Annexure-I

Annexure to Directors' Report on Energy Conservation, Technology Absorption and Foreign Exchange Earnings as per Companies (Disclosure of Particulars in the Report of Board of Directors) Rules 1988.

A) CONSERVATION OF ENERGY

a) Energy conservation measures taken:

As a part of our continued efforts towards energy conservation, a number of Energy Conservation projects have been implemented during 2010-11 in refineries resulting in savings of around 93,600 Standard Refinery Fuel Tonne (SRFT). Some of the major investments in this regard are as under:

Sl. No	PARTICULARS	COST (₹ in Lakh)	FUEL SAVING (Standard Fuel equivalent) MT/year
1.	Conversion of TG-I from condensing type to back-pressure type at Barauni Refinery	166.00	7900
2.	Installation of flare gas recovery system at Gujarat Refinery	900.00	7650
3.	Step-less control in make-up gas compressor in HCU at Gujarat Refinery	324.00	2000
4.	Installation of GT-III with HRSG at Haldia Refinery	17329.55	5000
5.	VBU economizer coil installation at Haldia Refinery	75.87	2000
6.	Use of NG as HGU feed at Mathura Refinery	640.38	2600
7.	Hot feed maximization ex AVU-I in DHDS / DHDT at Panipat Refinery	25.00	2240
8.	Flare gas recovery in PR-PX & PREP at Panipat Refinery	2865.00	6820

b) Additional investment and proposals, if any, being implemented for Energy Conservation:

- Modification of NSF & NSU process flows and column operation for heat optimization at Guwahati Refinery
- Recovery of H_2 from HDT net gas at Guwahati Refinery
- Heat recovery from HRSG-2 exhaust temperature at Barauni Refinery
- Heat recovery from wide cut and short residue run-down streams in AVU-I at Barauni Refinery
- Routing of FPU-II and VDU hot well off-gases to furnace at Gujarat Refinery
- Magnetic resonators in GT-4/5, LAB & HGU at Gujarat Refinery
- LP steam generation from FCC LCO stream at Gujarat Refinery
- Installation of DM water preheater in HRSG-I at Haldia Refinery
- Installation of step-less control in HCU make-up gas compressor at Haldia Refinery
- Waste heat recovery from KHDS furnace at Haldia Refinery
- Additional heat recovery module in HRSG-II at Haldia Refinery
- Optimization of RSU throughput (stoppage of steam to reboiler) at Mathura Refinery
- Installation of step-less control in DHDT MUG compressor at Mathura Refinery
- Injection of heavy naphtha feed in second column of PXNSU (stoppage of steam to reboiler) at Mathura Refinery
- Installation of magnetic resonators in GTs and furnaces at Digboi Refinery
- Installation of VAM in Fuel Sector, CPP control room to replace centralized AC at Digboi Refinery
- LP steam generation through steam drive instead of PRDS at Digboi Refinery
- Installation of step-less control for DHDT compressor at Panipat Refinery
- Heat recovery from C-7 overhead and bottom product in NSU-I for crude preheat improvement at Panipat Refinery
- NSU-II feed and reboiler heating with DHDT run-down at Panipat Refinery
- Preheat of DHDT cold feed with HCU-II kero pump-around at Panipat Refinery
- Improvement of feed preheat in PREP HCU, utilization of diesel pump-around heat with cold VGO at Panipat Refinery
- Generation of SML steam from 2 LP steam generators in PREP HCU and use in MSQ to MLP let-down from MP steam
- Variable speed turbine drive in Boiler 1 & 4 FD fans at BGR
- Additional rows in convection section of DCU-I & II furnaces at BGR

c) Impact of the measures at (a) and (b) above on reduction of energy consumption and consequent impact on the cost of production of goods:

The measures taken under item (a) resulted in savings of 93,600 SRFT in 2010-11. The impact of additional savings with major investments under item (b) in 2011-12 would be 62,500 SRFT.

d) Total energy consumption and energy consumption per unit of production:

Necessary information is provided in Form 'A' annexed hereto.

B) TECHNOLOGY ABSORPTION

Details of efforts made in technology absorption are provided in Form 'B' annexed hereto.

C) FOREIGN EXCHANGE EARNING AND OUTGO

(a) Activities relating to exports, initiatives taken to increase exports, development of new export market for products and services; and export plans:

IndianOil continues to export petroleum and petrochemical products during the year to various countries. While the export of petroleum products has increased by 23%, the export of lubricants increased by 15% and that of base oil by 63% as compared to the previous year. The export market for Linear Alkyl Benzene has expanded to 20 countries in 6 continents.

(b) Total foreign exchange used and earned.

(₹ in crore)

Foreign Exchange earnings	16,967.55
Foreign Exchange used	1,71,424.79

FORM-A

Form for Disclosure of Particulars with respect to Conservation of Energy

		2010-11	2009-10
A.	**POWER AND FUEL CONSUMPTION**		
1.	**ELECTRICITY:**		
	a) Purchased		
	Unit ('000 KWH)	**42126**	45255
	Rate/Unit	**6.87**	6.37
	Amount (₹/Lakh)	**2892**	2882
	b) Own Generation		
	i) Through Dual Fuel (HSD/Natural Gas Generators)		
	Unit ('000 KWH)	**3230991**	2429914
	KWH per MT of Std Fuel	**6818**	6065
	Cost/Unit (₹/KWH)	**3.92**	3.35
	ii) Through Steam Turbine/Generators		
	Unit ('000 KWH)	**1047340**	778248
	KWH per MT of Std Fuel	**3000**	2835
	Cost/Unit (₹/KWH)	**7.44**	6.40
	c) Electricity Consumed (a+b) ('000 KWH)	**4320457**	3253417
2.	**COAL**	**-**	-
3.	**LIQUID FUEL (FO / NAPHTHA/ DIESEL)**		
	Qty (MTs)	**1913675**	1682125
	Amount (₹/Lakh)	**479499**	351866
	Average Rate (₹/MT)	**25056**	20918
4.	**OTHERS / INTERNAL FUEL**		
	a) INTERNAL FUEL		
	i) Fuel Gas		
	Unit (MTs)	**1504006**	1403068
	Amount (₹/Lakh)	**346805**	278849
	Average Rate (₹/MT)	**23059**	19874
	ii) Coke		
	Unit (MTs)	**343758**	334247
	Amount (₹/Lakh)	**53213**	42995
	Average Rate (₹/MT)	**15480**	12863
	b) PURCHASED FUEL		
	Natural Gas		
	Unit (MTs)	**802066**	460671
	Amount (₹/Lakh)	**132290**	61816
	Average Rate (₹/MT)	**16494**	13419
B	**1. CONSUMPTION PER MT OF PRODUCTION: PETROLEUM**		
	(i) Actual Production ('000 MTs)	**47238**	45877
	(ii) Consumption per MT of Product		
	- Electricity (KWH/MT)	**76.046**	65.341
	- Liquid Fuel (MT/MT)	**0.033**	0.032
	- Fuel Gas/LDO/Coke (MT/MT)	**0.037**	0.036
	- Natural Gas (MT/MT)	**0.017**	0.010
2.	**CONSUMPTION PER MT OF PRODUCTION : LAB**		
	(i) Actual Production ('000MTs)	**126.315**	123.692
	(ii) Consumption per MT of Product		
	- Electricity (KWH/MT)	**609.395**	637.446
	- Liquid Fuel (MT/MT)	**0.549**	0.421
	- Fuel Gas/LDO/Coke(MT/MT)	**0.159**	0.151
	- Natural Gas (MT/MT)	**0.000**	0.000
3.	**CONSUMPTION PER MT OF PRODUCTION : PTA**		
	(i) Actual Production ('000MTs)	**431.000**	530.604
	(ii) Consumption per MT of Product		
	- Electricity (KWH/MT)	**465.905**	410.527
	- Liquid Fuel (MT/MT)	**0.240**	0.270
	- Fuel Gas/LDO/Coke(MT/MT)	**0.207**	0.149
	- Natural Gas (MT/MT)	**0.000**	0.000
4.	**CONSUMPTION PER MT OF PRODUCTION : PNCP**		
	(i) Actual Production ('000MTs)	**497.000**	0.000
	(ii) Consumption per MT of Product		
	- Electricity (KWH/MT)	**1382.335**	0.000
	Liquid Fuel (MT/MT)	**0.339**	0.000
	- Fuel Gas/LDO/Coke(MT/MT)	**0.000**	0.000
	- Natural Gas (MT/MT)	**0.019**	0.000

FORM-B

Form for Disclosure of Particulars with respect to Technology Absorption, Research & Development

1. Specific areas in which R&D was carried out by the Company

(a) Development of Refinery process technologies

(b) Catalysts development for refining processes

(c) Refinery Process Modeling

(d) Trouble shooting ,revamp and optimization in refineries

(e) Material failure Analysis, Corrosion and remaining life assessment

(f) Development of Intelligent & Caliper pigs for transportation of crude and petroleum products through pipelines

(g) Product development – Lubricant, Greases and Specialties

(h) Boundary Lubrication and Metal Working Tribology

(i) Specialty bituminous products

(j) Development of Fuel additives

(k) Fuel and Emission Studies

(l) Alternative fuels – Hydrogen, Hydrogen-CNG, bio-diesel, 2nd & 3rd Generation bio-fuels and Solar Energy

(m) Biotechnology

(n) Nanotechnology

(o) Petrochemicals & Polymers

2. Benefits derived as a result of above R&D :

- A cost effective process based on hydroprocessing route developed for selective mercaptan removal for ATF production with negligible hydrogen consumption.
- Dual mode deasphalting Technology developed to enhance refinery distillate yield using LPG as a solvent.
- Identified the blend compositions in pre and post Delayed Coker scenario for meeting the specifications of Bunker fuel (380 Cst) with minimum quality give away in density at Gujarat Refinery.
- IndianOil along with EIL licensed 1.2 MMTPA DHDT unit for Bongaigaon Refinery.
- R&D developed DHDS catalyst, INDICAT-DH-IV successfully completed a run of 451 days in diesel mode and 52 days in VGO mode in the Plant-13 of CPCL helping CPCL in the process to make BS-III/BS-IV diesel.
- New catalyst and additives like in-house Indmax catalyst formulation, DHDS catalyst system for reducing T-95 point of diesel, i-Max Premium ZSM-5 additive for GR Indmax unit, Bottoms upgrading additive for Gujarat FCC unit, value added E-Cat and Alumina support for hydroprocessing catalysts developed .
- A cost effective ZSM-5 zeolite formulation adopting a template free synthesis approach developed using commercial raw materials.
- 126 product formulations developed during the financial year 2010-11 out of which more than 85% commercialized.46 OEM and/or customer approvals and defence certifications.
- Ready with new generation Gasoline engine oil meeting API SN/ GF5 credentials – the day international specification came into vogue.
- *SERVO* Syngear 75W-90-LL, first Indian synthetic gear oil approved by M/S Voith, Germany for gear box applications of urban metro rail racks.
- RDSO approved *SERVO* RR 606MGPLUS[II] based on Haldia Group II base oils for ALCO Locomotives and clearance for field trials in GM Locomotives.
- Facilitated first overseas business contract of indigenously developed marine shipboard oils with Mauritius Shipping Corporation.
- Industrial Oils developed by R&D received prestigious international approvals.
- Tyre mould grease - *SERVO* Press approved by major Indian Tyre manufacturers.
- *SERVO* Agro Spray Oil, approved for Organic farming by IMO, Switzerland.
- Development of *SERVO* MLO Super for controlling mosquito larvae breeding approved by National Centre for Disease Control, Ministry of Health & Welfare, Government of India.
- First high speed crude oil pipeline trial run of 24" CPIG done over 138km of 24" dia Salaya-Mathura Pipeline.
- First commercial version of 12" IPIG and 12" CPIG developed through M/s ECIL, Hyderabad and successfully tried out in 206 km long Patna-Mughalsarai section of Barauni- Kanpur pipeline.
- A new chemical marker to check kerosene adulteration developed, which is comparable to the available state-of-the-art markers.
- Low pour Diesel for low temperature ambient operations developed for M/s Starbag Afcons, Germany's Rohtang Tunnel Project.
- Use of Hydrogen (up to 30%) as fuel blended with Compressed Natural Gas in Internal Combustion Engine: Phase-I of the project completed along with Society of Indian Automobile Manufacturers (SIAM) and Ministry of New and Renewable Energy (MNRE) by conducting performance and emissions tests on seven vehicles using 10-25% HCNG blends.

- A multi-feed fluidized bed gasification pilot plant (capacity 1-2 kg/hr) installed and commissioned. A micro reactor unit (slurry) also installed and commissioned for GTL and preliminary runs carried out successfully for conversion of syngas to hydrocarbon liquids.
- A demonstration unit based on in-house developed single step compact steam methane reforming process for HCNG production procured.
- After successfully helping Paradip Port Trust last year, IOC's Bioremediation technology- Oilivorous S - extended to tackling of oil spills at marine locations caused by collision of ships off Mumbai Coast.
- A state-of-the-art Petrochemical and Polymer Research Facility successfully commissioned to support IOCL's petrochemical operations and business.
- Benchmarking studies completed for PP-injection moulding grades, PP Raffia and BOPP grades.

3. Future Plans

- Development of long life, energy efficient cost effective lubricants for railways, marine applications and other automotive and industrial sectors.
- Frontier areas of nano technology.
- Development of fuel saving and environment friendly additives for fuels.
- Development of bio-degradable and FDA compatible lubricants.
- Production of 2nd/3rd Generation fuels.
- Setting up of state of the art automotive research laboratory with test benches.
- Development of bio-jet fuel.
- Technologies for reduction of GHG emissions.
- Development of World Class research facilities for corrosion and failure analysis in refineries.
- Co-processing of non-edible oils with refinery streams.
- Gasification of pet coke / coal / residue / biomass.
- New polymer grade development.
- Setting up demonstration units for catalysts production.
- Development of novel composites and engineering polymers.
- Fuel Cells testing and research.
- Solar Energy applications and product development.

4. Expenditure on R&D

(₹ in crore)

a) Capital	:	77.06
b) Revenue	:	131.54
c) Total	:	208.60

TECHNOLOGY ABSORPTION, ADAPTATION AND INNOVATION

1. EFFORTS MADE TOWARDS TECHNOLOGY ABSORPTION ADAPTATION AND INNOVATION

With a view to further improve the product pattern and product quality as well as to meet the environmental emission norms, IndianOil has adopted modern technologies. Major steps taken in this regard are given below:

A. Imported Technology

i. Hydrocracker Technology

A new Hydrocracking Unit with the technologies from M/s UOP, USA has been commissioned at Panipat under expansion of refinery from 6.0 to 12.0 MMTPA.

ii. Once through Hydrocracking Technology

Once Through Hydrocracking Units (OHCU) were commissioned at Panipat, Haldia and Mathura refineries with the technologies from M/s.UOP, USA, M/s.Axens, France and M/s.Chevron, USA respectively.

iii. Diesel Hydro-Desulphurisation Technology

Diesel Hydro Desulphurisation Units have been commissioned at Mathura & Panipat refineries with technology from M/s IFP, France and at Gujarat & Haldia refineries with technology from M/s UOP, USA to meet the Diesel quality requirement w.r.t Sulphur.

iv. Diesel Hydrotreatment Technology

Diesel Hydrotreatment Units have been commissioned at Guwahati, Barauni and Digboi refineries with the technology from M/s UOP, USA and at Mathura and Panipat refineries with technology of M/s Axens, France to meet the Diesel quality requirement w.r.t Sulphur and Cetane No. Technology from M/s Axens has been implemented at Gujarat Refinery under Resid Upgradation Project. Technology from M/s Shell Global Solutions, Netherlands has been selected for implementation at Paradip Refinery Project.

v. Fluidised Catalytic Cracking Technology

Fluidised Catalytic Cracking (FCC) technology from M/s UOP, USA has been implemented in Gujarat and Mathura refineries for conversion of Vacuum Gas Oil to LPG, MS and Diesel. Technology from M/s ABB Lummus, USA is under implementation for revamp of FCCU at Mathura Refinery for reliability improvement and maximization of value added Propylene.

vi. Resid Fluidised Catalytic Cracking Technology

The Resid Fluidized Catalytic Cracking (RFCC) technology from M/s S&W, USA has been successfully implemented at Panipat, Haldia and Barauni Refineries.

vii. Catalytic Iso-Dewaxing Unit at Haldia Refinery

For improving the lube oil quality in line with international standards and augmenting production capability, Iso-dewaxing technology from M/s MOBIL, USA has been implemented at Haldia Refinery.

viii. Solvent Dewaxing/Deoiling Technology at Digboi

In order to upgrade the process for production of Paraffin Wax at Digboi Refinery, Solvent dewaxing/deoiling technology from M/s UOP, USA has been implemented.

ix. Hydrofinishing Technology for treatment of Paraffin Wax/ Microcrystalline Wax

Process technology from M/s IFP, France for hydro finishing of paraffin wax has been implemented at Digboi refinery. The same technology from M/s IFP, France for production of Microcrystalline Wax has been implemented at Haldia Refinery.

x. Biturox Technology

To produce various grades of Bitumen as well as to meet the quality requirements, Biturox technology from M/s Porner, Austria has been employed at Gujarat and Mathura Refineries.

xi. Hydrogen Generation Technology

Hydrogen generation technology from M/s Linde, Germany was adopted in 1993 for Hydrogen production and supply to Hydrocraker unit at Gujarat Refinery and has been implemented at Barauni Refinery under MS Quality Improvement Project. Also, Hydrogen generation technology obtained from M/s Haldor Topsoe, Denmark is in operation at Gujarat, Mathura, Haldia, Panipat and Barauni refineries and has been implemented at Gujarat Refinery under Resid Upgradation Project. Technology from M/s UHDE, Germany has been selected through BOO operator M/s Prax Air, USA at Paradip Refinery Project. Similar technology from M/s KTI, the Netherlands has been implemented for Hydrogen generation at Guwahati, Digboi, and Mathura refineries and has been commissioned at Haldia Refinery under Once through HydroCracker Project. Hydrogen generation technology from M/s Technip Benelux B.V, the Netherlands has been implemented at Bongaigaon Refinery under Diesel Quality improvement project.

xii. Sulphur Recovery Technologies for reduction of SO2 emissions

Refineries at Gujarat, Haldia, Mathura and Barauni are provided with Sulphur Recovery Technology from M/s Stork Comprimo (now Jacob), the Netherlands. The Sulphur recovery technology from M/s Delta Hudson, Canada has been employed at Panipat refinery. Further, Sulphur recovery technologies from M/s B & V Pritchard, USA has been implemented under Panipat Refinery Expansion Project and has been implemented at Gujarat Refinery under Resid Upgradation Project. The same has also been selected for Paradip Refinery Project. Technology from M/s Technip, KTI, Spain has been implemented at Haldia Refinery under Once through Hydrocracker Project. Technology from M/s Jacobs, the Netherlands is under implementation in additional Sulphur Recovery Unit at Mathura Refinery. Technology from M/s Lurgi, Germany has been selected for Distillate Yield improvement (Coker) project at Haldia Refinery.

xiii. ISOSIV Technology at Guwahati Refinery

For production of unleaded MS at Guwahati Refinery, ISOSIV technology from M/s UOP, USA has been implemented.

xiv. Delayed Coker Technology

For bottom of the barrel upgradation, Coker technology from M/s ABB Lummus, USA has been implemented at Panipat Refinery as a part of the Panipat Refinery Expansion Project. Coker Technology from M/s Foster Wheeler, USA has also been implemented at Gujarat Refinery under Resid Upgradation Project and selected for at Paradip Refinery Project as well as at Haldia Refinery under distillate yield improvement project.

xv. VGO Hydrotreatment Technology

Technology from M/s.UOP, USA has been implemented at Gujarat Refinery under Resid Upgradation Project and Technology from M/s Axens, France has been selected for Paradip Refinery.

xvi. Continuous Catalytic Reforming Technology

For improvement in Octane number of Motor Spirit, Continuous Catalytic reforming technology from M/s IFP, France has been implemented at Mathura and Panipat refineries. Technology from M/s UOP, USA has been implemented at Gujarat Refinery under MS Quality Upgradation Project and has also been selected for implementation at Paradip Refinery Project.

xvii. Technology for Para -Xylene

For production of Para-Xylene at Panipat, technologies from M/s UOP, USA have been implemented and same have been selected for Paradip Refinery Project.

xviii. Technology for Purified Terephthalic Acid (PTA)

For production of PTA at Panipat Refinery, technology from M/s Du Pont, USA has been implemented.

xix. Technology for Linear Alkyl Benzene (LAB)

Technology from M/s UOP, USA has been implemented for production of Linear Alkyl Benzene at Gujarat Refinery.

xx. MS Quality Upgradation Technology

For MS quality upgradation, Isomerisation technology of M/s UOP, USA has been implemented at Mathura, Panipat and Gujarat Refineries. Technology from M/s Axens, France has been implemented at Haldia, Guwahati, Digboi and Barauni refineries.

FCC Gasoline desulphurization technology (Prime-G) from M/s Axens, France has been employed at Haldia, Mathura, Panipat and Barauni Refineries.

xxi. Naphtha Cracker Technology

Naphtha Cracker Technology from M/s ABB Lummus, USA has been deployed at Panipat Refinery. Technologies from M/s.Basell, Italy, M/s Basell, Germany, M/s Nova Chemicals, Canada & Scientific Design, USA have been implemented for various downstream polymer plants viz. Poly-Propylene (PP) Unit, HDPE unit, Swing Unit (HDPE/LLDPE) and MEG Unit respectively.

Technology from M/s Basell, Italy has been selected at Paradip Refinery Project for production of Poly-Propylene (PP).

xxii. Alkylation Technology

For production of MS, Alkylation technology from Exxon Mobil, USA has been selected for implementation at Paradip Refinery Project.

xxiii. Ethyl Benzene/Styrene Technology

For production Ethyl Benzene/Styrene, technology from M/s ABB Lummus, USA has been selected for implementation at Paradip Refinery Project.

xxiv. Regenerative type Flue Gas De-Sulphurisation Technology

In order to recover Sulphur Di-Oxide from Boiler flue gases a Regenerative type Flue gas De-Sulphurisation technology from M/s Cansolv Technology Incorporate (CTI), Canada, has been selected for implementation at Paradip Refinery Project.

xxv. Spent Acid Regeneration Technology

In order to regenerate fresh sulphuric acid from spent sulphuric acid recovered from Alkylation Unit a Spent Acid Regeneration technology from M/s MECS, USA has been selected for implementation at Paradip Refinery Project.

xxvi. ATF Treatment Technology

ATF Treatment Technology from M/s UOP, USA has been implemented at Gujarat Refinery. Technology from M/s Merichem, USA has been selected for Paradip Refinery Project.

xxvii. LPG Treatment Technology

Coker LPG Treatment technology from M/s UOP, USA has been selected for implementation at Haldia Refinery under the distillate yield improvement (Coker) project.

xxviii. Coker Gas Oil Hydrotreatment Technology

Coker Gas Oil Hydrotreatment Technology from M/s Axens, France has been selected for implementation at Haldia Refinery under the distillate yield improvement (Coker) project.

B. Indigenous Technology

i. INDMAX Technology

INDMAX technology developed in-house by IOC(R&D Centre) for converting heavy distillate and residue into LPG/light distillate products has been implemented successfully at Guwahati Refinery and has been selected for implementation at Bongaigaon Refinery. For production of petro-chemical feedstocks viz. Ethylene, Propylene from VGO, INDMAX technology has been selected for implementation at Paradip Refinery Project.

ii. Hexane Hydrogenation Technology

Hexane Hydrogenation process for production of Food grade Hexane (WHO grade quality), developed by IOC (R&D Centre) with indigenous catalyst has been successfully implemented at Gujarat Refinery.

iii. Diesel Hydrotreatment Technology

Diesel Hydrotreatment technology developed by IOC (R&D Centre) and licensed jointly with EIL is under implementation at Bongaigaon Refinery for meeting Diesel quality requirements.

iv. Isomerisation Technology

Isomerisation Technology developed by IOC (R&D Centre) and licensed jointly with EIL is under implementation at Bongaigaon Refinery for meeting MS quality requirements.

MODERNISATION OF INSTRUMENTATION & CONTROL

DISTRIBUTED DIGITAL CONTROL SYSTEM (DDCS)

DDCS has already been implemented and commissioned in all Process Units and Captive Power Plants of all Refineries. Also, all the new units already commissioned and planned in future have been / will be provided with DDCS.

ADVANCED PROCESS CONTROL (APC)

Model based Multi-variable Predictive Advanced Process Control Systems (APC) have been implemented in the various units of the Refineries.

A New Key Performance Index (KPI) based Methodology of APC Benefit assessment based on controller-wise, variable-wise on-stream factors and average values of controlled variables was devised and finalised in Apr' 10 jointly by IOCL and M/s HAIL. Accordingly, KPI based templates have been developed for all existing APC controllers across IOCL and are being used for monitoring realistic APC benefit on regular basis.

OFFSITE MODERNISATION

As a part of modernisation of Oil Movement & Storage (OM&S) facilities, the following have already been implemented:

- Automation of Tank Wagon loading at Barauni, Gujarat, Mathura and Haldia Refineries.
- Automation of Tank Truck Loading at Gujarat and Haldia Refineries.
- Blending Automation at Haldia, Mathura, Barauni and Panipat Refineries.
- Auto Tank gauging has been completed at all refineries.

AUTOMATION OF LABORATORIES

Automation of Laboratories has been completed at all refineries.

Networking & Real Time Data Base Management System (RTDBMS)

- Networking of units and offsite facilities has been completed at all refineries.
- RTDBMS has been implemented at all refineries and are in operation.
- DRYA (Data Reconciliation and Yield Accounting Package), implemented in all refineries for working out accurate Daily Production Balance using real time process data.
- PS (Production Scheduling) implemented at Gujarat and Panipat Refineries.

SC/ST/OBC REPORT - I

Annual Statement showing the representation of SCs, STs and OBCs as on 1st January 2011and number of appointments made during the preceding calender year

Name of the Public Enterprise: Indian Oil Corporation Ltd.

Groups	Representation of SCs/STs/OBCs (As on 01.01.2011)				Number of appointments made during the calendar year 2010									
					By Direct Recruitment				By Promotion			By Deputation/Absorption		
	Total No. of Employees	SCs	STs	OBCs	Total	SCs	STs	OBCs	Total	SCs	STs	Total	SCs	STs
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	14644	2395	987	1408	518	73	28	135	304	52	27	0	0	0
B	6369	1054	549	137	No recruitment is made in this Group				549	134	38	0	0	0
C	13096	2687	1031	1542	405	66	19	118	42	10	2	8	0	0
D (Excluding Sweeper)	244	54	26	48	17	3	0	2	0	0	0	3	0	0
D (Sweeper)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**34353**	**6190**	**2593**	**3135**	**940**	**142**	**47**	**255**	**895**	**196**	**67**	**11**	**0**	**0**

SC/ST/OBC REPORT - II

Annual Statement showing the representation of SCs, STs and OBCs in various group A services as on 1st January 2011 and number of appointments made in the service in various grades in the preceding calender year

Name of the Public Enterprise: Indian Oil Corporation Ltd.

Pay Scale (in ₹)	Representation of SCs/STs/OBCs (As on 1.1.2011)				Number of appointments made during the calendar year 2010									
					By Direct Recruitment				By Promotion			By Deputation/Absorption		
	Total No. of Employees	SCs	STs	OBCs	Total	SCs	STs	OBCs	Total	SCs	STs	Total	SCs	STs
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
24,900-50,500	4314	650	293	722	518	73	28	135	286	51	24	0	0	0
27,600-50,500	2697	421	184	335	No recruitment is made in this Group.				682	116	55	0	0	0
32,900-58,000	2915	562	203	276	No recruitment is made in this Group.				637	115	58	2	0	0
36,600-62,000	1652	338	148	59	No recruitment is made in this Group.				370	86	45	0	0	0
43,200-66,000	1276	241	108	7	No recruitment is made in this Group.				256	54	14	0	0	0
51,300-73,000	1101	140	44	5	No recruitment is made in this Group.				219	38	14	0	0	0
51,300-73,000	478	34	7	3	No recruitment is made in this Group.				95	8	0	0	0	0
51,300-73,000	144	7	0	1	No recruitment is made in this Group.				40	1	0	0	0	0
62,000-80,000	67	2	0	0	No recruitment is made in this Group.				19	0	0	0	0	0
G. Total	**14644**	**2395**	**987**	**1408**	**518**	**73**	**28**	**135**	**2604**	**469**	**210**	**2**	**0**	**0**