

Guwahati Refinery
Indian Oil Corporation Limited
Guwahati, Assam

1. UNIT PROFILE:

Indian Oil Corporation Ltd. is one of the Nine gems among Indian Public Sector Units and only Indian Company to have secured a place in the Hallowed rolls of the “Fortune 500’s corporations of the world”. Ever since its inception, India Oil, besides providing fuel to the country’s progress, has also maintained pace with the most state-of-the-art developments worldwide.

Indian Oil has seven operating refineries at Guwahati, Barauni, Haldia, Mathura, Koyali, Digboi and Panipat. Yet another refinery is being set up on the East Coast at Paradip.

Guwahati Refinery, the **Gangotri** of Indian Oil Refineries, is the first refinery commissioned in the 60’s. The refinery is designed to process crude tapped from the nearby wells in Assam. **Pandit Jawahar Lal Nehru** dedicated the refinery to the nation on 1st of January 1962.

Guwahati Refinery is amongst those Indian Refineries who have been rewarded with **ISO-9001** certification of International Quality Standards as well as **ISO-14001**, for Environment Management System and Occupational Health and Safety Management System (**OSHMS**) which is also a stringent International Standard which very few Indian Companies have achieved till date. Guwahati Refinery has been certified with International Safety Rating System (**ISRS**) level-6 certification by M/s DNV. These achievements show the deep commitment of Guwahati Refinery to Quality, Safety and Environmental Management System.

Guwahati Refinery since its inception has been in the forefront of productivity, quality, safety, environment protection, occupational health and a strong commitment to customer satisfaction.

Guwahati Refinery came into operation in the year 1962 with an installed capacity to process 0.75 MTPA of Assam Crude. After debottlenecking the operating process units, the total refining capacity was subsequently enhanced in first stage to 0.85 MMTPA and now to 1.0 MMTPA. The Refinery has an elaborate pollution control system to ensure that water generated are adequately treated prior to discharge into the river Brahmaputra. More than 50 % of the treated effluent water is now reused in the refinery.

Wide Range of Products: With capacity of 1.0 MMTPA, Guwahati Refinery processes crude oil received from the upper Assam oil fields and caters to the requirement of the petroleum products of north-eastern region.

Its product slate includes LPG, Motor Spirit (MS), Kerosene, High Speed Diesel (HSD), Light Diesel Oil (LDO), Straight Run Naphtha (SRN), Raw Petroleum Coke (RPC), and a special cut naphtha (RN) which is used as a feed stock for CRU of Digboi Refinery of

Assam Oil Division. Keeping pace with changes in Industrial Environment, Guwahati Refinery is diversifying to produce speciality products like Premium MS & Needle coke etc. for gearing up the cleaner fuel requirements of the country in coming years.

Guwahati Refinery is the first refinery in India to produce Needle Coke.

2. ENERGY CONSERVATION COMMITMENT, POLICY AND SET-UP:

Energy conservation being a key element for achieving performance excellence, the Refinery has been going full stream ahead by modernising plant and equipment. Schemes like heat exchanger train optimisation, installation & commissioning of high efficiency boiler and DM Water plant have contributed significantly towards energy conservation. The yield and energy optimisation projects of Crude Distillation and Delayed Coker Units has been implemented at an approved cost of Rs. 50 crores. Improvement in operational practices, continuous energy audits and periodic oil conservation awareness drives have paid rich dividends and curtailed energy consumption.

Towards Modernisation: In its long march of three and a half decades, the Refinery has progressively added new facilities for modernisation and to meet the multifarious challenges such as technological changes, increased product demand, energy conservation and stringent safety and pollution control standards.

LPG Recovery Unit (LRU) was added to the Delayed Coker Unit (DCU) in 1994. Additional LPG production of about 10 TMT/Yr. from this unit has provided great respite to the LPG consumers of this region. The Refinery took a big leap towards plant automation by commissioning Distributed Digital Control System (DDCS) in all its process units in October, '96. Off late Advance process control system has been put in place for Crude Distillation and Delayed Coking Unit.

The new projects that have been commissioned are as follow:

1. N2 plant in Nov'01 and ISOSIVE in Jan'02 for production of MS components.
2. H2 unit in Oct'02 and HDT in Nov'02 to improve quality of diesel in line with BS-II specification.
3. Indmax in June'03 for maximization of LPG & MS from bottom of barrels.

Apart from upgrading Refinery product pattern, ATU and SRU were commissioned during July'02 and Dec'02 respectively as a measure towards environment protection.

3. ENERGY CONSERVATION ACHIEVEMENT:

The Refinery has won laurels for its efforts in energy conservation. The prestigious **Jawaharlal Nehru Centenary Award for the best improvement in energy conservation amongst all refineries in India** was won for the year 1993-94.

In addition, Guwahati Refinery was accorded **MOP&NG Award of Best Performance in Steam Leak for the year 1997** and **OCF award (first position) in 2003** for achieving minimum steam loss as observed during joint Oil conservation survey carried out by CHT team.

Improvement in Productivity Achieved by Implementing Various Schemes for Energy Conservation:

SL NO	ENCON PROJECT	DATE OF COMM-ISSIONING	PROJECT COST (RS. LAKHS)	SAVINGS (SRFT/YR)
1.	Replacement of heater heat exchanger train & modernisation of CDU.	Dec'86	687	5000
2.	Installation of high efficiency TG-III.	Mar'86	403	2000
3.	Flare Management scheme in DCU.	Aug'88	5.2	660
4.	Crude Desalter in CDU.	June'91	92	200
5.	Motor driven P-2A pump in DCU.	Dec'91	48	200
6.	Commissioning of LP steam extraction ex TG-3.	Jan'92	-	800
7.	Installation of DM water plant.	Mar'93	224	1200
8.	Blowdown recovery in DCU.	Mar'93	38	1200
9.	Heat recovery from flue gases in CDU.	Jun'93	0.6	250
10.	Commissioning of new floating roof Tanks for crude oil service.	Nov'94	260	600
11.	Coker LPG project (flare loss reduction).	April'94	1554	450
12.	Distributed Digital Control System in process units.	Sept'96	1680	2913
13.	Additional 8 MW TG set.	Dec'97	2400	6048

14.	<i>Back Pressure Turbine in cooling water pump.</i>	<i>May'98</i>	<i>46</i>	<i>456</i>
15.	<i>Auto Tank gauging System under offsite automation.</i>	<i>May'99</i>	<i>855</i>	<i>650</i>
16.	<i>Yield and Energy Optimisation in DCU</i>	<i>Sept'2000</i>	<i>3215</i>	<i>4531</i>
17.	<i>Yield and Energy optimization in CDU</i>	<i>Sept'2000</i>	<i>1735</i>	<i>1700</i>
18.	<i>Online insulation of one RCO tank</i>	<i>Nov'2002</i>	<i>11.5</i>	<i>125</i>
19.	<i>Commissioning of new 2x50 T Boiler.</i>	<i>Mar'2004 May'2004</i>	<i>2200</i>	<i>2000</i>

4. ENERGY CONSERVATION PLANS AND TARGETS:

Energy Conservation Measures (Planned)	Anticipated savings		App. Investment (Rs. Lakhs)	Project commencement & completion year.
	in Energy Value (SRFT/YR)	In Rs. Lakhs		
Co-jetix crude oil auto sampler.	680	64.57	108	2004-05
Blow down recovery System.	500	47.48	299	2004-05
Pressurised cooling Tower for old units.	150	14.24	200	2004-05
Installation of 12 MW STG.	1500	142.44	4000	2004-05
Steam Condensate Recovery	1900	101.23	330	2005-06

1. ENVIRONMENT & SAFETY:

The Refinery's concern for Environmental Protection is demonstrated by full compliance of MINAS (Minimal National Standard) specifications with respect to quality and quantity of its treated effluents. A modern Effluent Treatment Plant (ETP), full fledged Pollution Control Laboratory and the strategy for maximising reuse of treated effluent in the refinery ensure adherence to such exacting standards. The balanced treated effluent is finally discharged into river Brahmaputra, downstream of Guwahati City at Saraighat through a 26 KM long underground pipeline. The emissions from the Refinery as well as ambient air quality in the Refinery fully comply with the notified standards.

Extensive tree plantations and development of Ecological Park, Environment Park and Sanjeevini Udyan in and around the Refinery spearhead Refinery's efforts to the cause of

ecological balance. Periodic campaigns are carried out in the neighborhood to bring home the importance of a clean environment.

In addition to the routine monitoring of environmental parameters, regulatory bodies also monitor the environmental performance periodically. Besides, a comprehensive EIS study was carried out for the new projects. The study revealed that there will not be adverse impact on the environment due to the projects.

SAFETY:

Safety is accorded the highest priority at all times. Refinery has a well equipped Modern fire station with elaborate fire protection facilities covering the entire Refinery. Gas Detection System and automatic water sprinkler are also provided in critical areas like LPG facilities. Extensive Awareness Programmes, Safety Audits, Mock Drills on Emergency Preparedness Plans are carried out to ensure safety and alertness.

Refinery has an excellent record of safety and has won many National and International Awards.

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|---|-------------------------------------|
| ➤ British Safety Council Award | Two Times |
| ➤ National Safety Award | Winner- 9 Times
Runner- 18 Times |
| ➤ Oil Industry Safety Award | Once |
| ➤ Oagle Trophy for Safety | 7 Times |
| ➤ Shreshtha Suraksha Award from National Safety Council | Once |

WRITE UP OF THE UNIT DEPICTING EQUIPMENT/ LOCATIONS WHERE ENERGY EFFICIENCY ACTIVITIES HAVE BEEN UNDERTAKEN DURING

1) 2 x 50 Tonnes Package Boilers:

Subject boilers of M/s Thermax have been procured at the cost of Rs. 22.0 crores. The efficiency of the boilers has been achieved at 93% based on performance test run. These boilers are pressurized boilers and having the facilities to run on fuel oil/ fuel gas/ naphtha. The commissioning of these two boilers has contributed to a saving of 2000 SRFT/Year. Photographs of the boilers are enclosed as Annexure-I.

2) Physical Acoustic Leak Detector:

Guwahati Refinery has procured Physical Acoustic Leak Detector as a part of ENCON scheme at the cost of Rs. 20 lakhs. Equipment is being extensively used for detection of leakage of fuel gas from safety valves, control valves and bypass valves connected to the flare in all the units. The use of Physical Acoustic Leak Detector has saved 200 SRFT/Year. Photograph of the equipment is enclosed as Annexure-II.

3) Portable Oxygen Analyser:

Guwahati Refinery has procured a Portable Oxygen Analyser at the cost of Rs. 1 lakh for regular checking of excess air and efficiency in process unit furnaces and also in boilers. Extensive use of Portable Oxygen Analyser has added to saving of 100 SRFT/Year. Photograph of the equipment is enclosed as Annexure-III.

4) Lakos Filter:

Lakos Filter has been installed at the cost of Rs. 52 lakhs in Delayed Coking Unit for separation of coke fines from coke cutting water and re-circulation of water for coke cutting purpose. This leads to saving of 200 SRFT/Year. Photograph of the equipment is enclosed as Annexure-IV.



Photograph of '2 x 50 Tonnes Package Boilers'



Photograph of 'Physical Acoustic Leak Detector'



Photograph of 'Portable Oxygen Analyser'



Photograph of 'Lakos Filter'

ENERGY POLICY

To be a World Class performer in energy management

By

- Adopting energy efficient and environment friendly technologies.
- Benchmarking our performance with the best in the world and endeavoring to be ahead.
- Promoting use of renewable sources of energy.
- Fostering a culture of participation and innovation amongst stake holders for continual improvement in energy conservation.
- Propagating the message of avoiding wastage of energy to the community.

GUWAHATI REFINERY
BLOCK FLOW DIAGRAM

