680 KL/year |
| iii) | Boiler feed | 2,92,990 KL/year |

7. Raw Material Consumption :

| S.No. | Name of the Raw Material | Consumption per year |
|---|---|---|
| 1. | Bamboo | 1,21,395 T |
| 2. | Hardwood | 32,581 T |
| 3. | Imported pulp/waste paper | 6,541 T |

8. Fuel Consumption :

| S.No. | Type of Fuel | Sulphur Content | Consumption per year |
|---|---|---|---|
| 1. | Coal | 0.045 % | 91,936 T |
| 2. | Furnace oil | 2.8 % | 385 KL |
| 3. | Diesel oil | - | 722 KL |
| 4. | Electricity | - | 875.41 x $10^5$ KWH |

9. Final Effluent :

i) Quantity : 1110 KL/hr.

ii) Quality :

| Sampling Point | Concentration of Pollutants | | |
|---|---|---|---|
| | BOD mg/l | COD mg/l | TSS mg/l |
| Inlet to ETP | 189 | 727 | 598 |
| Primary clarifier overflow | 108 | 350 | 180 |
| Lagoon overflow | 33 | 277 | 139 |
| Secondary clarifier overflow | 29 | 241 | 90 |
| Effluent Bund | 28 | 239 | 89 |
| Prescribed Limit | 30 | 250 | 100 |

10.Solid Wastes :

| S.No. | Solid Waste | Total Quantity T/year (Dry basis) | Mode of Disposal |
|---|---|---|---|
| 1. | Effluent sludge | 6000-6500 | Partially used for the manufacturing of cheap grade boards and rest discharged on low level areas. |
| 2. | Lime sludge | 30000-35000 | Land filling, soil treatment. |

11.Assessment/Recommendation:

Final discharge through effluent bund is conforming to the standards laid down in the consent.

## 13.0 SU INDUSTRIES

### 13.1 Bajaj Hindustan Sugar Ltd., Lakheempur

1. Name and Address of the Unit : M/s Bajaj Hindustan Sugar Ltd. Golagokaran Nath Lakheem Pur
2. Category : Sugar
3. Dates on which auditing was conducted : 6 - 14th January, 1992
4. Audit Team (Names) : Sh. P.M. Ansari SEE
   Sh. B.V. Babu AEE
   Sh. R.K. Singh SSA
   Sh. V.K. Sachan JSA
   Sh. R.P. Mishra JSA
   Sh. S.K. Sharma Sr. Tech.
   Sh. R.C. Rajpoot SLA
   Sh. Dev Prakash SLA
   Sh. R.M. Prasad JLA
5. Date of Commencement : Since 1932
6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | Sugar | 450 TPD | 600 TPD |

7. Water Consumption, KLD :

| | | | |
|---|---|---|---|
| i) | Process | : | 11505 |
| ii) | Cooling | : } | |
| iii) | Domestic | : | 714 |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | Sugar Cane | Sugar | 10.50 T |
| 2. | Lime | Sugar | 20.00 kg |
| 3. | Sulphur | Sugar | 7.9 kg |

9. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| 1. | Baggase | 4.0 T |

10. Final Effluent :

i) Quantity, KLD :

Domestic : —

Industrial : 4000

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | COD mg/l | — | 153 |
| 2. | BOD mg/l | 30 | 50 |
| 3. | SS mg/l | 30 | 56 |
| 4. | O&G mg/l | 10 | NT |

11. Final Emission :

| Stack No. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| 2. | SPM mg/Nm3 | 800 | 778 |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | 20 TPD |
| 2. | From pollution control facility | 10 TPD |
| 3. | Quantity recycled or reutilised | NIL |
| 4. | Mode of Disposal | As Filler in low lying area and as manure |

13. Assessment/Recommendation :

a) Better house-keeping and conservation of water by recirculation of condensate water.

b) Effluent bypass was noticed that may be due to more crushing than installed capacity.

c) Necessary investigation is required to increase the efficiency of aerobic treatment to more than 75% in terms ofBOD removal.

d) Wastewater having low pollutants may be segregated and reused.

## 13.2 K.C.P. Sugar Ltd., Vuyyuru

1. Name and Address of the Unit : K.C.P. Ltd (Sugar Division) Vuyyuru, Krishna District, Andhra Pradesh
2. Category : Sugar
3. Dates of which auditing was conducted : 11 - 15th November, 1991
4. Audit Team (Names) : A. Sudhakar, AEE; Dr. P.Mani,JSA; T.K.R. Balaji, JSA and G. Tharmalingam, JSA
5. Date on Commencement : 09-03-1943
6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | Sugar | 84000 T/Yr | 84,276 T/Yr |

7. Water Consumption, KLD :

i) Process : 4480
ii) Cooling : 2200
iii) Domestic : 80

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | Sugar Cane | Sugar | 10 T/T |
| 2. | Lime | -do- | O.15 % Of Cane |
| 3. | Sulphur | -do- | O.06 % Of Cane |
| 4. | Caustic Soda | -do- | O.006 % Of Cane |
| 5. | Triple Super PO4 | -do- | O.O13 % Of Cane |
| 6. | Washingh Soda | -do- | 0.0015 % Of Cane |

uel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| 1. | Fire Wood | 120 T/ |
| 2. | Furnace Oil | 36 KL/ |
| 3. | Bagasse | 1800 TPD |

0.Final Effluent :

i) Quantity, KLD :

| | | |
|---|---|---|
| Domestic | : | 60 |
| Industrial | : | 1260 |

ii) Quality :

| S.No. | Parameters | Prescribed Limits * | Actual Discharge * |
|---|---|---|---|
| 1. | pH | 5.5 - 9.0 | 7.4 |
| 2. | TSS | 100 | 20 |
| 3. | TDS | 2100 | 282 |
| 4. | TVS | — | 230 |
| 5. | COD | 250 | 80 |
| 6. | BOD | 30 | 21 |

* All e in mg/l except pH

1.Final Emission :

| Stack No. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| No. 1 | Particulars | — | 1449 mg/Nm3 |
| | Sulphur Dioxide | — | 0.70 mg/Nm3 |
| | Oxides of Nitrogen | — | 0.63 mg/Nm3 |

12.Solid Wastes :

| S.No. | Solid Waste | Total Quantity | Mode of Disp |
|---|---|---|---|
| 1. | From process | 25 tpd ash | Land filling and farming |
| 2. | From pollution control facility | 0.8 tpd grit | |
| 3. | Quantity recycled or reutilised | 240 tpd filter cake | |

13.Assessment/Recommendation :

a) To upgrade the existing ETP ;
b) To stop dilution of effluents ;
c) To use hot condensate water for the juicing process ;
d) To use the treated effluents for irrigation only ; and
e) To dismantle the old drains leading to the Kolleru Lake.

## 13.3 Poni Sugars & Chemicals Ltd., Sambalpur

1. Name and Address of the Unit : Poni Sugars & Chemicals Ltd., Tora (Bargarh), Sambalpur, Orissa.
2. Category : Sugar
3. Date on which auditing was conducted : 20th Jan., 1993
4. Audit Team : Shri B. R. Naidu, EE
   Shri K. N. Nandi, SLA
   Shri D. Sengupta, FA
5. Production Details :

| S.No. | Name of the Product | Capacity of Production (Per day) |
|---|---|---|
| 1. | Sugar | 125 T |

6. Water Consumption :

   i) Process : 400 KLD
   ii) Cooling : 100 "
   iii) Wash water : 200 "
   iv) Domestic : 100 "

7. Raw Material Consumption :

| S.No. | Name of the Raw Material | Consumption per day |
|---|---|---|
| 1. | Freshly harvested and matured sugarcane | 1250 T |

8. Fuel Consumption :

| S.No. | Type of Fuel | Consumption per day |
|---|---|---|
| 1. | Sugarcane bagasse | 375 Tons |
| 2. | Electricity | 31,000 KWH |

9. Final Effluent :

Quality :

| S.No. | Parameter | Prescribed Limit | Actual Discharge |
|---|---|---|---|
| 1. | pH | 6.5 - 8.0 | 7.9 |
| 2. | TSS | 100 | 56 |
| 3. | COD | 250 | 1254 |

10. Solid Wastes :

| S.No. | Solid Waste | Total Quantity (Per day) | Mode of Disp al |
|---|---|---|---|
| 1. | Sugarcane Bagasse | 375 T | Consumed as in boile |
| 2. | Press Mud | 37.5 T | Used as manure sugarcane factc farm |
| 3. | Lime sludge | 50 kg | Used in filling low lying area within the pre-mises |
| 4. | Boiler ashes & clinkers | 50 kg | Used in filling low lying area within the pre-mises. |

11. Assessment/Recommendation :

The chemical oxygen demand removal efficiency is only 77% and the effluent which is used for land irrigation is not meeting with the standard as the chemical oxygen demand is much higher.

## 14.0 THERMAL POWER PLANT

### 14.1 Rajghat Thermal Power Plant, Delhi

1. Name and Address of the Unit : Rajghat Thermal Power Station
   Near I.P. Statium, Ring Road
   New Delhi.
2. Category : Thermal Power Plant
3. Dates on which auditing was conducted : 22 - 24 October, 1991
4. Audit Team (Names) : Sh. Lalit Kapoor
   Sh. S. Srivastav
   Sh. P.K. Gupta
   Sh. D. C. Jakhwal
   Sh. S.B. Lahot
   Sh. N. Singh
5. Date of Commencement :
6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Procuction |
|---|---|---|---|
| 1. | Electricity | 135 MW | — |

7. Water Consumption, KLD :

| | | | |
|---|---|---|---|
| i) | Process | : | Not available |
| ii) | Cooling | : | |
| iii) | Domestic | : | |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| | ——Not applicable—— | | |

9. Fuel Consumption :

| S.No. | Type of Fuel | Name of Product | Consumption of Fuel |
|---|---|---|---|
| 1. | Coal | Electricity | 41 t/hr / 67.5 MW |

10. Final Effluent :

i) Quantity, KLD :

Domestic :
Industrial : } Not available

ii) Quality :

| S.No. | Parameters | | Prescribed Limits | Actual Discharge |
|---|---|---|---|---|
| 1. | pH | Ash Pond | 6.5 - 8.5 | 8.1 |
| 2. | SS | Ash Pond | 100 | 170 mg/l |
| 3. | COD | Ash Pond | - | 46 mg/l |
| 4. | pH | General Out let | 6.5 - 8.5 | 8.4 |
| 5. | SS | General Out let | 100.0 | 175 mg/l |
| 6. | COD | General Out let | - | 13 mg/l |

11. Final Emission :

| Stack no. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| Unit 1 | PM | 150 mg/Nm3 | 11841 mg/Nm3 |
| | SO2 | - | 764 mg/Nm3 |
| Unit 2 | PM | 150 | 7121.5 mg/Nm3 |
| | SO2 | - | 1201 mg/Nm3 |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | 756 T/day |
| 2. | From pollution control facility | NA |
| 3. | Quantity recycled or reutilised | NA |
| 4. | Mode of Disposal | - |

13.A sment/Recommendation :

i) formance of the ash removal system from the hoppers and ash dling should be made effictive.

ii) disposal of 300 T/day ash should be done as planned.

iii) Effluent from general outlet should be treated to maintain pH & SS within the limits.

## 14.2 Singrauli Super TPP, Sonebhadra (UP)

1. Name and Address of the Unit : Singrauli Super Thermal Power Plant (NTPC) Shakti Nagar, Sonebhadra (UP)
2. Category : Thermal Power Plant
3. Dates on which auditing was conducted : 27 - 29 November, 1992
4. Audit Team (Names) : Sh. Lalit Kapoor, Sh. N. Singh, Sh. A.K. Chaturvedi, Sh. S. Sahi, Sh. S.K. Paliwal, Sh. Ved Pradesi Sh. B.K. Shrivastav
5. Date of Commencement : 1982
6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | Electricity | 2000 MW | 1800 MW |

7. Water Consumption, KLD :

| | | | |
|---|---|---|---|
| i) | Process | : | 230 |
| ii) | Cooling | : | 25500 |
| iii) | Domestic | : | 500 |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| - | - | - | - |

9. F nsumption :

| S.No. | Type of Fuel | Name of Product | Consumption of Fuel |
|---|---|---|---|
| 1. | Coal | | 10 -14 T/MW Electricity (20,000-28,000 T/day) |
| 2. | Oil | | 1001 - .0015 T/MW ( 20 - 30 KL/day) |

10. Final Effluent :

i) Quantity, KLD :

Domestic : 500

Industrial : 259630

Quality :

| lo. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| | pH | 6.5 - 8.5 | 7.4 |
| | SS | 100 | 139 |
| 3. | COD | 250 | - |

All values in mg/l except pH

11. Final Emission :

| Stack no. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| Unit 1 (200 MW) | SO2 | - | 883 mg/Nm3 |
| | P.M | 150 | 61 mg/Nm3 |
| Unit 3 (200 MW) | SO2 | - | 660 mg/Nm3 |
| | P.M | 150 | 152 mg/Nm3 |
| Unit 6 (200 MW) | SO2 | - | 1051 mg/Nm3 |
| | P.M | 150 | 234 mg/Nm3 |
| Unit 7 | SO2 | - | 853 mg/Nm3 |
| | P.M | 150 | 124 mg/Nm3 |

12.Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process (Fly Ash) | 5600 T/day |
| 2. | From pollution control facility | - |
| 3. | Quantity recycled or reutilised | - |
| 4. | Mode of Disposal | Slurry to lagoons |

13.Assessment/Recommendation :

a) Maximum number of ESP heads attached to unit 6 should be operated so that the particulate matter emissions are kept within the limit.

b) Ash handling system of ESP attached to unit No. 6 should be properly maintained.

## 14.3 Talcher Thermal Power Station, Talcher

1 Name and Address of the Unit : Talcher Thermal Power Station, Talcher, Orissa

2. Category : Thermal Power Plant

3. Dates on which auditing was conducted : 22nd and 23rd Jan., 1993

4. Audit Team : Shri B.R. Naidu, E.E.
Shri J.K. Moitra, SSA
Shri K.K. De, Tech.I
Shri K.N. Nandi, SLA
Shri D.Sengupta, F.A.

5. Production Details :

| S.No. | Name of the Product | Capacity of Production |
|---|---|---|
| 1. | Electricity | 470 MW (62.5 x 4 + 110 x 2) |

6. Water Consumption :

i) Cooling system - 38,400 KLD

ii) D.M. water for Boiler- 1,500 "

7. Raw Material Consumption :

| S.No. | Name of Raw Material | Consumption per day |
|---|---|---|
| 1. | Coal (with 0.5% sulphur) | 4000 T |

8. Final Effluent Quality :

| Sampling Point | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| Ash pond Overflow | pH | 6.5 - 8.5 | 6.89 |
| | COD | 250 | 144 |
| | TSS | 100 | 4470 |
| | Oil & Grease | 20 | 48.0 |

9. Final Emission :

| Stack no.and attached to. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| Unit I & 2 of 62.5 MW capacity each | Particulate matter | 150 mg/$Nm^3$ | 2060 mg/$Nm^3$ |
| | $SO_2$ | - | 2131 " |

10. Solid Waste :

| S.No. | Solid Waste | Total Quantity per day | Mode of Disposal |
|---|---|---|---|
| 1. | Coal ash | 1600 T | Stored in ash pond |

11. Assessment/Recommendations :

The effluent discharge from the plant through ash pond overflow is very high in suspended solid and oil and grease and the emission from the stack, though connected with Electrostatic precipitors, are discharging huge quantity of particulate matter and thus the overall performance is not satisfactory.

## 14.4 Indian Charge Chrome Ltd., Choudwar, Cuttack.

1. Name and Address of the Unit : Indian Charge Chrome Ltd., Choudwar, Cuttack, Orissa.
2. Category : Thermal Power Plant
3. Dates on which auditing was conducted : 25th & 26th Jan., 1993
4. Audit Team : Shri B, R. Naidu, EE
   Shri J. K. Moitra,SSA
   Shri K. N. Nandi, SLA
   Shri K. K. De, Tech.I
   Shri D. Sengupta, FA
5. Production Details :

| S.No. | Name of the Product | Capacity of Production |
|---|---|---|
| 1. | Electricity | 108 MW |

6. Raw Material Consumption :

| S.No. | Name of the Raw Material | Consumption per hour |
|---|---|---|
| 1. | Raw water | 539 KL |

7. Fuel Consumption :

| S.No. | Type of Fuel | Sulphur Content | Consumption per day |
|---|---|---|---|
| 1. | Coal | 0.3 - 0.5 | 1818 T |
| 2. | Electricity | | 8 MW |

8. Final Effluent :

i) Quantity : 700 KLD

ii) Quality :

| S.No. | Parameter | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 5.5 - 9.0 | 8.84 |
| 2. | TSS | 100 mg/l | 108 mg/l |
| 3. | COD | 250 mg/l | 26 mg/l |

9. Final Emission :

| Stack no. and attached to | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| Captive Power Plant | Particulate Matter | 150 mg/Nm$^3$ | 15 mg/Nm$^3$ |
| Sulphur-di-oxide | - | 54 mg/Nm$^3$ | |

10. Solid Wastes :

| S.No. | Solid Waste | Total Quantity | Mode of Disposal |
|---|---|---|---|
| 1. | Bottom Ash | 654.5 T/day | Used in land filling of low lying areas. |
| 2. | Fly Ash | 72.7 " | - do - |

11. Assessment/Recommendation :

From the performance study and analytical results it is seen that both the final effluent and the emission from the stack conforms to the standard laid down in the consent.

## 14.5 Bokaro Thermal Power Station, Bokaro

1. Name and Address of the Unit : Bokaro Thermal Power Station - A, Bokaro, Bihar

2. Category : Thermal Power Plant

3. Dates which auditing was conducted : 19th & 20th November, 1992

4. Audit team : Sri B.R.Naidu,EE
Sri A.Chattopadhyay,AEE
Dr. D.P.Mukhopadhyay, Sc.B
Shri A.K.Naskar, SLA
Shri K.N. Nandi, SLA
Shri B. Kumar, JRF
Shri D.Sengupta, F.A.
Shri S.Bhattacharya, F.A.

5. Production Details :

| S.No. | Name of the Product | Capacity of Production |
|---|---|---|
| 1. | Electricity | 190 MW (3 x 50 MW + 1 x 40 MW) |

6. Water Consumption :

| | | | |
|---|---|---|---|
| i) Cooling system | - | 3,00,000 | KLD |
| ii) Ash disposal | - | 16,000 | " |
| iii) Domestic | - | 1,000 | " |
| iv) Others | - | 8,000 | " |

7. Raw Material Consumption :

| S.No. | Name of the Raw Material | Consumption per day |
|---|---|---|
| 1. | Coa | 12500 T |
| 2 | Light Diesel oil | 10 KL |

8. Final Effluent Quality :

| Sampling Point | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| Ash pond over-flow | pH | 6.5 - 8.5 | 8.18 |
| | T.S.S. | 100 | 2430 |
| | T.D.S | - | 176 |
| | C.O.D | 250 | 300 |
| | Oil & Grease | 20 | 40 |

9. Final Emission :

The stacks could not be monitored due to lack of facility provided in the stack.

10. Solid Waste :

| S.No. | Solid Waste | Total Quantity per day | Mode of Disposal |
|---|---|---|---|
| 1. | Coal ash | 500 T | Stored in ash pond |

11. Assessment/Recommendations :

The effluent discharge outside the plant through ash pond overflow which is meeting the river Konar contains high suspended solid and oil and grease. The unit is not at all serious in controlling the discharge of polluting effluent.

## 15.0 ZINC SMELTER

### 15.1 Binani Zinc Ltd., Binani Puram

1. Name and Address of the Unit : Binani Zinc Ltd., Binani Puram, Ernakulam Dist., Kerla
2. Category : Zinc Smelter
3. Dates on which auditing was conducted : 15 - 19 th February, 1992
4. Audit Team (Names) : T.Mahesh, AEE and M.Madhusudanan, SSA
5. Date of Commencement : 1967
6. Production Details :

| S.No. | Name of the Product | Capacity |
|---|---|---|
| 1. | Zinc Ingots | 20,000 T/Yr |
| 2. | Cadmium | 36 T/Yr |
| 3. | Sulphuric Acid | 36,000 T/Yr |

7. Water Consumption, KLD :

| | | | |
|---|---|---|---|
| i) | Process | : | 800 |
| ii) | Cooling | : | 1700 |
| iii) | Domestic | : | 1000 |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | Zinc Concentrate | Zinc Ingots | 1.81 |

9. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| 1. | LSHS | 1625 L/Hr |
| 2. | LDO | 230 L/Day |
| 3. | Furnace oil | 200 L/Day |

10. Final Effluent :

i) Quantity, KLD :

Domestic : 300

Industrial : 1550

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 5.5 - 9.0 | 7.4 |
| 2. | Zinc | 5.0 | 1.94 |
| 3. | Iron | - | N.D |
| 4. | Lead | - | 0.0 |
| 5. | Cadmium | 2.0 | N.D |
| 6. | Copper | 3.0 | 0.03 |
| 7. | Sulphates | 1000.0 | 3000.0 |
| 8. | Manganese | - | 0.04 |
| 9. | Oil & Grease | - | 3.20 |

All values in mg/l except pH

11. Final Emission :

| Stack no. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| No. 1 | Acid Mist | - | 209 mg/Nm$^3$ |
| | Sulphur Dioxide | - | 1563 mg/Nm$^3$ |
| No. 2 | Particulars | - | 6 mg/Nm$^3$ |
| | -do- | - | 5 mg/Nm$^3$ |

12.Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | 17.34 TPD |
| 2. | From pollution control facility | Nil |
| 3. | Quantity recycled or reutilised | Nil |
| 4. | Mode of Disposal | Storedin Open Ponds |

3.Assessment/Recommendation :

a) To make proper arrangements for solid waste disposal/storage; and

b) To treat all effluents properly before discharge.

## 15.2 Hindustan Zinc Ltd., Debari

1. Name and Address of the Unit : Hindustan Zinc Ltd., Debari Udaipur, Rajasthan.
2. Category : Zinc Smelter
3. Dates on which auditing was conducted : 24-27th December, 1991
4. Audit Team (Names) : SH. S. Sruvastav, SH. S.B. Lahot Dr. S.K. Paliwal, SH. Ratan Lal SH. N. Singh
6. Production Details :

| S.No. | Name of the Product | Capacity |
|---|---|---|
| 1. | Zinc Metals | 49,000 TPA |
| 2. | Silver | 8.5 TPA |
| 3. | Cadmium | 250 TPA |
| 4. | Sulphuric Acid | 87,000 TPA |
| 5. | Phosphoric Acid | 26,000 TPA |

7. Water Consumption, KLD :

| | | |
|---|---|---|
| i) Process | : | 6000 |
| ii) Cooling | : | - |
| iii) Domestic + Gardening | : | 2000 |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | Zincone | Zinc Metal | — |

9. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| | N.A. | |

Final Effluent :

i) Quantity, KLD :

Domestic :

Industrial : 3100 - 4300

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 6.5 - 8.5 | 7.7 |
| 2. | SS | 100 | 7 mg/l |
| 3. | COD | 250 | 5 |
| 4. | F | 1.5 | 1.3 " |
| 5. | Cu | - | .02 " |
| 6. | Cr | - | .01 " |
| 7. | Zn | - | 1.47 " |
| 8. | Fe | - | 2.11 " |

Final Emission :

| Stack No. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| No. 1 | Silver ST | 150 | - |
| No. 2 | Sulphuric Plant 1 | 150 | - |
| No. 3 | Sulphuric Plant 2 | 150 | - |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | 450 TPD + 120 TPD |
| 2. | From pollution control facility | |
| 3. | Quantity recycled or reutilised | |
| 4. | Mode of Disposal | |

13.Recommendations (In brief) :

i) Measures should be taken to make the emission control system effective in the Sulphuric Acid plant -II. SAP-I should be made DCDA based.

ii) Zinc oxide scrubbing system for controlling of SO2 as provided is Vizag smelter of HZL may also be envisaged for SAP(I). The resulting ZnSO4 may be utilized for reconering of Zn metal.

iii) Measures should be taken for complete recycling of waste wasters. Raw water used for gardening etc. may be replaced by the recycled water.

iv) Effective venitilation to be provided in Zinc electrolysis sections.

v) Arrangement should be made to utilize Zerosite residue and the pond area.

## 16.0 OTHER INDUSTRIES

### 16.1 Hindustan Latex Ltd., Belgaon

1. Name and Address of the Unit : Hindustan Latex Ltd., Kangala, Belgaon Dist., Karnataka
2. Category : Other (Rubber)
3. Dates on which auditing was conducted : 18 - 22th November, 1991
4. Audit Team (Names) : S. Suresh. AEE
   : M.Madhusudanan SSA
5. Date of Commencement : 1987
6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | Male Contracetives | 144 MPY | 160 MPY |
| | MPY- Million Pices per year | | |

7. Water Consumption, KLD :

   i) Process : 133
   ii) Cooling : 10
   iii) Domestic : 5

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | Latex | Contraceptives | 0.8 T/MP |
| 2. | Ammonia | -do- | 0.09 T/MP |
| 3. | Silica | -do- | 0.27 T/MP |
| 4. | Sulphur | -do- | 0.01 T/MP |
| 5. | Zinc Oxide | -do- | 0.01 T/MP |

9. Fuel Consumption :

| S.No. | Type of Fuel | Name of Product | Consumption of Fuel |
|---|---|---|---|
| 1. | Furnace Oil | Contraceptives | 4.33 M/MP |
| 2. | Diesel | -do- | 0.87 M/MP |

10. Final Effluent :

i) Quantity, KLD :

Domestic : 5

Industrial : 126

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 6.0 - 8.5 | 8.2 |
| 2. | COD | 250 | 95 |
| 3. | BOD | 30 | 3 |
| 4. | TSS | 100 | 26 |
| 5. | TDS | 2100 | 354 |
| 6. | Oil & Grease | 10 | NIL |
| 7. | TKN | 100 | 19.4 |
| 8. | NH 3 N | 50 | 17.7 |

All values in mg/L except pH

11. Final Emission :

| Stack no. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| No. 1 | Particulars | | 55 mg/Nm3 |
| | Sulphur Dioxide | | 1346 mg/Nm3 |

12.Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | 33 kg/day |
| 2. | From pollution control facility | 125 kg/day |
| 3. | Quantity recycled or reutilised | Nil |
| 4. | Mode of Disposal | Selling away |

13.Assessment/Recommendation :

a) To Chalk out proper Water Management Plan; and

b) To develop green belt area around the plant.

## 16.2 Modi Zerox Limited, Modi Nagar

1. Name and Address of the Unit : Modi Zerox Limited.
   Modi Nagar, Ram Pur (U.P.)
2. Category : Engineering
3. Dates on which auditing was conducted : 12 - 16th Feburary, 1992
4. Audit Team (Names) : Sh. P.M. Ansari SEE
   Sh. B.V. Babu AEE
   Sh. R.K. Singh SSA
   Sh. V.K. Sachan JSA
   Dr. R.P. Mishra JSA
   Sh. S.K. Sharma Sr. Tech.
   Sh. Dev Prakesh SLA
   Sh. R.M. Prasad JLA
5. Date of Commencement : —
6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | Photocopy Machines | — | 5705 per year |

7. Water Consumption, KLD :
   i) Process : 71
   ii) Horticulture : 196
   iii) Domestic : 89

aw Material Consumption :

| S.No. | Name of Raw Material the Product | Name of the Product | Consumption of Raw Material per unit of |
|---|---|---|---|
| 1. | Aluminium Foil | Zerox Machine | NM |
| 2. | Steel Sheets | -do- | NM |
| 3. | Wire & Cables | -do- | NM |
| 4. | Pb(Soldring Mat.) | -do- | NM |
| 5. | Polymer | Toner | NM |
| 6. | Carban Black | -do- | NM |
| 7. | Phosphoric Acid | Zerox Machine | NM |
| 8. | Poly Meth.Meta Acrylate | -do- | NM |
| 9. | Sodium Sulphide | -do- | NM |
| ). | Sodium Hydroxide | -do- | NM |
| 1. | Zinc Sterate | -do- | NM |
| 12. | Aerosil | -do- | NM |
| 3. | Hydro Choloric Acid | -do- | NM |

M = Not Measured

9. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| 1. | High Speed Diesel | Not Measured |
| 2. | Servo Press Oil | Not Measured |
| 3. | Diesel | Not Measured |

10. Final Effluent :

i) Quantity, KLD :

Domestic :
Industrial : } 15

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | — | 7.5 |
| 2. | COD | — | 23 |
| 3. | BOD | — | 07 |
| 4. | SS | — | 134 |
| 5. | PO4 | — | 11.2 |
| 6. | Fe | — | 0.52 |
| 7. | Zn | — | 0.05 |

All value in mg/l except pH

11. Final Emission :

| Stack no. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| Not monitored | | | |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | .016 KLD |
| 2. | From pollution control facility | Nil |
| 3. | Quantity recycled or reutilised | Nil |
| 4. | Mode of Disposal | Due to Hazardous Nature, it is not Disposed |

13. Recommendations (In brief) :

a) Frequent maintenance of the septic tank is required.

b) Flow measurement weir should be provided at ETP.

c) Sludge should be collected from settling tank and sludge drying beds should be made operational.

d) The noisy area near by Air Compressors should be seperated with other working zones with sound proof barriers.

## 16.3 Nestle India Ltd., Nanjangud

1. Name and Address of the Unit : Nestle India Ltd., No. 24, Industrial Area Nanjangud, Mysore-571301
2. Category : Other ( FOOD )
3. Dates on which auditing was conducted : 24 - 26 th February, 1992
4. Audit Team (Names) : S. Suresh, AEE and P. Mani, JSA
5. Date of Commencement : March, 1989
6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | Soluble Coffee and Coffee Chicory Mixture | 4000 T/Yr | 3000 T/yr |

7. Water Consumption, KLD :

| | | | |
|---|---|---|---|
| i) | Process | : | 500 |
| ii) | Cooling | : | 100 |
| iii) | Domestic | : | 150 |

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Ra Material per unit o the Product |
|---|---|---|---|
| 1. | Green Coffee | Soluble Coffee | 2.5 T/T |
| 2. | Roasted Chicory | Chicory Mixure | 0.6 T/T |
| 3. | Green Coffee | -do- | 1.6 T/T |

9. Fuel Consumption :

| S.No. | Type of Fuel | Name of Product | Consumption of Fuel |
|---|---|---|---|
| 1. | Coal | Coffee & Chicory Mixture | 2.5 T/T |
| 2. | Furnace Oil | -do- | 0.38 T/T |
| 3. | Diesel | -do- | 0.75 T/T |
| 4. | Coffee Grounds | -do- | 1.25 T/T |

10. Final Effluent :

i) Quantity, KLD :

Domestic : 50
Industrial : 180

ii) Quality :

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| 1. | pH | 6.0 - 8.5 | 7.3 |
| 2. | TSS | 100 | 80 |
| 3. | TDS | 2100 | 600 |
| 4. | Oil & Grease | 10 | ND |
| 5. | Ammoniacal NH3 | 50 | 7.6 |
| 6. | BOD | 30 | 14 |
| 7. | COD | 250 | 185 |

All values in mg/l except pH

11. Final Emission :

| Stack no. | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| No. 1 | Particulates | 350 mg/Nm3 | 155 mg/Nm3 |
| | Sulphur Dioxide | - | 31 mg/Nm3 |
| No. 2 | Particulates | 150 mg/Nm3 | 32 mg/Nm3 |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | 16 Tpd |
| 2. | From pollution control facility | Nil |
| | Quantity recycled or reutilised | 10 Tpd |
| | Mode of Disposal | Land Filling |

13. Recommendations (In brief) :

a) Provision for effluent flow measurement should be made ;

b) Records on cost incurred on operation & maintenances of ETP should e kept; and

c) oper arrangements for storage of coffee grounds during rainy son should be made.

**APPENDIX I**

## LIST OF THE 18 CATEGORIES OF HIGHLY POLLUTING INDUSTRIAL SECTORS

| S.No. | Name |
|---|---|
| 1. | Aluminium Smelter |
| 2. | Basic Drugs and Pharmaceuticals |
| 3. | Caustic Soda |
| 4. | Cement |
| 5. | Copper Smelter |
| 6. | Distillery |
| 7. | Dyes & Dye Intermediate |
| 8. | Fertiliser |
| 9. | Iron and Steel |
| 10. | Leather Processing Industries |
| 11. | Oil Refinery |
| 12. | Pesticides |
| 13. | Petrochemicals |
| 14. | Pulp and Paper |
| 15. | Sugar |
| 16. | Sulphuric Acid |
| 17. | Thermal Power Plant |
| 18. | Zinc Smelter |

**APPENDIX II**

## MINISTRY OF ENVIRONMENT AND FORESTS

## NOTIFICATION

New Delhi, the 22nd April, 1993

G.S.R. 386(E)- In exercise of the powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely :-

1. (1) These rules may be called the Environment (Protection) Amendment Rules, 1993

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986 :-

(a) in rule 14 -

(i) for the words "audit report" wherever they occur, the word "statement" shall be substituted;

(ii) for the figures letters and words "15th day of May" the words "thirtieth day of September," shall be substituted.

(b) In Appendix 'A', for FORM V, the following form shall be substituted, namely :- ii)

**"FORM V"**

(See rule 14)

Environmental Statement for the financial year ending the 31st March.....

**PART A**

(i) Name and address of the owner/occupier of the industry operation or process.

(ii) Industry category Primary (SIC Code) Secondary - (SIC Code)

(iii) Production capacity - units-

(iv) Year of establishment

(v) Date of the last environmental statement submitted

## PART B

**Water and Raw Material Consumption**

(i) Water consumption, KLD :

Process :
Cooling :
Domestic :

| Name of Product | Process Water Consumption per unit of Product Output | |
|---|---|---|
| | During the Previous Financial Year | During the Current Financial Year |
| | (1) | (2) |
| (1) | | |
| (2) | | |
| (3) | | |

Raw Material Consumption :

| *Name of Raw Materials | Name of Products | Consumption of Raw Material per unit of Output | |
|---|---|---|---|
| | | During the Previous Financial Year | During the Current Financial Year |

* Industry may use codes if disclosing details ofraw material would violate contractual obligations, otherwise all industries have to name the raw materials used.

## PART C

**Pollution discharged to environment/unit of output**
(Parameter as specified in the consent issued)

| Pollutants | Quantity of Pollutants Discharged (mass/day) | Concentrations of Pollutants in Discharges (mass/volume) | Percentage of Variation from Prescribed Standards with Reasons |
|---|---|---|---|
| (a) Water | | | |
| (b) Air | | | |

## PART D
## HAZARDOUS WASTES

(as specified under Hazardous Wastes/Management and Handling Rules, 1989)

| Hazardous Waste | Total Quantity(kg) | |
|---|---|---|
| | During the Previous Financial Year | During the Current Financial Year |
| (a) From process | | |
| (b) From pollution control facilities | | |

## PART E

**Solid Wastes**

| | Total Quantity | |
|---|---|---|
| | During the Previous Financial Year | During the Current Financial Year |
| (a) From process | | |
| (b) From pollution control facility | | |
| (c) (i) Quantity recycled or reutilised within the unit | | |
| (ii) Sold | | |
| (iii) Disposed | | |

## PART F

Please specify the characterisations (in terms of composition and quantum) of hazardous as well as solid wastes and indicate disposal practice adopted for both these categories of wastes.

## PART G

Impact of the pollution abatement measures taken on conservation of natural resources and on the cost of production.

## PART H

Additional measures/investment proposal for environmental protection including abatement of pollution, prevention of pollution.

## PART I

Any other particulars for improving the quality of the environment.

## APPENDIX III

## FORMAT USED FOR THE PREPARATION OF THE BRIEF AUDIT REPORTS

1. Name and Address of the Unit :
2. Category :
3. Dates on which auditing was conducted :
4. Audit Team (Names) :
5. Date of Commencement :
6. Production Details :

| S.No. | Name of the Product | Capacity | Actual Production |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |

7. Water Consumption, KLD :

   i) Process :
   ii) Cooling :
   iii) Domestic :

8. Raw Material Consumption :

| S.No. | Name of Raw Material | Name of the Product | Consumption of Raw Material per unit of the Product |
|---|---|---|---|
| 1. | | | |

9. Fuel Consumption :

| S.No. | Type of Fuel | Consumption of Fuel |
|---|---|---|
| | | |

10. Final Effluent :

i) Quantity, KLD :

Domestic :

Industrial :

ii) Quality

| S.No. | Parameters | Prescribed Limits | Actual Discharge |
|---|---|---|---|
| | | | |

11. Final Emission :

| Stack no | Parameters | Emission Standards | Actual Emission |
|---|---|---|---|
| | | | |

12. Solid Wastes :

| S.No. | Solid Waste | Total Quantity |
|---|---|---|
| 1. | From process | |
| 2. | From pollution control facility | |
| 3. | Quantity recycled or reutilised | |
| 4. | Mode of Disposal | |

13. Recommendations (In brief) :

I- 2 - 8 Pages

3- 18
19- 34
35- 50
51- 66
67- 82
83- 98

} - 16 Pages

99- 102 - 4 Pages