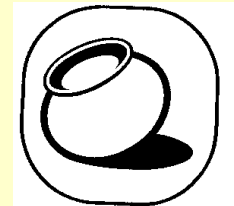




TATA INTERNATIONAL

# Welcome & Greetings



ECOMARK

**TATA INTERNATIONAL**

Indian Institute of Science Bangalore  
28 March 2006

**TATA INTERNATIONAL**

**TATA INTERNATIONAL LTD**

**2006**

**Leather & Leather Products**

**1975**



# Leather & Leather Products business

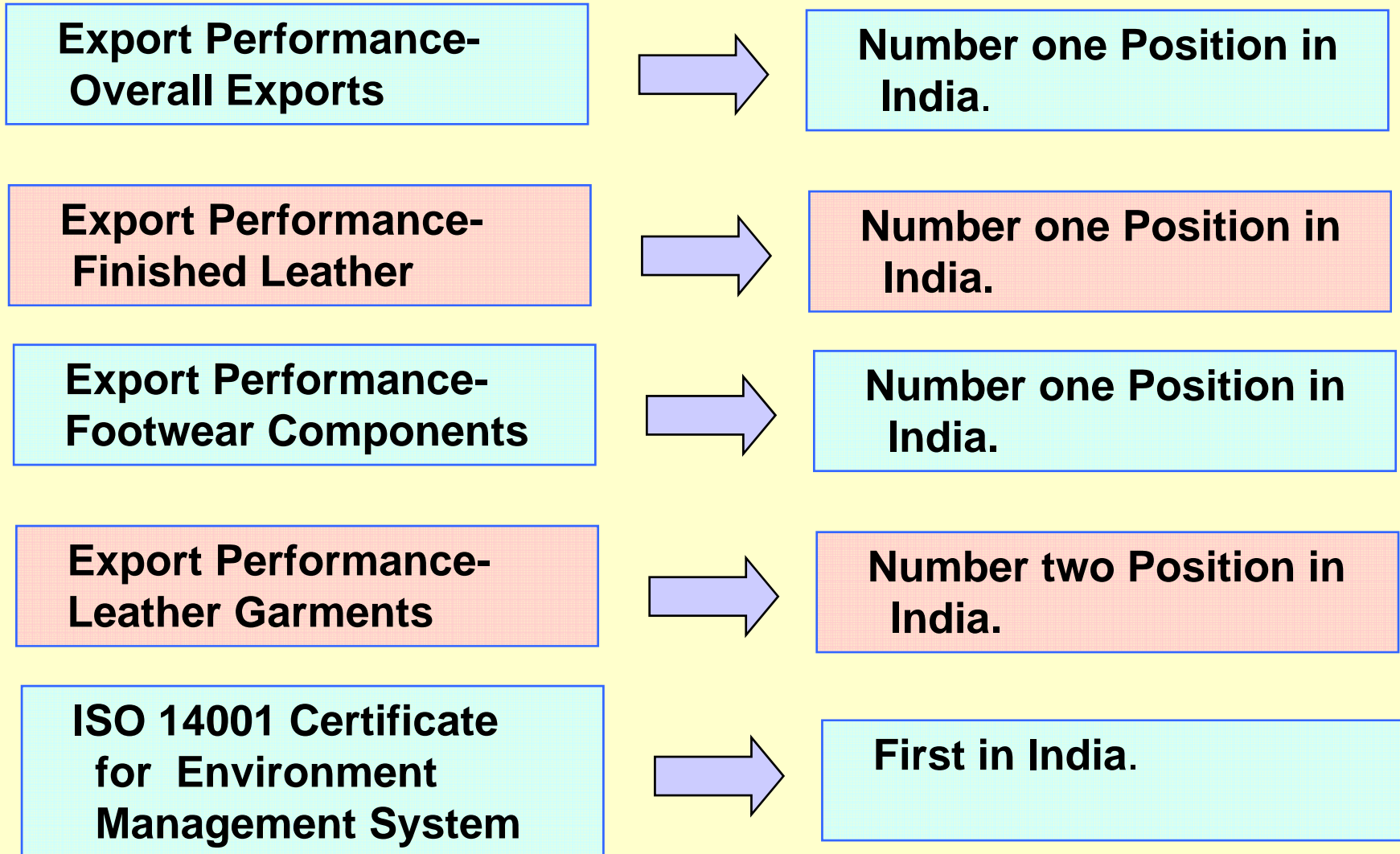
## Genesis

- ☞ **Established In 1975**
  - **Largest Tannery In India**
  - **Among The Top three Goat tanneries in the World**
- ☞ **Leader in leather exports from India since 1982**

## Profile

- ☞ **Pioneers in leather industry in India and in the region**
  - **Exploring new markets**
  - **New Product development**
  - **Setting quality standards**
- ☞ **Value proposition for sustainable customer relationship**
- ☞ **Recognized for R&D capabilities**
- ☞ **Responsible corporate citizen**

# TATA INTERNATIONAL



# Leather– Global Business of TATA Group

- **One of the few global businesses of the group with 85% of turnover from international markets**
  - **Global Markets** – Exporting products to over 35 countries across the globe
  - **Global Sourcing** – RM from Middle East, Far East, Bangladesh, Africa, CIS etc.
  - **Global Supply Chain** – India (Dewas, Chennai, Kolkata, Kanpur), China, Bangladesh, Italy.
  - **World-class Technology** – Chemicals / Waste recycling / Advanced Machines.
  - **Global Alliances** – Graziella & Missardi of Italy; Lloyd / Ara of Germany; Getever & Lianyon of China.

# Leather GBU's Partners with Global Brands

## Finished Leather

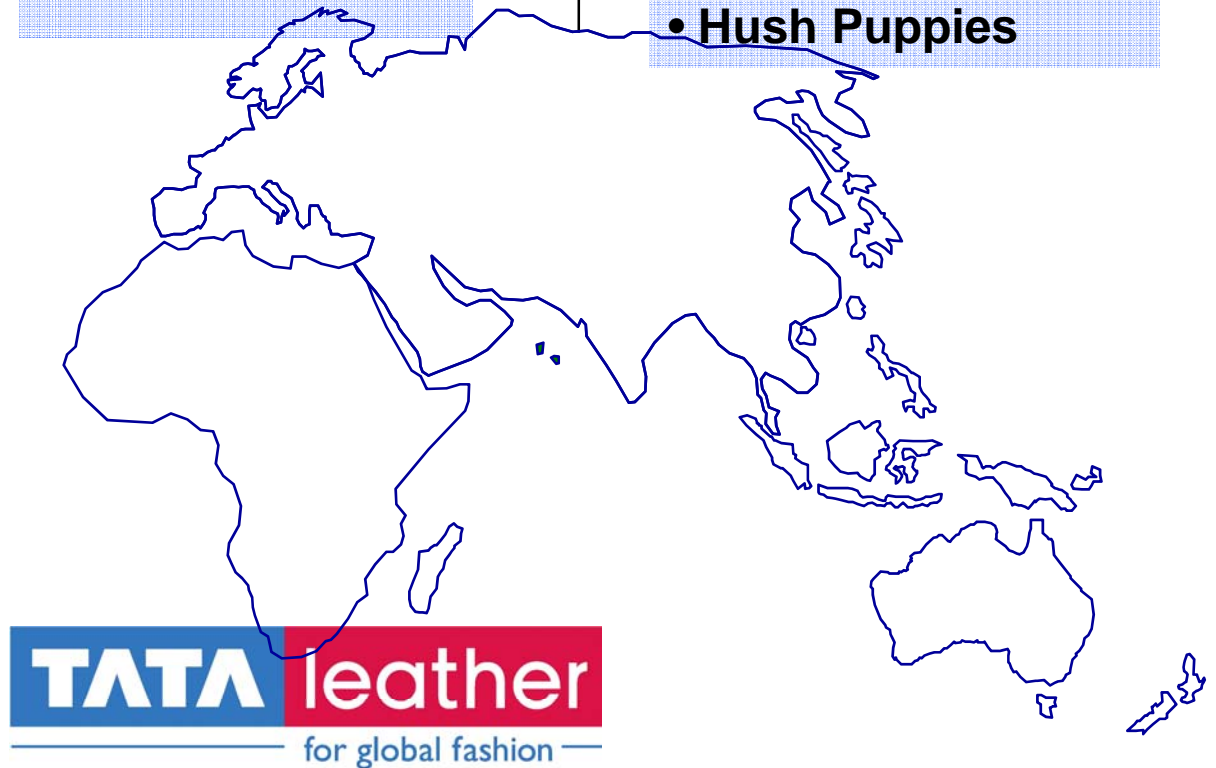
- Peter Kaiser
- Aerosole
- Ara
- Naturalizer
- Gabor

## Leather Garments

- Mango
- Zara
- Pierre Cardin
- Escada
- Betty Barclay

## Footwear

- Gabor
- Marks & Spencer
- Florsheim
- Ara / Lloyd
- Ambiorix
- Grenson
- Hush Puppies



# How Environment friendly is our leather ?

R&D capabilities

## Environmental Care



**Environment  
Excellence  
Awards**



**ISO 14000  
Certification from  
RWTUV, Germany**

### Liquid Waste Management

- ETP to meet all the norms through physiochemical and microbiological treatment
- “Reverse Osmosis” to optimize the recycling of liquid waste

### Solid Waste Management

- The world’s first plant to use bio methanation technology for solid waste treatment based on in-house patented technology - UNDP/TIL/MNES sponsored project
- Developed process for specialty leathers like Zero Chrome (Minerals free)
- Most Environmental Friendly way of disposal/recycling of Waste

### Ecolabelling –

First Leather company in India recommended for Eco Labelling

# **TOWARDS SUSTAINABLE LEATHER INDUSTRY**



**Two Lacs Trees Planted all Around the Complex**



## Energy Saving

- Large Solar array (~700 nos.) for heating Boiler feed water.
- Capacity 50M<sup>3</sup> per day to 80°C.
- Specific Power consumption reduction in leather processing
- Biogas from leather waste.

# Ground and Roof Water Harvesting



## Pollutants Generated:

**SOLID WASTE : SHAVING DUST FROM WET BLUE AND TRIMMINGS**

**LIQUID WASTE : EXHAUST LIQUORS FROM DRUMS OF DYE HOUSE**

**AIR POLLUTION : VAPOURS FROM SPRAY BOOTHS**

# How Environment friendly is our leather ?

## Environment Care



**Pole View of Effluent Treatment Plant**

## **POLLUTION TREATMENT MEASURES TAKEN:**



### **Water Recycling**

- Reverse Osmosis Plant on Treated Effluent Recycling.
- RO plant capacity ~ 200 M<sup>3</sup> per day.
- Ground and Roof water harvesting.

# **LEATHER SOLID WASTE CONTAINING CHROMIUM**



## **Hazardous Waste Recycling :**

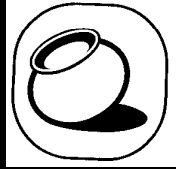
- Recycling Capacity of 700 tons per annum of Chromium containing leather waste.
- Bio-gas from Chromium containing leather waste project 50% sponsored by MNES/UNDP
- Methane gas production 250M<sup>3</sup> per day
- Chromium Recovery and recycling, 12 tons per annum as Chromium Sulphate.
- Two Patents on “Hazardous Waste Recycling”





# Industry Leadership & Accolades

2005



ECOMARK

ECO MARK for  
FINISHED LEATHER

2005

TERI Corporate Environment  
Award – Across Industries

2005

Winner of the CLE's  
Best Exporter  
Award In Leather  
from  
1984 to 2004

MP State Award for Best practices in  
Environment protection

2004

ISO 9001 Certification for Chennai Supply  
Chain operations

2003



Rajiv Gandhi Award for Environment Protection –  
Best of All, only leather company in India

2002

ISO 14001 certification – 1<sup>st</sup> in India

2000

Rajiv Gandhi National Quality Award  
– Best of All, only leather company in India

1998

ISO 9000 certification for Leather Garments and Footwear  
- 1st in India

1995

ISO 9000 certification - 1st tannery in India

## **How Environment friendly is our leather ?**



- **Eco friendly leather :**

**In house eco friendly leather manufacturing process has been developed which is chrome free.**

- **Bio-Methanation plant :**

**Implemented in house developed patented technology for gainful utilization of solid waste. At present the gas generation is around 250 m<sup>3</sup>/day.**

- **Eco labeling of finished leather:**

**Eco labeling of our finished leather has been Awarded by Bureau of Indian Standards (BIS).**

**Implemented to make our leather free from banned items like PCP, formaldehyde, Azo dyes to meet the eco criteria.**

## **How Environment friendly is our leather ?**



### **ETP Treatment by new process:**

**A new process has been developed at pilot level for reducing chemical , manpower & energy cost as well as sludge reduction.**

### **Substitution by cheaper chemicals:**

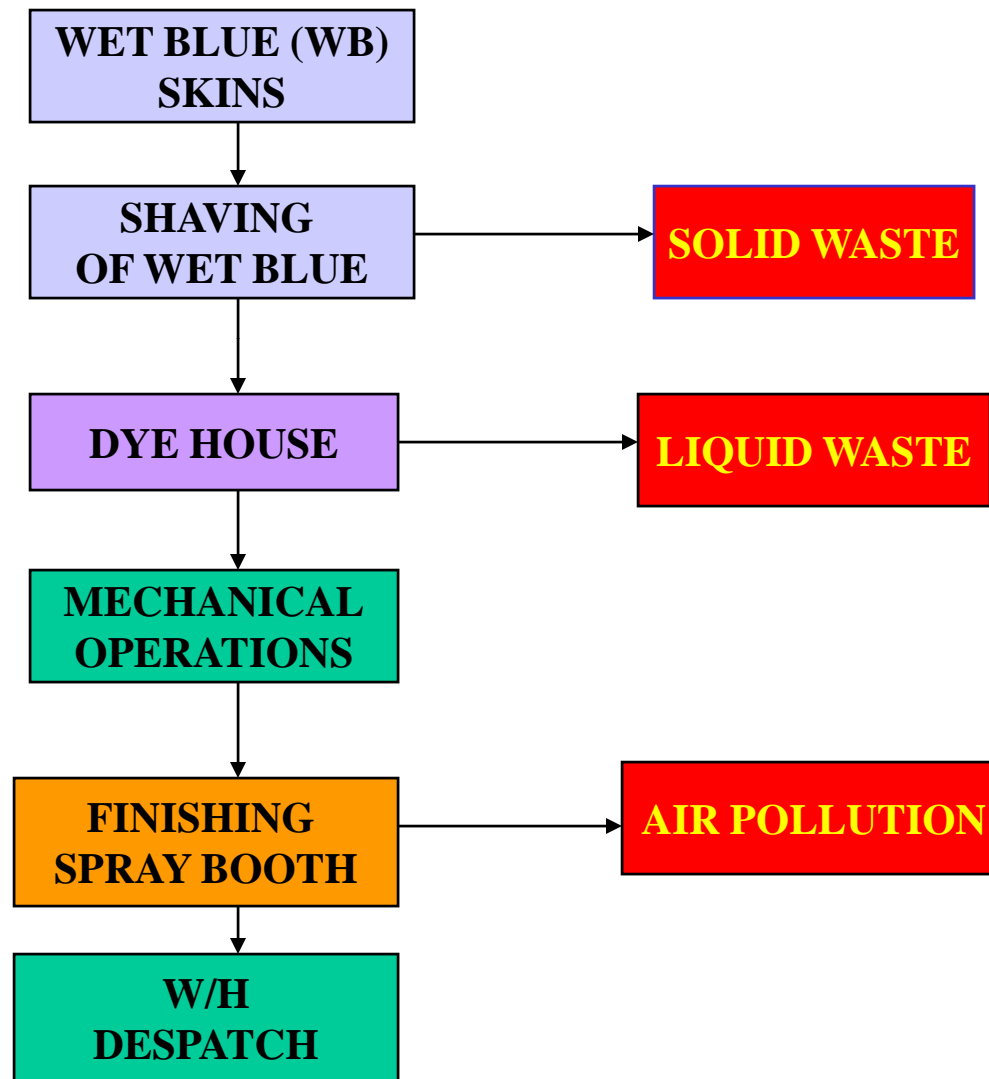
**Expensive & hazardous chemicals have been replaced with cheaper & environment friendly chemicals.**

**Chemicals from Waste Recycling**

### **Up gradation of technology:**

**Adopted Reverse Osmosis technology for further improving the effluent treated water. Daily 200 M<sup>3</sup> water as good as drinking water is supplied to boiler house.**

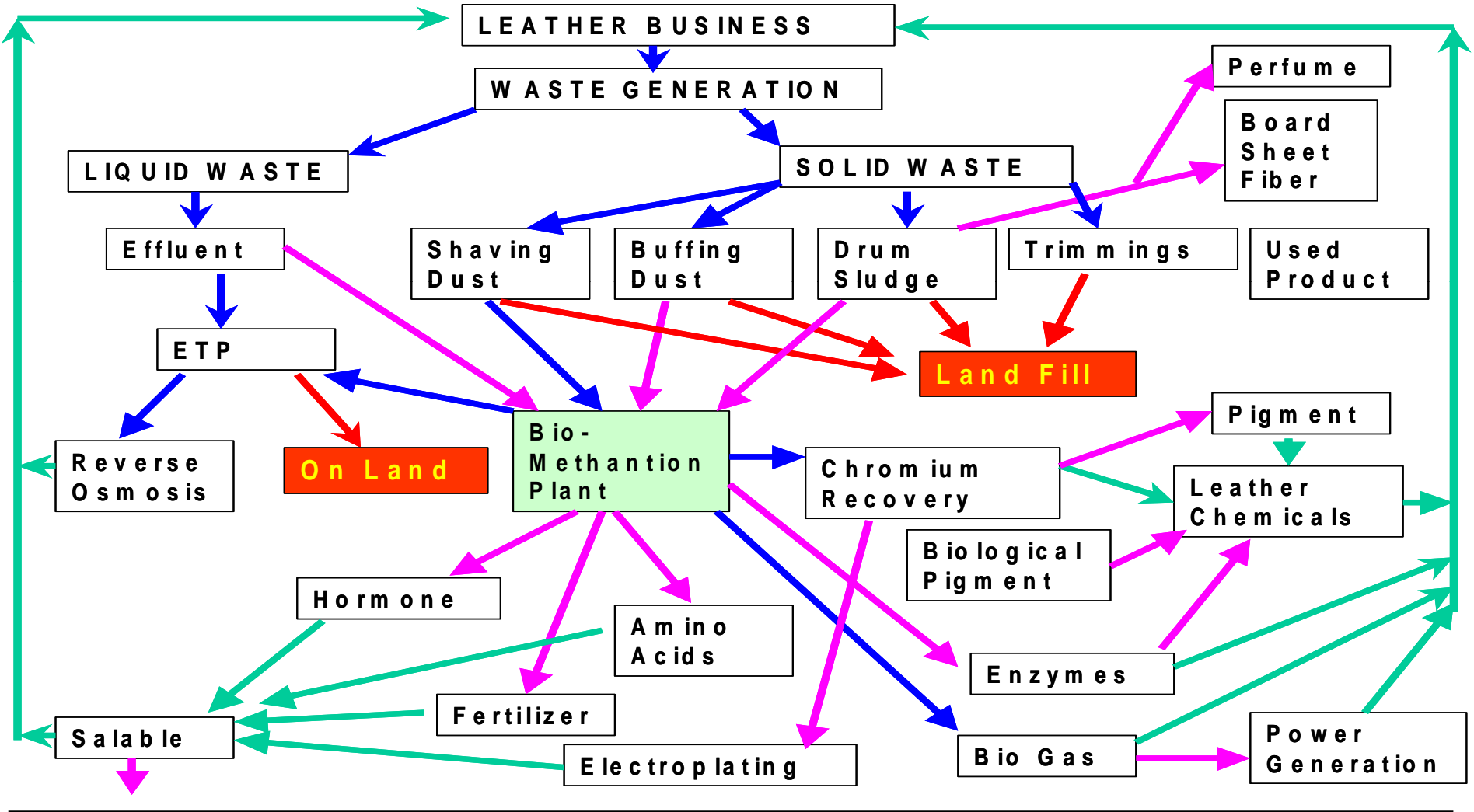
## **MANUFACTURING PROCESS:**



**ENVIRONMENT FRIENDLY TOTAL SOLUTION  
FOR  
LEATHER SOLID WASTE CONTAINING CHROMIUM**

**MODE: GAINFUL UTILIZATION THROUGH  
BIOTECHNOLOGY/BIOMETHANATION**

# ENVIRONMENT FRIENDLY TOTAL SOLUTION FOR LEATHER SOLID WASTE CONTAINING CHROMIUM



→ Non-Environment Friendly    
 → Innovative Route    
 → Recycle    
 → Present

**LEATHER SOLID WASTE BIOMETHANATION  
BULK IMPLEMENTATION.**

**DEMONSTRATION PLANT FOR LEATHER SOLID  
WASTE BIOMETHANATION**

**AT TATA INTERNATIONAL LTD  
DEWAS**

**BASED ON IN-HOUSE R&D PATENTED TECHNOLOGY**

**WITH SUPPORT FROM  
UNDP / MNES (G.O.I.)  
&  
MONITORED BY CLRI.**

## **CONCEPT:**

**A novel innovative scheme for utilizing these wastes in-house as an economically self sustaining environmental care project.**

**The concept was to treat the solid wastes to separate the chrome and the organics. The organics would go for Biomethanation and chrome would be recycled for leather making.**



## **Patents/Publication by TIL, R&D:**

### **Two Patents granted by Govt. of India in August 2003**

- 1. Indian patent no. 188788 (612/BOM/98) Dated 22<sup>nd</sup> September 98**

**“A process for the production of methane containing fuel gas and nitrogenous fertilizer by Biomethanation of pelt/chromed leather solid wastes.”**

- 2. Indian patent no. 188789 (613/BOM/98) Dated 22<sup>nd</sup> September 98**

**“A process for the recovery of Basic Chromium Sulphate (BCS) from chromed leather solid wastes.”**

## **High Rate Biomethanation Plant Based on Solid Waste From Leather Industry**

<b>Place of Installation :</b>	<b>Dewas, Madhya Pradesh</b>
<b>Date of Commissioning :</b>	<b>September, 2002</b>
<b>Status of Functioning :</b>	<b>Continuously Running</b>
<b>Implementing Agency :</b>	<b>Tata International Limited UNDP &amp; MNES (Govt of India)</b>
<b>Technology :</b>	<b>Tata International Limited</b>
<b>Technology Institution for Monitoring :</b>	<b>Central Leather Research Institute, Chennai</b>
<b>Plant Installation Agency :</b>	<b>Mailhem Engineers Pvt. Ltd</b>

# Progress Report On Biomethanation Plant



## **Chronology of events for Bulk implementation:**

**1994-96:** Bench scale data established.

**Late '96:** Ministry of Non Conventional Energy Sources (MNES) (Govt. of India) Brainstorming session on leather industry Solid waste treatment process.

**'97:** MOU signed by TATA, Central Leather Research Institute (CLRI), Chennai/MNES/UNDP.

**'98:** Patent application.  
DPR preparation

**'99-00** Tender document preparation by CLRI, All India tender invitation, screening & awarding of tender.

## **Chronology of events for Bulk implementation:**

**March '01:** Final agreement signing between TIL, MNES & Mailhem for implementation of the UNDP sponsored project.

Plant installed.

**Aug. '02** Commissioning.

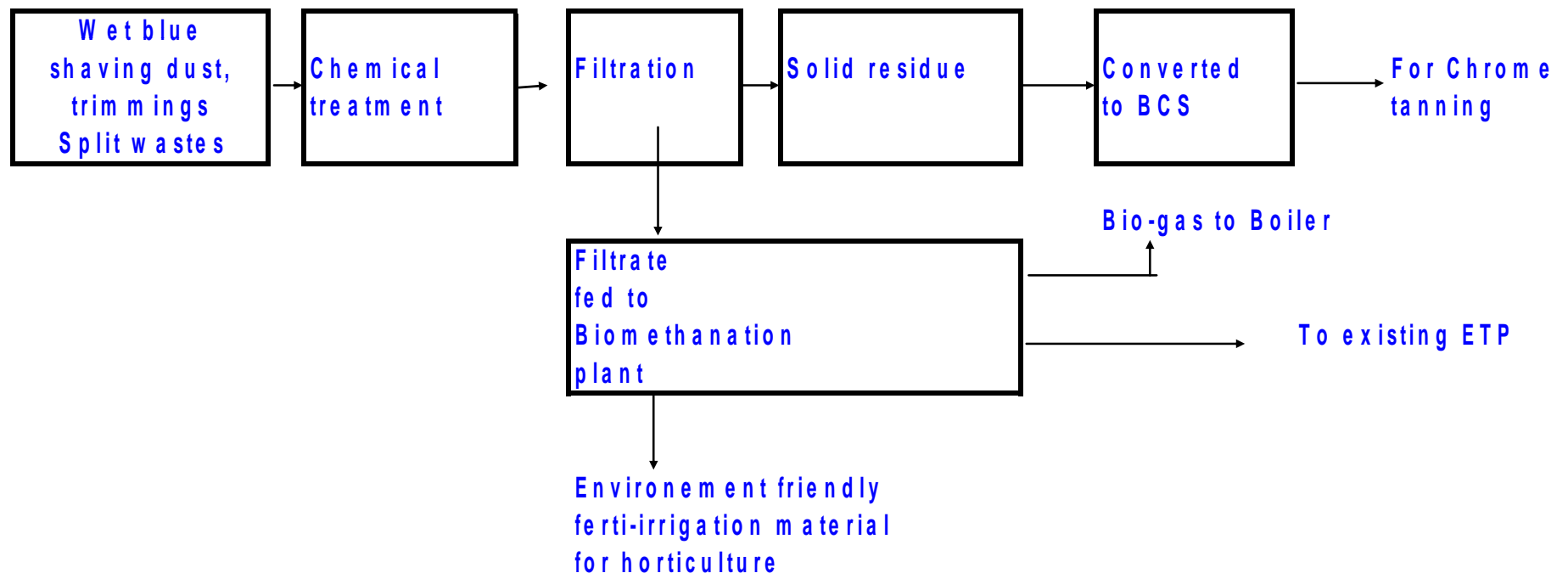
**Mar '03** O&M Completed.

**Apr '03 –**

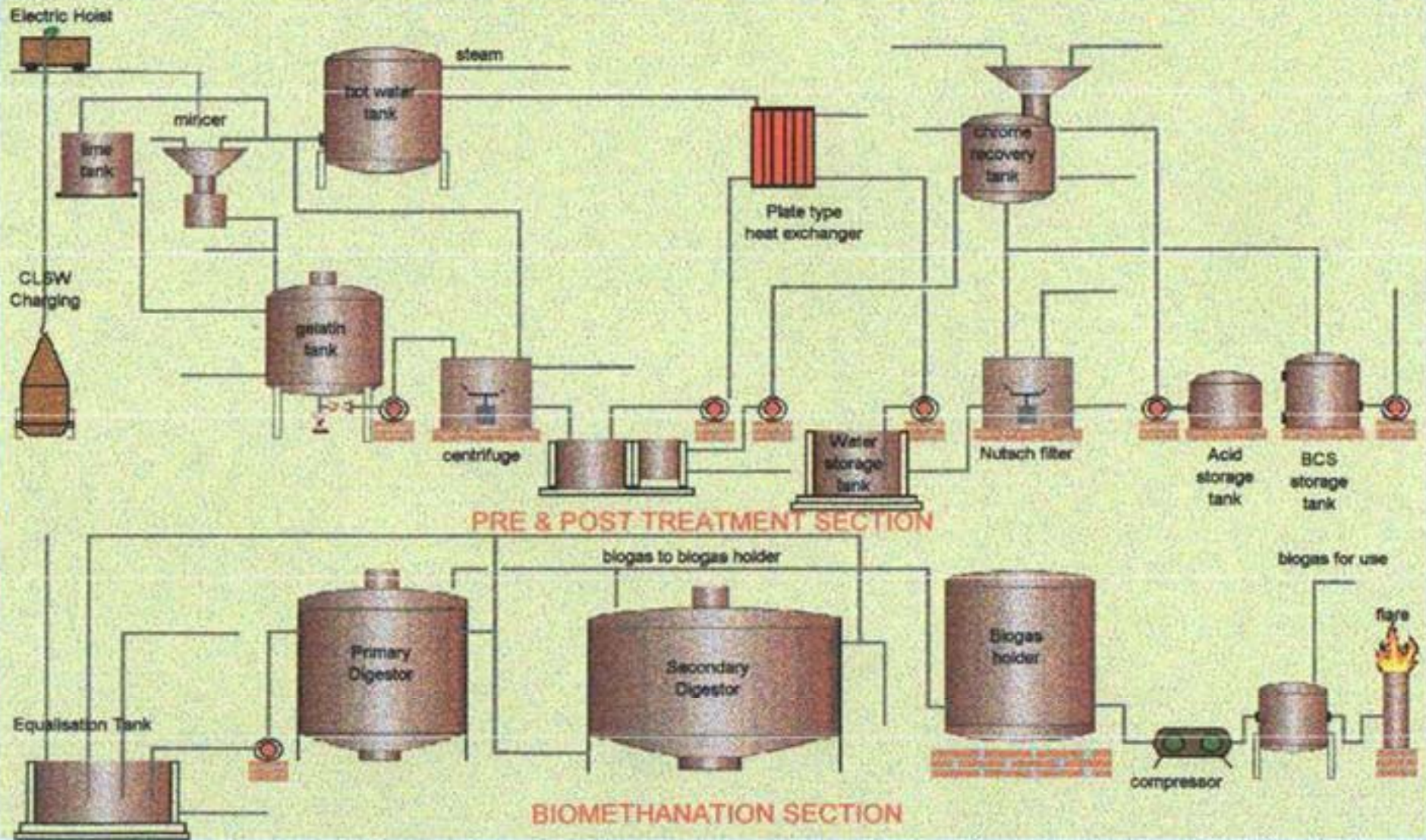
**Mar '06** Run by TIL

## PROCESS FLOW DIAGRAM:

The process flow for Hazardous solid waste treatment from leather is as given below

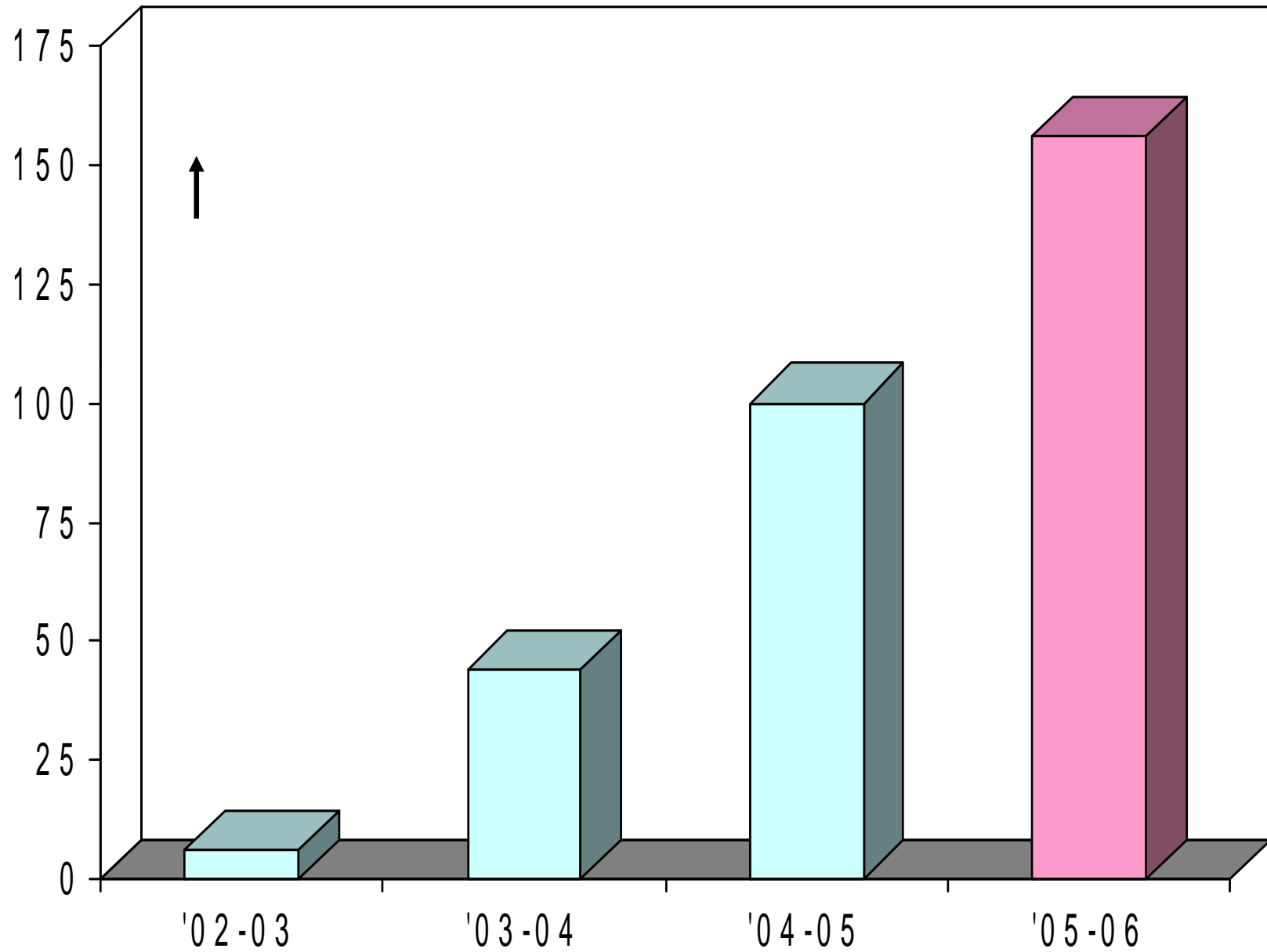


HAZARDOUS SOLID WASTE BIOMETHANATION PLANT BY TIL R & D TECHNOLOGY  
AT TATA INTERNATIONAL LTD. DEWAS, M.P.



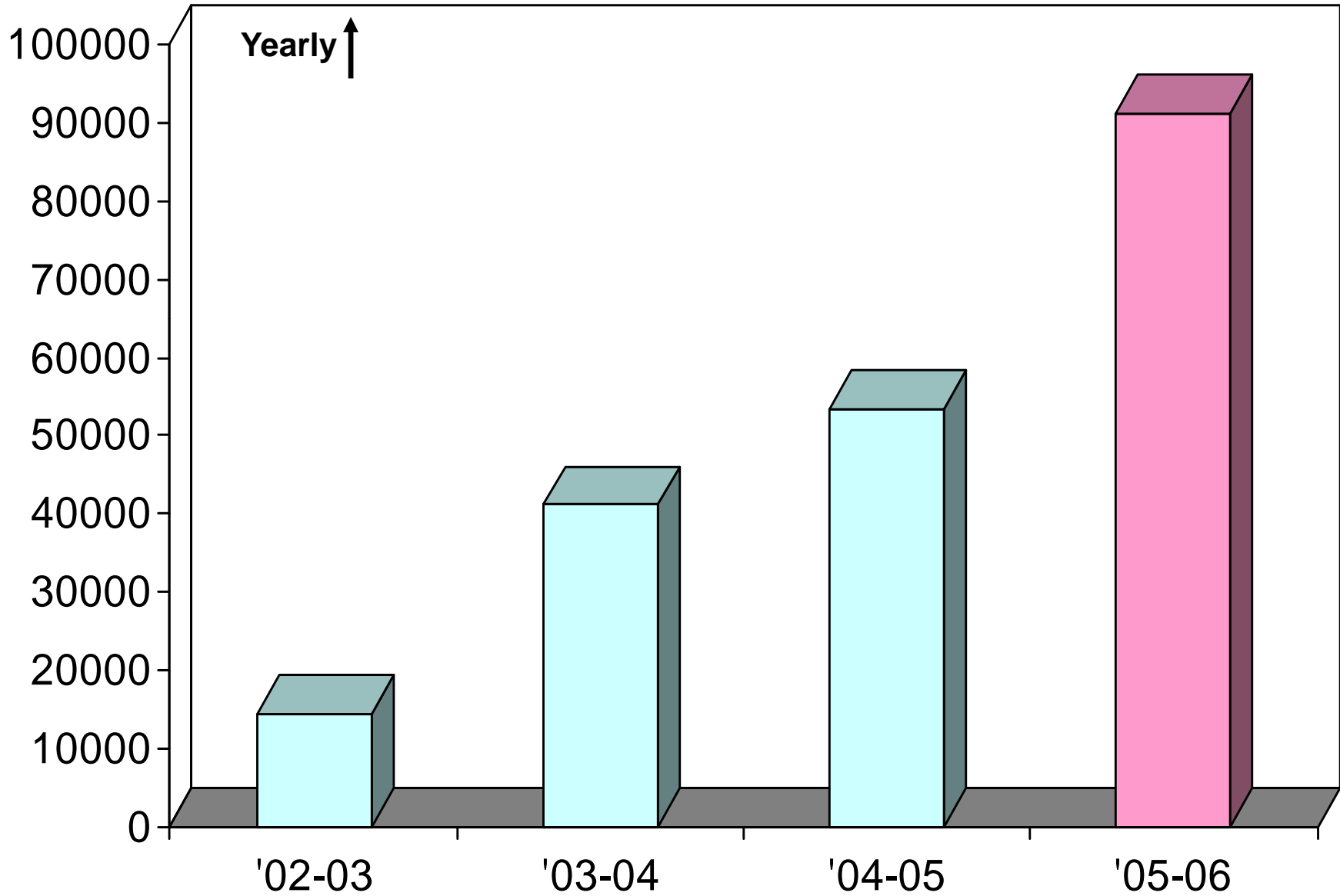
CLSW - Chromed leather shaving waste  
BCS - Basic Chrome sulfate (necessary for leather making)

# Recycled Chrome Sulphate (10%) in Tons/Year





# Solid Waste Recycling : Biogas M<sup>3</sup>/Year





**Benefits Of Biomethanation Plant**

**Revenue Generation from Haz. Leather**  
**Solid Waste treatment**  
**by**  
**TIL-B.M. Plant on full scale operation**

**A. Products:**

- 1. Bio-gas generation:** @ 280 m<sup>3</sup> 60-65% Methane/day
- 2. Chrome Recovery :** @ 500 Lits. (10 % BCS liquor)/day  
i.e., 50 Kg commercial Powder /day

**B. Revenue generation/Yr.**

- 1. From gas:** @ of Rs. 18.5 / M<sup>3</sup> as Rs. 750/  
equivalent to 19 Kg Industrial LPG and  
 $280 * 18.5 * 300 = \text{Rs. } 15.5 \text{ lakh.}$
- 2. From Chrome Liquor** @ of Rs. 30 /kg. of powder  
 $50 * 30 * 300 = \text{Rs. } 4.5 \text{ lakh.}$

**Total revenue generation = Rs. 20 lakh / year approx.**

# **Benefits Of Biomethanation Plant**

- **Environmental Friendly Disposal of Hazardous waste.**
- **Resource recovery of Chrome as Basic Chromium Sulphate for Tanning Process.**
- **Converting hazardous, non-degradable waste to non-hazardous recyclable waste gainfully.**
- **Energy recovery from renewable non-conventional sources by Biomethanation**
- **Solving of Hazardous waste disposal problem saves soil/ground water pollution**
- **Environmental Care Clean Technology Self Sustainable Plant while solving Solid Waste Disposal Problem.**

A photograph of a path lined with young trees, leading into a dense forest. The path is covered in grass and small plants. The trees are green and have thin trunks. In the background, a person is visible on a tall structure, possibly a tower or a crane. The sky is bright and clear. The text "A WAY FORWARD" is overlaid in white, bold, capital letters across the middle of the image.

**A WAY FORWARD**

# Energy Conservation : Reduction/Generation

- Increased production of Bio-gas (Biomethanation Plant)
- Used CO<sub>2</sub> for Neutralisation of Hydrolysed Shaving Dust
- Bio-methanation Plant without Chemicals in Progress
- Hot Water Generation (Value addition to RO Water) trial successfully Conducted
- Bio-purification of Biogas (~ 15% CO<sub>2</sub>) Pilot Plant Studies Completed
- Increased Chromium Recycling

# *Recycling of Process Water*

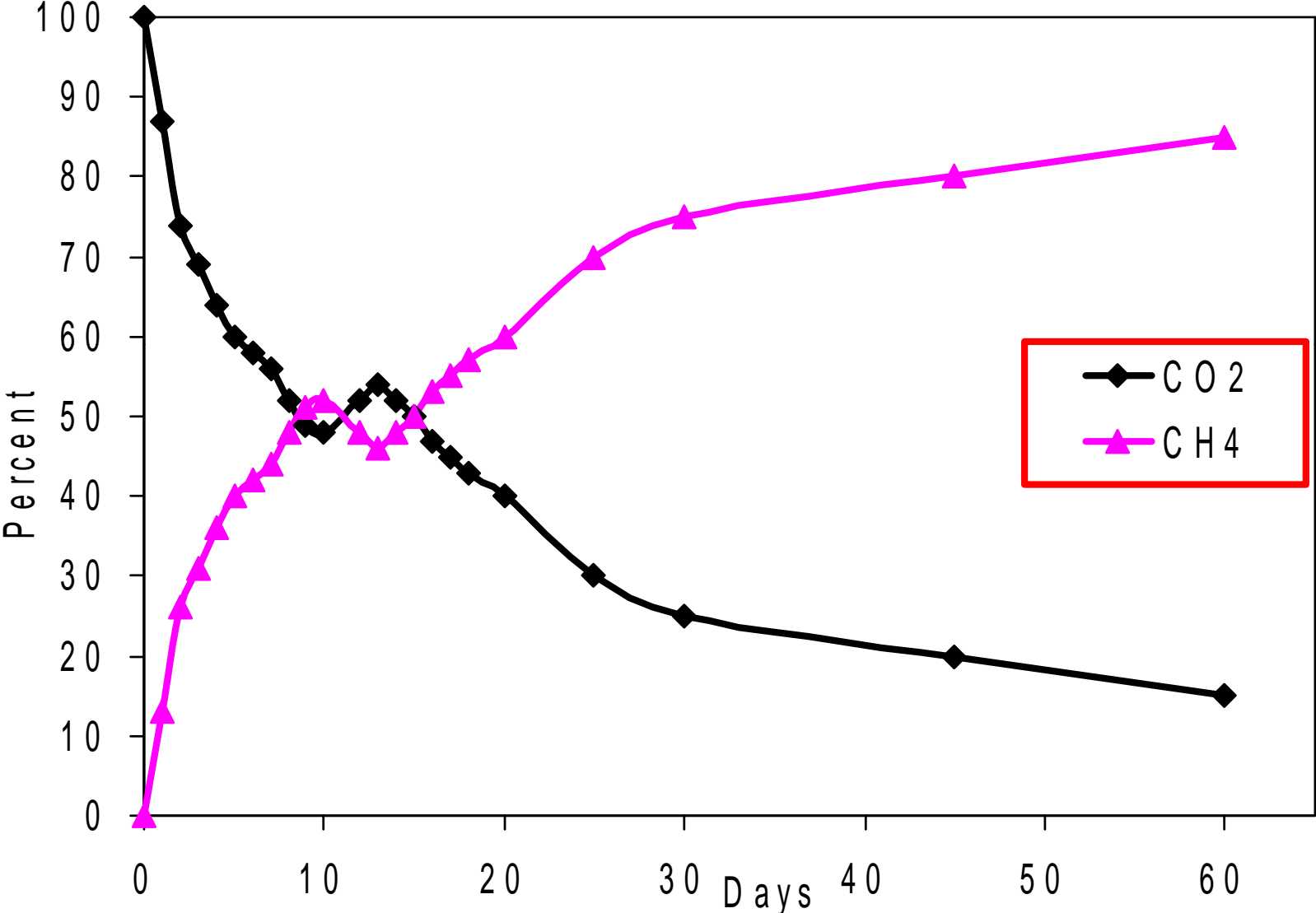
## **Recycling of Re-Chrome Liquor**

### **Approaches :**

- **Equilibrium Approach : Recharging in Re-chroming Float**
- **Value Addition Approach : Use in BM Plant**

	<b>Shaving Dust</b>	<b>Chrome Cake</b>	<b>Ratio</b>
<b>Present Process</b>	<b>500 gm</b>	<b>72.4 gm</b>	<b>100 %</b>
<b>Proposed Process</b>	<b>500 gm</b>	<b>106.5 gm</b>	<b>145 %</b>
<b>Present Process</b>	<b>2 tons</b>	<b>288 kg</b>	<b>100 %</b>
<b>Proposed Process</b>	<b>2 tons</b>	<b>416 kg</b>	<b>145 %</b>

# Bio-purification of Biogas – Pilot Plant (1 Tons)



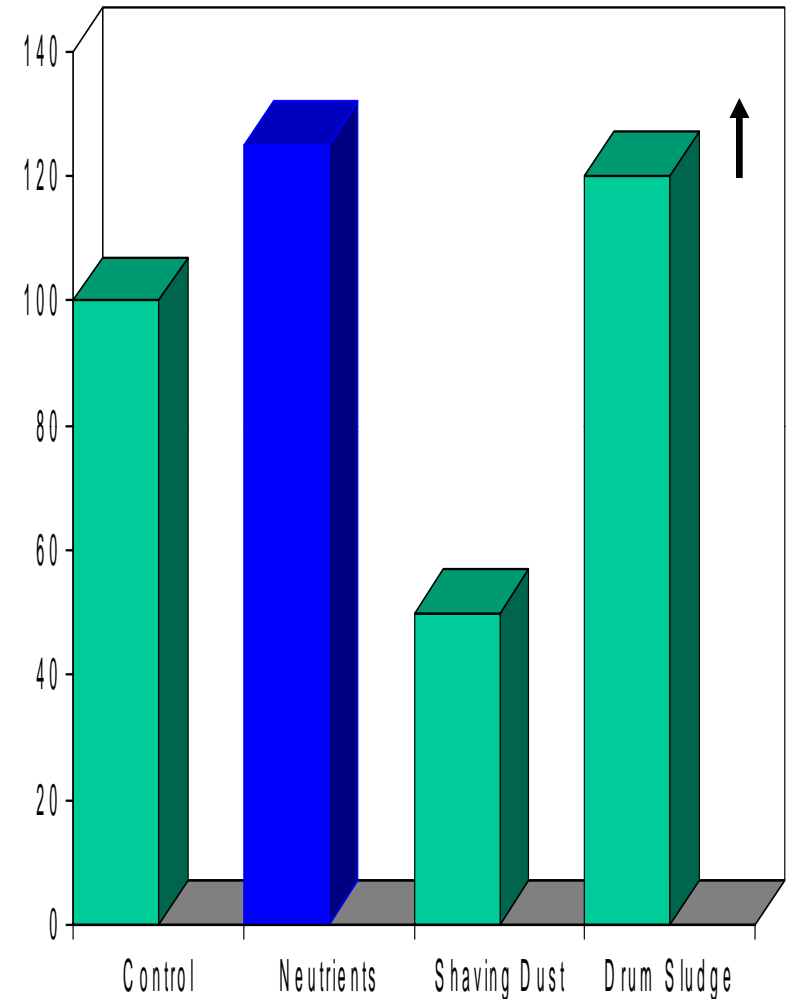


# Waste Management : Energy Conservation

Process	Remarks
Control Gelatin Digester	Control
Nutrients Approach	High Efficiency
Shaving Dust Digester (Complete Bio-Chemical Treatment)	No Chemical Treatment
Treated Drum Sludge Digester (Preliminary Data)	Reverse Degradation

	Description	Gas/Day , lit	Ratio
1	Control	2200	-
2	Expt 1 : Nutrients Route	2800	1:1.3
3	Expt 3 : Shaving Dust (Bio/Nutrients Route)	1000	1:0.5
4	Expt 4 : Treated Drum Sludge	2500	1:1.2

## Bio-Gas Production



Pilot Plant Digester (~ 2 ton capacity) for increased efficiency are running for ~ 6 months

# Energy Saving Continuous Digester

Installed on = 1/10/2004

Volume = 2.78 Cu Met

Length = 2.37 Met

Radius = 0.4 Met

Gas = 900-1200 liters/day

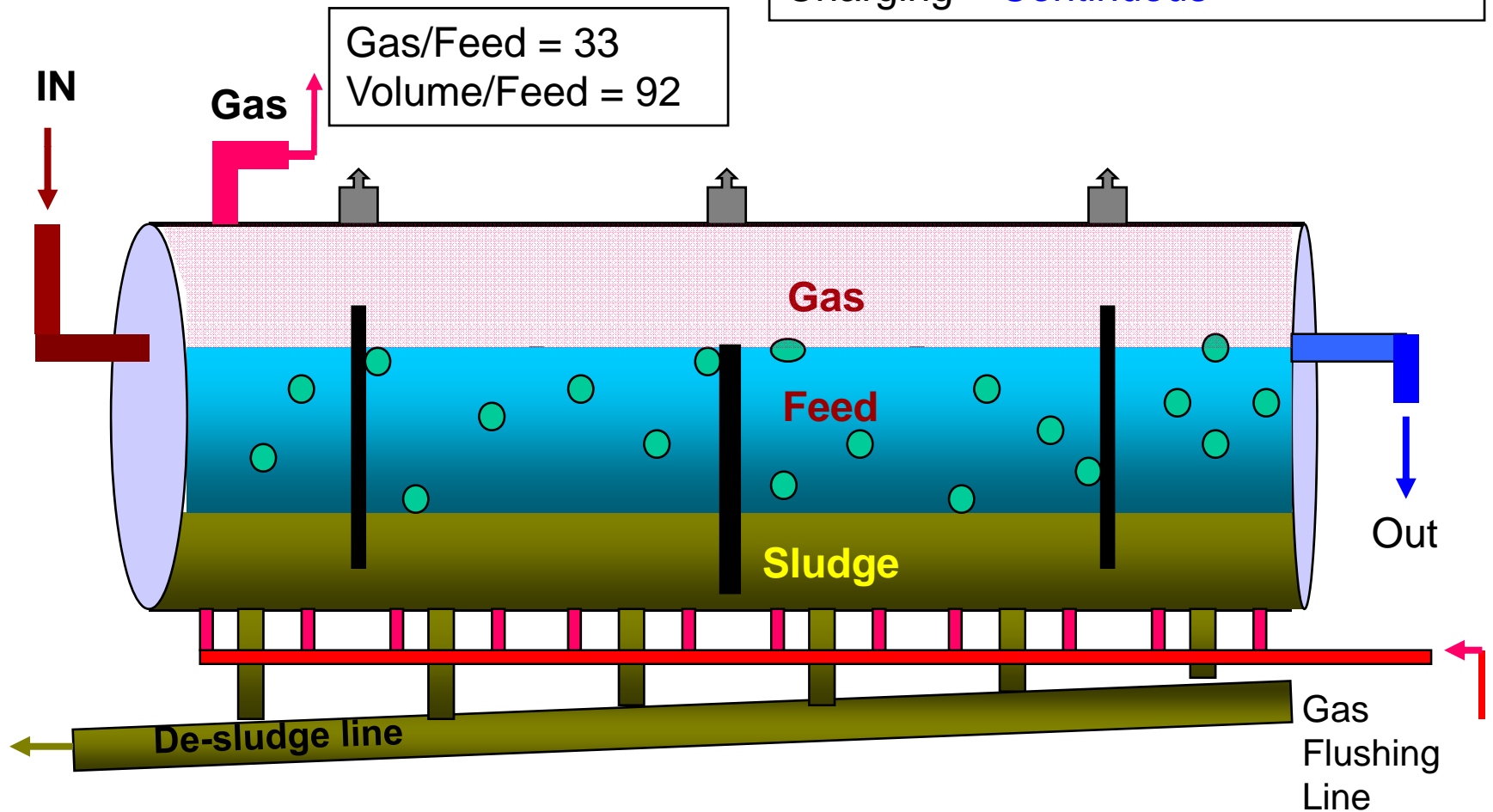
Feed = *Treated Drum Sludge*

Feed Rate = 20-40 liters/day

Sludge = Shaving Dust

Charging = **Continuous**

Gas/Feed = 33  
Volume/Feed = 92



# Three Stage Digester (D)

Installed = 1<sup>st</sup> Sept 2004

Volume = 1.06 Cubic Meter

Height = 2.37 Met

Radius = 0.377 Met

Gas = 500-700 liters/day

Feed = Normal

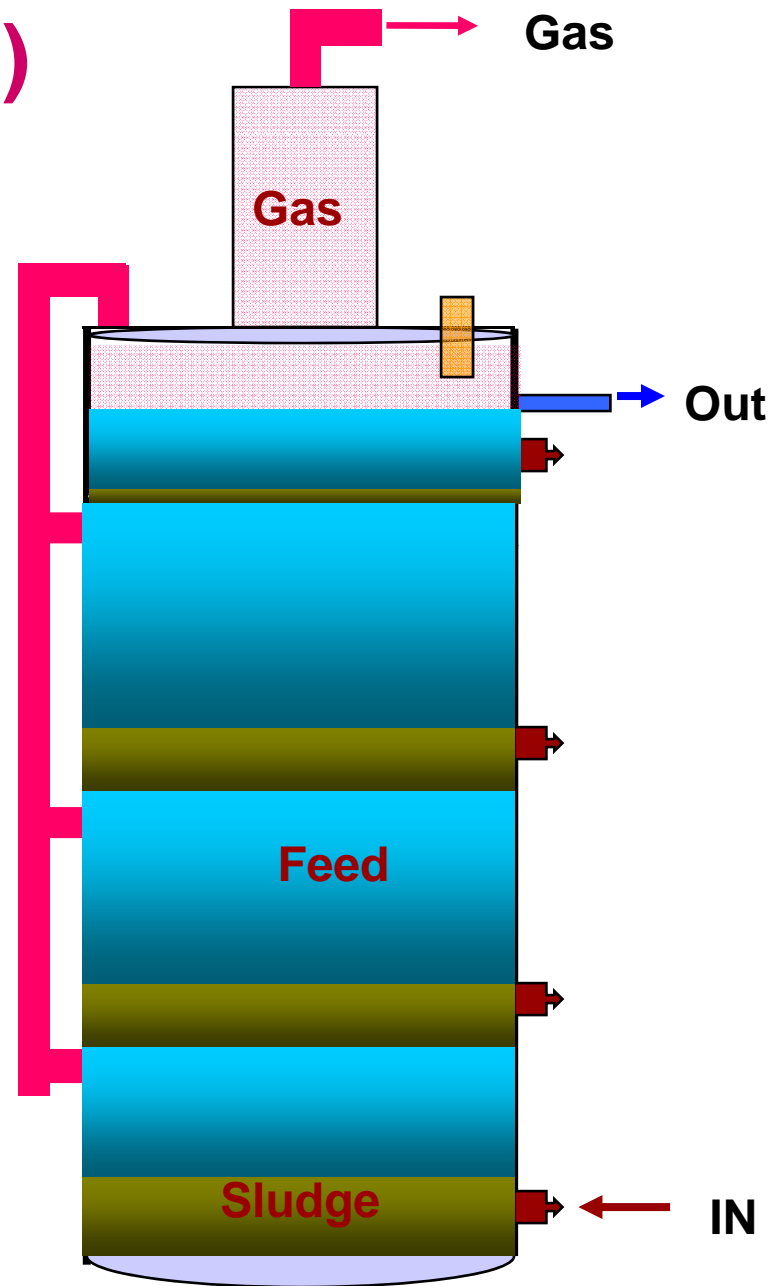
Feed Rate = 20-40 liters/day

Sludge = Shaving Dust/Cow Dung-Once

Charging = Contineous

Gas/Feed = 20

Volume/Feed = 35

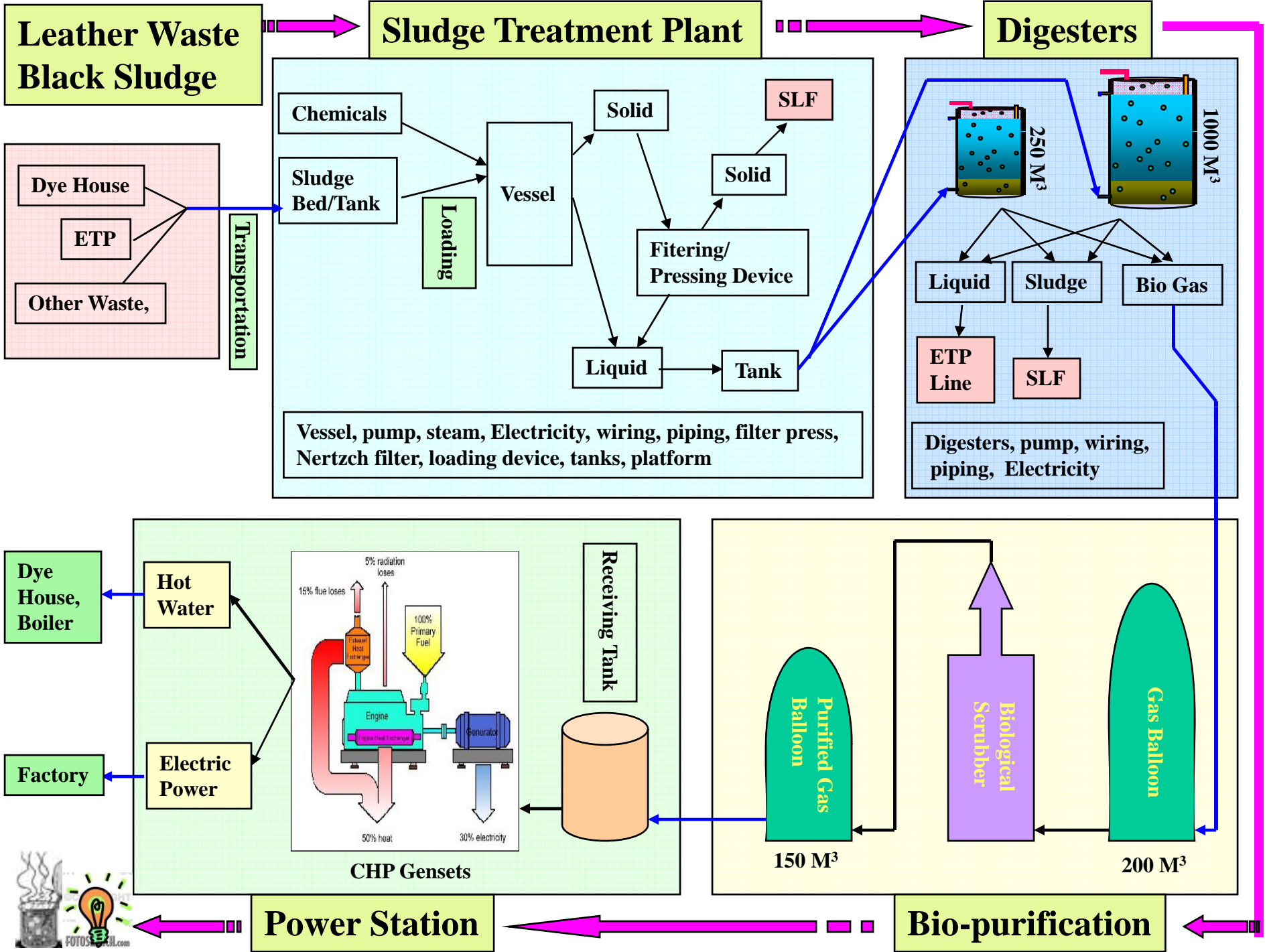


## **GAINFUL UTILISATION OF SLUDGE / WASTE**

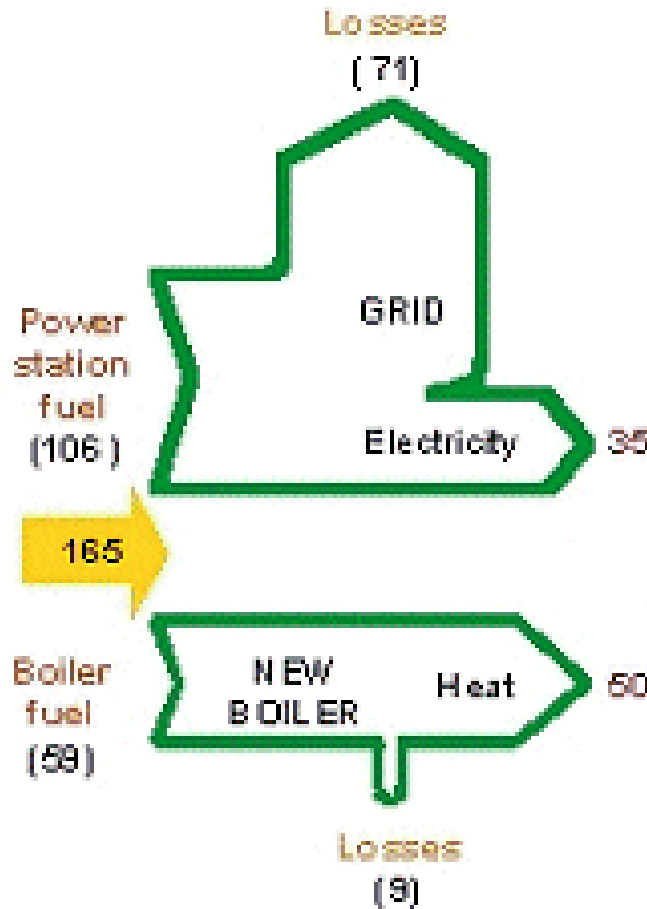
- **No Technology was Available for Recycling of Hazardous Buffing Dust / Drum Sludge / Trimming.**

### **Solution:**

- **Developed In-house Process for Degradation**
- **Generation of Power is Progress**

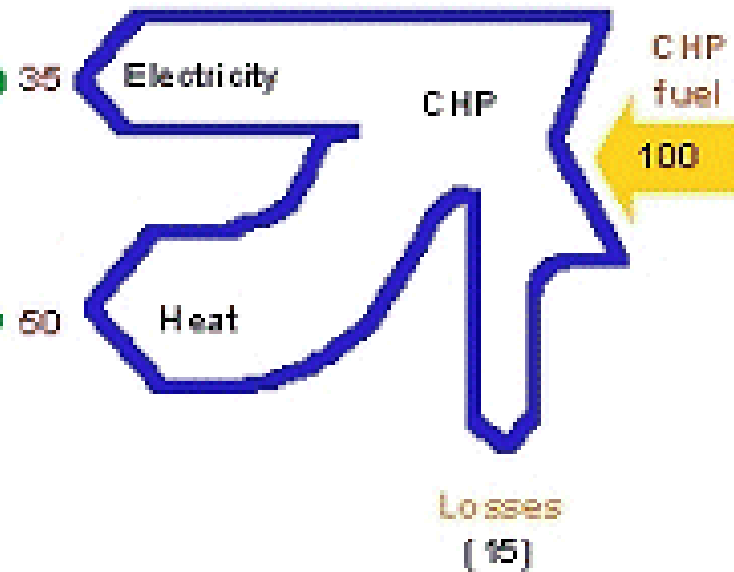


## Conventional Generation

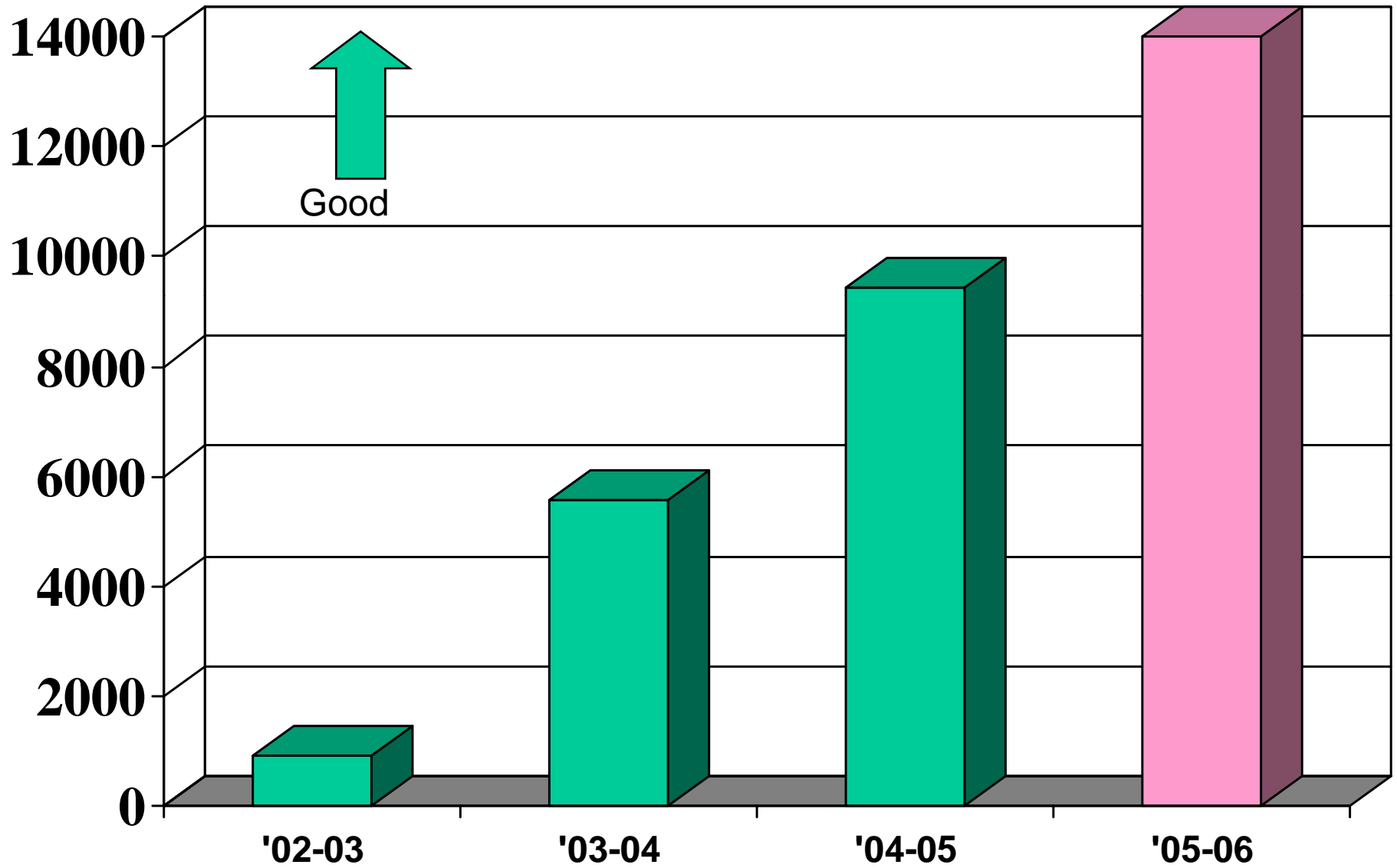


## Combined Heat and Power

(1 MW natural gas reciprocating engine)



# Water Recycling : M3 per year





**White Crust Pieces Dyed with Bacterial Colour**





Thank You